Academic Program Review
Panel Report

A.S. in Pre-Science

August, 2017

Table of Contents

Membership of the Program Review Panel

Chair:.....Joe Lipar

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Program Name and History

Program Name

This document pertains to the Associate of Science degree in Pre-Science at Ferris State University.

Program History

While investigating the history of this program, I was surprised to find that the origins of this program date back to the 1940's, at a time when the College of Arts and Sciences served solely as a provider of general education courses. Since that time the program has evolved to meet the needs of the students in the college; for the past 20 years or so it has served in several capacities:

1) The Pre-Science A.S. program serves as an "introductory" program for incoming students that are interested in a natural science-based program but who either are not ready to choose a specific field of study or do not meet the entrance requirements to begin the typical first year combination of mathematics, biology, and chemistry classes. After fulfilling the entrance requirements (generally mathematics courses), these students are moved into an academic program that matches that of their career goals (Chemistry, Biochemistry, or the Biological Sciences) and then are placed into the typical first year course sequence of math, biology, and chemistry. Identifying these students as pre-science, as opposed to placing them in a General Studies or Career Exploration program, is also very helpful from an advising perspective, as the designation as a pre-science student serves as a useful delineating tool that can be used by professional advisors to more closely monitor the progress of those students during the early stages of their studies at Ferris.

2) The Pre-Science A.S. program is a primary program for those students who are seeking one of the natural-science related Bachelor's level programs (BIPM, BIPO, CHEM, etc.) but also qualify for the Tuition Incentive Program (TIP). To receive TIP funding, students must be enrolled in an associate program or certificate.

3) As a way to more accurately portray graduation rate metrics. Currently, some pre-professional students enter Ferris and are subsequently accepted into their professional school of interest without completing their Bachelor's degree. Often, these pre-professional students can earn an Associate in Science (Pre-Science) while completing their undergraduate coursework, which allows Ferris to count these students as graduates of a program.

During the 2015/16 and 2016/17 academic years, long term discussions regarding this program occurred, involving members of the Department of Biological Sciences and the Department of Physical Sciences. These discussions were spurred, in part, by the fact that the format of the curriculum for the program was such that specific science and math courses were not identified on the checksheet, and this was causing difficulty for students who receive TIP funding, insomuch as state auditors were tightening their interpretation of how TIP funding should be allocated and decided that it would not be awarded unless courses were specified on the checksheet. This allowed for greater discussions of the purpose of the program, which courses really should be included, etc. In addition, the committee that was working on this also suggested a change of name. Indeed, an entire new program, an A.S. in Natural Science, was proposed and subsequently approved by the University Curriculum Committee and will largely replace the Pre-Science program starting in the Fall of 2017. More details can be found later in this document.

Program Mission

Ferris State University Mission Statement

Ferris State University prepares students for successful careers, responsible citizenship, and lifelong learning. Through its many partnerships and its career-oriented, broad-based education, Ferris serves our rapidly changing global economy and society.

College of Arts and Sciences Mission Statement

Through academic programs, general education, and outreach activities, the College of Arts and Sciences provides a learning-centered education that prepares students to contribute to a complex and diverse world.

A.S. Pre-Science Program Mission Statement

The A.S. Pre-Science program does not have an official mission statement. The development of a statement will be one of the goals for the program for the upcoming program review cycle.

Incorporating the Mission

Although an official mission statement for this program does not currently exist, one would expect that such a statement would focus on the attainment of foundational knowledge and the development of observational, analytical, and critical thinking skills. In this sense, the focus of the program would be highly aligned with the mission of the College of Arts and Sciences, whose statement is focused on a learning-centered education that prepares students for a complex and diverse world, and with the mission of Ferris State University, whose statement is focused on preparing students for successful careers, responsible citizenship, and lifelong learning.

In providing the necessary scientific skills and knowledge, the program helps to prepare students for entry into a Bachelor's-level program, from which they can further develop the skills necessary to eventually enter the workplace.

Program Goals

Overall Goals of the Program

The overall goal of the A.S. Pre-Science program has been to provide a solid foundation of scientific knowledge and to allow for the development of observational and analytical skills so that, after two years of study, students are well-prepared to enter into a baccalaureate program in the sciences (e.g. Biology, Chemistry, Biochemistry). Unfortunately, a strategic plan does not currently exist for this program. Indeed, one of the future goals for the program is to develop a strategic plan that can guide future actions related to the program.

Specific Goals of the Program

The last (and only) program review for the A.S. Pre-Science program occurred in the Fall of 2009, when it was incorporated into a report for a number of "pre-professional" programs, including Pre-Pharmacy, Pre-Mortuary Science, and Pre-Engineering. At that time, specific goals for this program were not outlined. Therefore, we are unable to assess progress against a clearly-defined set of goals.

One of the major accomplishments during this past cycle has been the complete revision of the A.S. Pre-Science curriculum into a new curriculum that is called A.S. Natural Science. Details can be found in the next section. We believe that this revision provides more structure for the students who are enrolled in the program, and it also provides academic advisors with a curriculum guide that is clear and flexible.

Future Goals

The list below represents specific goals for the program. The achievement of these goals would lead to a stronger program overall and will ensure that students are being well-prepared for future academic endeavors.

- Implement an "Oversight Committee", composed of members of the Biological Sciences Department and the Physical Sciences Department, that will be responsible for overseeing all actions related to the program, including assessment, future program reviews, and curriculum modification/development.
- Carry out ongoing program-level assessment.
- Create a strategic plan for the program.
- Create a mission statement for the program.
- Create a greater awareness of and connection to the program for faculty in the Biological Sciences Department and the Physical Sciences Department.

Curriculum

Program Check sheets – Program checksheets for both the A.S. Pre-Science and the newly-created A.S. Natural Science can be found at the end of the report. **[See Appendix A]**

Course Syllabi – Course syllabi are also at the end of the report**. [See Appendix B]**

Program Policies and Procedures – Because this program is equally connected to both the Department of Biological Sciences and the Department of Physical Sciences, oversight of the curriculum has been jointly assumed by those two departments. For example, the recent curricular changes that are described below were initiated by a subcommittee consisting of members of both departments, discussed in joint department meetings, and eventually approved jointly.

There are currently two professional advisors in the college who work primarily with students in science programs, including this program. They fully understand the needs of

the students as they relate to the curriculum and to extra-curricular activities, and they facilitate seamless transitions in baccalaureate programs as much as possible. These professional advisors also serve as the primary communicators of program requirement information to both prospective and current students.

Experiential Education – Internships or other similar learning experiences are not required for this program. However, the professional advisors tend to treat students in this program as if they were already enrolled in their baccalaureate curriculum, particularly with respect to gaining experience through job-shadowing, research experiences, etc. In other words, we think it is important for students to gain practical experience and explore their career options through job shadowing and other similar experiences, and we think that they should not wait until their third year to do so. As with all students in the sciences, the importance of practical experiences and extracurricular activities is stressed by the professional advisors and by faculty associated with the program. The exact nature of these experiences depends upon the academic and career pathways that the individual students hope to follow.

Recent Curricular Changes – Since the last academic program review, one curriculum proposal for the A.S. Pre-Science program has been submitted and approved. This curriculum proposal made several modifications to the program, including a change of name, to create a new A.S. Natural Science degree. (Currently, both the A.S. Pre-Science and the A.S. Natural Science exist; it is expected that the A.S. Pre-Science program will be eliminated in the near future.)

While the long-standing A.S. Pre-Science program had been adequate for the needs of the students, there were two main reasons why a modified curriculum was created.

1) Ferris State University was recently audited by the State of Michigan with respect to administration of TIP funding and was found to be out of compliance with some requirements of the program. One of the major areas of noncompliance was with respect to the TIP requirement that in order for a student to receive full TIP funding, any courses taken must be specified on a program checksheet for an associate's degree or certificate. The long-standing A.S. Pre-Science program checksheet was incredibly generic, with no specific course requirements listed in the Scientific Understanding and Mathematics or Electives sections of the checksheet. The redirection to an Associate in Science in Natural Science program with more specific course requirements will allow TIP eligible students to continue to receive TIP funding.

2) The "Pre-Science" title for the program was quite vague. There are many types of "science" including natural science, political science, social science, etc. This

program has traditionally been used for students interested in pursuing a career in the natural sciences, so the name of the program should reflect this fact.

In short, courses that were included on the new A.S. Natural Science checksheet were those courses that were typically taken by students enrolled in the A.S. Pre-Science program, even though those courses were not specified. All of these courses are also included on at least some of the checksheets for the B.S. Biology, B.A. Chemistry, and B.A. Biochemistry programs. In other words, the course requirements for the new A.S. Natural Science program will not be significantly different from those of the A.S. Pre-Science program; the course requirements will just now be specifically listed on the checksheet. No new courses were created for inclusion in the A.S. Natural Science program.

In addition, the number of credits required in science and math classes was changed from a minimum of 20 credits in science and mathematics classes to a requirement of 29-30 credits in biology/chemistry/physics/geology classes and a requirement of 3-4 credits in mathematics classes. This allows for a more robust science/mathematics background should a student elect to earn an associate's degree but not move into a baccalaureate-level program.

Although most students will continue into a baccalaureate program, we believe that completion of the A.S. Natural Science program may allow students to find entry-level employment in some fields of science, especially basic laboratory work.

No other curricular changes are currently under consideration.

Assessment of Student Learning

The systematic collection, review, and use of information to improve course delivery and enhance learning is an essential component of the educational process. This assessment is important because it tells us what and how much students are learning. It also provide insight into how the program might be modified. Program-level assessment for the A.S. Pre-Science program is, in general, lacking. However, as part of a college-wide effort within the College of Arts and Sciences, begun in the Fall of 2016, program-level assessment for this program has begun and will continue going forward. As a part of this process, this program, and all others in the college, have been following the timelines presented below.

1. December 1st, 2016 - Develop Student Learning Outcomes (SLOs) for the program.

2. January 31st, 2017 – Choose a total of 6-8 courses per program that all students take.

3. February 28th, 2017 - Map each SLO to the 6-8 courses that were selected and determine whether the SLO is "Introduced", "Reinforced", or "Mastered" during this class.

4. March 31st, 2017 – Develop a timeline for assessment, understanding that we don't have to assess every SLO every semester in every class. It should take about three years for all of the SLO's to be assessed in each appropriate class.

5. August 31st, 2017 (For classes to be assessed in Fall 2017) – A plan for which measurements will be used to assess program outcomes in the courses mapped for this fall should be prepared. Data collection will occur during the semester.

Step #1 has been completed, and the program outcomes are presented below. With respect to step #2, there are actually no courses that are guaranteed to be taken by all students in the A.S. Natural Science program. However, there are a number of courses that will likely be taken by a vast majority of students enrolled in the program. These include BIOL 121/122, CHEM 121/122, BIOL 321/322, and CHEM 321/322. These courses will be the focus of program assessment. With respect to step #3, a curriculum map is presented below. Please note that because this is an associate's degree-granting program, outcomes are either "Introduced" or "Reinforced" as opposed to "Mastered". A timetable for assessment (step #4) is also presented below.

Student Learning Outcomes

Prior to the 2016/2017 academic year, official program outcomes for the A.S. Pre-Science program did not exist. The newly-developed A.S. Natural Science program has six defined student learning outcomes, presented below, which have been approved jointly by the Department of Biology and the Department of Physical Sciences.

1. Graduates will explain major concepts in the natural sciences.

2. Graduates will apply natural science theories or principles to analyze and solve problems.

3. Graduates will utilize the scientific method to investigate problems of the natural sciences.

4. Graduates will perform laboratory and field techniques appropriate for the natural sciences.

5. Graduates will collaborate in various team settings.

6. Graduates will clearly communicate scientific information in both written and oral forms.

Curriculum Map

The courses most likely to be taken by students in the A.S. Natural Science program were mapped onto the course outcomes. Please note that because this is an associate's degree-granting program, most outcomes are either "Introduced" or "Reinforced" as opposed to "Mastered".

Courses Commonly Taken by Students in **A.S. Natural Science**	**BIOL 121** General Biology 1	**BIOL 122** General Biology 2	**CHEM 121** General Chemistry 1	**CHEM 122** General Chemistry 2	**BIOL 321** Human Physiology and Anatomy 1	**BIOL 322** Human Physiology and Anatomy 2	**CHEM 321** Organic Chemistry 1	**CHEM 322** Organic Chemistry 2
Graduates will explain major concepts in the natural sciences.	I	I	I	I	R	M	R	M
Graduates will apply natural science theories or principles to analyze and solve problems.	I	I	I	I	R	R	R	R
Graduates will formulate hypotheses, make careful observations, analyze data, and draw conclusions.	I	I	I	I	R	R	R	M
Graduates will be proficient in laboratory and field techniques appropriate for their discipline.	I	I	I	I	R	M	R	M
Graduates will collaborate in various team settings.	I	I	I	I	R	R	R	R
Graduates will clearly communicate scientific information in both written and oral forms.	I	I	I	I	R	R	R	R

Timeline for Assessment

A timeline for assessment of program outcomes is presented here. Multiple assessment points have been identified for each outcome.

	SLO #1	SLO #2	SLO #3	SLO #4	SLO #5	SLO #6
Fall 2017	BIOL 121		CHEM 121		BIOL 321	CHEM 321
Spring 2018		BIOL 122		CHEM 122	BIOL 322	CHEM 322
Fall 2018	BIOL 321	CHEM 321	BIOL 121		CHEM 121	
Spring 2019	BIOL 322	CHEM 322		BIOL 122		CHEM 122
Fall 2019	CHEM 121		BIOL 321	CHEM 321	BIOL 121	
Spring 2020		CHEM 122	BIOL 322	CHEM 322		BIOL 122

Evaluation of Program Assessment

Prior to the current efforts, little in the way of program-level assessment had occurred. The courses that are taken by students in this program are, for the most part, integral components of other baccalaureate-level programs. As such, improvements and changes to those courses have come about due to course-level assessment and to program-level assessment for those programs. The fact that not all students enrolled in the courses identified in this assessment plan will not be A.S. Natural Science students (indeed, most of them will not be), the connection between the data gathered and eventual, potential modifications to the A.S. Natural Science program will be complex.

Program Profile

Applications, Admits, and Enrolled

Number of Applications to Program				
2012/13	2013/14	2014/15	2015/16	2016/17
198	182	271	259	295

Number of Students Admitted to Program				
2012/13	2013/14	2014/15	2015/16	2016/17

163	158	252	238	272

Number of Students Enrolled into Program				
2012/13	2013/14	2014/15	2015/16	2016/17
NA	NA	68	66	72

The number of applications to the program and the number of students admitted to the program appears to have increased over the past five years. The percentage of applicants who are admitted also increased over that time span from 82% to 92%. For the three years that data were available, approximately 27% of applicants that were admitted actually enrolled in the program.

Compared to many programs on campus, interest in this program appears to be relatively high. This corresponds to the popularity of the Biology, Chemistry/Biochemistry, and Pre-Pharmacy programs on our campus.

Enrollment – Headcounts

Students Enrolled in Major				
2012/13	2013/14	2014/15	2015/16	2016/17
102	82	106	135	162

Note: All students in the A.S. Pre-Science program are on-campus students.

Total headcounts for this program have increased during the past five years. This can be attributed to a variety of factors, including a) an increase in the need for financial aid, including TIP funding, for incoming students, b) an increase in the number of students who may not automatically qualify to be enrolled in a baccalaureate-level program in the sciences due to their incoming mathematics placement, c) an increase in the transfer GPA required for students to enroll directly in BIBS (Bachelor of Science in Biology) programs, and d) closure of the A.S. Pre-Mortuary Science program during the last five-year period.

There is not a desire at this time to try to increase enrollment numbers. Existing facilities and resources could accommodate increases should they occur.

Student Credit Hour Trends

Productivity data were not available for this program in the documents provided by Institutional Research and Testing.

Productivity

Student credit hour data were not available for this program in the documents provided by Institutional Research and Testing. In reality, productivity for this program would be directly linked to productivity data for particular courses offered by the Department of Biological Sciences and the Department of Physical Sciences.

Enrollment – Residency

Students Enrolled in Major – Residents vs. Non-residents									
2012/13		2013/14		2014/15		2015/16		2016/17	
99	3	81	1	103	3	128	7	154	8

Overwhelmingly, the students enrolled in this program (96.2%) are residents of Michigan. We do not anticipate that this will change in the future, as Ferris State is a regional state university that is most attractive to students in our area.

Students Enrolled in Major – Average Age				
2012/13	2013/14	2014/15	2015/16	2016/17
18	18	18	18	18

The low average age of students in this program is not surprising, as most students spend only one or two years in the program before moving on to a baccalaureate-level program. The data also indicate that most of the students are of a traditional college age and that there are not many non-traditional students with respect to age.

Students Enrolled in Major – Average GPA				
2012/13	2013/14	2014/15	2015/16	2016/17
2.84	3.01	3.03	3.00	3.01

There do not appear to be any surprises here, with fairly middling GPA averages. There appears to be an increase in average GPA from 2012/13 to 2016/17. However, we have not performed a statistical analysis to determine if these changes are statistically significant.

Students Enrolled in Major – Average ACT				
2012/13	2013/14	2014/15	2015/16	2016/17
21.94	22.06	22.23	21.32	21.94

The average ACT scores of students enrolled in the program appears to have remained fairly consistent over the last five-year period.

Enrollment – Gender and Ethnicity

Students Enrolled in Major – Females vs. Males									
2012/13		2013/14		2014/15		2015/16		2016/17	
67	35	56	26	78	28	95	40	108	54

The data indicate that the majority (68%) of enrolled students are female, the relative numbers remained consistent over this five-year period. This is a trend that has been seen

in undergraduate science programs across the country, so it is not unexpected. This is not something that will be addressed at this time.

Students Enrolled in Major – White vs. Non-white									
2012/13		2013/14		2014/15		2015/16		2016/17	
75	22	63	12	78	16	99	23	108	40

(For this table, we have combined the data for Black, Hispanic, Native, Asian, and Hawaiian and labeled them as Non-White. This was due to the low numbers of students in each of those individual categories.) The percentage of non-white students for each year of this review was 22.7%, 16.0%, 17.0%, 18.0%, and 27.0%. A program review of baccalaureate programs in the Biology Department from two years ago yielded percentages that ranges from 10% to 12%. This indicates that there are greater numbers of minorities, relatively speaking, in the A.S. Pre-Science program. Discussions regarding this trend should occur.

Students Enrolled in Major – Full-time vs. Part-time									
2012/13		2013/14		2014/15		2015/16		2016/17	
101	1	81	1	103	3	130	5	161	1

The data indicate that the overwhelming majority of students in the program are full-time students. No efforts in this area seem to be warranted.

Retention

Retention of Students to Second Year				
2012/13	2013/14	2014/15	2015/16	2016/17
60%	82%	72%	69%	NA

Although there is some variability, the retention rates of students in this program from their first to second year appears to be quite high. This is due, in part, to the fact that many students are enrolled in the program because they receive TIP funding, which requires them to be enrolled in an associate's program for their first two years. Any improvements in retention will come as a result of departmental, college-wide, and university-wide retention efforts.

Retention of students is a real concern for all programs on campus, both for the sake of the students and the health of the programs in general. One of the goals of the College of Arts and Sciences is to improve retention in all programs. This program will therefore be involved in efforts by the college to improve retention. Specific strategies have not yet been outlined.

For students in this program, we use an advising model where all freshmen, sophomores, and new transfer students are advised by professional advisors. This allows for more consistent and complete advising for our students (and the potential for more attention), all of which can contribute to increased retention.

Program Graduates

Note: All graduates are on-campus only.

Historically, the six-year graduation rate for this program has ranged from about 20% to about 35%. These numbers are quite low, but in fact are artificial in nature. Most students who are in the A.S. Pre-Science program will transfer to a baccalaureate program at some point, and many do so by simply changing their major. Most of them do not take the time to apply for graduation from their A.S. program. The College of Arts and Sciences has, on several occasions, tried to campaign for students to apply for graduation from associate's programs, but the efforts have not been entirely successful.

Graduate Average GPA

Average FSU GPA of Graduates				
2012/13	2013/14	2014/15	2015/16	2016/17
2.96	3.21	3.35	NA	2.92

The average GPA for graduates has not appeared to increase or decrease over time. There is variability from year to year, but there are no discernible trends. Nothing here seems to warrant action of any kind.

Graduate Average ACT

Average ACT of Enrolled Students				
2012/13	2013/14	2014/15	2015/16	2016/17
21.94	22.06	22.23	21.32	21.94

The average ACT is newly-enrolled students appears to have remained consistent over this five-year period.

Average ACT of Program Graduates				
2012/13	2013/14	2014/15	2015/16	2016/17
21	24	24	25	24

The average ACT of graduates is comparable, or even higher than, the average ACT of students enrolled in baccalaureate programs in biology. This reflects the fact that the A.S. Pre-Science program contains many students who would otherwise be enrolled in bachelor's-degree granting programs if the TIP program did not require them to enrolled in an associate's program.

In most cases, the average ACT of graduates is higher than that of the ACT of newly-enrolled students. This is an expected result, as those with lower incoming ACT scores are less likely to see success at the college level.

State and National Examinations – Students in this program are not required to take state or national examinations, and we do not keep track of those that eventually take entrance examinations for admittance into graduate or professional schools.

Program Value beyond Productivity and Enrollment Numbers

The real value of the A.S. Pre-Science program lies in the fact that it provides students who may not have a particularly strong background in the sciences an alternative to starting directly in a baccalaureate program. This program also provides a "resting place" for students who receive TIP funding and must therefore be enrolled in an associate's program.

Because the A.S. Pre-Science program is intimately related to programs in the Department of Biological Sciences and the Department of Physical Sciences, the value of the program is tied to the faculty and facilities of those departments. Faculty who teach courses in this program bring benefits to the university by teaching service courses, teaching general education courses, being present on committees, and supporting RSO's, among other things. These individuals may also provide benefits to off-campus entities by serving as judges at science fairs and presenting public lectures, for example.

Program Flexibility and Access

Currently, the courses that are listed as options in the major (on the new Natural Sciences checksheet) are not offered online, and they are not offered at remote locations. Most of the science courses include laboratories, which does not allow them to be taught online in an effective manner. Typically, courses are not offered on the weekend. Although some laboratory sections may be offered in the evening hours, there are not enough options for someone to work full-time during the day and take classes at night.

The program itself is highly flexible, insomuch as students can choose from a wide variety of course options to fulfill the major requirements. This allows for ease of entry into the program for transfer students, as well. The flexibility allows students to modify the courses they take to best support their transition into a baccalaureate program.

Visibility and Distinctiveness

The A.S. Pre-Science program is distinctive for the two reasons that have been repeatedly mentioned in this document. 1) The Pre-Science A.S. program serves as an "introductory" program for incoming students that are interested in a natural science-based program but who either are not ready to choose a specific field of study or do not meet the entrance requirements to begin the typical first year combination of mathematics, biology, and chemistry classes. 2) The Pre-Science A.S. program is a primary program for those students

who are seeking one of the natural-science related Bachelor's level programs (BIPM, BIPO, CHEM, etc.) but also qualify for the Tuition Incentive Program (TIP). To receive TIP funding, students must be enrolled in an associate program or certificate.

Most of the program courses are taught by tenured and tenure-track faculty members. Some lecture courses may be of a moderate size (~100), but the majority of the program courses have a low student-to-teacher ratio, with cap sizes of 24 or less. In addition, most of the courses in the program are taught with labs; this allows the students a greater degree of hands-on participation.

Nearly all universities will have biology and chemistry programs, and each will have their own structure for those students who may need some additional introductory coursework before starting in the major proper. Ferris is unique amongst four-year institutions in the state in that the others do not receive TIP funding for students. Those other institutions would therefore not have a need for a "holding degree" for TIP students.

Demand

Again, students enroll in the A.S. Pre-Science program because a) they either have not decided on a baccalaureate program or because they do not yet qualify to begin the entry-level courses in those programs, or b) because they must enroll in an associate's program because they receive TIP funding as part of their financial aid package.

Because students in this program do not typically feed directly into the job market, but rather move directly into baccalaureate programs, a market analysis of demand for graduates is not directly relevant.

Overall, demand for the program has been increasing, as evidenced by the enrollment numbers provided above. This has been driven by a number of factors, including a) an increase in the need for financial aid, including TIP funding, for incoming students, b) an increase in the number of students who may not automatically qualify to be enrolled in a baccalaureate-level program in the sciences due to their incoming mathematics placement, c) an increase in the transfer GPA required for students to enroll directly in BIBS (Bachelor of Science in Biology) programs, and d) closure of the A.S. Pre-Mortuary Science program during the last five-year period.

Student Achievement

Students who are enrolled in the A.S. Pre-Science program have a strong relationship with their academic advisor. However, faculty in the Biological Sciences and Physical Sciences Departments really do not have a strong connection to the A.S. Pre-Science program, even though they would have connections to the students enrolled in their courses. Students who are enrolled in this program due to TIP requirements really identify with their eventual baccalaureate program, and they are treated as such by advisors and faculty.

Unfortunately, this all leads to the fact that records regarding student achievement beyond the classroom have not been recorded over time. Of course, in both departments student success and achievement is a top priority. Faculty members try to provide students with the appropriate educational background in the classroom, and they also try to encourage and engage our students in activities outside of the classroom. Many of these outside activities help the students become successful in the careers that they desire. These activities include (but are not limited to) participation in RSO's on campus, membership in the Honor's Program, research experiences, job-shadowing, and participation in other community and volunteer services.

Employability of Graduates

In general, the goal of this program is to prepare students for entry into a baccalaureate program; it is not the purpose of this program to prepare students for direct entry into the workforce, although there may be some entry-level opportunities for students with a science-based associate degree.

Faculty Composition and Engagement

Organization – The information presented here is for those faculty members who teach or may teach the courses specifically listed under the Major Requirements for the A.S. Natural Science program who were active during the 2016/2017 academic year. This includes 17 tenure-line or tenured faculty within the Department of Biological Sciences, 15 tenure-line or tenured faculty within the Department of Physical Sciences, 7 adjunct faculty within the Department of Biological Sciences, and 3 adjunct faculty within the Department of Physical Sciences. All of these faculty teach the majority of their load on the Big Rapids campus, and nearly all of them teach the entirety of their load here. The current ratio of tenure-line

faculty to adjunct faculty has remained fairly consistent in these two departments for many years. No changes to the current structure of the faculty are required for this program.

Curriculum Vitae –The CV's for all individuals listed below are included as an appendix to this document. **[see Appendix G]**

Tenure-Line or Tenured Faculty in the Department of Biological Sciences		
Name	Highest Degree Earned	Average Semester Load (FTE)
Dr. Karen Barkel	Ph.D.	1.29
Dr. Daisy Daubert	Ph.D.	1.15
Dr. Christopher DeFraia	Ph.D.	1.00
Dr. Olukemi Fadayomi	Ph.D.	1.10
Dr. Clifton Franklund	Ph.D.	1.27
Dr. David Griffith	Ph.D.	1.18
Dr. Scott Herron	Ph.D.	1.13
Dr. Bradley Isler	Ph.D.	1.26
Dr. Paul Klatt	Ph.D.	1.20
Dr. Roger Mitchell	Ph.D.	1.07
Dr. Mary Murnik	Ph.D.	1.04
Dr. Michael Ryan	Ph.D.	1.18
Dr. James Scott	Ph.D.	1.10
Dr. Anne Spain	Ph.D.	1.06

Dr. Christopher Westerkamp	Ph.D.	1.10
Dr. Changqi Zhu	Ph.D.	1.06
Dr. Mary Zimmer	Ph.D.	1.10

Adjunct Faculty in the Department of Biological Sciences		
Name	Highest Degree Earned	Average Semester Load (FTE)
Kim Andrus	M.S.	0.78
Cindy Fitzwilliams-Heck	M.S.	1.01
John Johnson	M.S.	1.10
Dr. Gary Miller	Ph.D.	1.11
Dr. Schuyler Pike	Ph.D.	1.00
Anna Rizzo	B.S.	1.14
Dr. Doug Workman	Ph.D.	0.90

Tenure-Line or Tenured Faculty in the Department of Physical Sciences		
Name	Highest Degree Earned	Average Semester Load (FTE)
Dr. Daniel Adsmond	Ph.D.	1.07
Dr. Charles Bacon	Ph.D.	1.10
Dr. Peter Balanda	Ph.D.	1.09

Dr. Thomas Brennan	Ph.D.	1.10
Dr. Kim Colvert	Ph.D.	1.07
Dr. Jeffrey Christafferson	Ph.D.	1.05
Dr. Pasquale DiRaddo	Ph.D.	1.26
Dr. Fred Heck	Ph.D.	1.07
Dr. William Killian	Ph.D.	1.15
Dr. Yamuna Kollalpitiya	Ph.D.	1.03
Dr. Bo Lou	Ph.D.	1.02
Dr. Colleen Partigianoni	Ph.D.	1.00
Dr. Luis Rivera-Rivera	Ph.D.	1.00
Dr. Prabhakara Shetty	Ph.D.	1.00
Dr. Mark Thomson	Ph.D.	1.05

Adjunct Faculty in the Department of Physical Sciences		
Name	Highest Degree Earned	Average Semester Load (FTE)
Dr. Keith Calkins	Ph.D.	1.05
Dr. Elizabeth Miller	Ph.D.	1.09
James Weaver	M.S.	1.10

Service – The information presented here represents a sample of the service work that is done by members of the Department of Biological Sciences and the Department of Physical Sciences. The members of these two departments are quite active across campus. Information in this section has been obtained primarily from faculty vitae.

- At the departmental level, faculty serve on standing committees such as the Curriculum Committee, Planning Committee, Awards Committee, Faculty Development Committee, Safety Committee, Assessment Committee, and Tenure Review Committee.
- At the department level, faculty actively participate in search committees for faculty and staff positions.
- Faculty serve on advisory boards such as the Biotechnology Advisory Board, the Card Wildlife Education Center Advisory Board, the FSUS Advisory Committee, the Pre-Dental Advisory Committee, and the Pre-Med Advisory Committee.
- Dr. Beth Zimmer serves as the coordinator of the Biology Research Seminar Series.
- At the college level, faculty serve on standing committees such as the Academic Standards and Policies Committee, the Curriculum Committee, the Diversity Committee, the Assessment Committee, the Planning Committee, the Graduate Education Committee, the Promotion and Merit Committee, the Scientific Understanding Committee, the Sabbatical Leave Committee, and the Special Grants Committee. Several individuals have served as chairs of these committees.
- At the college level, faculty have served on search committees for the Dean of the College, the Director of Student Academic Affairs, and other positions.
- At the college level, faculty have participated in events such as Homecoming; the Majors, Minors, and More Expo; student-faculty mixers; and the CAS student recognition event.
- At the university level, faculty have served on Academic Senate; outside academic program review committees (nursing); Senate Health Promotions and Substance Abuse Committee; Senate Student Life Committee (including a term as chair); Senate Academic Standard and Policies Committee; (ad hoc) Student Enrollment Committee; Search Committee for Dean of University Library; Academic Program Review Council, the Institutional Animal Care and Use Committee, Hazardous Substance Abuse and Compliance Committee, Institutional Review Board, Faculty Research Committee, Faculty Development Committee, Honors Advisory Board,

Diverse Workforce Taskforce, University Portfolio Software Assessment Committee, University Diversity Planning Committee, University Assessment Committee, Vice-President of Student Affairs Search Committee, Human Subjects Review Committee, University General Education Writing-Intensive Outcomes Assessment Committee, Ferris Faculty Association Executive Board, Ferris Ad Hoc Title IX Committee, Faculty Senate Ad Hoc Committee on Study Abroad Education, Senate Athletic Advisory Committee, and the Academic Program Review Council.

- Dr. Clifton Franklund had served for three years as the General Education Coordinator.
- Faculty regularly participate in Dawg Days and other recruiting events.
- Faculty have served as faculty advisors to student organizations, including the Biotechnology Student Organization; the Pre-Optometry Club, the Student Affiliate of the American Chemical Society (SAACS), the Pre-Medicine Club, the Pre-Physical Therapy Club, the Pre-Dental Club, the Pre-Pharmacy Club, the Kappa Psi Pharmaceutical Fraternity, Ferris NOW, the Ferris Running Club, and Circle K International.

Research – Examples of research carried out by our tenure-line faculty members. In almost all cases, the research programs focus on providing research experiences for students. This often includes travel by the students to conferences to present their work.

- Dr. Karen Barkel (2015) visited the Smithsonian Marine Station at Carrie Bow Cay in Belize for a research/training experience, with the goal of reinitiating a research program.
- Dr. Daisy Daubert was a visiting scientist at the Oregon Health & Sciences University (Summer 2012) and at the University of Florida (Summer 2013).
- Dr. Christopher DeFraia – "If we are to harness the full potential of plants as a source of food, energy, medicine, and enjoyment we must determine function of their genes. Combining the powerful genetic resources of the model plant *Arabidopsis thaliana* with a novel genetic screening technique, my students and I are characterizing genes of unknown function using genetic, molecular, and bioinformatics techniques. I am currently working with who have had a very successful summer of research, and have determined the biological function of five plant genes. Their newly discovered functions include drought resistance, regulation of leaf shape, chlorophyll production, and flowering time."

- Dr. Anne Spain – "We are working with two soil bacterial strains, *Paenibacillus* sp. A1 and A3, in my lab that are capable of moving across solid surfaces (e.g. the agar surface of growth media in a petri dish) in a highly unusual pattern, which we call "scattering." I have supervised many students on research projects related to this project. Currently, my student, Sarah Mathie, has been investigating the nutritional profile of these isolates. Because of her work, we have come up with the hypothesis that the surface movement behavior of our bacterial isolates might vary depending on the nutrient composition of what they are degrading."
- Dr. Christopher Westerkamp – Carries out research in the area of exercise physiology. Recent student abstracts under his mentorship include the following titles: Phenotype of extraocular muscles from anophthalmic rats. Reliability of the Lactate Threshold in Long Distance Runners. The 30-minute Time Trial as a Predictor of Ventilatory Threshold Running Velocity and Heart Rate. Skeletal Muscle Hyperplasia in Response to Synergist Removal.
- Dr. Changqi Zhu – "My current research project is "The role of Drosophila Activin signaling in aging regulation of adult fruit flies". Shaughna Langerak and Hannah Lamberg have been actively working with me on this research project.
- Dr. Beth Zimmer – Carries out research in the area of neurobiology. Her recent projects have examined the effects of spinal cord injury on learning and memory. Two faculty have had research sabbatical leaves. One was a one-semester leave in organic chemistry; the other was a year-long leave in biochemistry. Upon return from sabbatical, both professors have engaged undergraduate chemistry and biochemistry (and biotechnology) majors in research projects.
- Dan Adsmond has had three publications since 2011, and he has made five conference presentations since 2012 (most involving undergraduate students). He made four invited plenary presentations in Kazan, Russia, and has a further manuscript submitted for publication. He also has sponsored five students over the last three years with research fellowships, and has received released time with a faculty research fellowship for his own research.
- Peter Balanda has had three presentations/publications since 2014. He has supervised two research projects of students in the summer student research fellowship program.
- Kim Colvert has nine presentations since 2012 involving students performing research in biochemistry.
- Pasquale Di Raddo has made five off-campus presentations since 2011. He

sponsored two students with posters in the annual CAS student recognition event.

- David Frank has one publication (in association with Francis Burns) in 2013. He has been a co-author of five presentations since 2013.
- Bill Killian has a poster presentation on the ICT program at a national ACS meeting. He has a published book chapter on Workplace Behavior with Mark Thomson.
- Yamuna Kollalpitiya has one presentation at a Midwest Regional meeting of the American Chemical Society in 2010.
- Mark Thomson has sponsored and supervised the undergraduate research of eight students since 2011. These projects have resulted in eight student/faculty presentations at various venues. He has made five other presentations since 2012. He also has a published book chapter in cooperation with Bill Killian.

Continuing Education –

- Dr. Clifton Franklund – Received a Graduate Certificate in Higher Education Assessment from James Madison University (2015). Also received an Online Certificate in Data Science from Johns Hopkins University (2015).

- Dr. Mary Murnik – Serves as a Test Writer for the Dental Admission Test and the Optometry Admission Test.

- Dr. Christopher Westerkamp – Was a Fulbright Scholar at Health Science University in Mongolia. Peter Balanda attended the 44th National Organic Chemistry Symposium; Integrating Contemplative Practices into the Teaching and Learning Experience; and the 2014 Biennial Conference on Chemical Education.

- Kim Colvert conducts annual (unpaid) research in biochemistry during the summers at labs at the University of Kansas in Lawrence.

- Pasquale Di Raddo attended the latest Biennial Conference on Chemical Education, including a soap-making workshop at the conference.

- David Frank attended the latest Biennial Conference on Chemical Education.

- Yamuna Kollalpitiya is currently conducting work as an FSU Junior Faculty Fellow (sponsored by the faculty center).

- Colleen Partigianoni is the only member of our department to have attended both of the last meetings of the Biennial Conference on Chemical Education.

- Mark Thomson has attended four ACS Leadership Development workshops at national and regional meetings.

- Many faculty have attended workshops and other professional development initiatives sponsored by the Faculty Center for Teaching & Learning.

Stakeholder Perceptions of the Quality and Composition of Faculty – Due to concerns about the privacy of our faculty, we have decided to not include copies of IDEA or SAI forms. This decision is supported by the Dean of the College of Arts and Sciences.

There is, in general, variability amongst our faculty in the scores and comments that they receive from students. Some faculty members consistently receive very high scores, while others tend to receive lower scores. In all cases, the IDEA and SAI forms are reviewed by the department chair, and conversations are held with faculty whenever they receive below-average scores in a course. A plan is developed to try to improve their teaching effectiveness. At times this can occur very quickly, in other cases it is a longer process. Overall, the goal is to improve the quality of instruction in the department. For new faculty, conversations are held for all courses for at least two full years after they begin teaching, and often for longer than that if warranted. This process appears to be useful for the faculty in general.

We did not perform surveys with either our alumni or our advisory board members.

Program Policies and Procedures – The two departments use Faculty Development Funds, which are supplied by the CAS Dean's Office, to help support professional development. These funds are used mostly for travel to and attendance at professional conferences and workshops. Most of these funds are used for tenure-line faculty, but some are used for supporting the professional development of adjunct faculty. Additional funds may come from the department at the discretion of the Department Chair.

The minimum qualifications for tenure-line faculty are that they must hold a Ph.D. in their respective field.

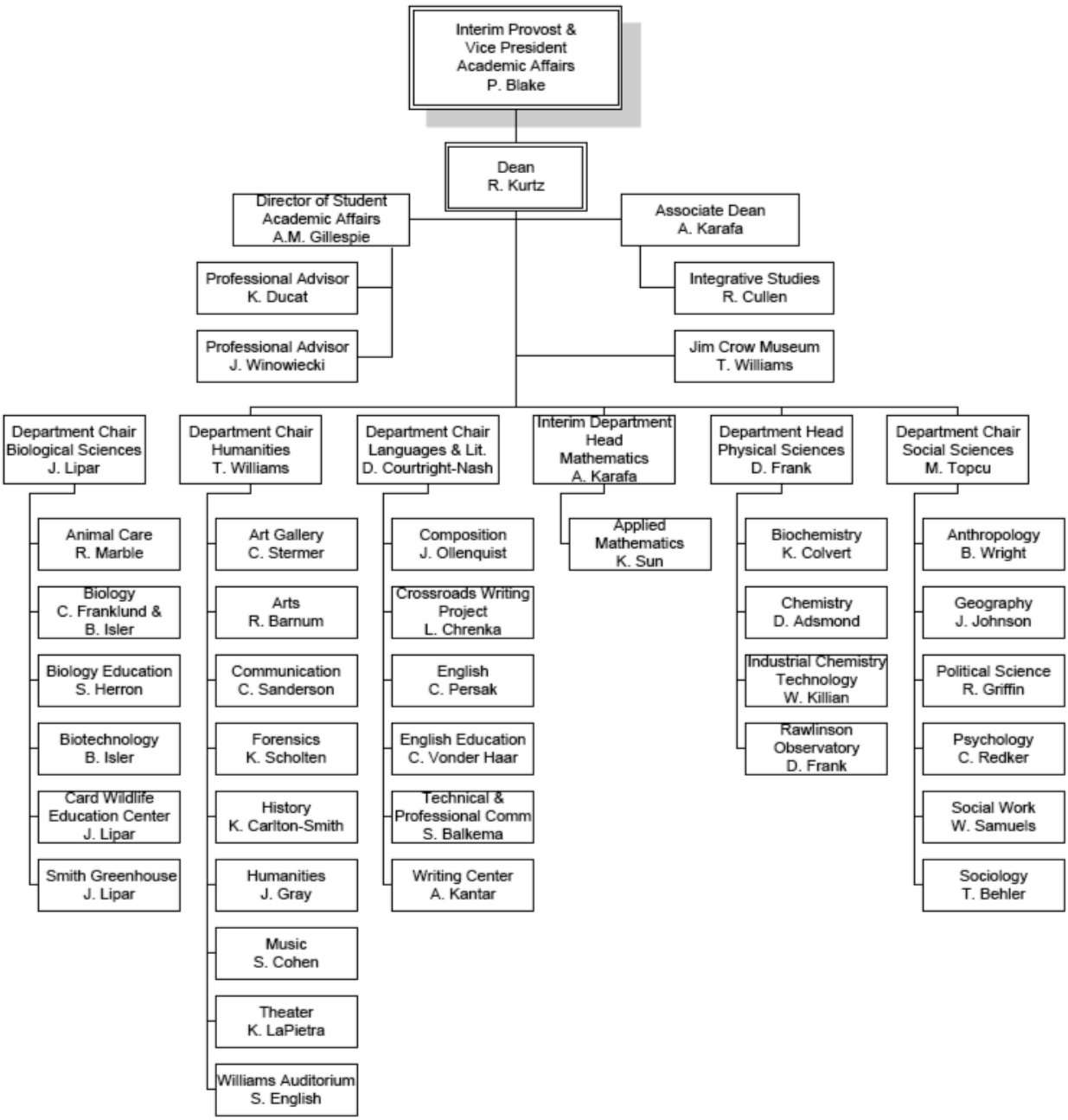
At least for the Department of Biological Sciences, the minimum qualifications for adjunct faculty are outlined in the department's bylaws as follows:

- Within the Department of Biological Sciences, it is strongly preferred that Level 3 Instructors hold a Ph.D. in the Biological Sciences.
- Adjunct faculty that teach the lecture portion of non-majors courses must hold, at minimum, a Master's Degree in the Biological Sciences.
- Adjunct faculty that teach the lecture portion of Biology majors courses must hold a Ph.D. or comparable degree in the Biological Sciences.
- In extraordinary circumstances, the Department Chair may make temporary exceptions to these policies after first consulting with the voting members in the department of Biological Sciences.

Hiring and Retention – In general, hiring and retention processes focus on identifying and hiring well-qualified and capable individuals and then providing them with appropriate guidance and feedback to succeed as faculty members. When searches for tenure-line faculty members are conducted, there is a culture that all or nearly all of the members of the department take an active part in the interview process by meeting with the candidate, attending the candidate's teaching seminar, and joining the candidate at meals. We also ask students to meet with the candidates. We make a concerted effort to provide a genuine picture of the department and our students for the candidates. We have had good success with searches over the years, as those who have been hired have developed into productive members of their department.

The tenure processes are outlined in detail as part of the Departmental Bylaws for each department. We believe in providing constructive feedback to our tenure-track faculty to help them reach their potential as teachers and as colleagues. This process has been successful for many years.

Program Administration and Support



This organizational chart of the College of Arts and Sciences indicates the positions of the Department of Biological Sciences and the Department of Physical Sciences within the academic hierarchy of Ferris State University. The A.S. Pre-Science program is jointly supported by these two programs.

Administrative Positions with Program Oversight:

Name	Title	Highest Degree Earned	Experience in Position
Dr. David Frank	Department Head, Physical Sciences	Ph.D.	32 years
Dr. Beth Zimmer	Department Chair, Biological Sciences	Ph.D.	1 year
Dr. Joseph Lipar	Associate Dean	Ph.D.	1 year
Trinidy Williams	Associate Dean		1 year
Dr. Andy Karafa	Dean	Ph.D.	1 year

There is currently no Program Coordinator for the A.S. Pre-Science program. Under the current structure, the A.S. Pre-Science program has not received the attention that it probably could and should have, as indicated by the lack of assessment data, the lack of organized goals, the lack of an advisory board, etc., as outlined in this report. The College of Arts and Sciences is currently exploring options for the handling of oversight of this program. It is likely that, in the future, oversight will come in the form of either an advisory committee or a single coordinator.

Staff Positions within the Department of Biological Sciences:

Name	Title
Patricia Bunce	Department Secretary
Richard Marble	Animal Care Facility Coordinator
Frank Hartley	Laboratory Coordinator
Lisa French	Laboratory Coordinator
Jessica Parker	Assistant Laboratory Coordinator (Part-Time)

Andrea Lodholtz	Greenhouse Manager (Part-Time)

Staff Positions within the Department of Physical Sciences:

Name	Title
Leona Royer	Department Secretary
Janet Miller-Monfils	Laboratory Manager

All staff members within the two departments perform their duties efficiently and effectively. The current structure allows for all work to be completed in a timely fashion.

No changes to the structure are needed at this time.

Support Services

In general, services are well-provided to our program by units from across campus. In general, there have been no major concerns or complaints regarding our interactions with those units. Some units in particular, as listed below, provide particularly important services for us.

Faculty Center for Teaching and Learning – FCTL regularly provides learning opportunities for our faculty, and a number of our faculty take advantage of the resources provided. For example, during the Fall of 2015 and the Fall of 2016, two adjunct faculty members in the Department of Biological Sciences took part in the Learn Lab project, where they taught smaller, separate sections of BIOL 121 and BIOL 122 so that they could carry out and evaluate some alternative pedagogical techniques. In addition, mini-travel grants have supported several people attending professional conferences, especially those faculty making presentations. Faculty have also benefitted from the variety of on-campus workshops offered by the center. Our incoming faculty have attended the center-sponsored activities two weeks before classes, as well as the bi-weekly sessions for new faculty during their first year on campus.

Tutoring Center – We work closely with the Tutoring Center every semester to provide specialized tutors for some of our courses with high enrollment and to provide SLA instructors for some of our lower-level courses that are more difficult for the students. The tutoring center offers a full array of services for students taking lower-level required

courses in chemistry, physics and mathematics. In addition, the SLA program has provided assistance to a variety of our biology and chemistry classes.

Educational Counseling and Disabilities – Our department works regularly with this office when we have students with disabilities or who are looking for advice on potential career pathways. Their office is invited to one of our departmental meetings each year so they can provide an overview of the services they provide.

FLITE - We have made use of the facilities in FLITE for student presentations, especially for students who have completed extensive research in their organic chemistry labs. Their conference rooms give a professional setting not unlike the facilities students will encounter at a meeting. The library has an online subscription to journals that provide access for faculty and students to the professional literature they need.

IT Services - Much of the instrumentation in chemistry labs includes a computer interface, and IT has helped us find appropriate computers for new instruments. As is true for many other academic institutions, we try to keep our expensive instruments on-line as long as possible. Sometimes new computers and operating systems are not compatible with our older instruments, so we especially rely on IT to provide the equipment we need to keep the computers running.

Instrument Repair - This department has often helped troubleshoot, diagnose and repair problems on instruments in the Department of Physical Sciences. Again, as our instruments age, we turn to their services more often.

Facilities and Equipment – Department of Biological Sciences

Space

Instructional Facilities	
Lecture Rooms	SCI 120 (mornings), SCI 126, SCI 137, STR 136, and IRC 120
Teaching Labs	SCI 207, 208, 211, 212, 215, 216, 222, 227, 228, 231, 232, and 235 SCI 337 is shared with the Department of Physical Sciences.
Research Labs	SCI 102A, 143, 201, 229, 233, and 234.

When scheduling courses, the Department of Biological Sciences has first access to all of the lecture rooms listed above. The exception is IRC 120, which is regulated by the Provost's Office and must be requested. We typically use that room for one or two lectures per semester, usually those classes have an enrollment of at least 75. We generally use the other rooms to 70-80% capacity each semester. All of our lecture spaces have been updated in recent years with new computers and projection equipment, which appears to be adequate in all cases. Overall, there is not a need for more lecture space.

We have sole access to the teaching labs listed above. Each room is specialized for use in specific courses. In general, there is not a need for more teaching laboratory space. All but just one laboratory space has been updated in recent years with new computers and projection equipment. We plan to request an update to that sole laboratory within the next couple of years.

The research labs and auxiliary facilities listed above are not used on a regular basis for teaching courses but may be used as destinations for classes when particular methods or topics are being taught.

The research labs listed above are used primarily by faculty and students for ongoing research projects. In general research space is shared amongst faculty, as there is not enough space for each faculty member to "own" their own space. As new faculty have been hired over the past several years, they have been more likely to want to carry out research with students. Due to this, we currently do not have enough research space to satisfy everyone's needs. Two changes should alleviate this problem in the near future. First, we plan to convert one of our former teaching laboratories (SCI 231, which was used for our now-defunct Ornamental Horticulture Program) into a research space. Plans have been developed in conjunction with Physical Plant, and tentative financial support has been provided by the Dean's office. We expect that the project could be completed within two years. In addition, a new Core Research Facility, which has been developed through donations from Shimadzu Corporation, will be opening during the Fall 2015 semester on the first floor of the Arts and Sciences Commons. This research space is intended to be used by the Department of Biological Sciences, the Department of Physical Sciences, the College of Pharmacy, and any other units on campus who might have a need for the equipment in the facility. A full-time laboratory manager is currently being hired to run the facility. Although members of our department won't be able to carve out space in that facility, it will provide opportunities for faculty and students to have access to some very powerful, high-end research equipment.

Computers

Computer resources appear to be adequate at this time. All of our faculty are on the university's computer replacement program, and all of our adjunct faculty have offices that contain computers. Computers that are used in research labs are either purchased by faculty with grant money or by the department in some cases. One of our teaching labs for anatomy and physiology, SCI 228, is equipped with 13 computer stations. Those computers were all replaced in 2013 with equipment funds from the Provost's office (see below). Only one of our courses uses computer labs, and that course is taught only once per year; we are generally able to find a computer lab for that course. No changes to computer availability are needed at this time.

Equipment

Due to the nature of our field, our teaching, research, and support facilities require continual upgrades to scientific equipment to ensure that our students have experiences that will prepare them well for what they might see in the future. We also must provide continuous maintenance for many of those pieces of equipment. Minor equipment is purchased through the departments supply and expense operating budget. Larger pieces of equipment have traditionally been purchased through equipment funds from the Provost's office. Examples during the last five years include the replacement of 25 microscopes for use in our general biology labs, a new automated washer/sterilizer for the animal care facility, a real-time thermocycler, replacement of a control panel on one of our autoclaves, and a Nano-Drop spectrophotometer. There is a currently a "wish list" of about five larger pieces of equipment that have been requested in the recent past and will continue to be requested in the near future. One other source of equipment funds is an endowed fund that has been used about once every three years to purchase moderately expensive items.

Facilities and Equipment – Department of Physical Sciences

Space

Instructional Facilities	
Lecture Rooms	SCI 102, SCI 111, SCI 117, SCI 120 (afternoons), SCI 336, STR 233, and IRC 120
Teaching Labs	SCI 301, 309, 314, 320, 321, 328, 330, 332, 333, 335, 337, 343 SCI 337 is shared with the Department of Biological Sciences.

Research Labs	SCI 313, 332A, 337, 338, 343, and the new Shimadzu Core Research Facility

When scheduling classes, the Department of Physical Sciences has first access to all of the lecture rooms above except IRC 120. SCI 102 seats up to 172 students and can accommodate our large classes such as General Chemistry and Organic Chemistry. The only other relatively large lecture room is SCI 120, which seats up to 80 students. This room is very cramped because the fixed seats are so close together, and it is difficult to administer exams in this room.

We have access to the teaching labs listed above. We share SCI 337 & 343 with the biology department. In general, there is not a need for more teaching laboratory space.

SCI 313 and SCI 332A are used solely as chemistry research labs and are not used for teaching. There is a small research lab for biochemistry, SCI 338, but student researchers in biochemistry also use SCI 337 and SCI 343, which are also used for biochemistry and biotechnology courses. This is not problematic because these teaching labs are often unoccupied.

The new Shimadzu Core Research facility, opened in the Fall 2015 semester, is used by the Department of Biological Sciences, the Department of Physical Sciences and the College of Pharmacy. Although this is a shared space, and faculty members in our department won't "own" a space, the facility will provide access to some high-end research equipment.

Although our lecture and teaching lab space is adequate for our needs, our space for student research is limited. We have one designated research space for analytical/ instrumental chemistry, and one research space for organic chemistry. In general, research space is shared amongst faculty, and there is not enough space for each faculty member to "own" their own space. Since our newer faculty have more interest in conducting research, and we have increasing numbers of students who intend to go to graduate school, we may need to support greater amount of undergraduate research, including more space.

Computers

All of our faculty members are equipped with a computer in their office. Each of our lecture rooms listed in the space section is equipped with a computer. Most of our computers in the laboratories are integrated with equipment to enable analysis of results. However, many of our labs also have one or two additional computers for student use.

The General Chemistry labs are also equipped with Vernier Data–Collection Technology. There are a total of 24 LabQuest computing devices, which can be interfaced with a

computer or used standalone to collect data. The LabQuest devices are equipped with graphing software. We have a least 12 probes for measuring temperature, pH, gas pressure, electrical conductivity, and visible absorption and emission spectra. We also have several Vernier drop counters, which can be used in place of burets, for adding solutions dropwise, and monitoring volume of solutions added.

Equipment

Classroom Instructional Equipment - Most of the classrooms, both large and small, are equipped with at least one computer, one projector, one document camera and a whiteboard.

Laboratory Equipment - In General Chemistry, much of the equipment needs include an adequate supply of analytical balances, pH meters, centrifuges, and tabletop visible spectrophotometers. The general chemistry labs are also equipped with the Vernier equipment previously discussed in the computer section.

The Shimadzu Core Research Facility, which is used by some courses to allow exposure of students to advanced equipment and is also available to some students for research activities, contains an LCMS–8040 Triple quadrupole liquid chromatograph mass spectrometer, a GCMS_QP2010 Ultra IRtracer–100 with IR microscope, a BioSpec-nano Micro-volume UV–Visible spectrophotometer, an AXIMA performance MALDI TOF/TOF Mass Spectrometer, and a UV–2600 (or UV–2700) uv-visible spectrophotometer AUW–D Series Dual-range Semi-Micro Balances Prominence preparatory HPLC system.

Adequacy of Equipment

For the most part, the classrooms in which we teach are well equipped with enough technology so that instructors can use a variety of teaching strategies.

The remodeling of SCI 102 has made the room more versatile. The extensive whiteboards provide adequate writing space and the computer meets the needs of the professors who use Powerpoint presentations, 3D images, or online access. Replacing overhead projectors with document cameras saves the expense and hassle of overhead transparencies and overhead markers, and images are usually more legible. Perhaps the biggest improvement is the ability to project two different images simultaneously with the two projectors.

One feature lacking in SCI 102 is that the room is not conducive to students working together in small groups. Although the seats swivel, they are held in fixed positions, making it difficult for more than three students to interact face-to face. With the present seating configuration, one or more students in groups of four must stand.

The equipment in the labs is also adequate, but several items in the chemistry labs were purchased more than 20 years ago. There is no guarantee that funds will be immediately available to upgrade or replace the old equipment. Due to cost, we could potentially be without some equipment if it fails. Moreover, it is difficult to find parts needed to repair outdated equipment. The old equipment is often not compatible with newer parts. For example, our old infrared spectrometer is not compatible with newer printers. Unfortunately there is no one dedicated to maintenance of the equipment, so we have some older equipment that needs attention and sits unused. Due to limited supply, students are sometimes backed up waiting to use certain pieces of equipment.

Perceptions of Overall Quality

Survey of Current Students

The following survey was sent to students enrolled in the A.S. Pre-Science program during the spring semester of 2017,

Section A: Personal Information Related to the Pre-Science Program

1. How did you enter into the Pre-Science program at Ferris:
    A. I started as a freshman.
    B. I started in another program at Ferris.
    C. I transferred to Ferris from another institution.

2. If you started in another program at Ferris or transferred from another college/university, please provide the name of that program or college/university.

3. Why were you enrolled in the pre-science program?
    A. I receive TIP funding as part of my financial aid package and therefore must be enrolled in an associate's degree program.
    B. I am still trying to decide what major I would like to pursue to earn a bachelor's degree.
    C. I felt that I could benefit from taking some entry-level science classes before moving into the major-level requirements.

4. Do you intend to pursue a bachelor's degree after you have completed the associate's degree in pre-science? (Please also answer yes if you think you might move into a bachelor's program before completing the associate's degree.)

   A. Yes
   B. No

5. If so, in which bachelor's degree program due you intend to enroll?

6. What is your ultimate career goal?

Section B: Evaluation of the Pre-Science Program

7. On a scale of 1 (unsatisfactory) to 5 (excellent), please rate the pre-science program in the following areas:

- The pre-science program provided a solid foundation of knowledge in the major disciplines of natural science, such that I am competitive to continue my education or enter the workforce.
- My coursework allowed me to develop proficiency in the laboratory and field techniques appropriate for my discipline.
- The coursework developed my ability to formulate hypotheses, make careful observations, analyze data, and draw conclusions.
- My coursework developed my ability to analyze and solve problems.
- My coursework allowed for opportunities to collaborate with others in various settings.

8. In your opinion, what are the overall strengths of the pre-science program? Please be thoughtful and truthful in your answer.

9. What suggestions can you make to assist our efforts in improving the program? Again, please be thoughtful and truthful in your answer.

Results

Although the survey was sent to 109 current students, only 11 of them actually completed the survey. This may be attributed, in part, to the timing of the survey; it was sent to students near the end of the spring semester, when many of them were likely focused on other things. However, we were still able to gather some interesting data.

1. How did you enter into the Pre-Science program at Ferris:

    - Of those that replied, 64% started in the program as a freshman, 18% transferred from another program at Ferris, and 18% transferred from another institution.

2. If you started in another program at Ferris or transferred from another college/university, please provide the name of that program or college/university.

    - Students that transferred from another program at Ferris came from Pre-Dental Hygiene and from Graphic Design,
    - Students that transferred from another institution came from Delta Community College and from Saginaw Valley State University.

3. Why were you enrolled in the pre-science program?

    - Of those that replied, 64% were enrolled in the program due to TIP requirements, 18% were still trying to decide on a baccalaureate major, and 18% felt that they could benefit from taking some entry-level science classes before moving into major-level requirements.

4. Do you intend to pursue a bachelor's degree after you have completed the associate's degree in pre-science?

    - 90% of the respondents indicated that they intended to pursue a bachelor's degree.

5. If so, in which bachelor's degree program due you intend to enroll?

- Programs listed include Biology, Biology (Pre-Medicine), Pharmacy, Chemistry, Forensic Biology, Nursing, Health Care Systems Administration, Product Design, and Mortuary Science (at Wayne State University).

6. What is your ultimate career goal?

- Answers included Pediatrician, Pharmacist, Mortician, Forensic Scientist, and Nurse.

Section B: Evaluation of the Pre-Science Program

7. On a scale of 1 (unsatisfactory) to 5 (excellent), please rate the pre-science program in the following areas:

- The pre-science program provided a solid foundation of knowledge in the major disciplines of natural science, such that I am competitive to continue my education or enter the workforce.

  - The average score was 3.91, with modes of 4 and 5.

- My coursework allowed me to develop proficiency in the laboratory and field techniques appropriate for my discipline.

  - The average score was 3.64, with a mode of 4.

- The coursework developed my ability to formulate hypotheses, make careful observations, analyze data, and draw conclusions.

  - The average score was 3.73, with a mode of 5.

- My coursework developed my ability to analyze and solve problems.

  - The average score was 3.73, with a mode of 4.

- My coursework allowed for opportunities to collaborate with others in various settings.

- The average score was 3.64, with a mode of 3.

8. In your opinion, what are the overall strengths of the pre-science program? Please be thoughtful and truthful in your answer.

- You get more knowledge about biology and chemistry.
- Great professors. Highly qualified and knowledgeable of what they are teaching. Challenging curriculum.
- I really love the chemistry and biology programs. SLA has really helped me out along the way.
- The biology professors and advisors.
- Many of the classes include SLA options which can be helpful for students like me who genuinely like science courses but may not be as good at retaining information the first time.
- The strengths are that it gives you a good foundation to rely on when choosing a major.
- The best things about Pre-science, which is one of the reasons I went into it, was because it gives people who don't know what they want to do a taste of what the science field is.

9. What suggestions can you make to assist our efforts in improving the program? Again, please be thoughtful and truthful in your answer.

- There are major failings within the way the program is run, schedule availability, help availability, and competence of the professors to name a few.
- Make more SLA courses for biology and chemistry.
- More out of class work and guided studying to help retain relevant information better.
- Smaller class sizes to better understand material.
- Some of the courses state they can be taken together if one is the pre-req of the other but scheduling makes this difficult and sometimes impossible.
- Some of the professors teach by memory and not for the newly enrolled students. It's very difficult to learn/catch on to a topic when the professor goes

tremendously fast because he/she knows everything in the curriculum already.

- Offer more SLA's for students who get stuck with bad professors.

Analysis of Results

According to the survey results, most students enter the program as freshman. This is not unexpected, especially for an associate's degree.

Most students who are enrolled in the A.S. Pre-Science program are there due to TIP requirements. This is an expected result. The results also indicate that the program is also beneficial for students who either haven't decided on a baccalaureate program or do not yet have the academic credentials to fully enroll in one.

Nearly all of the survey respondents indicated that they intended to enroll in a baccalaureate program. This reinforces the purpose of the A.S. Pre-Science program as a stepping stone toward those programs.

Question #7 is directly related to the program outcomes. Overall, the respondents appear to think that the program develops and reinforces the particular skills identified as program outcomes. Due to an error in the wording of the question related to the development of communication skills, this question was discarded.

Survey of Former Students

The following survey was sent to students who were formerly enrolled in the A.S. Pre-Science program but were enrolled in a baccalaureate program at Ferris State University during the spring semester of 2017. This questions in this survey mirror those of the survey sent to current students.

Section A: Personal Information Related to the Pre-Science Program

1. How did you enter into the Pre-Science program at Ferris:
    A. I started as a freshman.
    B. I started in another program at Ferris.
    C. I transferred to Ferris from another institution.

2. If you started in another program at Ferris or transferred from another college/university, please provide the name of that program or college/university.

3. Why did you enroll in the pre-science program?

A. I receive TIP funding as part of my financial aid package and therefore was required to be enrolled in an associate's degree program.
B. I was still trying to decide which major I wanted to pursue to earn a bachelor's degree.
C. I felt that I could benefit from taking some entry-level science classes before moving into the major-level requirements.

4. Did you complete the Pre-Science program before moving into another program?

5. In which bachelor's degree-granting program are you currently enrolled?

6. What is your ultimate career goal?

Section B: Evaluation of the Pre-Science Program

7. On a scale of 1 (unsatisfactory) to 5 (excellent), please rate the pre-science program in the following areas:

- The pre-science program provided a solid foundation of knowledge in the major disciplines of natural science, such that I am competitive to continue my education or enter the workforce.
- My coursework allowed me to develop proficiency in the laboratory and field techniques appropriate for my discipline.
- The coursework developed my ability to formulate hypotheses, make careful observations, analyze data, and draw conclusions.
- My coursework developed my ability to analyze and solve problems.
- My coursework allowed for opportunities to collaborate with others in various settings.

8. In your opinion, what are the overall strengths of the pre-science program? Please be thoughtful and truthful in your answer.

9. What suggestions can you make to assist our efforts in improving the program? Again, please be thoughtful and truthful in your answer.

Results

Although the survey was sent to 15 current students, only 12 of them actually completed the survey. This rate of return is similar to that of the previous survey,

Section A: Personal Information Related to the Pre-Science Program

1. How did you enter into the Pre-Science program at Ferris:

- Of those that replied, 33% started in the program as a freshman, 50% transferred from another program at Ferris, and 17% transferred from another institution.

2. If you started in another program at Ferris or transferred from another college/university, please provide the name of that program or college/university.

- Students that transferred from another program at Ferris came from Social Work, Elementary Education, Pre-Nursing, and Pre-Pharmacy.
- Students that transferred from another institution came from Montcalm Community College and from Lansing Community College.

3. Why did you enroll in the pre-science program?

- Of those that replied, 92% were enrolled in the program due to TIP requirements, and 8% were still trying to decide on a baccalaureate major.

4. Did you complete the Pre-Science program before moving into another program?

- One-half of the respondents completed the A.S. Pre-Science program before moving into another program.

5. In which bachelor's degree-granting program are you currently enrolled?

- Biology, Biology (Pre-Medicine), Environmental Biology, Psychology, Medical Laboratory Science, Elementary Education, Human Resource Management.

6. What is your ultimate career goal?

- Answers included Physician, Doctor, Pharmacist, Laboratory Oncologist, Teacher, and Counseling Psychologist.

Section B: Evaluation of the Pre-Science Program

7. On a scale of 1 (unsatisfactory) to 5 (excellent), please rate the pre-science program in the following areas:

- The pre-science program provided a solid foundation of knowledge in the major disciplines of natural science, such that I am competitive to continue my education or enter the workforce.

  - The average score was 3.09, with a mode of 1 and 5.

- My coursework allowed me to develop proficiency in the laboratory and field techniques appropriate for my discipline.

  - The average score was 3.09, with a mode of 4.

- The coursework developed my ability to formulate hypotheses, make careful observations, analyze data, and draw conclusions.

  - The average score was 3.00, with modes of 1 and 4.

- My coursework developed my ability to analyze and solve problems.

  - The average score was 3.09, with modes of 1 and 5.

- My coursework allowed for opportunities to collaborate with others in various settings.

- The average score was 3.18, with a mode of 4.

8. In your opinion, what are the overall strengths of the pre-science program? Please be thoughtful and truthful in your answer.

- The program is extremely challenging. It contains a lot of knowledge, but it is not an easy program. Tutors should be more recommended. The teachers are okay, depending on who you get.
- Overall strengths of the program include amazing professors who stand by you and help you every step of the way, classes that bring out knowledge from all walks of life, ability for students in the TIP program to fulfill the requirements necessary for completing phase 1 in these areas of study.
- It's set up well to take money from students for minimal education gained.
-Decent professors.
- I'm not too sure. Personally, I wasn't happy with the professors or the way the classes were taught. A lot of students weren't successful.

9. What suggestions can you make to assist our efforts in improving the program? Again, please be thoughtful and truthful in your answer.

- Recommend tutoring, get more tutors.
- If anything, I would suggest providing advisors/professors with more information about the TIP program. My advisor was unsure of how it all worked and I had to get him the information so he would know for his other students in the program. Being involved with any associate's degree. I believe that the advisors should be prepared to answer questions and help guide their students.
- Get new advisors, new teachers, and hold administration accountable for telling kids to take incorrect courses.
- Better advisors that know more about pre-medicine and TIP.
- Definitely to improve the curriculum.
- Get advisors who know how to advise. Get teachers who care about teaching.

Analysis of Results

According to the survey results, most of these students entered the program from another program at Ferris. This is a different result than in the previous survey.

Nearly all of the students were enrolled in the A.S. Pre-Science program due to TIP requirements. This is consistent with the results of the survey of current students.

The responses to Question #7 indicate that these students were not as optimistic about the preparation they received from the program. Due to the low sample size, these results may have been skewed by one or two individuals who consistently gave very low scores. Due to an error in the wording of the question related to the development of communication skills, this question was discarded.

A common theme in the suggestions for the program is that the students did not feel they received adequate advising. Training of advisors on the requirements of this program and the requirements of the TIP program should be addressed.

Survey of Faculty

The following survey was sent to tenure-track and tenured faculty members in the Department of Biological Sciences and the Department of Physical Sciences.

1. On a scale of 1 (very low) to 5 (very high), how would you rate your knowledge of the purpose of the Pre-Science program?

2. On a scale of 1 (very low) to 5 (very high), how would you rate your knowledge of the specific requirements of the Pre-Science program?

3. On a scale of 1 (very low) to 5 (very high), how valuable is the Pre-Science program?

4. In your opinion, what are the overall strengths of the pre-science program? Please be thoughtful and truthful in your answer.

5. What suggestions can you make to assist our efforts in improving the program? Again, please be thoughtful and truthful in your answer.

Results

1. On a scale of 1 (very low) to 5 (very high), how would you rate your knowledge of the purpose of the Pre-Science program?

- The average score was 4.33, with a mode of 4.

2. On a scale of 1 (very low) to 5 (very high), how would you rate your knowledge of the specific requirements of the Pre-Science program?

- The average score was 4.33, with a mode of 4.

3. On a scale of 1 (very low) to 5 (very high), how valuable is the Pre-Science program?

- The average score was 3.33, with modes of 1 and 4.

4. In your opinion, what are the overall strengths of the pre-science program? Please be thoughtful and truthful in your answer.

- The pre-science program, for years, was a holding tank for student not yet qualified for entrance into a BS, BA or pre-professional program. It protected the integrity of other programs, while giving guidance to poorly qualified students who wished to pursue those career opportunities. The program offered minimal value as a terminal degree, as most science-based programs required a higher level of preparation. And, because of the at risk nature of the majority of students in the program, few actually attained the degree--those with the aptitude, attitude and work ethic required for earning a place in other programs did so and transferred into those programs once qualified; those lacking one of the key attributes necessary for success in science-based university programs left school or transferred into a less rigorous, non-science based program.
- The Pre-Science program was previously very valuable for TIP students and those with low MATH placement.
- It prepares students well for later pursuits into science-based programs and professions.

5. What suggestions can you make to assist our efforts in improving the program? Again, please be thoughtful and truthful in your answer.

- With the advent of TIPS, a greater number of highly qualified students became candidates for an associate in pre-science. However, the existing pre-science program was not likely to meet the needs of these more advanced students. In response to this need, two new, more rigorous associate degree programs were created--an associate in prepharmacy and an associate in natural sciences (to replace the pre-science degree). Both of these new degrees can potentially service less qualified, at risk students, while offering the rigor necessary to provide some value as a terminal degree, should the student change career paths. More importantly, these new associate programs allow students to earn an associate degree while directly pursuing the learning outcomes and coursework for a BS or pre-professional program.
- With the creation of the new AS Natural Science program, the need for the Pre-Science program has been greatly diminished. The Natural Science program will now serve the needs of >95% of all TIP students and can also serve the needs of most students with moderately low (MATH 115) MATH placement. The PSCI program should either be eliminated or used exclusively for students with a MATH placement so low (< MATH 110) that they would be placed in the RSS unit.
- With the restriction in hours, I cannot think of a way.

Analysis of Results

This survey was sent to 33 faculty members, but only five of them responded. This low response rate may indeed be an indication that the faculty in these two departments do not feel a strong connection to the A.S. Pre-Science program.

It is difficult to ascertain much from these results, as the sample size was quite low.

Perceptions of PRP Members

Dr. Bradley Isler, Faculty Member in Biological Sciences - I have been the advising coordinator for all B.S. Biology concentrations for five years and have assisted with summer orientation and registration for 11 years. In this time, I have worked with and advised many students in the Pre-Science program. The majority of these students were enrolled in the Pre-Science program in order to receive financial aid from the TIP program. A minority of Pre-Science students were truly "Pre-Science" and needed a bit of remedial work before ultimately transferring into a B.S. program. I can only think of 2 or 3 cases where a Pre-Science student actually completed the requirements for Pre-Science and then used it as a "terminal" degree. The Pre-Science program was originally designed to be a preparatory program, eventually morphed into a TIP-eligible program, and has served these purposes very well in the past. However, a recent review of TIP-eligible programs by the state of Michigan gave the Pre-Science program a failing grade with respect to TIP-eligibility. The inability of Ferris students to receive TIP funding was a major issue that needed to be solved very quickly. This issue was solved by creating a new A.S. program in Natural Science that fulfills the requirements for TIP-eligibility, while still maintaining the preparatory component of Pre-Science. While the Pre-Science program has fulfilled our needs well in the past, the new A.S. Natural Science program makes the Pre-Science program both outdated and redundant. Keeping both the A.S. Pre-Science and A.S. Natural Science programs is confusing to admissions counselors, advisors, and students and I am of the opinion that the Pre-Science program should be deleted.

Dr. Kent Sun, Faculty Member in Mathematics – The pre-science A.S. degree is an important degree for Ferris because it houses many students who are uncertain about their major as well as housing many TIP students who want to continue on to bachelor's degrees in the natural sciences but can't immediately do so without losing their TIP scholarships. The biology/physical sciences oversight committee has created the Natural Science A.S. program by modifying the pre-science check sheet to update and to clarify the requirements for the advisors and students as well as to satisfy the TIP auditors. The committee also realizes the need to create a mission statement and strategic plan so that in a future academic program review, it can be determined whether the mission statement is being met and whether the program goals are being met. I think that the committee is aware of what needs to be done to strengthen this program and is moving towards doing them. My recommendation is to continue the program.

Jenice Winowiecki, Professional Advisor in the College of Arts and Sciences –

Historically, PSCI has served two populations: math/science students in the TIP program, which requires enrollment in an associate degree to qualify, and students who are truly underprepared for the program of their choice, but are otherwise eligible to CAS. In the first group, PSCI serves its purpose to allow advisor directed electives that apply to a student's intended BA/BS degree (or PPHR while it was in transition to degree-granting), to also apply to the AS. Because of the flexibility with the PSCI curriculum structure, students remain qualified for TIP while also progressing towards their intended degree. In the second group, student are either defaulted into PSCI for not meeting a program's ACT/SAT requirement or placement, high school GPA or transfer GPA, or if the student needs remedial course work such as ENGL 074, MATH 010/MATH 110, and/or READ 106. Students stayed in PSCI until they met qualifications to start courses in their major, this could be one semester, or several.

So how useful is it? For TIP students otherwise eligible to their program - 100% useful. For students who do not meet program admission criteria? This is a set up for failure.

Good things:

- Higher AS graduation rates for the College since courses overlap 100% with BA/BS
- Higher AS graduation reflects more accurately graduation rates for student who leave for programs that do not require a BA/BS (COP, MCO, chiropractic, etc.)
- Diversifies the college student body
- Allows flexibility for students undecided about a path in the math/sciences
- Allows flexibility for students pursuing programs we don't have (PMOR for example)
- Is a default program for students who need to leave before completing a BS/BA

Things to work on:

- This program, with current resources and FSU structure, should probably be housed in RSS for students placed here due to academic insufficiencies.
- Gives underprepared students a false sense of hope that they are prepared for CAS and their intended program.
- Need more resources for students placed in PSCI for academic preparedness deficits. These students are already at risk, and by the time an advisor knows at midterms (assuming the student comes in for advising), it's probably too late to intervene; need intentional efforts before student's first semester to strategize with

them how to navigate college and resources- need more advising, mentoring, and academic/personal supports during first two years for these students. Maybe these students go into an FSUS that meets 2x/week?

- Not employable, what is a student's return on investment?
- For academically prepared students, it's just a transaction after 2 years; Nothing unique to PSCI that a student would not already be doing for BA/BS
- No structure for curriculum progression, if keep, should probably look at ways of filtering academically underprepared students such as for INST to ensure they discuss academic plans with an advisor before admission to program.

Dr. Joseph Lipar, Associate Dean in the College of Arts and Sciences –

For an overall rating, I think that I would give the A.S. Pre-Science Program an 80 out of 100. On one hand, the program has steadily served its purpose with respect to providing a stepping stone for those who have to develop their academic abilities in the field of science and for providing a landing place for those students who are interested in science and are also receiving financial aid in the form of TIP funding. Although an official mission statement does not exist, the overall aims of the program and the individuals who support are aligned with the missions of the college and the university. Enrollment numbers are robust and appear to be increasing. However, there are a number of reasons why a higher score is not warranted. Overall, oversight of the program has not been consistent; no single individual or group of individuals has been in charge of the program for quite some time. This has led to a lack of assessment data, the lack of a mission statement, and the lack of a strategic plan. Going forward, the College of Arts and Sciences will formulate a plan to remedy this situation. Based on the comments of the some of the students and from one of our professional advisors, I think that a serious conversation about the usefulness of this program for students who are poorly prepared in the areas of math and science when they matriculate into Ferris. It appears to me that the rate of failure and non-completion may be too high; however we will have to analyze the data to come up with real conclusions. I think that converting the A.S. Pre-Science program into the A.S. Natural Science program is a good initial step in giving this program the attention it needs.

Dr. Kristi Haik, Dean of the College of Arts and Sciences – The Dean's perceptions will be provided in a letter that is forthcoming.

Implementation of Findings

The assembly of this report has brought to light some issues that should be addressed. The main tasks that have been identified for the upcoming review period are delineated below.

Implementation of Greater Oversight for the Program - This may take the form of an "Oversight Committee", composed of members of the Biological Sciences Department and the Physical Sciences Department, that will be responsible for overseeing all actions related to the program, including assessment, future program reviews, and curriculum modification/development. Alternatively, a single program coordinator may be appointed to ensure that the program receives appropriate oversight.

Program-level Assessment – Although initial steps in program assessment have occurred, the assessment process for this program will have to be further developed, and it will have to be fully implemented.

Creation of a Strategic Plan – A strategic plan for this program does not currently exist. Input from faculty, advisors, administrators and others will be used to create a useful document. This plan will be mapped to concurrent college-wide and university-wide strategic plans.

Creation of a Mission Statement – The creation of a mission statement will help drive oversight of the program.

Sharing of Findings – The findings and recommendations of this report will be shared with the faculty and staff of the Department of Biological Sciences and the Department of Physical Sciences. It will also be shared with the professional advisors who focus on science majors. A PDF version of this document will also be stored on the network drive and will be available for review.

FERRIS STATE UNIVERSITY

Pre-Science (PSCI) - 60 Credits

Associate of Science (AS)

College of Arts and Sciences

ADMISSION REQUIREMENTS

New Students

- High School GPA of 2.50 (on a 4.0 scale)
- ACT of 17 or SAT of 900

Transfer Students

- Overall GPA of 2.0 (on a 4.0 scale)
- 12 credits, including an English and a mathematics course

UNIVERSITY GENERAL EDUCATION REQUIREMENTS			
Courses in this section are required to satisfy the university general education requirements for an AS degree.			
Prefix	###	Course Title (Prerequisites shown in parenthesis)	Crs
TIER 1: FOUNDATION COMPETENCIES			
COMMUNICATION COMPETENCY – 9 Credits Required (or their equivalent)			
CHOOSE ONE	COMM 105 COMM 121 COMM 221	Interpersonal Communication Fundamentals of Public Speaking Small Group Decision Making	3
ENGL	150	English 1 (SAT 370 OR ACT 14 OR ENGL 074 with C- or higher)	3
ENGL	250	English 2 (C- in ENGL 150)	3
QUANTITATIVE LITERACY COMPETENCY – 3 Credits Required			
MATH	115	Intermediate Algebra (MATH 110 w/ a grade of C- or higher, or 19 on ACT or 460 on SAT)	3
TIER 2: DISTRIBUTION COMPETENCIES			
NATURAL SCIENCES COMPETENCY – minimum 6 Credits Required; at least one must be a class with a lab			
ELEC			
ELEC		lab	
CULTURE COMPETENCY – 9 Credits Required *; Courses in this category must come from two different disciplines			
ELEC			
ELEC			
ELEC		(200+)	
SELF AND SOCIETY COMPETENCY – 9 Credits Required *; Courses in this category must come from two different disciplines			
ELEC			
ELEC		Foundation	
ELEC		(200+)	

*General Education Requirements - | must have a 200 level course in both Culture and Self and Society | The Self and Society Foundation course can be your 200+ course.

Freshman Seminar Requirement, FSUS 100, is satisfied by:

Prefix	###	Course Title (Prerequisites shown in parenthesis)	Crs
MAJOR REQUIREMENTS – 20 Total Credits Required			
Natural Sciences and Mathematics coursework – 20 Total Credits Required (This includes the credits earned in Quantitative Literacy and Natural Sciences)			
ELECTIVES – to total 60 minimum credits			

ADDITIONAL GRADUATION REQUIREMENTS

Students must

- maintain a 2.00 cumulative FSU GPA
- have 15 credits of Ferris classes (FSU Residency requirement)
- have a minimum 60 total credits to earn an associate degree
- have 20 credits in natural sciences and mathematics
- must have a minimum of 50 credits (out of 60) in College of Arts and Sciences Credits

FERRIS STATE UNIVERSITY

Natural Science - 60 Credits

Associate in Science

College of Arts and Sciences

UNIVERSITY ADMISSION REQUIREMENTS

New Students

- High school courses and grade point average, SAT composite and SAT math sub scores will be considered in the admission and course placement process.

Transfer Students

- Must have at least 12 credits including one English course and one Mathematics course
- Must have an overall GPA of 2.0 (on a 4.0 scale)

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

Prefix ###		Course Title (Prerequisites shown in parenthesis)	Crs
TIER 1: FOUNDATION COMPETENCIES			
COMMUNICATION COMPETENCY – 9 Credits Required (or their equivalent)			
CHOOSE ONE	COMM 105 COMM 121	Interpersonal Communication Fundamentals of Public Speaking	3
ENGL	150	English 1 (SAT 370 OR ACT 14 OR ENGL 074 with C- or better)	3
ENGL	250	English 2 (C- in ENGL 150)	3
QUANTITATIVE LITERACY COMPETENCY – 3 Credits Required			
This requirement is satisfied in the major			
TIER 2: DISTRIBUTION COMPETENCIES			
NATURAL SCIENCES COMPETENCY – minimum 6 Credits Required; at least one must be a class with a lab			
This requirement is satisfied in the major			
CULTURE COMPETENCY – 9 Credits Required *; Courses in this category must come from two different disciplines			
		(200+)	
SELF AND SOCIETY COMPETENCY – 9 Credits Required *; Courses in this category must come from two different disciplines			
		Foundation	
		(200+)	

* General Education Requirements - | must have a 200 level course in both Culture and Self and Society | The Self and Society Foundation course can be your 200+ course.

Freshman Seminar Requirement, FSUS 100, is satisfied by:	

Natural Science – Associate of Science - 60 Credits

Prefix	###	Course Title (Prerequisites shown in parenthesis)	Crs
MAJOR REQUIREMENTS – 29-30 Credits Required (choose from the following electives)			
BIOL	121	General Biology 1 (CHEM 121 may be concurrent)	4
BIOL	122	General Biology 2 (BIOL 121 and CHEM 121)	4
BIOL	205 or 321 or 321 and 322	Human Anatomy/Physiology (CHEM 114 or CHEM 121) Human Physiology and Anatomy 1 (BIOL 122 and CHEM 122) Human Physiology and Anatomy 1 and 2	5 4 4/4
BIOL	218 or 286 or 386	Microbial Ecology (BIOL 121) General Microbiology (CHEM 122) Microbiology and Immunology (BIOL 322)	3 3 5
CHEM	121	General Chemistry 1 (MATH 115 and prior CHEM)	5
CHEM	122	General Chemistry 1 (CHEM 121)	5
CHEM	214 or 321 or 321 and 322	Fundamentals of Organic Chemistry (CHEM 114 or CHEM 121) Organic Chemistry 1 (CHEM 122) Organic Chemistry 1 and 2	4 5 5/5
PHYS	130 or 211 or 211 and 212 or 241 or 241 and 242	Concepts in Physics (MATH 110) Introductory Physics 1 (MATH 116 or 120) Introductory Physics 1 and 2 General Physics 1 (MATH 220) General Physics 1 and 2	4 4 4/4 5 5/5
GEOL	121	Physical Geology	4
MATHEMATICS REQUIREMENTS – 3/4 Credits Required (you may take more math than required)			
MATH	115	Intermediate Algebra (MATH 109 or 110 w/C- or higher or MATH ACT19 or SAT500)	3
MATH	120	Trigonometry (MATH 115)	3
MATH	130	Adv. Algebra-Analytical Trig (MATH 120)	4
MATH	220	Analytical Geometry – Calculus 1 (MATH 130)	4
MATH	251	Stats for Life Sciences (MATH 130)	3

ADDITIONAL GRADUATION REQUIREMENTS

Students must

- maintain a 2.00 cumulative GPA in all FSU courses
- have 15 credits of Ferris classes (FSU Residency requirement)
- have a minimum 60 total credits to earn an associate degree

DEGREE OUTCOMES (the outcomes will be used in TracDAT)	
1.	Graduates will explain major concepts in the natural sciences.
2.	Graduates will apply natural science theories or principles to analyze and solve problems.
3.	Graduates will utilize the scientific method to investigate problems of the natural sciences.
4.	Graduates will perform laboratory and field techniques appropriate for the natural sciences.
5.	Graduates will collaborate in various team settings.
6.	Graduates will clearly communicate scientific information in both written and oral forms.

General Biology I

Biology 121 Fall 2016

Paul H. Klatt
2114 ASC Building
591-2671
PaulKlatt@ferris.edu

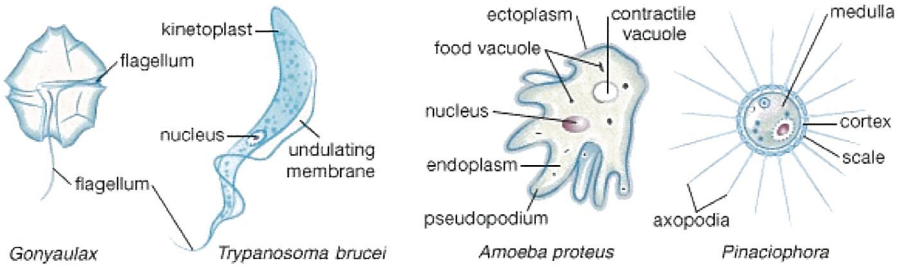
Text: Biology, Campbell and Reece, 9th Edition
Lab Manual for General Biology 2016
Class: SCI 126, 8:00 am, MWF
Office hours: Thursday and Friday 3:00-5:00 pm

Grading Scale:

A (94% and up)	C (73-76.9%)
A- (90-93.9%)	C- (70-72.9%)
B+ (87-89.9%)	D+ (67-69.9%)
B (83-86.9%)	D (63-66.9%)
B- (80-82.9%)	D- (60-62.9%)
C+ (77-79.9%)	F (59.9% and below)

Exam I	100
Exam II	100
Exam III	100
Exam IV	200
Total	500

Course Description: The first semester of a year-long sequence in introductory biology designed for the science major and as a prerequisite for advanced biology courses. The topics include an introduction to scientific thinking, ecology, cell division, Mendelian genetics, evolution, the diversity of the biological kingdoms (bacteria, Protista, Fungi, and Plantae), and plant structure and function. Laboratory exercises are designed to enhance the lecture material with hands-on experiences. Designed for students in science baccalaureate degree programs, this course meets General Education requirements: Scientific Understanding, Lab. 4 Credit Course that requires CHEM 121 or CHEM 114 as a pre- or co-requisite.



General Education Outcomes: This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

1) have a working knowledge of the fundamental principles of a natural science discipline;
2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

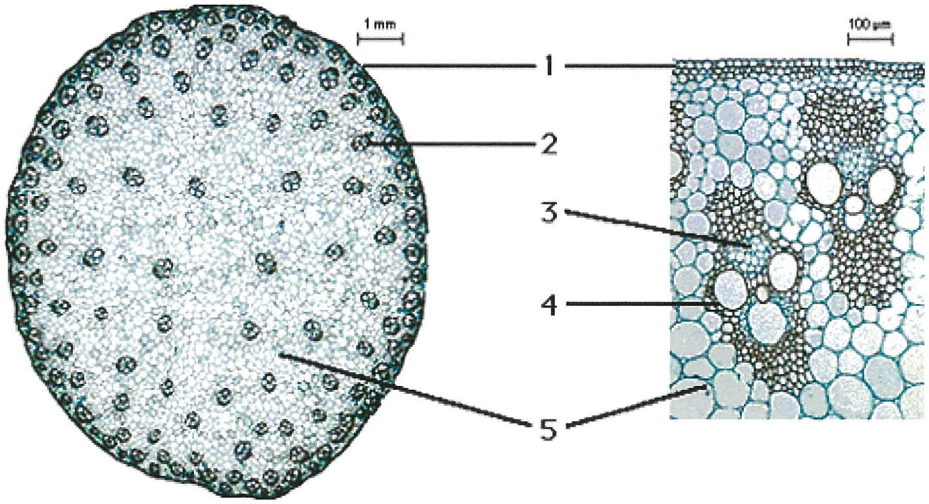
Specific Course Outcomes: This course is the first of a two part introductory biology sequence, thus it will lay the foundation for further study in biology. A student succeeding in this course should be able to:

1) demonstrate by examination a majors-level introductory knowledge in ecology, cell division, Mendelian genetics, evolution, diversity of bacteria, protists, fungi, and plants, and plant structure and function.
2) demonstrate the ability to use mathematics to solve problems in Biology and utilize graphs or tables to present data effectively.
3) use the scientific method to formulate hypotheses, design experiments, collect and analyze data, and draw conclusions.
4) show an ability to utilize equipment (such as a microscope) safely and effectively to complete lab assignments.

Other Materials Required: You are required to bring to class on exam days, a #2 pencil, and a Scantron Form 882 sheet.

Exams: Half of the final exam will be comprehensive. Lecture Exams cannot be made up. Students who are absent on exam day, and do not have a legitimate excuse, will receive a zero on that exam. Students who must be absent on the day of the exam, for a legitimate reason, may use the comprehensive portion of the final exam to replace the missed exam. **Cheating** will result in failure of the course. Additional action may be taken by the University.

Electronic Devices must be turned off in the lecture hall.



Tentative Schedule:

Date		Lecture	Chapter
Aug.	29	Introduction	01
	31	Ecology	52
Sept.	02	Animal Behavior	51

Sept.	05	[Labor Day Holiday]	
	07	cont.	
__	09	Population Ecology	53
	12	cont.	
	14	Community Ecology	54
__	16	Ecosystems	55
	19	**Exam I** - 100 points	
	21	Conservation Biology	56
__	23	The Cell Cycle	12
	26	Meiosis and Sexual Life Cycles	13
	28	cont.	
__	30	Mendel and the Gene Idea	14
Oct.	03	cont.	
	05	The Chromosomal Basis of Inheritance	15
__	07	cont.	
	10	Descent with Modification	22
	12	cont.	
__	14	**Exam II** - 100 points	
	17	The Evolution of Populations	23
	19	cont.	
__	21	The Origin of Species	24
	24	cont.	
	26	Phylogeny and Systematics	26
__	28	cont.	
	31	The History of Life on Earth	25
Nov.	02	cont.	
__	04	Viruses (P. 381-390)	19
	07	Prokaryotes	27
	09	cont.	
__	11	**Exam III** - 100 points	
	14	Protists	28
	16	cont.	
__	18	Fungi	31
	21	cont.	
	23	Plant Diversity I	29
__	25	[Thanksgiving Holiday]	
	28	cont.	
	30	Plant Diversity II	30
Dec.	02	cont.	
	05	Plant Structure and Growth	35
	07	cont.	
__	09	Plant Transport	36
	14	**Exam IV** - 200 points, 8:00 am - 9:40 am	

Final Note: Enjoy the course and take pride in your work. The University experience is what you make it. This syllabus is subject to change at any time.

Lab Information

Lab Quizzes: There will a quiz given each week covering the material from the previous week (150 points in total). Labs cannot be made up. If you have a legitimate reason for missing your section, you may request to attend another lab section in its place (within the same week) and still get credit for that lab. Bring the lab make up form to the instructor of the replacement lab and request their permission to attend that section. You will be allowed to do this only twice during the semester.

Tentative Schedule:

Week of	Topic
1) 29 Aug.	The Scientific Method: Pill Bug Lab
2) 05 Sept.	[Labor Day Holiday]
3) 12 Sept.	Population Growth
4) 19 Sept.	Environment and Macroinvertebrates
5) 26 Sept.	Microscope and Cell Division
6) 03 Oct.	Mendelian Genetics I
7) 10 Oct.	Mendelian Genetics II and ABO, Rh Blood Types
8) 17 Oct.	Mendelian Genetics III, Adaptive Mutants in Yeast, and Biochemical Evidence of Evolution
9) 24 Oct.	Bacteria
10) 31 Oct.	Protista
11) 07 Nov.	Fungi
12) 14 Nov.	Survey of Plants
13) 21 Nov.	[Thanksgiving Holiday]
14) 28 Nov.	Plant Anatomy
15) 05 Dec.	Plant Physiology

Biology 321 - Human Physiology and Anatomy 1

Course Syllabus Fall Semester 2016

Course Description: First of two semesters of a comprehensive, integrated course in anatomy-physiology, developing logical correlations between structures and their functions with emphasis on the molecular and cellular basis of organ system structure and function. Topics: cell physiology; control mechanisms; nervous, muscle, and endocrine systems. Laboratories include cadavers in anatomical studies and animal experimentation demonstrating physiological principles. Designed for students in science baccalaureate degree programs.

Instructor: Dr. M. Beth Zimmer, PhD
Office: 2120 Arts and Science Commons
Phone: (231) 591-5022
Email: zimmerm4@ferris.edu

Office hours: M 10:00-11:50am;
R: 10:00 – 10:50am
F: 2:00 – 2:50pm
By appointment

Lectures:	M, W, F, 1:00-1:50pm	IRC 120
Labs:	Monday 3:00-5:50pm	SCI 228
	Tuesday 12:00-2:50pm	SCI 228
	Tuesday 3:00-5:50pm	SCI 228
	Wednesday 3:00-5:50pm	SCI 228
	Thursday 6:00-8:50pm	SCI 228JJ

Course Prerequisites: BIOL 122 and CHEM 122

Required Texts:

1. ***Lecture Material:*** Fundamentals of Human Physiology: A Comparative Examination, Preliminary Edition, Zimmer MB, Cognella, San Diego, CA.
2. ***Lab Material:*** Seeley's Lab Manual, McGraw Hill, Note: Older/newer editions of the lab book will be sufficient; however, chapter and page numbers will not match those listed on the syllabus.

Course Learning Outcomes: By the end of this course, students will be able to meet the following learning outcomes:

1. Students will be able to use a microscope effectively to identify the 4 tissue types (epithelial, connective, nervous, and muscular) within any human tissue.
2. Students will be able to identify and name designated anatomical structures (both histological and gross) within the following organ systems: integumentary system, the muscular system, the nervous system, the skeletal system, and the endocrine system.
3. Students will be able to explain physiological functions and mechanisms within the following organ systems: integumentary system, the muscular system, the nervous system, the skeletal system, and the endocrine system.
4. Students will be able to apply their knowledge of anatomy and physiology to think critically about the application of anatomical and physiologic concepts to specific situations.
5. Students will be able to carry out experimental procedures, evaluate experimental data and interpret their data based on the anatomy and physiology that they have learned.

Lecture and Lab NOTES - Blackboard and the Internet:

All lecture and lab notes will be made available via Blackboard.

Although the internet has become a major source of scientific information, one should remember that, unlike scientific papers or textbooks, web sites do not undergo the process of peer review. Consequently, never assume that absolutely everything posted on the web is correct, actually assume the opposite. When surfing the net, choose web sites that belong to well-established institutions such as colleges and universities. I will attach some sites that may become useful for study. If you find any sites that you'd like to share, please let me know and we can attach the links to the course site.

Evaluation:

The lecture mark is based on: (500pts total)

- Four lecture exams – 100 pts each
- Final cumulative exam – 100 pts

The lab mark is based on: (250pts total)

- Lab quizzes – 6 @ 25 pts each = 150
- Lab Final exam – 100 pts

Total points for class: 750

Lecture exams: will be given approximately every 4 weeks. They will consist of questions that pertain to the previous ~4 week's information (you will be told which subject areas are on a particular exam). More specific details will be given out prior to each exam.
Final Lecture Exam: A Comprehensive exam covering all of the material taught throughout the semester will be given.

Weekly quizzes: a short quiz will be given at the beginning of most labs and cover the material from the previous lab (anatomy labs only)
Lab Final: a comprehensive lab final will be given. Material from all anatomy labs will be covered on this exam.

YOU MUST PASS BOTH LECTURE AND LAB TO PASS THE COURSE

Course Policies

Grading:

93 – 100 = A	73 – 76.99 = C
90 – 92.99 = A-	70 – 72.99 = C-
87 - 89.99 = B+	67 – 69.99 = D+
83 – 86.99 = B	63 – 66.99 = D
80 – 82.99 = B-	60 – 62.99 = D-
77 – 79.99 = C+	Below 60 = F

Attendance: Attendance at lectures is expected. There is a positive correlation between students who attend lecture regularly and good grades. I will not take attendance, but there will be opportunity for extra credit for attendance in lecture!

Lab attendance is MANDATORY.

There will be no make-up labs. If you have a valid excuse for missing lab, please see me ***immediately***. Otherwise, you may not take the quiz for that lab and thus the missed lab will be recorded as a "0". Two missed labs for ANY reason will result in a failing grade.

Academic Integrity: Cheating of any kind will NOT be tolerated. Any reports of cheating or plagiarism will be forwarded to the Office of Student Conduct and be treated accordingly.

It is not hard to succeed in Biology 321/322 as long as you approach this course with a certain degree of maturity and proper attitude. The few points suggest some strategies that you may find helpful in your study of the lecture material.

1. Always read/skim chapter material BEFORE coming to lecture. You are responsible for the entire content of lecture material. Because there is not enough time to discuss everything in detail, we will concentrate on those concepts that are either more difficult or critically important for the comprehension of the entire topic. Therefore, you must read the material ahead of time in order to place each lecture in proper context. Take notes!!!

2. Study consistently. DO NOT wait with studying until the last 48 hours before the exam! The amount of information will overwhelm you! It is much more effective to spend a short amount of time (even 15-20 minutes) in the evening following each lecture trying to *understand* the material. This way you should establish good comprehension of each individual concept and can concentrate on "putting the pieces together" during the week before the exam.

3. Ask questions. Many aspects of physiology are complex - DO NOT HESITATE TO ASK QUESTIONS each time you run into a problem. You can see me in my office hours or make an appointment to see me. Or simply ask other student in the class or your study group. This can be done in small study groups (see #4) or over individually.

4. Study in small groups. I strongly encourage students to study in small groups. It won't be long before you will get to know other students in the class, you may know some already. Try to establish a small study group and try to get together once a week to reinforce each other's comprehension of the material. Ask and answer questions aloud. If you can explain a concept aloud then you will have mastered the concept, try it! Such interactions will help you to assess your knowledge and point the areas that you overlooked in studying on your own.

Biology 321/322 Word and Prefix list

Sooner or later (probably sooner) you will come across the following words and prefixes listed below in the course of anatomy and physiology. They signify location or direction.

Superior (Cranial, rostral)	= toward the head or on top
Inferior (Caudal)	= toward the tail or at the bottom
Anterior	= toward the front
Posterior	= toward the back
Medial	= toward the midline
Lateral	= away from midline of the body
Intermediate	= between a medial and a lateral structure
Proximal	= closer to the origin of the body
Distal	= farther from the origin of the body
Superficial	= toward or at the body surface
Deep	= more internal, away from the body surface
Apical	= at the top (apex)
Basal	= at the bottom (base)
Afferent	= leading toward
Efferent	= leading away
Supra-	= on top
Infra-	= under
Extra-	= outside
Intra-	= inside, within
Inter-	= between
Para-	= to the side of
Exo-	= to the outside
Endo-	= to the inside
Epi-	= on top of
Peri-	= around
Ento-	= inner
Ecto-	= outer
Meso-	= middle
Centro-	= center
Ad-	= to or toward
Ab-	= away from

Week	Day		Lecture	Reading
1	M	Aug 29	Introduction to Anatomy and Physiology	Chap 1
	W	Aug 31	Cell structure and function	Chap 2
	F	Sep 2	Movement of molecules across cell	Chap 2
2	M	Sep 5	**Labor Day – No classes**	
	W	Sep 7	Movement of molecules across cell	Chap 2
	F	Sep 9	Nervous System	Chap 3, Section 1
3	M	Sep 12	Nervous – Resting membrane potential	Chap 3, Section 1
	W	Sep 14	Nervous – Action Potential	Chap 3, Section 1
	F	Sep 16	Synaptic Transmission (***ONLINE lecture***)	Chap 3, Section 1
4	M	Sep 19	Synaptic Transmission	Chap 3, Section 1
	W	Sep 21	Synaptic Transmission	Chap 3, Section 1
	F	Sep 23	**Exam 1**	
5	M	Sep 26	Post-synaptic potentials; EPSP, IPSP	Chap 3, Section 1
	W	Sep 28	Synaptic integration and strength	Chap 3, Section 1
	F	Sep 30	Neurotransmitters and Receptors	Chap 3, Section 2
6	M	Oct 3	Structure of Nervous system	Chap 3,
	W	Oct 5	Autonomic Nervous System	Chap 3, Section 3
	F	Oct 7	Brain and spinal cord	Chap 3, Section 4
7	M	Oct 10	Sensory physiology – receptors	Chap 4, Section1
	W	Oct 12	Somatic sensory	Chap 4, Section 2
	F	Oct 14	Special senses – Vision	Chap 4, Section 3
8	M	Oct 17	Special senses – Vision	Chap 4, Section 3
	W	Oct 19	Special senses – Hearing	Chap 4, Section 3
	F	Oct 21	**Exam 2**	
9	M	Oct 24	Special senses – Vestibular system	Chap 4, Section 3
	W	Oct 26	Special senses – Taste and smell	Chap 4, Section 3
	F	Oct 38	Learning/Memory and Language	
10	M	Oct 31	Skeletal Muscle – structure	Chap 5, Section 1
	W	Nov 2	Skeletal Muscle – contraction/relaxation	Chap 5, Section 1
	F	Nov 4	Skeletal Muscle – NMJ and mechanics	Chap 5, Section 1
11	M	Nov 7	Skeletal Muscle – metabolism and fatigue	Chap 5, Section 1
	W	Nov 9	Skeletal Muscle – fibers - whole muscle	Chap 5, Section 1
	F	Nov 11	Smooth Muscle	Chap 5, Section 1
12	M	Nov 14	Control of body movement	Chap 5, Section 2
	W	Nov 16	Descending motor pathways	Chap 5, Section 2
	F	Nov 18	**Exam 3**	
13	M	Nov 21	The Endocrine System	Chap 10
	W	Nov 23	**Thanksgiving – No class**	
	F	Nov 25	**Thanksgiving – No class**	
14	M	Nov 28	Hypothalamus and Pituitary	Chap 10
	W	Nov 30	Hypothalamus and Pituitary	Chap 10
	F	Dec 2	Thyroid gland	Chap 10
15	M	Dec 5	Pancreas	Chap 10
	W	Dec 7	Adrenal gland	Chap 10
	F	Dec 9	Review	

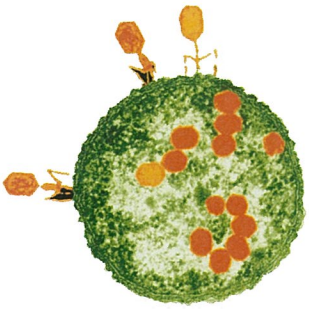
Final Exam - Wednesday, December 14, 2010 12:00pm-1:40pm

BIOLOGY 321 Human Anatomy and Physiology
LAB Schedule
Fall Semester 2016

Week	Dates	Subject
1	Aug 29- Sep 1	***Chapter 1*** – Human Anatomy – pg 1-10 ***Chapter 3*** – Histology: Epithelial, Connective – pg 19-28
2	Sep 5-8	**No Labs**
3	Sep 12-15 **Quiz**	***Chapter 3*** – Histology: Muscle (10), Nerve (13) – pg 19-28 ***Chapter 4*** - Integumentary System – pg 29-32
4 **Exam 1**	Sep 19-22	**Cell membrane permeability – **Handout**
5	Sep 26-29 **Quiz**	Peripheral nervous system - Central nervous system – spinal cord
6	Oct 3-6 **Quiz**	***Chapter 9*** - Central nervous system, Brain – pg 102-112 PNS - Cranial nerves
7	Oct 10-13 **Quiz**	**Compound action potential – Handout
8 **Exam 2**	Oct 17-20	Special senses – Anatomy and Physiology – **Handout** Sensory Taste Vision Hearing
9	Oct 24-27– In **SCI 222**	***Chapter 5, 6*** - Skeletal system – Bones – pg 33-57
10	Oct 31-Nov 3 **Quiz**	***Chapter 8*** - Skeletal muscle anatomy – pg 68-101
11	Nov 7-10 **Quiz**	**Skeletal muscle physiology – **Handout**
12 **Exam 3**	Nov 14-17	**Neural – Smooth muscle physiology – **Handout**
13	Nov 21-24	**Thanksgiving – No labs**
14	Nov 28-Dec 1	Open Lab for Review
15	Dec 5-8	**Comprehensive lab final**

** - Physiology labs

BIOL 286: General Microbiology
Course Syllabus, Spring 2016



In order to optimize student learning, the standards and requirements set forth in this syllabus may be modified during the semester. Notice of any such changes will be announced in class and posted on our Blackboard course welcome page.

Class location and meeting time

Lectures will be held on Mondays and Wednesdays from **4:00 to 4:50 pm** in **SCI-126**. The laboratory sessions will meet on Tuesdays and Thursdays at either **9:30 to 10:45 am**, **12:00 to 1:15 pm**, or **1:30 to 2:45 pm** in **SCI-215**. You are responsible for all announcements, assignments, handouts, etc., even if you are late or absent (see the attendance policy for more details).

Contact information

Instructor name:	Dr. Clifton Franklund	Ms. Kim Andrus
Office:	ASC 2011	ASC 2015E
Telephone:	(231) 591-2552	(231) 591-3678
Email:	franklc@ferris.edu	KimberlyAndrus@ferris.edu
Twitter:	@Dr_Franklund	
Web site:	http://franklund-micro.com	

Contacting Dr. Franklund

Office hours: [M | W | F] from 2:00 to 3:00 pm

I will maintain official office hours as indicated above. These are first come, first served – you are encouraged to make appointments but walk-ins are welcome and will be accommodated whenever possible. You can sign up times online at http://cliftonfranklund.youcanbook.me. In addition, I have posted my schedule outside of my office door. **All** of my "free" time is available to you as office hours. Simply find the day that works for you and sign up for a meeting (in 15-minute increments).

Email: You can expect me to reply to your email questions within 24 hours during the work week and within 48 hours on weekends and holidays.

I offer bonus points for office hours following each exam to briefly to discuss your recent performance. Bring your completed feedback email report, your exam, and your notes. We will work together to try to find strategies to improve your performance over time.

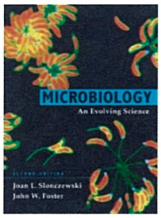
Prerequisites

CHEM 122: General Chemistry 2 or consent of the instructor

Course description

Introduction to the microbial world including microbial structure, function, metabolism, classification, genetics, control of microbial growth and immunity. The laboratory provides practical experience with fundamental concepts, techniques and instrumentation. This course is designed for students in the clinical laboratory science program and is open to other students by permission of the professor.

Required texts and materials



Textbook: *Microbiology: An Evolving Science 2nd edition by Slonczewski and Foster. 2011* (ISBN 0-393-93447-0)

Lab notebook: We will be using the hardcover *Student Laboratory Notebook* published by the American Society for Microbiology Press, 2005. (ISBN 1-55581-358-5)

Required materials: We will be using Turning Technologies ResponseCard NXT clickers in class this semester. These will be required for in-class review questions, bonus quizzes and for taking lecture and lab exams.

A cloth lab coat, a Sharpie™, access to a digital camera (e.g. iPhone, android phone), and colored pencils (pink, red, green, blue, yellow, and black are needed) will be required for lab.

Optional materials*:* You should seriously consider getting a 3-inch D-ring binder for your class notes. Other optional materials include a scientific calculator, a USB flash drive, and a wax pencil for the laboratory. A copy of *A Student Handbook for Writing in Biology 3rd edition by Knisely. 2009* is potentially useful, but completely optional.

Learning outcomes

I have several specific learning objectives for you in this course and they are listed below. Some of these will be covered in lab, others in lecture, and many in both. By the conclusion of this course, you should be able to:

A. ***Microbial Diversity*** - Give examples of and compare and contrast different types of microbial cells (including viruses, bacteria, fungi, and protozoa). Identify cell structures and define their functions.
Assessed via laboratory and online quizzes or reports, questions from lecture exams 1, 2 and 3, the laboratory practical, and the comprehensive final exam.

B. ***Microbial Metabolism*** - Explain the various metabolic strategies employed by microbes. Provide specific examples of how metabolism is linked to environmental cycling of elements and pathogenesis.
Assessed via laboratory and online quizzes or reports, questions from lecture exams 2, and 3, the laboratory practical, and the comprehensive final exam.

C. ***Microbial Genetics*** - Describe basic concepts involving how genetic information flows in microbial cells. Detail the importance of mutation, recombination, and lateral genetic exchange in virulence.
Assessed laboratory and online quizzes or reports, questions from lecture exam 3, the laboratory practical, and the comprehensive final exam.

D. ***Host-Microbe Interactions*** - Differentiate between the innate, humoral, and cellular defenses and identify points of interaction. Explain how inappropriate immune responses can result in host damage. Compare the different interactions possible between host and microbial cells. Describe several different molecular strategies employed by microbial pathogens and give several specific examples of each.
Assessed via laboratory and online quizzes or reports, the laboratory practical, and the comprehensive final exam.

E. ***Laboratory Techniques*** - Correctly perform proper laboratory skills and display a habit of good laboratory practices that extend to your everyday life. Perform simple and differential stains on isolates and properly use compound light microscopes to visualize and describe microbial cell morphologies.
Assessed via laboratory quizzes and notebook entries, and the laboratory practical.

F. ***Critical Thinking*** - Accurately follow instructions and collect data based upon observations from laboratory exercises or clinical case studies. Plot data when appropriate and interpret any trends. Make inferences and predictions based upon the interpretations.
Assessed via laboratory and online quizzes, laboratory notebook entries, and the laboratory practical.

G. ***Communication*** - Demonstrate an ability to work in group settings and exchange ideas concerning course-related topics. Read, write, and speak about Microbiology with classmates and members of the community.
Assessed via short microbiology papers.

H. ***Metacognition*** - Articulate preferences and dislikes (strengths and weaknesses) for learning new and complex information. Adopt new learning strategies to improve retention of information and comprehension of the course materials.
Assessed via post-exam bonus assignments, feedback during office hours, and occasional class surveys.

A taxonomy of Microbiology skills

Each of the graded course activities will correspond to one or more of our six course outcomes. In addition, these activities can be involved different levels of cognitive skill or ability. These skills and their relative contribution to course assignments are described below.

Content Knowledge

IDENTIFYING – You will be expected to remember and correctly use appropriate scientific terms and concepts. This skill is assessed by measuring the ability to recall information in the same context in which it was presented during instruction. Approximately 15% of the course points will correspond to this skill.

CATEGORIZING – You will be expected to classify or provide examples of specific scientific concepts or constructs. This skill is assessed by measuring the ability to conceptually organize information in contexts different from those presented during instruction. Approximately 30% of the course points will correspond to this skill.

Critical Thinking

CALCULATING – You will be expected to correctly solve a variety of problems using mathematical reasoning. This skill is assessed by measuring the ability to select and apply appropriate formulae to solve novel problems. Approximately 10% of the course points will correspond to this skill.

INTERPRETING – You will be expected to analyze data provided in tables, images, or case studies to answer specific questions. This skill is assessed by measuring the ability to identify relevant facts and interpret them to address specific scientific problems or case studies. Approximately 15% of the course points will correspond to this skill.

PREDICTING – You will be expected to make sound inferences based upon their understanding of the interactions that make up a natural system. This skill is assessed by measuring the ability to make reasonable forecasts of the behavior of a specified system following a specified perturbation. Approximately 10% of the course points will correspond to this skill.

JUDGING – You will be expected to evaluate the validity of scientific statements or potential courses of action. This skill is assessed by measuring the ability to detect errors or inconsistencies in such statements. Approximately 5% of the course points will correspond to this skill.

Lab Skills

PERFORMING – You will be expected to use the scientific method to safely and correctly execute scientific exercises in the laboratory or field. This skill is assessed by measuring the ability to execute the exercises, record and interpret the observations, and report the results in an appropriate manner. Approximately 15% of the course points will correspond to this skill.

Instructional methods

BIOL 286: General Microbiology will be taught as a blended delivery class. The primary form of instruction for this course will be most likely be lecture. The material covered in lecture will be amplified and applied in a variety of required laboratory exercises. In addition, a number of important and required materials will be presented online via our Blackboard site. A complete online laboratory manual will be available during the semester. A moderate amount of out-of-class work will be required for this class. You will be expected to bring your clicker to every class session and participate in group discussions (both in class and online). We will regularly use the clickers to gather feedback, take concept check quizzes, and work collaboratively on case studies or problems. Your clicker responses *may* be included as part of your course score in the form of occasional bonus points.

Grading policies

I use an objective point-based system to grade all assigned work. The nature and relative point values of all assignments are explained in the following section. I have designed this course to be worth a total of **1,400 points**. Mid-term grades will be posted by **March 7, 2016** so that you may assess your class standing. Final grades for the course will be assigned based upon your total earned score as indicated

Breakpoints are not negotiable.

The bonus points should give you more than adequate buffer against any poor assignment performances.

Point Range	Grade	Percent
1,302 to 1,400 points	A	93-100%
1,260 to 1,301 points	A-	90-92.9%
1,218 to 1,259 points	B+	87-89.9%
1,162 to 1,217 points	B	83-86.9%
1,120 to 1,161 points	B-	80-82.9%
1,078 to 1,119 points	C+	77-79.9%
1,022 to 1,077 points	C	73-76.9%
980 to 1,021 points	C-	70-72.9%
938 to 979 points	D+	67-69.9%
882 to 937 points	D	63-66.9%
840 to 881 points	D-	60-62.9%
0 to 839 points	F	0-59.9%

Graded assignments

Lecture exams – There will be three 160-point comprehensive lecture exams (see the lecture schedule for dates). They will consist of multiple choice (four options) questions. The exam items will assess your comprehension of course materials at several different cognitive levels. They may be based upon diagrams, problems, data sets, or material drawn from the textbook or assigned readings.

- *480 points (34.3% of your final grade)*

Laboratory quizzes – There will also be twelve 10-point laboratory quizzes (see the lab syllabus for dates). These will cover the prior lab's material as well as the assigned readings for the current lab period. Questions may include matching, multiple-choice, and problem solving.
• *120 points (8.6% of your final grade)*

Laboratory notebook – You will be required to record your observations from laboratory exercises and analyze these data in a bound lab notebook. Your notebook entries will be periodically evaluated using a set of simple scoring rules. Your notebook scores will be entered into the Blackboard grade book several during the semester. Keep up-to-date in your notebooks to ensure that you score all of these points!
• *150 points (10.7% of your final grade)*

Online Quizzes – A series on online quizzes will be made available on Blackboard. There will be one 10-point quiz for each lecture in the course. You may take these as many times as you wish – your highest score will count toward your final course grade. I have found that too many students procrastinate on these assignments. They are there to provide you with an opportunity to study and review over time – rather than cramming before the exams. Therefore, there will be weekly deadlines for completing this this semester. After the deadline, the quizzes will be available for practice and review – but not for course points.
• *240 points (17.1% of your final grade)*

Short Microbiology Papers – During the semester, you will be asked to write four short (2-page) papers to address specific prompts about microbiological issues. Their purpose is to stimulate creative and critical thinking on your part with regard to the application of what we are covering in class to your everyday lives. More precise instructions about these papers, a grading rubric, and paper deadlines can be found on our Blackboard site.
• *100 points 7.1% of your final grade)*

Laboratory Practical – At the end of the semester, there will be one 150-point laboratory practical. This will consist of twenty-five timed stations covering the materials seen and worked with over the course of the semester. Each station will have three multiple-choice questions. The penultimate lab session will be devoted to reviewing the materials for this exam.
• *150 points 10.7% of your final grade)*

Final Exam – There will be a comprehensive lecture exam. Its content drawn from material on in our four lecture modules (approximately half new material and half review questions). Like the lecture exams, it will consist of multiple-choice (four options) questions.
• *160 points (11.4% of your final grade)*

Bonus – At various points during the semester, bonus assignments may be given. The nature of the assignments, their due dates, and point values will be announced during the semester.
• *70 points (up to an extra 5% added back onto your final grade)*

Due dates for graded work

Your grade will be based upon many different assignments this semester. The following is a chronological compilation of the due dates (last acceptable date) for each assignment. These due dates can also be found in our Blackboard course calendar online.

Assignment	Due Date	Points	Percent	Cumulative
Online quiz [1]	1/17/16	10	0.71%	0.71%
Lab quiz 1	1/19/16	10	0.71%	1.43%
Notebook [1,2]	1/21/16	10	0.71%	2.14%
Online quiz [2]	1/24/16	10	0.71%	2.86%
Lab quiz 2	1/26/16	10	0.71%	3.57%
Notebook [3,4,5]	1/28/16	15	1.07%	4.64%
Online quiz [3,4]	1/31/16	20	1.43%	6.07%
Lab quiz 3	2/2/16	10	0.71%	6.79%
Notebook [6,7,8,9]	2/4/16	20	1.43%	8.21%
Paper 1	2/5/16	25	1.79%	10.00%
Online quiz [5,6]	2/7/16	20	1.43%	11.43%
Exam 1	2/8/16	160	11.43%	22.86%
Lab quiz 4	2/9/16	10	0.71%	23.57%
Notebook [10,11,12]	2/11/16	15	1.07%	24.64%
Online quiz [7]	2/14/16	10	0.71%	25.36%
Lab quiz 5	2/16/16	10	0.71%	26.07%
Notebook [13,14]	2/18/16	10	0.71%	26.79%
Online quiz [8,9]	2/21/16	20	1.43%	28.21%
Lab quiz 6	2/23/16	10	0.71%	28.93%
Notebook [15,16,17]	2/25/16	15	1.07%	30.00%
Paper 2	2/26/16	25	1.79%	31.79%
Online quiz [10,11]	2/28/16	20	1.43%	33.21%
Lab quiz 7	3/1/16	10	0.71%	33.93%
Exam 2	3/2/16	160	11.43%	45.36%
Online quiz [12]	3/6/16	10	0.71%	46.07%
Notebook [18,19]	3/17/16	10	0.71%	46.79%
Online quiz [13,14]	3/20/16	20	1.43%	48.21%
Lab quiz 8	3/22/16	10	0.71%	48.93%
Online quiz [15,16]	3/27/16	20	1.43%	50.36%
Lab quiz 9	3/29/16	10	0.71%	51.07%

Notebook [20,21,22]	3/31/16	15	1.07%	52.14%
Paper 3	4/1/16	25	1.79%	53.93%
Online quiz [17,18]	4/3/16	20	1.43%	55.36%
Exam 3	4/4/16	160	11.43%	66.79%
Lab quiz 10	4/5/16	10	0.71%	67.50%
Notebook [23,24,26]	4/7/16	15	1.07%	68.57%
Online quiz [19]	4/10/16	10	0.71%	69.29%
Lab quiz 11	4/12/16	10	0.83%	70.00%
Online quiz [20,21]	4/17/16	20	1.43%	71.43%
Lab quiz 12	4/19/16	10	0.83%	72.14%
Notebook [25,27,28,29,30]	4/21/16	25	1.79%	73.93%
Online quiz [22,23]	4/24/16	20	1.43%	75.36%
Laboratory practical	4/28/16	150	10.71%	86.07%
Paper 4	4/29/16	25	1.79%	87.86%
Online quiz [24]	5/1/16	10	0.71%	88.57%
Final exam	5/2/16	160	11.43%	100.00%
Total		**1,400**	**100.00%**	**100.00%**

Class attendance, late assignments, and make-up policies

You are expected to attend class regularly. I have noted a direct correlation in my prior classes between student attendance and class performance. However, it is ultimately up to you to show up for class. You will be responsible for all reading, discussions, and lecture materials. The lab is an essential component of this course. **Therefore, anyone with more than two (2) unexcused absences from lab will receive an 'F' for the course.**

All graded materials must be completed on time. Make up exams will be provided only in the case of an excused absence. You must contact me within one week of the missed exam and provide written evidence to explain your absence. If you know in advance that you will be absent for an exam, please contact me immediately. I will attempt to arrange to accommodate you (within reason) with no penalty. You may always turn in assignments before their due dates. If you miss a lab, you may attend a different section in order to participate in graded work.

The following are instances of excused absences:

1. Hospitalization, with documentation from your physician
2. Severe illness, with documentation from your physician
3. Jury duty, with a copy of your court summons
4. Bereavement, with a letter from a family member

5. Ferris-sponsored sporting event, with a letter from your coach

The following are **NOT** instances of excused absences:

1. Oversleeping – get a better alarm clock
2. Work – You agreed to the class schedule when you signed up for the course
3. Appointments – see number two
4. Traveling – see number two
5. Other classes conflict – see number two
6. Jail or prison time – you have bigger problems than a missed deadline
7. Illness without documentation – you must have a physician's note
8. Forgot deadlines – they are your responsibility
9. Bad weather – if Ferris is open, our classes will meet as scheduled
10. Confusion – ask questions earlier rather than later!
11. Computer problems – there are over 100 computers available in the library alone

Blackboard

This semester, we will be extensively using Blackboard Learn in our course. Our site will contain a variety of materials to supplement, but not replace, class attendance and reading. I am always interested in comments, corrections, or suggestions with regard to the electronically delivered course content! This semester, the site will contain the following:

1. A PDF copy of this syllabus.
2. Links to many different resources to help you to succeed in this class.
3. All course announcements pertaining to this class.
4. A calendar of all course assignments and deadlines.
5. Online communication tools for you to contact me or your classmates.
6. On-line access to your course grades.
7. Ancillary lecture materials including: 1) assigned readings with links to the e-textbook, 2) PDF copies of the lecture slides for your note-taking convenience, 3) a link to a Tegrity recording of the lecture (if Tegrity actually works that day), and 3) links to additional information on the internet offered by our textbook publisher (for review only).
8. Online quizzes and bonus materials – these **do count** toward your final grade in the course.
9. A completely online laboratory manual. This will consist of about 30 modules – one for each laboratory activity this semester.
10. Additional information about me, my background, and my interests.

I hope that you find this material to be helpful in preparing for exams and pursuing your interests. Please feel free to offer constructive criticism.

Registering your Turning Technologies clicker

To complete this process, you will need the following: a Turning Technologies clicker (NXT) and a computer with Internet access.

1. Turn on your computer.
2. Connect to the Internet using your favorite browser.
3. Go to the MyFSU website and log in. (http://myfsu.ferris.edu/)
4. Click on the Blackboard "Bb" icon at the top of the screen.
5. Click on the "Courses" icon at the top of the page.
6. Select "BIOL286: General Microbiology, Spring 2016" from the list of online courses.
7. Click on "Start Here (please) in the left navigation menu
8. Click on the link called "Register Clicker"
9. Enter your clicker's serial number.

If you are experiencing difficulty registering your clicker, please come to my office hours.

Statement of disability services at FSU

Ferris State University is committed to following the requirements of the Americans with Disabilities Act Amendments Act and Section 504 of the Rehabilitation Act. If you are a student with a disability or think you may have a disability, contact the Disabilities Services office at 231.591.3057 (voice), or email mailto:ecds@ferris.eduto discuss your request further. More information can be found on the web at http://www.ferris.edu/htmls/colleges/university/disability/.

Any student registered with Disabilities Services should contact the instructor as soon as possible for assistance with classroom accommodations.

Academic misconduct policies at FSU

The university may discipline a student for academic misconduct, which is defined as any activity that tends to undermine the academic integrity of the institution. Academic misconduct includes, but is not limited to, the following:

Cheating - A student may not use unauthorized assistance, materials, information, or study aids in any academic exercise, nor should a student give assistance, materials, information, or study aids to another student in any academic exercise.

Fabrication - A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citations of the sources of information.

Facilitating Academic Dishonesty - A student must not intentionally or knowingly help or attempt to help another student to commit an act of academic misconduct. A student is

responsible for taking reasonable precautions to ensure his or her work is not accessed by or transferred to another individual wherein it may then be used to commit an act of academic misconduct.

Interference - A student must not steal, change, destroy, or impede another student's work. Impeding another student's work includes, but is not limited to, the theft, defacement, or mutilation of resources so as to deprive others of the information they contain. A student must not give or offer a bribe, promise favors, or make threats with the intention of affecting a grade or the evaluation of academic performance.

Plagiarism - A student must not adopt or reproduce ideas, words, or statements of another person without appropriate acknowledgment. A student must give credit to the originality of others and acknowledge indebtedness whenever he or she quotes or paraphrases another person's words, either oral or written and whenever he or she borrows facts, statistics, or other illustrative material, unless the information is common knowledge.

Violation of Course Rules - A student must not violate course rules as contained in a course syllabus which are rationally related to the content of the course or to the enhancement of the learning process in the course.

Violation of Professional Standards and Ethics - A student must not violate the professional standards or ethical code related to one's intended profession as defined by the academic program or department.

Communication courtesy policy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and other online communication. If I deem any of them to be inappropriate or offensive, I will first contact the persons involved. For chronic problems, I will forward the messages to the chair of the department and appropriate action will be taken, not excluding expulsion from the course. The same rules apply online as they do in person. Be respectful of other students. Foul or inappropriate discourse will not be tolerated. Please take a moment and read the following link concerning the four hallmarks of "FerrisConnetiquette". http://www.ferris.edu/HTMLS/administration/academicaffairs/online/FerrisConnetiquette.pdf

Preparing for this course

This course will cover a diverse range of topics and will require you to possess some fundamental skills and knowledge. These will include a basic background in biology, chemistry, and math. In addition, you will need to have a working understanding of the metric system, common laboratory practices, and good study skills. Because of these demands, many students claim that this is a challenging class. I want you to succeed this semester! Take a little time right now to find out if your background in these fundamental topics is sufficient. Simply go to this site: http://www.mhhe.com/micro_prep/ and complete the online quizzes there. This site will

help you to identify any weaknesses early on and will also give you some study suggestions as you begin the class. In addition, go to our Bonus Work folder and complete the pre-course test. I want to see what your preexisting knowledge of microbiology is like. Thanks.

Lecture Schedule

		Date	Topic	Chapters	Pages
	M	*Jan 11*	*Course introduction and orientation*	*see syllabus*	
Microbial Diversity	W	Jan 13	Scope and History of Microbiology	1	2-38
	M	Jan 18	***Martin Luther King Holiday - No classes!***		
	W	Jan 20	Observing Microbes	2	39-72
	M	Jan 25	Microbial Cells	3	73-114
	W	Jan 27	Prokaryotic Diversity	18,19	675-754
	M	Feb 01	Eukaryotic Diversity	20	755-792
	W	Feb 03	Virus Structure and Function	6	181-217
	M	**Feb 08**	**LECTURE EXAM ONE**		
Microbial Metabolism	W	Feb 10	Bacterial Growth	4	115-148
	M	Feb 15	Environmental Influences on Growth	5	149-180
	W	Feb 17	Catabolism	13	458-504
	M	Feb 22	Respiration, Lithotrophy, and Photolysis	14	505-546
	W	Feb 24	Food and Industrial Microbiology	16	583-619
	M	Feb 29	Microbial Ecology	21,22	793-859
	W	**Mar 02**	**LECTURE EXAM TWO**	**15% OLD MATERIAL**	
	M	***Mar 07***	***Spring Break - No classes!***		
	W	***Mar 09***	***Spring Break - No classes!***		
Microbial Genetics	M	Mar 14	Microbial Genomes	7	218-256
	W	Mar 16	Gene Expression	8	257-302
	M	Mar 21	Molecular Regulation 1	10	341-384
	W	Mar 23	Molecular Regulation 2	10	341-384
	M	Mar 28	Gene Transfer and Mutagenesis	9	301-340
	W	Mar 30	Viruses and the Mobilome	11	385-426
	M	**Apr 04**	**LECTURE EXAM THREE**	**30% OLD MATERIAL**	
Host-Microbe	W	Apr 06	Chemotherapy	27	1029-1062
	M	Apr 11	Innate Immune Defenses	23	860-894
	W	Apr 13	Adaptive Immune Defenses	24	895-936
	M	Apr 18	Hypersensitivities and Vaccines	24	893-934
	W	Apr 20	Microbial Pathogenesis	25	937-978
	M	Apr 25	Microbial Diseases 1	26	979-1028
	W	Apr 27	Microbial Diseases 2	26	979-1028
	M	**May 02**	**COMPREHENSIVE FINAL EXAM**	**45% PRIOR MATERIAL**	

Laboratory Schedule

	Date	Graded Work	Topic
T	Jan 12		(1) Laboratory safety
R	Jan 14		(2) Microscopy
T	Jan 19	**Quiz 1**	(3) Cell morphology & (4) Aseptic technique <*continuing*>
R	Jan 21	**Notebook 1**	(5) Gram stain & Complete aseptic technique
T	Jan 26	**Quiz 2**	(6) Capsule stain & (7) Endospore stain
R	Jan 28	**Notebook 2**	(8) Acid-fast stain & (9) Bacterial motility
T	Feb 02	**Quiz 3**	(10) Protozoa & (11) Fungal slide culture <*continuing*>
R	Feb 04	**Notebook 3**	(12) Viable bacteria counts <*continuing*>
T	Feb 09	**Quiz 4**	(13) Bacteriophage & Complete viable bacteria counts & Fungal slide culture
R	Feb 11	**Notebook 4**	(14) Bacterial growth curve & Complete bacteriophage
T	Feb 16	**Quiz 5**	(15) Environmental conditions <*continuing*> & (16) Anaerobes <*continuing*>
R	Feb 18	**Notebook 5**	(17) Antimicrobial compounds <*continuing*> & Complete anaerobes
T	Feb 23	**Quiz 6**	Complete antimicrobial compounds & Environmental conditions
R	Feb 25	**Notebook 6**	(18) Thermal death curves <*continuing*>
T	Mar 01	**Quiz 7**	(19) Ultraviolet light & Complete thermal death curves
R	Mar 03		Complete ultraviolet light
T	***Mar 08***		***Spring Recess - No Class!***
R	***Mar 10***		***Spring Recess - No Class!***
T	Mar 15		(20) Water quality testing <*continuing*> & (21) Transformation <*continuing*>
R	Mar 17	**Notebook 7**	(22) Lactose regulation <*continuing*> & Continue transformation & Complete water quality testing
T	Mar 22	**Quiz 8**	(23) Enterobacteriaceae & Complete transformation
R	***Mar 24***		***Mid-Semester Recess - No Class!***
T	Mar 29	**Quiz 9**	(24) Gram positive cocci & (25) Bacterial unknown streaking <continuing>
R	Mar 31	**Notebook 8**	(26) Symbioses <continuing> & Bacterial unknown staining <continuing>
T	Apr 05	**Quiz 10**	(27) Exoenzymes <continuing> & Complete symbioses & Bacterial unknown <continuing>
R	Apr 07	**Notebook 9**	Complete exoenzymes & Bacterial unknown characterization <continuing>
T	Apr 12	**Quiz 11**	Bacterial unknown identification <continuing>
R	Apr 14		(28) Wastewater treatment plant tour < -- *field trip* -- >
T	Apr 19	**Quiz 12**	(29) Lysozyme <*continuing*> & Complete bacterial unknowns
R	Apr 21	**Notebook 10**	(30) White blood cells & Complete lysozyme
T	Apr 26		Laboratory practical review session
R	**Apr 28**		**LABORATORY PRACTICAL EXAM**

SYLLABUS ATTACHMENT
FERRIS STATE UNIVERSITY – COLLEGE OF ARTS AND SCIENCES
Spring 2016

ARE YOU CONSIDERING ADDING A MINOR OR MAJOR TO YOUR CURRENT PROGRAM?
Use **My Degree** to see what classes may already apply.
For more information, stop by the Arts and Sciences Dean's Office!

IMPORTANT DATES		
Late registration	Wed. – Fri	Jan 6 – 8
First day of classes	Monday	Jan 11
Last day for Drop/Add	Thursday	Jan 14
Martin Luther King Day (no classes)	Monday	Jan 18
Last Day for Online Grad Application	Friday	Feb 26
Mid-term grades due	Monday	Mar 7
Spring recess (no classes)	Sat, Mar 5 – Sun, Mar 13	Mar 5 – Mar 13
Last day for "W" grades (full semester)	Wednesday	Mar 23
Mid-term recess (no classes)	Thurs - Sun	Mar 24 - 27
Last day of classes	Friday	April 29
Examination Week	Mon – Fri	May 2 – May 6
Commencement	Friday, Saturday	May 6, 7
Final grades due by 1:00 pm	Monday	May 9

DEPARTMENT OFFICES		
Biology	ASC 2004	591-2550
Humanities	JOH 119	591-3675
Lang/Lit	ASC 3080	591-3988
Mathematics	ASC 2021	591-2565
Physical Sciences	ASC 3021	591-2580
Social Sciences	ASC 2108	591-2735
Social Work	ASC 2108	591-2737
Dean's Office	ASC 3052	591-3660

Sessions	Dates	Last Day to Withdraw
Full Session	Jan 11 – April 29	Mar 23
Session A	Jan 11 – Mar 1	Feb 11
Session B	Mar 2 – April 29	Apr 12
Session D	Jan 11 – Feb 12	Feb 1
Session E	Feb 15 – Mar 24	Mar 4
Session F	Mar 28 – April 29	Apr 18

WHAT YOU NEED TO KNOW

E-MAIL
All registered FSU students have a Ferris Gmail account. This is the only email to which all official University information about registration, financial aid, student activities, and class cancellations will be sent. Please check your account at least once a week. E-mail is our primary communication resource for students.

CLASS ATTENDANCE IS IMPORTANT!
Attendance usually has a high correlation with how well you do in a course. Many instructors have mandatory attendance policies by which your grade will be affected by absences. Some instructors also have policies about class tardiness to encourage students to be present for the full class period. Check your course syllabus or talk to your instructor about his/her policies.

HOW TO CONTACT A FACULTY MEMBER OR ADVISOR
If you have questions or need help, talk to your instructor. Faculty office locations, phone numbers, and office hours may be obtained from the class syllabus or department office, through the College of Arts and Sciences web page at http://www.ferris.edu/htmls/colleges/artsands/, or through the Directories & Maps link on the FSU home page.

DROPPING CLASSES OR WITHDRAWING
Dropping and adding only occurs during the first four days of the term. You can adjust your schedule **online during the first four days** or in person at the Timme Center (from 8-5 except for the last day when it is 12-5). *If you add a class you must pay for your additional charges by the fourth day or your schedule will be dropped.*

If you need to withdraw from a class after the official drop/add period, you must do so **OFFICIALLY**, through your dean's office, in order to avoid receiving an "F" grade in the course. **You may not withdraw online after the first four days of the term.** You will receive a "W" for the course. *You will not receive a refund.* If you need to totally withdraw from the University, you must do so **officially** at Admissions and Records in CSS 101. The last day to withdraw or drop a class may be different for different classes. **CHECK THE SESSIONS DATES SECTION ABOVE OR THE REGISTRATION AND ACADEMIC GUIDE FOR THE WITHDRAWAL DEADLINES FOR THE SEMESTER**. In cases of extenuating circumstances (e.g., a serious illness requiring you to withdraw from school), contact Birkam Health Center at 591-2614.

INCOMPLETES
The "I" is only considered for extenuating circumstances that have led to a student missing a portion of the course. The intent and appropriate use of the "I" grade is NOT to avoid student probation, dismissal, or unacceptable grades, nor should it be considered as an extended alternative to withdraw from a class (W). Extenuating circumstances are generally defined as those situations over which a student has little or no control—e.g., illness, birth, jury duty, death of a parent, serious injury. Instructors may require suitable documentation.

Students must have completed at least 75% of the coursework at passing levels before an "I" will be considered, and they may be required to sign an agreement regarding course completion. An "I" grade automatically changes to an "F" after one semester (not counting summer) unless the faculty member files another grade or extends the incomplete.

GRADUATION – ONLINE APPLICATION DEADLINE for participation in Spring Commencement Ceremony: **February 26, 2016**
Students should apply for their degree the semester prior to the degree completion term. To obtain a degree audit for either associate in arts degree, contact Dr. Roxanne Cullen (cullenr@ferris.edu) or Dave Schrock (daveschrock@ferris.edu), or associate in science degree, contact Kim Ducat (ducatk@ferris.edu). For a degree audit and clearance for bachelor degrees, contact your program coordinator. Online graduation application is REQUIRED and deadlines will be ENFORCED per the Provost's Office and Records Office. Apply for your degree by logging into your MyFSU, (click on Student tab, My Records link, Degree Progress and Graduation, Apply to Graduate link). For more information, contact the Dean's Office.

INCLEMENT WEATHER CONDITIONS
Only during the most severe weather conditions – which could potentially endanger the safety of students or staff – will the Big Rapids campus consider cancelling classes. The decision to cancel classes due to weather conditions at the Big Rapids site will be made as early as possible. In the event it is necessary to cancel classes, periodic announcements will be made on area radio and television stations. It is the student's responsibility to listen for these announcements. A student may also call the Ferris Information Line at 231-591-5602 or check the Ferris website.

ACADEMIC MISCONDUCT

Academic misconduct refers to dishonesty or misrepresentation with respect to assignments, tests, quizzes, written work, oral presentations, class projects, internship experience, or computer usage; violation of computer licenses, programs, or data bases; or unauthorized acquisition or distribution of tests or other academic material belonging to someone else. It includes such behaviors as cheating, copying materials from the internet without documentation, presenting another person's ideas or work as your own, taking someone else's exam for them, violating computer software licenses or program/data ownership, etc. It is the expectation of the College of Arts and Sciences that all work you turn in is your own and is original for the course in which it is being submitted. If you are uncertain about whether a particular behavior might represent academic misconduct, be sure to ask your professor for clarification. Penalties for academic misconduct can include **FAILURE** of the assignment or the course, and/or disciplinary action up to and including probation or dismissal from the University.

DISRUPTIVE BEHAVIOR
The College of Arts and Sciences strives to maintain a positive learning environment and educational opportunity for all students. Consequently, patterns of behaviors which obstruct or disrupt the teaching/learning environment will be addressed. The instructor is in charge of his or her course (e.g., assignments, due dates, attendance policy) and classroom (e.g., behaviors allowed, tardiness). Harassment, in any form, will not be tolerated. Penalties for disruptive behavior can include involuntary withdrawal from the course and/or disciplinary action up to and including probation or dismissal from the University. The full Disruptive Behavior Policy is available on the College of Arts and Sciences website at http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/CAS-disruptive-behavior-policy-final.pdf
For additional policies and helpful information, check out the College of Arts & Sciences Student Resources page at
http://www.ferris.edu/HTMLS/colleges/artsands/student-resources/

WHERE TO GO FOR HELP

The following services are available to any Ferris student, free of charge. They are designed to help you succeed in your courses, in your career planning, and in meeting the challenges of university life. Don't hesitate to explore and use these services at Ferris.

ACADEMIC ADVISING
All students have an assigned advisor and should confer with that advisor regularly. Students who have declared a major should see an advisor in that major. To find out who your advisor is, login to MyFSU, (click on the Student tab, My Registration, Advisor Information, Select Term, Submit).

ACADEMIC SUPPORT CENTER.....ASC 1017 – 591-3543
THE WRITING CENTER.....ASC 1017 – 591-2534
The Academic Support Center, Tutoring Services, and Writing Center join together to offer FSU students an array of academic support services. Tutors are available to answer questions for many courses. The Writing Center helps writers individually and in workshops with skills and assignments. There is also study skills assistance to help with note-taking, test-taking, memory and reading strategies, and time management.

DISABILITIES SERVICES.....STR 313 591-3057
According to the Americans with Disabilities Act, each student with a disability is responsible for notifying the University of his/her disability and requesting accommodations. Students requiring a classroom accommodation due to a physical, learning, mental or emotional disability should contact the Disabilities Services Office.

SCHOLAR PROGRAM.....ASC 1021 591-5976
SCHOLAR is an academic support program that aids in the student's successful progression by offering a Peer Mentor Program, a Student Retention Program, and an Academic Student Advisory Committee.

PERSONAL COUNSELING, SEXUAL ASSAULT, SUBSTANCE ABUSE BIRKAM HEALTH CENTER ..... 2nd Floor - 591-5968
Personal counseling is available confidentially and free of charge. Counselors are available to assist with personal and stress-related problems, family and relationship issues, substance abuse, sexual assault, depression, or other similar problems. Call or stop by to obtain an appointment.

If you or a friend is in immediate crisis, call 911.

EDUCATIONAL & CAREER COUNSELING.....STR 313 591-3057
Students wanting to examine their choice of major or career choice, learning styles or strategies can make one-on-one appointments with licensed counselors.

SAFETY
Please observe the posted shelter and evacuation routes in the hallway nearest your classroom.

OTHER RESOURCES

BIRKAM HEALTH CENTER.....1st Floor 231-.591-2614
The Birkam Health Center provides fee-for-service medical care including evaluation and treatment for illness and injury anytime during the year. Patients are seen on a walk-in and by appointment basis.

FLITE LIBRARY.....231-591-2669
Regular hours for FLITE:
Monday – Thursday . . . . . 7:30 am – Midnight
Friday . . . . . 7:30 am – 6:00 pm
Saturday . . . . . NOON – 5:00 pm
Sunday . . . . . 1:00 pm – Midnight
Extended Studies Court will begin late night hours January 19, 2016
*Sunday-Thursday/MIDNIGHT to 7:30 a.m.
*Friday-Saturday/6 p.m. to MIDNIGHT

FSU BOOKSTORE.....UNIVERSITY CENTER 231 - 591-2607
Regular hours for Bookstore *(subject to change)*:
Monday – Thursday . . . . . 9:00 am – 6:00 pm
Friday . . . . . 9:00 am – 5:00 pm
Saturday . . . . . NOON – 4:00 pm
Sunday . . . . . CLOSED

HELPFUL NUMBERS

Admissions	2100	Inst. Testing	3628
Business Office	2125	Public Safety	5000
Financial Aid	2110	Records	2792
Housing	3745	TAC	4822

When calling from off campus, extensions can be called by using the prefix 231-591-_____.

MICROBIAL ECOLOGY
BIOL 218, 3 Credit Hours
SPRING 2017

CONTACT INFORMATION:
Professor: Dr. Anne M. Spain
Office: ASC 2118
Email: annespain@ferris.edu
Office phone: 231.591.3190
Twitter: https://twitter.com/spainmicrobio

COURSE INFORMATION:
Lecture: Science Building Rm. 137
TR 12:00 - 12:50 p.m.

Lab: Science Building Rm. 211
TR 1:30 - 2:45 p.m

OFFICE HOURS
MW 1:00 – 3:00 p.m.
Or by appointment

All students are highly encouraged to primarily use office hours for any and all questions regarding class material and grades. These office hours are an opportunity where you can come and go over recent exams and quizzes, or ask questions regarding class material for which you may need further explanation or help understanding. You are encouraged to make appointments but walk-ins are welcome and will be accommodated whenever possible. If you score below 60% on any lecture exam, **you are required** to schedule and attend at least one office hour session to go over your results.

COURSE DESCRIPTION AND PREREQUISITES:
The course will cover an introduction to microbial cells; microbial interactions, both intraspecific and interspecific, including the roles of microbes in plant and animal ecology; microbial responses to abiotic environmental factors and their role in biogeochemical cycling and biodegradation; and the use of microbes in environmental applications, such as heavy metal and petroleum bioremediation, pest control, wastewater treatment, and the production of alternative energy sources. This course is designed for biology education, environmental biology, and environmental health students and meets General Education requirements: Scientific Understanding Lab. *The prerequisite for this course is passing Biol 121 with a C- or better*

REQUIRED COURSE MATERIALS:
Textbook: *Microbial Ecology*. By Larry L. Barton and Diana E. Northup. Wiley-Blackwell, 2011. Online reading assignments will also be given through Todar's Online Textbook of Bacteriology (free) found at: http://textbookofbacteriology.net/index.html

Laboratory Manual: *Benson's Microbial Applications*, 12th edition. By Alfred E. Brown. McGraw-Hill Education, 2011.

Other supplies: Cloth lab coat, bound laboratory notebook, marking pen (sharpie), and a scientific calculator (needed for lecture exams and laboratory exercises and quizzes). A no. 2 pencil may also be required on exam days. Access to a computer and printer will also be highly important – Lecture outlines and PowerPoint slides, and some lab materials will also be available on the designated Blackboard site for this course. ***It is highly advised that you print off lecture outlines prior to each class to enable active note-taking during lecture.***

GENERAL EDUCATION LEARNING OUTCOMES:
This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should: 1) have a working knowledge of the fundamental principles of a natural science discipline; 2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences; 3) have a basic

understanding of the scientific method, scientific concepts, and the evolution of scientific ideas; and 4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

SPECIFIC COURSE GOALS AND LEARNING OUTCOMES: Each of the general education outcomes listed above will be addressed and assessed over the course of the semester. Some will be dealt with in lecture, others in laboratory, and others in both. Listed below are several specific learning objectives for students in this course. By the end of this course, you should be able to:

1) Demonstrate a general majors-level knowledge and understanding in key areas of Microbial Ecology:

a) *The microbial cell and microbial ecology.* In this unit, you will give examples of and compare and contrast different types of microbial cells (including bacteria, archaea, and microeukaryotes); identify various cell structures and define their functions; and understand basic cellular processes, such as molecular genetics, metabolism, and growth. You will learn taxonomic vs. functional approaches to assessing microbial diversity, and learn about methods used to address questions in the field of microbial ecology.
b) *Microbial interactions:* In this unit, you will understand how environmental parameters affect microbial growth, and identify ways in which microbes interact with each other, their environment (e.g. soil, water, air), plants, and animals.
c) *Microbial applications:* In this unit, you will use your knowledge of microbial metabolism to understand how microbes can be used in various environmental and industrial applications, such as wastewater treatment, bioremediation of metals and petroleum, ethanol production, and food and beverage production.

Knowledge and understanding in these areas will be assessed via individual and group class quizzes and assignments, laboratory quizzes, lecture exams, and a comprehensive final exam.

2) Demonstrate proper laboratory skills and develop habits of good laboratory practices that extend to your everyday life and future careers. *This will be assessed via laboratory exercises, laboratory notebooks entries, laboratory quizzes, and the laboratory practical.*

3) Critically think about data collected upon observations from laboratory exercises and experiments. Plot data when appropriate and interpret any trends. Make inferences and predictions based upon the interpretations. *This will be assessed via laboratory quizzes, a written laboratory report, and the laboratory practical.*

4) Communicate effectively individually and in group settings and exchange ideas concerning course-related topics. Read, write, and speak about Microbiology with classmates and members of the community. *This will be assessed via short writing assignments, a written laboratory report, group quizzes and assignments, short answer and essay questions on lecture exams, and a group oral presentation.*

COURSE POLICIES:

Attendance and Participation:

- Students are expected to 1) attend lecture regularly, 2) read assigned chapter readings BEFORE each class, and 3) answer questions in class based on assigned reading and content learned from previous lectures.
- Lecture outlines will be provided on your Blackboard course site prior to each class and should be printed and used as a tool to take notes from your assigned reading and lecture. Coming to class prepared in this way will greatly improve chances of success in this course,

and will be reflected in individual and group quizzes and assignments.

- All graded materials with deadlines must be completed and turned in on time, but you may turn in assignments early. Late assignments will result in a grade deduction of 10% per day.
- For unexcused absences, there are no makeups for exams, in-class quizzes, and/or assignments.
- Make-up exams and quizzes will be provided only in the case of a documented excused absence. You must contact me **within one day** of the missed exam/quiz and provide **written evidence** within one week to explain your absence. If you know in advance that you will be absent for an exam, please contact me immediately.
- **You will be held responsible for all in-class announcements, assignments, handouts, etc., even if you are late or absent (excused or unexcused).**
- Because the lab is an essential component of this course, anyone with **more than two (2) unexcused absences from lab will receive an 'F' for the course**. There is only one lab section for this course, so there will not be lab make-up sessions available for either excused or unexcused absences.

The following are instances of excused absences:

1. Severe illness or hospitalization, with documentation from your physician
2. Jury duty, with a copy of your court summons
3. Bereavement, with a letter from a family member or obituary notice.
4. Ferris-sponsored sporting event, with a letter from your coach

Cheating and plagiarism: Any instance of cheating or failure to use one's own thoughts, words, or figures/tables (i.e. plagiarism) on a quiz, exam, or written assignment will result in a "0" for the entire graded item. Additional information regarding policies regarding academic misconduct can be found at: http://www.ferris.edu/HTMLS/administration/studentaffairs/judicial/faculty_resources/homepage.htm

GRADING GUIDELINES: There is a total of 1000 points in this class; the distribution of these points is shown below

***Calculation of Final Grade*:** This course is designed to be out of a total of 1000 possible points. Your final grade is based on the number of points that you earn out of these 1000 points. Your midterm grade will be posted by March 6, 2017. For both your midterm and final grades, there will be no curves or adjustments given. As well, there will be no extra credit assignments given; however, there may be bonus questions available on quizzes and tests. The point range for each possible grade is shown below:

FINAL POINTS	FINAL PERCENT	GRADE
930-1000	93.0-100%	A
900-929	90.0-92.9%	A-
870-899	87.0-89.9%	B+
830-869	83.0-86.9%	B
800-829	80.0-82.9%	B-
770-799	77.0-79.9%	C+
730-769	73.0-76.9%	C
700-729	70.0-72.9%	C-
670-699	67.0-69.9%	D+
630-669	63.0-66.9%	D
600-629	60.0-62.9%	D-
<600	<60%	F

Description of Course Components and Distribution of Points:

Component	Description	Points	% of Final Grade
Lecture: The lecture portion of this class makes up 65% of your final grade (655 points). On the next page is a detailed lecture schedule; below is a description of the graded components of the lab.			
Lecture Exams	Each lecture exam will consist of a combination of multiple choice, T/F, matching, fill-in-the-blank, and short answer, and/or essay questions.	**450**	**45**
Exam 1	Unit 1 exam **(150 pts)**		
Exam 2	Unit 2 exam **(150 pts)**		
Exam 3	Comprehensive final exam **(150 pts)**		
Lecture quizzes and attendance	Individual and group quizzes and assignments will be given in class randomly; thus, you must be in attendance to receive pts.	**95**	**9.5**
Short writing assignments	Two short writing assignments (1-2 pages) will be assigned during the first two units of this class. Each writing assignment will involve reading a research article and discussing a current topic in microbial ecology. Specific instructions will be given with each assignment.	**30**	**3.5**
Group Presentations	Members of each group will, together, select a topic related to a microbial application, and present a 20-25 min lecture to the class during Unit 3. Complete instructions will be given in lecture.	**50**	**5**
Group evaluations	At the end of the semester, each group member will evaluate oneself as well as each of his/her fellow group members. Your grade will be based on evaluations from your peers, but will be assigned by myself.	**25**	**2.5**
Lab: The laboratory portion of this class makes up 35% of your final grade (350 points). On the last page, you will find a detailed schedule; below is a description of the graded components of the lab.			
Laboratory quizzes	There will be ten 10-point quizzes given on the Wednesday of each week, *at the beginning of class*, covering any background/reading material covered, lab procedures performed, and/or data analyzed since the previous week's quiz. There will also be one bonus 10-point quiz given toward the end of the semester (Lab Quiz 11).	**100**	**10**
Lab Practical	At the end of the semester, there will be a 50-question laboratory practical. This will consist of twenty-five timed stations (two questions at each station) covering the materials seen and worked with over the course of the semester. The lab session held prior to the practical exam will be devoted to reviewing the materials for this exam.	**100**	**10**
Lab Notebook	You will be required to record ***in pen*** an entry for each laboratory exercise performed in class. Lab notebook entries serve as a reflection of the work that was done in lab, and any and all results/observations obtained from such work. Every entry is formatted the same (with the following subsections: title, purpose, materials and methods, results and observations, and conclusions) and each page is dated according to when the work was done/when results or observations were obtained. More specific instructions on how to keep a lab notebook and what to include in each entry will given in lab. A 40-point analytic rubric will be used to score your entries twice during the semester.	**80**	**8**
Lab Reports	You will complete two mini-lab reports (35 pts each) that discuss the methodology and results of two lab exercises. Mini-lab reports will also include the generation of tables and/or figures to depict results. Complete instructions will be provided for each assignment in lab.	**70**	**7**

LECTURE SCHEDULE: BIOL 218, Spring 2017

Day	Date	Lecture Title		Reading Assignments	
				Barton & Northup	Todar's
Unit One: Microbial Diversity					
T	Jan 10	Course Overview (Syllabus) & Our Microbial Biosphere		1.1-1.2	http://textbookofbacteriology.net/Impact.html
R	Jan 12				
T	Jan 17	Structural Diversity of Prokaryotic and Eukaryotic Microorganisms	Part 1: Prokaryotes	1.6-1.61 3.1-3.7.3	http://textbookofbacteriology.net/structure.html
R	Jan 19				
T	Jan 24				
R	Jan 26		Part 2: Microeukaryotes	2.8-2.11	N/A
T	Jan 30	Metabolic Diversity of Microorganisms		1.6.2 1.3-1.5.2 3.9-3.10	http://textbookofbacteriology.net/metabolism.html
R	Feb 2				
T	Feb 7				
R	Feb 9	Phylogenetic Diversity of the Three Domains		2.1-2.13	http://textbookofbacteriology.net/procaryotes.html
T	Feb 14				
R	**Feb 16**	**Unit One Exam – 150 pts**			
Unit Two: Microbial Interactions					
T	Feb 21	Microbe-Microbe Interactions		6.1-6.9	N/A
R	Feb 23				
T	Feb 28				
R	Mar 2	Environmental Influences on Microbial Growth		N/A	http://textbookofbacteriology.net/nutgro.html http://textbookofbacteriology.net/growth.html
No classes for the week of Mar 6-Mar 10: SPRING BREAK!					
T	Mar 14	Environmental Influences on Microbial Growth		N/A	http://textbookofbacteriology.net/control.html
R	Mar 16	Biogeochemical Cycling and Microbial Habitats	Part 1: Introduction, C and O cycling	10.1-10.4	http://textbookofbacteriology.net/environment.html
T	Mar 21				
R	Mar 23	***Selection of presentation topics and group work***			
T	Mar 28	Biogeochemical Cycling and Microbial Habitats (cont)	Part 2: Soils, Oceans, and the N cycle	4.4-4.4.1 9.11.1 10.5-10.5.4	
R	Mar 30				
T	Apr 4		Part 3: Oceans, aquatic springs, and the S cycle	9.11.2 10.6-10.6.2	
R	Apr 6				
T	Apr 11	**Unit Two Exam – 150 pts**			
R	Apr 13	***No class (mid-semester recess)***			
Unit Three: Microbial Applications					
T	Apr 19	Group lectures 1 & 2		TBD	
R	Apr 21	Group lectures 3 & 4		TBD	
T	Apr 26	Group lectures 5 & 6		TBD	
R	Apr 28	Spain Lecture – Bioremediation of uranium in groundwater co-contaminated with nitrate		TBD	
Tuesday, May 2, 12:00-1:40 p.m. Comprehensive Final Exam (150 points)					

*Dates and topics are subject to change – Announcements regarding changes will always be made in class. Thus, if you miss class, it is your responsibility to find out if there were any changes to the lecture schedule

BIOL 218 LAB SCHEDULE:

Day	Date	Titles of Lab Exercises (Exercise No.)
T	Jan. 10	Lab Safety; Introduction to Keeping a Laboratory Notebook
R	Jan. 12	Brightfield Microscopy (1); Smear Preparation (11); Simple Staining (12)
T	Jan. 17	Preparation of Soil/Sediment Slurries (Handout); Ubiquity of Bacteria (7)
R	Jan. 19	Ubiquity Follow-Up (7)
T	Jan. 24	Aseptic Technique and Isolation of Pure Cultures (9, 10)
R	Jan. 26	Gram Stain (15)
T	Jan 21	Endospore and Capsule Stains (16, 14)
R	Feb. 2	Set up Winogradski Columns (52)
T	Feb. 7	Fungal Diversity (8)
R	Feb. 9	Diversity of Protists and Cyanobacteria (6)
T	Feb. 14	Anaerobic Growth (27)
R	Feb. 16	Anaerobe Follow-Up; Effects of Environ Parameters on Microbial Growth (28-30)
T	Feb. 21	Antimicrobial Resistance (34)
R	Feb. 23	Environ. Parameters and Antimicrobial Resistance Follow-Ups
T	Feb 28	Microbial Interactions: Commensalism and Antagonism (55, 57)
R	Mar. 2	Microbial Interactions Follow-Up
SPRING BREAK (MAR. 6-10): NO LABS		
T	Mar. 14	Introduction to the N Cycle; Ammonification (48)
R	Mar. 16	Ammonification Follow-Up; Free-living Nitrogen-Fixation
T	Mar. 21	Nitrogen-Fixation (Pt 2)
R	Mar. 23	Nitrification and Denitrification (Handout)
T	Mar. 28	Nitrogen Fixation (Pt 3)
R	Mar. 30	Nitrification and Denitrification Follow-Up
T	Apr. 4	Breakdown of Winogradsky columns; Enrichment of Sulfate-Reducing Bacteria
R	Apr. 6	Quantification of Fecal Coliforms in Recreational Water (Handout)
T	Apr. 11	SRB Follow-Up
R	Apr. 13	***No Labs (mid-semester recess)***
T	Apr. 18	Fecal Coliforms Follow-Up; Lab Check Out
R	Apr. 20	Visit to the Big Rapids Wastewater Treatment Plant
T	Apr. 25	Lab Practical Review Session & Lab Checkout
R	Apr. 27	**Laboratory Practical Exam**

* All lab coats left in the laboratory after check out will be held until Friday, May 12. After that, they will be donated to area schools.

Biology 322
Human Anatomy and Physiology
Course Syllabus
Spring 2017

Course Description: Second of two semesters of a comprehensive, integrated course in anatomy-physiology developing logical correlations between structures and their function. Topics: respiratory, digestive, metabolic, cardiovascular, excretory and reproductive systems. Designed for students in science baccalaureate degree programs.

Instructor:	Dr. Daisy Daubert
Office:	2012 Arts and Science Commons
Phone:	(231) 591-2554
Email:	dauberd@ferris.edu (best way to contact me)

Office hours:	Monday	10:00-11:00 am	ASC 2012
	Tuesday	1:20-2:50 pm	ASC 2012
	Thursday	1:20-2:50 pm	ASC 2012
	By appointment		

Lectures:	Tu, Th	12:00-1:15 pm	Sci 120
Labs:	Tu	6:00-8:50 pm	Sci 228
	W	12:00-2:50 pm	Sci 228
	Th	6:00-8:50 pm	Sci 228

Course Prerequisites: BIOL 122, 321 and CHEM 122 each with a grade of C- or better

Required Materials:

1. M. Beth Zimmer. Fundamentals of Human Physiology: A Comparative Examination Preliminary Edition. Cognella Academic Publishing. San Diego, CA. https://students.universityreaders.com/store/

2. Turning Technologies clicker

Lab Material:

1. OpenStax Anatomy and Physiology
   https://cnx.org/contents/FPtK1zmh@8.47:zMTtFGyH@4/Introduction
   or any human anatomy lab manual

Course Outcomes:

1. Students will be able to identify and name designated anatomical structures (both histological and gross) within the following organ systems: the digestive system, the respiratory system, the cardiovascular system, the male and female reproductive system, and the renal system.
2. Students will be able to explain physiological functions and mechanisms within the following organ systems: the digestive system, the respiratory system, the cardiovascular system, the male and female reproductive system, and the renal system.

3. Students will be able to apply their knowledge of anatomy and physiology to think critically about the application of anatomical and physiologic concepts: analyze the specific situation and predict the outcome and the possible consequences of additional changes.
4. Students will be able to carry out experimental procedures, evaluate experimental data and form an understanding of the process that comes from the results of the experiment.

Lecture and Lab NOTES - Blackboard and the Internet:

All lecture and lab notes will be made available via Blackboard either before or after the class period. Most lectures will also be recorded via Tegrety for later viewing/listening through Blackboard. Tegrety has not always been reliable so you should not count on it being available for any given lecture.

Some lectures or lab lectures will be online only. On these days you will be responsible for watching the lectures before attending lecture. In class we will do activities that require you to have read the book and/or watched the lectures online.

Although the internet has become a major source of scientific information, one should remember that, unlike scientific papers or textbooks, web sites do not undergo the process of peer review. Consequently, never assume that absolutely everything posted on the web is correct, actually assume the opposite. When surfing the net, choose web sites that belong to well-established institutions such as colleges and universities. I will attach some sites that may become useful for study. If you find any sites that you'd like to share, please let me know and we can attach the links to the course site.

Communications:

Important information may be communicated through email. It is in your best interest to check your email frequently. Email is the best way to contact me.

Evaluation:

- Four lecture exams – 100 pts each
- Final cumulative lecture exam – 100 pts
- Lab worksheets, in-class assignments, lecture quizzes, post-labs – 160 points
- Lab quizzes – 6 @ 40 pts each
- Lab final exam – 100 pts

Total points for class: 1000

Lecture Exams: Lecture exams will be given according to the attached schedule. Exams may be multiple choice/short answer/fill in the blank. We will vote on the format. All exams are cumulative from the beginning of the semester.

Lecture Quizzes: There will be a quiz at the start of lecture each day. All quizzes are cumulative from the beginning of the semester. These quizzes will be done with your clicker and you will be able to work together but will not be able to use your notes, book, or any technology other than your clicker. Time will be limited to 6 minutes for a 5 question or less quiz. If you forget your clicker, after the first exam, I will grade your quiz by hand up to 3 times but you will lose one point if I do grade it by hand. If you forget your clicker more than 3 times you will no longer get any credit for the quiz.

Lab Worksheets: There will be lab worksheets due at the beginning of all anatomical labs except the first one, where it will be due at the end of lab. These worksheets require you to label many (but not necessarily all) of the anatomical structures you need to know for the next quiz. There are videos in Blackboard that cover everything you will need to know for the anatomy quizzes. You should watch the videos and fill out the worksheets before coming to lab so that lab time can be spend reviewing the structures on actual histological slides, models and cadavers. Also, if you have reviewed before lab and are unclear on a particular structure you can ask me in lab to clarify it for you.

Post-Labs: There will be online assignments in Blackboard for the physiology labs. Post-labs are due the Tuesday following your lab on that topic at 5pm. There are postlabs for all physiology labs.

About Lecture Quizzes, Lab Worksheets, In-Class Assignments and Post-labs: There will be more than 160 points worth of quizzes, lab worksheets, in-class assignments and post-labs. Your lowest individual scores will be dropped to give a total of 160 points. Because several quizzes/worksheets/assignments/post-labs will be dropped, there will be no ability to make them up, even if you have an excused absence.

Final Lecture Exam: A comprehensive exam covering all of the material taught throughout the semester/session will be given. The format for this exam will be set by the instructor and may be any percentage of multiple choice, short answer and fill in the blank.

Lab Quizzes: will be given at the start of lab according to the attached schedule and consist primarily of anatomical identification, designed to test students' comprehension of lab material. All quizzes are cumulative from the beginning of the semester/session. Physiology labs will not be quizzed in lab, but material learned in physiology labs may appear on lecture exams.

Comprehensive Lab Exam: A comprehensive lab exam will be given on the last day of scheduled lab. This will include only material covered in the anatomy labs. This exam is worth 100 points or, if you do well, can be used as your lab grade (340 points).

About Spelling and Legibility: On all exams and quizzes improperly spelled words will not result in missed points per se. However, if a word is not spelled correctly, I will sound out what you spelled phonetically. If it does not sound as it should be pronounced, you will lose points. You will lose points in every instance where the word is inaccurate in either spelling or phonetic pronunciation. Inaccurate pronunciation could come from missing letters, the wrong letters, or extra letters so be careful and check your answers, even for everyday words. If I can't read your writing you will also lose points, so be as neat as possible. If you spell everything correctly on a lab quiz you will earn one point extra credit on that quiz.

Course Policies

Grading:

93 – 100 = A	73 – 76 = C
90 – 92 = A-	70 – 72 = C-
87 - 89 = B+	67 – 69 = D+
83 – 86 = B	63 – 66 = D
80 – 82 = B-	60 – 62 = D-
77 – 79 = C+	Below 60 = F

I will round up if you are within 0.5 percentage points of a grade. This is to make up for any errors in grading and is a strict cut off.

Your grade is a reflection of what you have demonstrated learning. It is my responsibility to anyone who will see your transcript in the future to report what knowledge you have demonstrated learning from this class.

Class Attendance Policy: There will be quizzes and/or questions in lecture on most days. In order to get the points for these questions you must be present. If you take a lecture quiz, but then leave class early you will receive a 0 on the quiz for that day. If you are late and miss a quiz you will not be able to make it up.

Anyone who misses a lecture exam must notify me in person, by phone, or email **prior** to that class and must arrange with me to take a make-up exam.

Since persons who take exams late have additional time to prepare for the exam, to be fair to the rest of the class, I will deduct 10% of the total points available from the score for each day the exam is delayed. The first 10% will be taken off even if the exam is taken later than the scheduled time on the same day. If you have an excused absence, such as for a sports competition, you must take the exam before you leave.

Lab attendance is MANDATORY. There will be no make-up labs. If you have a valid excuse for missing lab, please see me ***immediately***. Otherwise, you may not take the quiz for that lab and thus the missed lab will be recorded as a "0". If you have a reason for missing your assigned lab time you may be able to attend another lab in that week. Again, contact me as early as possible so we can try to reschedule you. Two missed labs for ANY reason will result in a failing grade.

Academic Integrity: Cheating of any kind will NOT be tolerated. Any reports of cheating or plagiarism will be forwarded to the Office of Student Conduct and may result in failing the assignment/exam or the course.

I reserve the right to make needed and appropriate adjustments in this syllabus.

BIOLOGY 322 Human Physiology and Anatomy-2
Lecture Schedule
Spring 2017

(Subject to change)

Day		Topic	Book Section
Tu	Jan 10	Intro to cardiovascular system/Cardiac Anatomy	Chapter 6 Section 1
Th	Jan 12	Heartbeat Coordination	Chapter 6 Section 1
Tu	Jan 17	Mechanical Events of the Cardiac Cycle	Chapter 6 Section 1
Th	Jan 19	The Cardiac Output	Chapter 6 Section 1
Tu	Jan 24	Arteries and Arterioles	Chapter 6 Section 2
Th	Jan 26	Capillaries and Veins	Chapter 6 Section 2
Tu	Jan 31	Cardiovascular regulation	Chapter 6 Section 3
Th	Feb 2	**EXAM**	
Tu	Feb 7	Hypotension, Upright Posture, Exercise	Chapter 6 Section 3
Th	Feb 9	Blood	Chapter 6 Section 4
Tu	Feb 14	Hemostasis	Chapter 6 Section 4
Th	Feb 16	Respiratory Anatomy/Intro to Ventilation	Chapter 7 Section 1
Tu	Feb 21	Ventilation	Chapter 7 Section 1
Th	Feb 23	Gas Exchange	Chapter 7 Section 2
Tu	Feb 28	Gas Transport	Chapter 7 Section 2
Th	Mar 2	**EXAM**	
Tu	Mar 7	**HOLIDAY**	
Th	Mar 9	**HOLIDAY**	
Tu	Mar 14	Control of Respiration	Chapter 7 Section 2
Th	Mar 16	Renal Structure, Functions and Basic Processes	Chapter 8
Tu	Mar 21	Basic Processes Cont./Renal Clearance/Micturition	Chapter 8
Th	Mar 23	Regulation of Ion and Water Balance	Chapter 8
Tu	Mar 28	Regulation of Ion and Water Balance Continued	Chapter 8
Th	Mar 30	Hydrogen Ion Regulation	Chapter 8
Tu	Apr 4	Digestive System Introduction	Chapter 9
Th	Apr 6	**EXAM**	
Tu	Apr 11	Digestive System Continued	Chapter 9
Th	Apr 13	**HOLIDAY**	
Tu	Apr 18	Digestive System Continued	Chapter 9
Th	Apr 20	The Liver	Chapter 9
Tu	Apr 25	Reproductive Physiology	Chapter 10 Gonadal Hormones
Th	Apr 27	Reproductive Physiology Continued	Chapter 10 Gonadal Hormones

Final Exam: Tuesday May 2nd 12:00-1:40pm

BIOLOGY 322 Human Physiology and Anatomy-2
LAB Schedule
Spring Semester 2017

(subject to change)

Week	Dates	Quizzes	Subject	Section in OpenStax
1	Jan 10-12		Heart Anatomy	19.1
2	Jan 17-19		**NO LABS**	
3	Jan 24-26	Quiz	Cardiac Physiology	
4	Jan 31- Feb 2		Functions of the heart ECG and Blood pressure	
5	Feb 7-9		Blood vessels Lymphatic System	20.1 20.5 21.1
6	Feb 14-16	Quiz	Structures of the Respiratory System	22.1
7	Feb 21-23	Quiz	Respiratory Function	
8	Feb 28- Mar 2		**NO LABS**	
9	Mar 7-9		**Spring Break - NO LABS**	
10	Mar 14-16		Renal Anatomy	25.2 25.3 25.4
11	Mar 21-23	Quiz	Digestion Anatomy	23.1 23.3 23.4 23.5 23.6
12	Mar 28-30	Quiz	Digestion Physiology	
13	Apr 4-6		Reproductive Anatomy **(LAB in SCI 222)**	27.1 27.2
14	Apr 11-13		**NO LABS**	
15	Apr 18-20	Quiz	Open Lab for Review	
16	Apr 25-27		**Comprehensive lab final**	

GENERAL MICROBIOLOGY AND IMMUNOLOGY

BIOL 386 (5 CR: 4+1) **SPRING 2017**

PREREQUISITES: BIOL 232 AND BIOCHEMISTRY/
CONCURRENT BIOCHEMISTRY
OR INSTRUCTOR PERMISSION

COURSE SYLLABUS

	DATE:	**TOPIC:**	**REFERENCE:**
1.	TUE 1/10	Introduction and History	**Brock** ch.: 1,2
2.	THU 1/12	Prokaryotic & Eukaryotic Cells	B ch. 3,20
3.	TUE 1/17	Bacterial Structure & Function	B. ch: 3
4.	THU 1/19	Bacterial Structure & Function	B. ch: 3
5.	TUE 1/24	Bacterial Growth/ Sporulation/ Taxonomy	B. ch: 5,
6.	THU 1/26	Viral Structure & Replication	B. ch.: 9
7.	TUE 1/31	Viral Structure & Replication	B. ch.: 9
8.	THU 2/2	Fungal Structure & Taxonomy	B. ch.:20
9.	**TUE 2/7**	**EXAM I**	
10.	THU 2/9	Microbial Metabolism	B. ch. 13, 14
11.	**TUE** 2/14	Microbial Metabolism	B. ch. 13, 14
12.	THU 2/16	Microbial Genetics	B. ch.: 10, 11, 12
13.	TUE 2/21	Microbial Genetics	B. ch.: 10, 11, 12
14.	THU 2/23	Micro Control: Antimicrobial/Disinfectants	B. ch.: 15, 26
15.	**TUE 2/28**	**EXAM II**	
16.	THU 3/2	Mech. of Microbial Pathogenesis	S. ch. 8.9.10,31
	TUE 3/7	**SPRING BREAK**	
	THU 3/9	**SPRING BREAK**	
17.	TUE 3/14	Respiratory Tract/ Oral cavity	S. ch. 13,19,21,23,57,58,59
18.	THU 3/16	CNS/Skin and Mucosal Membrane Infect.	S..ch.: 36,39,58,48, 61
		Wed., 23 March: Last day for W grade	
19.	TUE 3/21	GI Tract Infections/ Intoxications	S. ch. 16,17,22,32,37,42,73
20.	THU 3/23	Wound Infections	S. ch.: 11,15,20,35
21.	TUE 3/28	STD	S. ch.:14,24,27,66
22.	**THU 3/30**	Immune System Innate Immunity, Phagocytosis	Kuby ch,.: 1,2, 3,4,5,6,18,

22.	TUE 4/4	**EXAM III**	
23.	THU 4/6	Humoral Immunity Complement/ Acute Inflammation	K. ch.: 4-6,7,11,13
24.	THU 4/11	Cellular Immunity	Kch.: 8,.9,10,12,13,14,20,21
25.	TUE 4/13	**Spring Recess**	
27.	TUE 4/18	Chronic Inflammation	K Appendix: A1,A27
28.	**THU 4/20**	**EXAM IV**	
29.	TUE 4/25	Hypersensitivity / Autoimmunity	K. ch. :15
30	THU 4/27	Hypersensitivity / Immune Based Disease	K. ch.: 16,17
	TUE **5/2**	**FINAL EXAM (4 - 5:40 PM)**	

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SUGGESTED TEXTS: 1) **Brock: Biology of Microorganisms**, 13[TH] Edition, 2011 or more recent edition by Madigan et al., Benjamin Cummings. (N.B.: Working glossary at the end of each chapter and G1-G17 at the back of the text.)

2) **Schaechter's Mechanisms of Microbial Disease**, 4th Edition, 2007 or a more recent edition, by Engleberg et.al, Lippincott Williams and Wilkins)

3) **Kuby Immunology**, 6th EDITION, 2007or a more recent edition, by Kindt, Goldsby, Osborne (Glossary/Chapter Question & Answers

EXAMS: There will be 4 scheduled exams plus a comprehensive final. Each of these exams are worth 100 points and **will be individually curved**, if necessary, to 75%. **In addition laboratory will be worth 100 points for a total of 600 points** for the course. Exam format may include multiple choice, matching, essay, and problem solving case studies. **Make up exams**, for valid and documented absences, are essay in format and are graded without a curve.

SCALE: 100-93 = A, 92-90 = A-, 89-87 = B+, 86-83 = B, 82-80 = B-, 79-77= C+, 76-73 = C, 72-70 = C-, 69-67 = D+, 66-63 = D, 62-60 = D, 59- = F

ATTENDANCE: You are **EXPECTED** to attend every lecture and to explain any absence.

INSTRUCTOR: M. Ryan, Ph.D., ASC2115, Voice mail: 231-591-5892. FAX: 231-591-2540, Email: ryanm@ferris.edu
Office hours: MTWR 3-4 PM and by appointment. If I am not available, please leave a message via voice mail or e-mail.

LEARNING OBJECTIVES:

1) To learn how professionals in microbiology use the scientific method to gain new knowledge and to modify/eliminate existing paradigms.
2) To learn collaborative skills by working in groups for some assignments.
3) To learn how to apply certain course material to develop problem solving and critical thinking skills in microbiology.
4) To learn the language/terminology of microbiology.
5) To learn the fundamental principles of microbial structure and function, microbial metabolism, microbial growth and reproduction, microbial genetics, and the use of antimicrobial drugs.
6) To learn the principles, mechanisms, and theories of microbial pathogenicity in humans.
7) To learn the structure, function, and control of the immune system and the mechanisms of hypersensitivity.

LECTURE LEARNING OUTCOMES :

GOAL	CLASSROOM ACTIVITY	MEASUREABLE OUTCOME/ASSESSMENT
1. The student will learn the scientific method as it applies to medical microbiology – BIOL 386	Instruction in the Koch's Postulates which have been used historically and contemporarily to establish the microbial etiology of diseases	Student will demonstrate knowledge of the Koch's Postulates. Assessed by examination questions.
2. The student will learn problem solving/critical thinking skills as they apply to medical microbiology – BIOL 386	Instruction in both lecture and laboratory in the analysis of clinical case studies, bacterial generation time problems, and dilution problems	Student will demonstrate knowledge solving case studies, generation time and dilution problems. Assessed by lecture and laboratory examination questions.
3. The student will learn the structures and functions of bacteria, viruses and fungi studied in BIOL 386	Instruction from lectures, study guide and textbook assignments on microbial structure and function	Student will demonstrate knowledge of microbial structure and function. Assessed by lecture and laboratory examination questions.
4. The student will learn how to analyze scientific data generated during BIOL 386 laboratories	Instruction in the graphing and charting of scientific data generated in laboratory sessions	Student will demonstrate knowledge constructing graphs and/or charts. Assessed by completion of lab assignments requiring graphs/charts and examination questions.
5. The student will learn how to use scientific instruments such as the compound light microscope	Instruction in the preparing and visualization of stained microorganisms using all levels of magnification of the compound light microscope, including oil immersion,	.Student will demonstrate knowledge of microscopy. Assessed by laboratory examinations.

GENERAL EDUCATION OUTCOMES: This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:

1) have a working knowledge of the fundamental principles of a natural science discipline;
2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
4) have a more positive attitude toward science and an increased confidence in their ability to understand science .

BIOL 205 HUMAN ANATOMY AND PHYSIOLOGY

SYLLABUS Spring 2017 **SCI 126 MTWR 3-3:50**

Christopher Westerkamp, PhD
ASC 2119
westerc@ferris.edu
591-5037
Office hours: MWF 10-11, R 2-3
or by appointment

Text And Supportive Materials:

1. Human Anatomy & Physiology, 4th-7th ed. Author: Saladin.
2. BIOL 205 Lab Manual by Friar, Griffith, and Westerkamp, available at Rankin Bookstore.
3. Blackboard Learn course website. This site will contain a variety of materials to supplement, but not replace, class attendance and reading. The site will contain the following:
   a. A PDF copy of this syllabus.
   b. Links to many different resources to help you to succeed in this class.
   c. All course announcements pertaining to this class.
   d. Online communication tools for you to contact me or your classmates.
   e. on-line access to your course grades.
   f. Tegrity lecture recordings
   g. Online quizzes and bonus materials

Course Description:

An integrated course in human anatomy and physiology which emphasizes structure and function as they relate to clinical considerations. Basic concepts of structure and function will be discussed at the cellular tissue and organ system levels. Laboratory will utilize cadavers in anatomical studies. Designed for students in allied health associate degree programs; and science education, medical technology and sports medicine baccalaureate degree programs.
Prerequisites: Chem 114

Course Outcomes:

By the end of the semester, you will be able to:
1. define basic anatomical terms.
2. predict the relationship between structure (anatomy) and function (physiology).
3. apply the concept of homeostasis within physiological systems.
4. distinguish the major anatomical structures of the organ systems.
5. predict the effect of changes in function of one organ system on the function of another.
6. identify organs, structures, and tissues on gross and microscopic levels.

Additional Help:

1. To enhance learning and retention and to make learning easier, we will have reviews and open lab times. I encourage all students to take advantage of this additional help and instruction, but it cannot help you if you do not participate.

2. Online help: If you have questions, suggestions, comments, or problems you want to discuss, contact me at: *westerc@ferris.edu*. If I have not responded within 24 hours then the message likely did not make it through, resend.

3. Office hours and personalized help are available daily. If you cannot make one of my established office hours, request an appointment, stop by my office. Do not wait until you are failing to talk to me.

Class Attendance Policy:

You are expected to attend class regularly. I have noted a direct correlation in my prior classes between student attendance and class performance. However, it is ultimately up to you to show up for class. You will be responsible for all reading, discussions, and lecture materials. The lab is an essential component of this course. Therefore, anyone with more than two (2) unexcused absences from lab will receive an 'F' for the course.

If you are going to miss an exam or quiz due to previous appointments or you have problems making it to class, contact me prior to the exam or quiz to reschedule.

Since persons who take exams or quizzes late have additional time to prepare for the exam. To be fair to the rest of the class, I will deduct 5% from the score for each day the exam or quiz is delayed.

Assessment:
Assessment:
1. Lecture Exams and Quizzes: There are 10 lecture quizzes worth 30 points each. Lecture quizzes will be on the first day of the week and cover the previous week's lecture material. There will be 4 lecture exams plus the final exam. The exams are 100 points each and the comprehensive final exam will be 200 points. 90% of the material on the exams will cover the material since the previous exam with 10% cumulative and synthesis questions.

a. Source of Questions: Questions are based on lecture notes. I base the exams on material covered in class in reference to the lecture notes; **consider the lecture notes your study guides**. The textbook is a supplement to this information that can help clarify topics that we cover quickly (which is all of them).

b. Types of questions: Each exam or quiz may include multiple choice, matching, fill-in-the-blanks, definitions, short answers, essay questions, and/or diagrams. (NOTE: lecture exam questions will NOT come from lab and vice versa.)

2. Online assignments: For every chapter there are assigned readings and accompanying questions. Each section will be worth 5-10 points.

3. Lab quizzes: Each week there will be a quiz at the beginning of lab. This will be over the material covered in the previous lab. A missed quiz becomes a zero. There will be a quiz at the end of some labs.

Lab scores will add up to 350 points. Lab can have a major effect on your final class grade. Missing more than two labs will result in an automatic fail.

Grading System:
A 93-100%
A- 90-92.9%
B+ 87-89.9%
B 83-86.9%
B- 80-82.9%
C+ 77-79.9%
C 73-76.9%
C- 70-72.9%
D+ 67-69.5%
D 63-66.9%
D- 60-62.9%
F Below 60%

This is a set scale and will NOT be changed. I do not give extra points to persons who are close to the next letter grade. Note: A B- is 80.0%, if your final grade is 79.9% then you have a C+.

Your grade is a reflection of what you have learned and your efforts toward that goal. Intelligence comes from constant inquiry and refinement of what you know. You must be an active participant in this process.

Common Courtesies:
Use of electronic devices during lecture is not permitted. There are 8 hours a week that I ask for your attention. Phones, laptops, tablets, etc. are a distraction. I ask you to refrain from their use during lecture.
If anything occurs during lecture or lab that interferes with your ability to concentrate or to learn, let me know. There is much to learn in this course, and I want the classroom and laboratory to be places that nurture that process.
Academic dishonesty of any form will not be tolerated and will be forwarded to the Office of Student Conduct.

January	9	Syllabus, Introduction, History of A & P	Chapters 1 (pp. 1-25), 2 (53-86), 3 (89-122)
	10	History of A&P, Chemistry	
	11	Chemistry, Cell Biology	
	12	Cell Biology	
	16	Martin Luther King Day, no lecture or lab	Chapter 5 (153-170, 174-178)
	17	Quiz 1, Cell Transport	
	18	Cell Transport, Tissues	
	19	Tissues	
	23	Quiz 2, Tissues	Chapters 6 (187-202), 7 (213-231)
	24	Glands, Integumentary	
	25	Integumentary, Bones	
	26	Bones	
	30	**Exam 1**	Chapters 12 (441-477)
	31	Neuroanatomy	
February	1	Neuroanatomy, AP	
	2	AP	
	6	Quiz 3, CNS	Chapters 13 and 14
	7	CNS	
	8	ANS	
	9	ANS, Forebrain	
	13	Quiz 4, Cerebrum	Chapters 15 and 16
	14	Senses, touch, smell, taste	
	15	Sensory	
	16	Sensory	
	20	**Exam 2**	Chapters 11
	21	Muscle anatomy and histology	
	22	Muscle contraction	
	23	Muscle phys	
	27	Quiz 5, Muscle	Chapter 17
	28	Muscle phys	
March	1	Endocrine	
	2	Endocrine	
	6-10	Spring Break	
	13	Quiz 6, Pituitary	Chapter 17
	14	Thyroid, PTH	
	15	Adrenal cortex	
	16	Pancreas	
	20	**Exam 3**	Chapter 19 and 20
	21	Cardiovascular system	
	22	Anatomy of heart	
	23	Actions of heart **(last day to drop)**	
	27	Quiz 7, cardiac function	Chapter 19 and 20
	28	Anatomy of vessels	
	29	Cardiac output, control of blood flow	

	30	Fluid balance	
April	3	Quiz 8, Digestion	Chapter 25 and 26
	4	Digestion	
	5	Digestion Nutrition and Metabolism	
	6	Nutrition and Metabolism	
	10	**Exam 4**	Chapters 26
	11	Respiratory system anatomy	
	12	Ventilation, breathing mechanics	
	13	**Mid-semester recess, no class**	
	17	Quiz 9, O_2 and CO_2 transport	Chapter 22 and 23
	18	Respiratory control	
	19	Urinary system	
	20	Urinary system	
	24	Quiz 10, Nephron	Chapter 24, 27, and 28
	25	Acid/base balance	
	26	Male reproductive system	
	27	Female reproductive system	

Final Exam will be Monday May 1st from 2-3:40 pm in SCI 126

BIOL 122 General Biology II 2017

Lecture: SCI 126 MWF 1:00-1:50PM
Lab section 231, SCI 216 Tuesday (T) 8:00AM – 10:50AM
Lab section 233, SCI 216 Thursday (R) 12:00PM – 2:50PM
Lab section 234, SCI 216 Tuesday (T) 3:00PM – 5:50PM (Ms. Anna Rizzo rizzoa@ferris.edu phone: (231) 591-5841)

Instructor: Dr. Karen Barkel
Office hours: MW 8:00-8:50AM, 12:00-12:50PM, or by appointment
Contact info: Phone: 591-2544 email: karenbarkel@ferris.edu Office: 2116 ASC

Required Materials:
Lecture Materials**:** Biology, 9th edition by Campbell, 3 ringed binder
Laboratory Materials: General Biology 2 Laboratory Manual (Available at the Great Lakes Bookstore)**,** notebook, calculator, 3 ringed binder
Required test materials: #2 pencils, student ID, Pack of scantron sheets(Form 882-E)

Devices: Unless you check in with me, devices should be turned off and put away during lecture. Cell phones should be turned off unless you are expecting an important call (medical issue etc). You may use tablets or laptops for class notes- but only if you stay off email, facebook, or other websites that may distract you and other students from the class discussion.

Notes: I will post partial notes on blackboard, but you will miss important information if you miss class. It is your responsibility to attend class, take notes, and become informed of any announcements made during your absence. Please GET TO KNOW OTHER STUDENTS IN THE CLASS! The questions for the exams will be taken from the material presented in class and the chapters assigned in the textbook.

Attendance: Attendance in lecture is expected. Please BE ON TIME!!!! Random bonus quizzes may be given during the semester, you must be present to get these points! Attendance in lab is MANDATORY. Labs cannot be made up. More than 2 missed laboratories (for any reason) will **result in a failing grade in the class** (Departmental Policy).

Course objectives:
As this course is the second of a two-part introductory biology sequence, it will continue to lay the foundation for further study in biology. See the lecture schedule for a list of topics covered.

General Education Outcomes: This course may be used to help fulfill the general education requirement for Scientific Understanding. A student succeeding in this course should:
1) have a working knowledge of the fundamental principles of a natural science discipline;
2) be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
3) have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
4) have a more positive attitude toward science and an increased confidence in their ability to understand science.

Specific Course outcomes: This course is the first of a two-part introductory biology sequence, thus it will lay the foundation for further study in biology. A student succeeding in this course should be able to:
1) demonstrate by examination a majors-level introductory knowledge in molecular biology, cell biology (including bioenergetics and metabolism), molecular genetics, the diversity of Kingdom Animalia, and animal structure and function.
2) demonstrate the ability to use mathematics to solve problems in Biology and utilize graphs or tables to present data effectively.
3) use the scientific method to formulate hypotheses, design experiments, collect and analyze data, and draw conclusions.
4) show an ability to utilize equipment (such as a microscope) safely and effectively to complete lab assignments.

Exams: Examinations will be given during the normal lecture period on the dates are listed on the class schedule. Exams will include material covered in lecture and assigned readings in the textbook. Failure to take an exam at the scheduled time (see class schedule) will result in a grade of 0 for the exam. If you have a valid excuse, inform me ahead of time (except for hospitalization etc.), and provide written documentation within 2 weeks of the missed exam, the points missed will be added to the cumulative final exam. For example, if you missed exam 2 (with a valid excuse), the comprehensive final would be worth 300 points instead of 200 points. If given at least 2 weeks notice, you may be able to take an exam early if you have a school sponsored activity (with documentation).You will not receive your exams back but you may stop by my office (during my office hours/by appointment) to look them over. Exam grades will be posted on Blackboard.
***Bring a scantron sheet (Form 882-E), 2 #2 pencils, and your student ID to each exam.

Grading: Final grades will be based on points earned in lecture (75%) and laboratory (25%).
The Lecture grade will be comprised of the average of 4 exams (100 points each) and a CUMULATIVE final (200 points) as well as any quiz points earned during the semester. The final exam will include two parts, part 1 - new material covered since the last exam (similar to a regular exam, 100 points), and part 2 - Cumulative material (material from the whole semester! 100 points).
Lab grades will be based on the score earned on lab quizzes (15 points each) and lab participation (5 points, assessed by your lab instructor). See lab section for more detail

Grading Scale:

A (≥94%)	C (73 - 76.9%)
A- (90 - 93.9%)	C- (70 - 72.9%)
B+ (87- 89.9%)	D+ (67 - 69.9%)
B (83-86.9%)	D (63 - 66.9%)
B- (80-82.9%)	D- (60 - 62.9%)
C+ (77 - 79.9%)	F (≤ 59.9%)

Academic Integrity: Any form of cheating will not be tolerated, and will result in a zero for the assignment, and possible. Additional action may be taken by the University.

To do well in this course:

- Attend all lectures and labs, and please BE ON TIME
  - (missing more than 2 labs will result in a grade of F for the semester)
- Exhibit professional behavior during class (**cell phones should be turned off**)
- Print off the slide packets posted on Blackboard and bring them to class.
- Ask questions in class when you don't understand something.
- Organize your notes – make flash cards or lists of terms that are new to you.
- Read the assigned sections of the text book before we cover a topic.
- Study your notes EVERY WEEK, not just before the exam.
- Do the chapter study questions posted on Blackboard
- Seek help if you are having trouble **right away**.

If you have a low quiz or exam grade – seek help before you take the next quiz or exam. You likely need to change something to improve your grades.

Lecture Schedule: (subject to change)

Week		Dates	New Topic	Chapter reading
1	M	Jan 9	Intro / chemistry	2
	W	Jan 11	Water	3
	F	Jan 13	Organic molecules	4/5
2	M	Jan 16	Martin Luther King Day (no class)	
	W	Jan 18	Macromolecules	5
	F	Jan 20	Cells	6
3	M	Jan 23		6
	W	Jan 25	Membrane Structure and function	7
	F	Jan 27		7 /8
4	M	Jan 30	**Exam 1**	
	W	Feb 1	Intro to the Metabolism	8
	F	Feb 3		8
5	M	Feb 6	Cellular Respiration	9
	W	Feb 8		9
	F	Feb 10		9
6	M	Feb 13	Photosynthesis	10
	W	Feb 15		10
	F	Feb 17	**Exam 2**	
7	M	Feb 20	DNA structure	16
	W	Feb 22		16
	F	Feb 24	Transcription and Translation	17
8	M	Feb 27		17
	W	Mar 1	Gene Regulation / Technology	18
	F	**Mar 3**	Gene Regulation / Technology	18, 19 (parts)
9	M-F	Mar 6-10	SPRING BREAK- no class	
10	M	Mar 13	Animal Evolution	32
	W	Mar 15	Start Invertebrates	32 /33
	F	Mar 17	**Exam 3**	
11	M	Mar 20	Invertebrates	33
	W	Mar 22	Invertebrates	33
	F	Mar 24	Invertebrates	33
12	M	Mar 27	Invertebrates	33
	W	Mar 29	Invertebrates	33
	F	Mar 31	Chordate Diversity	34
13	M	Apr 3	Chordate Diversity	34
	W	Apr 5	Chordate Diversity	34
	F	Apr 7	Animal Structure	40
14	M	Apr 10	**Exam 4**	
	W	Apr 12	Animal Structure	40
	F	Apr 14	No class – Mid- semester Recess	
15	M	Apr 17	Animal Nutrition	41
	W	Apr 19		41
	F	Apr 21	Circulation	42
16	M	Apr 24	Gas Exchange	42
	W	Apr 26	Reproduction	46
	F	Apr 28		46
17	W	**May 3 12:00-1:40pm**	**2 Part Final** (Part 1 new material = **Exam 5**, Part 2 cumulative)	

Lab information

Lab Grades: The points earned in lab will count for 25% of your final course grade.

Lab participation: You can earn up to 5 points each lab period for participation. You can lose these 5 points by being late to lab, leaving lab early, not participating in the activity, being disruptive in class. It is up to the discretion of your lab instructor to assign these points so make sure you know what he or she expects from you. (you are given one grace day). Lab books may be checked during any lab period.

Labs, and thus participation points earned, cannot be made up for any reason. However, if you have a valid reason for missing your section (school – sponsored activity etc) you may request to attend another lab section in its place (within the same week) and still get credit for the lab. Bring a card with your name, section number (regular lab section), and lecture instructor to the instructor of the replacement lab and request their permission to attend that section. To get credit, you must provide written documentation (with explanation) within 2 weeks of the missed lab to your instructor. ***Missing more than 2 labs will result in a failing grade in the course**

Lab Quizzes: 150 points: Quizzes are worth 15 points each and will be given at the beginning of the lab period. Dates of each quiz are listed on the Lab schedule. The best 10 (of 11) quiz scores will count towards your lab grade. There are no make-ups for lab quizzes.

Lab Schedule: (subject to change)

Week	First lab of week	Topic	Quiz
1	Jan 10/12	Macromolecules	
2	Jan 17/19	No Lab this week	
3	Jan 24/26	Osmosis & Diffusion	Quiz 1 (macromolecules)
4	Jan 31/Feb 2	Enzymes I	Quiz 2 (Osmosis)
5	Feb 7/9	Enzymes II	Quiz 3 (Enzymes)
6	Feb 14/16	Energy	Quiz 4 (Enzymes 2)
7	Feb 21/23	DNA I. Transformation 1, electrophoresis 1	Quiz 5 (energy)
8	Feb 28/ Mar 2	DNA II: Transcription/translation, transformation 2, electrophoresis 2	Quiz 6 (DNA 1)
9	Mar 7 /9	SPRING BREAK	
10	Mar 14/16	Properties of DNA, transformation 3	
11	Mar 21/23	Invertebrate lab 1	Quiz 7(DNA 2 and 3)
12	Mar 28 / 30	Invertebrate lab 2	Quiz 8 (Invert 1 material)
13	Apr 4 /6	Histology	Quiz 9 (invert 2 material)
14	Apr 11/13	No lab this week: Mid semester recess	
15	Apr 18/20	Vertebrate Anatomy	Quiz 10 (Histology)
16	Apr 25/27	Chordate Diversity	Quiz 11 (Vert anatomy)

Mr. Bill Killian

CHEMISTRY 121
FALL 2016

AUGUST 2016

Schedule of Assignments

OFFICE LOCATION: **SCI 307** PHONE: **2590** OFFICE HOURS **M W** 10-11:00 am
R 10:00-12:00 pm

Lecture: MWRF 9-9:50 AM Location: SCI 102
LABS: **M 3-5:50 PM SCI-333, T 8-10:50AM SCI 333, W+R 3-5:50PM SCI 333,**

Textbook: "Chemistry Molecular Nature" 7th edition by Silberberg & Amateis
Lab Manual: "Laboratory workbook for Chemistry 121/122"

WEEK OF	LECTURE TOPIC	CHAP.	LAB ASSIGN.	SPEC EVENT
8/29	Basic Concepts Mathematical & Chemical	1	Check in/#1	--
9/05	Atoms and Molecules	2	#2	--
9/12	Stoichiometry	3	#3	--
9/19	Stoichiometry	4	#14	Test #1 9/21 Wednesday
9/26	Gases	5	#5	--
10/03	Thermochemistry	6	Handout	--
10/10	Electron Studies	7	#8	Test #2 10/12 Wednesday
10/17	Periodic Law	8	#7	
10/24	Bonding	9	#15	--
10/31	Bonding Theories I	10	#6	--
11/07	Bonding Theories II	11	#10	Test #3 11/09 Wednesday
11/14	States of Matter/Liquid Solids	12	#11	--
11/21	Solutions	13	No Lab	--
11/28	Descriptive Chemistry	13	#12	
12/05	Intro to Acids & Bases	15	#4	Test #4 12/07 Wednesday
12/12	EXAM WEEK			

Grading policy

Requirements		*Grading*	*# of points*
13 of 14 labs	*130 points*	*A*	*>534*
3 of 4 tests	*300 points*	*A-*	*>522*
Final exam	*150 points*	*B+*	*>505*
	580 points	*B*	*>481*
		B-	*>464*
		C+	*>447*
		C	*>418*
		C-	*>401*
		D+ or D-	*<400*
		F	*<319*

"Science is not everything. But science is very beautiful."
J. Robert Oppenheimer
U.S. Nobel Prize Winner

IMPORTANT CONSIDERATIONS:

1. *All lab reports are to be turned in **BEFORE** leaving the lab.*
2. *Lab safety is of primary importance! You will work safely at all times.*
3. *Reading in addition to your text is recommended, see me or the Library.*
4. *Problem assignments are not collected, but strongly suggested. Long term successful student devote 2 hours of their own time in problems and reading per 1 hour of lecture.*
5. *All test are an hour. The final is a two-hour comprehensive. Your lowest test score is dropped. The final is **NOT** dropped. Plan ahead!*
6. *Your attendance in lecture and lab is mandatory. You are expected to regularly attend and exhibit a good professional attitude in class and in lab.*
7. *If you disagree with a grade, please see me. **NOTE**: if you miss a lab or a test, that is the one that will be dropped.*
8. *Make-up test for extraordinary situations, please see me well in advance.*
9. *Some sample test are available in the library for your use.*
10. *Homework keys are available in my office all day M-F.*
11. *Don't bring phones, ipods, ect., to class. Bring a simple calculator. Nothing is on-line.*

CHEM 122
General Chemistry 2
Spring 2016 (5 credits)

Instructor:	Dr. Prabhakara Shetty
Office:	ASC 3097
	Office Hours: M 11:00AM to 1:00PM, R 1:00 PM to 3:00 PM
Telephone:	591 2589
Text Book:	CHEMISTRY: The Molecular Nature of Matter and Changes, by Martin Silberberg
	7th Edition.
Lab Manual:	Lab Workbook for CHEM 121 & 122
	Laboratory Manual for Qualitative Analysis

Course Description: Continuation of CHEM 121, including chemical kinetics, chemical equilibrium, acids and bases, thermodynamics, oxidation-reduction reactions, electrochemistry, nuclear chemistry, and descriptive chemistry of metals and nonmetals. Laboratory will involve some experiments illustrating topics discussed in lecture along with several sessions devoted to the qualitative analysis of common cations and anions. This course meets General Education requirements: Scientific Understanding, Lab.
Pre-Requisites: MATH 115 with a grade C-/better or ACT 24 or SAT 560; & CHEM 121 with a grade C- or better. Typically Offered: Spring, Summer

Course Outcomes: In this course, students will be expected to:

a) Apply theoretical models of reaction rates to the use of rate laws and the description of possible reaction mechanisms.
b) Describe at a molecular level what takes place when physical or chemical systems come to equilibrium, interpret diagrams or graphs representing such systems, and calculate concentrations of species in reactions that have come to equilibrium.
c) Apply appropriate thermodynamic factors to determine the spontaneity of a process.
d) Design and perform lab experiments and interpret data.
e) Apply common theories of acids and bases to describe relevant species in acidic solutions, basic solutions, and buffers.
f) Integrate diverse concepts in chemical kinetics, redox reactions and electrochemistry, and the chemistry of the elements and apply them to new and unknown problems.
g) Identify common radioactive particles and describe their role in basic nuclear reactions.

Upon completion of the course, students should:

1. Have a working knowledge of the fundamental principles of chemistry.
2. Be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences.
3. Have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas.
4. Have a more positive attitude toward science and an increased confidence in their ability to understand science.

5. Recognize that:
   a. the physical universe is understandable.
   b. scientific ideas are not static, but rather dynamic and change over time.
   c. scientific principles are testable.
   d. scientific knowledge is based on a vast number of observations.

Lecture Outline:

Chapter #	Topics
16	Rates of reaction: definition, dependence, reaction order, collision and transition-state theories, energy diagrams catalysis.
17	Chemical equilibrium: equilibrium constant, predicting the direction of reaction, dependence on physical conditions.
18	Acids and bases: definitions, relative strengths, autoprotolysis of water, solutions of acids and bases, pH
19	Buffers, acid-base titrations. Solubility and complex-ion equilibria: solubility, solubility product, common-ion effect, ion-product and precipitation, dependence of solubility on physical parameters, separation by selective precipitation, complex ions, qualitative analysis.
20	Thermodynamics and Equilibrium: enthalpy, enthalpy change, free energy and spontaneity, standard free energy change and equilibrium constant.
21	Electrochemistry: redox reactions, half reactions, voltaic cells, emf, standard electrode potentials, cell emf, cell emf and equilibrium constant, commercial cells and electrolysis of molten metals and solutions.
24	Nuclear Chemistry.
23	Chemistry of Coordination Compounds (time permitting).

Requirements:

Five hourly tests:	100 pts each
Final Exam:	100 pts (cumulative)
Laboratory:	120 points.
Online Homework/reading assignment	50 point (McGraw-Hill Connect)

Grading Scale:

Numerical grades will be converted to letter grades at the end of the semester using the following scale.

92.5 % and above	A
89.5 to 92.4 %	A-
86.5 to 89.4 %	B+
82.5 to 86.4 %	B
79.5 to 82.4 %	B-
76.5 to 79.4 %	C+
72.5 to 76.4 %	C
69.5 to 72.4 %	C-
66.5 to 69.4 %	D+
62.5 to 66.4 %	D
59.5 to 62.4 %	D-

Attendance Policy: Three and more unexcused absences, and disruptive behavior in the class may affect your overall letter grade in this class.

Policy on Tardiness: Students are expected to be on time and stay till the end of the lecture. If a student comes late or leaves early, he/she will be marked absent for that day. Students will not be allowed to come late to the lab.

Tentative test schedule

Test # 1	January 29
Test # 2	February 19
Test # 3	March 18
Test # 4	April 8
Test # 5	April 22
Final Exam	May 3, Tuesday 10:00 to 11:40AM

Chemistry 214: Fundamentals of Organic Chemistry
Course Syllabus: Spring 2016

Instructor: Peter Balanda, Ph.D., Professor of Chemistry
ASC 3012, 591-5870, PeterBalanda@ferris.edu
Office Hours: TR 1:00-1:50, WF 11:00-11:50 and other by appointment
Lecture: MWF 1:00-1:50 in SCI 120; 4 credits (3+3)
Lab Section: 211 R, 212 W, 214 T; 3:00-5:50 in SCI 117/332

University Catalog: A survey course in organic chemistry which uses the functional group approach to cover the important preparations and reactions which organic compounds undergo. Also provides an introduction to organic compounds of biological significance. Concurrent laboratory sessions include exercises in basic lab techniques, demonstrations, and workshops. Designed for students who do not anticipate further studies in organic chemistry. This course meets General Education requirements: Scientific Understanding, Lab. Pre-Requisites: CHEM 114 or CHEM 121 with a grade of C- or better.

Course Outcomes:

1. Demonstrate an understanding of the functionality and nomenclature of organic compounds by identifying functional groups in chemical structures, systematically naming molecules given their structures, and drawing structures given their names.
2. Predict relative physical properties of organic compounds based on chemical structures.
3. Predict chemical reactivity of organic compounds based on their chemical structure—functionality, size, shape, and regiochemistry.
4. Demonstrate a basic understanding of the energetic and mechanistic pathways of organic reactions by drawing reaction energy profile diagrams and illustrating reaction mechanisms.
5. Gain an appreciation for the techniques used to execute the synthesis, purification, and characterization of organic compounds through laboratory work.

Required Materials:

- McMurry, J. ***Organic Chemistry***, 9th ed., loose leaf print version with **OWLv2** 6 month access, ISBN 9781305779495. Click here for *OWLv2 Getting Started Guide*
- TurningTechnologies ResponseCard RF LCD, QT Device or ResponseCard NXT
- **Molymod Molecular Model Set for Organic Chemistry**
- Instructor approved safety goggles (sold in the bookstore)
- Solvent resistant gloves (Chemical stripping gloves, nitrile gloves)
- An inexpensive scientific calculator

Electronics: Cell phones will be turned off during scheduled class periods. Portable computing devices may be used for note taking purposes, and for displaying and clarifying course content. Use of such devices for any other purpose is prohibited. ***Audio and/or video recording is prohibited***. The classroom environment is to be a safe place, where

students and faculty can ask questions and express their views without fear of those conversations appearing on the internet. In addition, some of the lecture materials are copyrighted property of content publishers, who have given faculty limited rights for their use in a closed course setting. All materials are the intellectual property of the faculty author and may not be posted or reposted on the internet in any form.

Attendance: Attendance and class participation are mandatory components of both the laboratory and lecture portions of this course. Students will be expected to work individually, and in groups. Students who are not engaged in class discussions or assignments may be asked to leave.

1. Bring your TurningTechnologies "Clicker" to class each day. You will be expected to answer questions integrated into the lecture. Your responses will be graded. These points cannot be made up.
2. Missed exams may be made up *prior to* the next class period *if* the absence is excused. A missed test, not made up prior to the next class period will be replaced by the final exam. If no tests are missed, the lowest test score (if lower than the final exam score) will be replaced by the final exam. *Makeup exams may differ in format from the regular exams.* Missed class work, quizzes, homework and laboratory assignments will typically *not* be accepted for credit.
3. Excused absences (verifiable and in writing: extenuating medical reason, funeral, subpoena to testify, or university excused absence) may allow for the waving of an assignment, but do not lower the expectations for learning. *Three unexcused absences or five absences of any kind, in the laboratory portion of the course will result in failure of the course. Failure to take the final exam will result in failure of the course.*
4. Weather: It is the responsibility of the student to assure safe passage to campus in the event of inclement weather, provided FSU is open. Have a contingency plan in place in advance.

Homework: Our goal here is to develop an understanding of basic organic principles and to use them to enrich our understanding of macromolecules. The more you understand before you walk in the door, the more you will gain from the classroom experience, and the more interesting it will become. Read assigned pages, study assigned PowerPoints and Video Lectures, and complete OWLv2 assignments ***by the dates*** listed on the syllabus schedule (FerrisConnect) and OWLv2 web-site. Some of the OWL assignments assume no prior knowledge, others provide review. As you read the assigned pages, do all associated problems in the text. You will find a link to all of the old organic chemistry tests from various courses. Take as many as you can to help you focus your studies.

Laboratory: **Objectives:** The laboratory portion of the CHEM 214 course is designed to support and enhance the lecture experience. Students will learn and use many of the techniques routinely employed in chemical research facilities with the aim of coming to understand how the physical and chemical properties of the compounds they manipulate evolve from their microscopic chemical structures. Special emphases are placed on observation, data collection, and data analysis. Some of the laboratory exercises encourage students to explore the properties of materials prior to their discussion in the lecture so that lecture and reading take on greater meaning. At other times, the laboratory is used to reinforce lecture topics that have already been covered.

Main rules:

1. Safety glasses must be worn at all times in the laboratory. Put them on in the hallway before entering the room. Take them off in the hallway after completing the laboratory assignment.
2. Closed toe shoes are mandatory for admittance to the lab.
3. Model kits, calculator must be brought to class according to the Course Schedule.
4. Labs are to be submitted at the end of the laboratory period (unless otherwise instructed).
5. There is a *no make-up* rule in effect. If you have a university approved excuse, the missed lab will not count against you. If you know in advance that you will miss class, and it fits your schedule, you must attend the other lab section.

Lab Reports: Students will work with a partner. Each person is to complete and submit a laboratory report. One of the reports will be randomly chosen for grading. Both reports will receive that grade. The paper that is graded will have the grade circled. Lab partners are responsible for assisting each other with all aspects of the laboratory, including data analysis and conclusions. If your partners report is the one graded, you are expected to read and transpose my comments to your paper. Lab reports should be kept in an organized binder or folder. Material covered in the laboratory may find its way onto lecture exams.

Grading: ***Lecture – 75%***

Tests (3 x 100 pts)
Responses/Quizzes/Assignments (50-150 pts)
Final Exam (1 x 20 pts)
Online Homework (100 pts)

Grade	Percent	Grade	Percent	Grade	Percent
A	93.0	B-	80.0	D+	67.0
A-	90.0	C+	77.0	D	63.0
B+	87.0	C	73.0	D-	58.0
B	83.0	C-	70.0	F	<58.0

Lab – 25%

Students who do not retake the lab when repeating the course: Lecture 100%.

Note: Students who are repeating the course can refrain from retaking the laboratory portion of the course if they received at least 80% of the points possible in the lab. Have your previous instructor send me an e-mail with your prior lab grade. In addition, you must send me an e-mail stating that you wish to be excused from the laboratory, and that you understand that you understand that your prior lab grade will not be used in calculating your new course grade.

The instructor reserves the right to modify this syllabus to meet the changing needs of the class.

For a copy of the FSU syllabus attachment, click here.

Chemistry 214: Fundamentals of Organic Chemistry

Fall 2016: Tentative Course Schedule.

Prior to Lecture: (1) *Read* McMurry, (2) *Study* the PowerPoint lecture, (3) *Watch* the Kahn Academy Videos, (4) *Do* OWL Tutors, (5) *Do* OWL Mastery. *Review* McMurry as needed.

Prior to Lab: (1) Review **web links and background information as appropriate (2) *Read* and *print* the lab, (3) *Bring* the lab sheet, and model kit/calculator, as required, to lab.**

Date	McMurry Readings	McMurry PowerPoint		Kahn Academy Videos	OWLv2	Topic/ Special Events	Lab	Lab Items
M 1/11					Intro 1 Intro 2	Introduction, syllabus	Lab check in / safety,	Model Kit
W 1/13	1.1-1.5; Questions	Show	PDF	Dot structures;	Tutors Mastery	Atomic & Lewis Structure; the Covalent Bond; VSEPR	Determination of Melting Point; Review: Melting Point Determination - MIT OpenCourseware	
F 1/15	1.6-1.12; Questions	Show	PDF	Bond-line structures; Hybrid orbitals	Tutors Mastery EOC	Hybridization, M.O. Theory, Drawing Chemical Compounds		
M 1/18						No Class	Determination of boiling point and Refractive Index	Model Kit
W 1/20	2.1-2.6	Show	PDF	Electronegativity; Formal charge and resonance	Tutors Mastery EOC	Polar Covalent Bonds; Formal Charge; Resonance		
F 1/22	2.7-2.10	Show	PDF	Acid/base	Tutors Mastery EOC	Acids & bases: Bronsted-Lowry Acids & Bases		
M 1/25	2.11-2.12	Show	PDF		Tutors Mastery EOC	Lewis Acids & Bases; Noncovalent Interactions	Introduction to Hydrocarbons	Model Kit
W 1/27	3.1-3.3	Show	PDF	Functional groups	Tutors Mastery EOC	Functional Groups, Isomers & Alkyl groups; BRING MODEL: hexane		
F 1/29	3.4-3.7	Show	PDF	Alkanes	Tutors Mastery EOC	Alkanes: Naming, Properties and Conformation; BRING MODEL: butane		
M 2/1	4.1-4.8	Show	PDF	Cycloalkanes	Tutors Mastery EOC	Cycloalkanes; BRING MODEL: 1,4-dimethyl cyclohexane	Introduction to Alcohols and Phenols	Model Kit
W 2/3	5.1-5.9	Show	PDF	Stereochemistry	Tutors Mastery EOC	Stereoisomerism BRING MODEL: 1-bromo-2-chloro-3-fluoropropane		

F 2/4						Catch-up; Review; Quiz, etc.		
M 2/8						**Test 1: Chapters 1-5**		
W 2/10	6.1-6.10	Show	PDF	Intro. to Reaction Mechanisms	Tutors Mastery EOC	Organic reactions: reaction types, mechanisms, reactive intermediates, rates and energy diagrams	Dehydration of an Alcohol; Review: Introduction to GC	Calculator
F 2/12	7.1-7.6, 9.1	Show	PDF	Alkene nomenclature;	Tutors Mastery EOC	Alkene structure		
M 2/15	7.7-7.9, 7.11, 8.1-8.3, 8.6-8.8	Show,	PDF,	Alkene reactions (2);	Tutors Mastery EOC	Preparation and Reactions of alkenes and alkynes	Finish Dehydration of Alcohols lab from previous week;	Calculator
W 2/17	9.2-9.3, 9.5-9.9	Show	PDF	Alkyne reactions		Alkyne structure; preparation and reactions of Alkynes	Recrystallization of Salicylic Acid	
F 2/19	8.10, 31.1-31.2				Questions	Overview of Polymerization; Vinyl polymerization		
M 2/22	14.1-14.3, 14.6	Show	PDF	Conjugated Dienes	Tutors Mastery EOC	Conjugated alkenes and resonance revisited; diene polymers	Alkene Polymerization; Obtaining an Infrared Spectrum	Calculator
W 2/24	10.1-10.5,	Show	PDF	Naming alkyl halides; Free radical reactions; Preparation of alkyl halides from alcohols;	Tutors Mastery EOC	Properties and Preparation of alkyl halides;		
F 2/26	10.6, 10.8	Show	PDF	Oxidation and reduction	Tutors Mastery EOC	Alkyl Halides: Rxns with metals; oxidation/reduction		
M 2/29	11.1-11.5, 11.7-11.10, 11.12	Show	PDF	Substitution Elimination	Tutors Mastery EOC	Nucleophilic substitution reactions: S_N1, S_N2	Steam Distillation 1	
W 3/2		Show	PDF			Elimination reaction: E1, E2, E1cb		
F 3/4						**Test 2: Chapters 6-11, 14**		
M 3/7	Spring Break					No Class	No Lab	
W 3/9								
F 3/11								
M 3/14	15.1-15.6,	Show	PDF	Aromatic Compounds	Tutors Mastery EOC	Aromaticity	Steam Distillation 2	Calculator

W 3/16	16.1-16.3	Show	PDF			Electrophilic aromatic substitution (EAS)		
F 3/18	16.4-16.5, 16.7, 16.9-16.10	Show	PDF		Tutors Mastery EOC	Substituent effects in EAS; Nucleophilic aromatic substitution; other reactions		
M 3/21	17.1-17.6; 17.9-17.10	Show	PDF	Alcohols, ethers, epoxides, sulfides	Tutors Mastery EOC	Alcohols & phenols		
W 3/23	18.1-18.2, 18.5-18.6	Show	PDF		Tutors Mastery EOC	Ethers & epoxides;	No lab	
F 3/25						No Class		
M 3/28	18.8	Show	PDF			Thiols, sulfides & disulfides	Introduction to Carbonyl Compounds	
W 3/30	19.1-19.8, 19.10	Show	PDF	Aldehydes and ketones	Tutors Mastery EOC	Aldehydes & ketones; Nucleophilic addition to the carbonyl		
F 4/1	20.1-20.2, 20.4-20.7, 20.9	Show,	PDF,	Carboxylic acids and derivatives	Tutors Mastery EOC	Carboxylic acids and derivatives		
M 4/4	21.1-21.7	Show	PDF		Tutors Mastery EOC	Reactions and of carboxylic acids and derivatives:	Carboxylic acid derivatives	
W 4/6	22.1-22.3, 22.5-22.7	Show	PDF		Tutors Mastery EOC	Alpha-substitution reactions		
F 4/8	23.1-23.9	Show	PDF		Tutors Mastery EOC	Carbonyl condensation reactions		
M 4/11	24.1-24.7	Show	PDF	Amines	Tutors Mastery EOC	Amines	Thin Layer Chromatography of Analgesics; Review: TLC: The Basics	
W 4/13						*Catch-up, review, quiz, etc.*		
F 4/15						**Test 3: Chapters 10,11,15-18**		
M 4/18	25.1-25.5	Show	PDF		Tutors Mastery EOC	Carbohydrates; monosaccharides	Carbohydrates	
W 4/20	25.6-25.9, 25.11	Show	PDF		Tutors Mastery EOC	Disaccharides and polysaccharides		
F 4/22	26.1-26.4	Show	PDF		Tutors	Amino Acids & Polypeptides		

					Mastery EOC			
M 4/25	26.9-26.11	Show	PDF		Tutors Mastery EOC	Protein structure & function	Analysis of Milk	
W 4/27	27.1-27.6	Show	PDF		Tutors Mastery EOC	Lipids	Clean-up; check-out	
F 4/29	28.1-28.8	Show	PDF		Tutors Mastery EOC	Nucleic Acids		
W 5/4						***Final Exam*** *W 5/4, 12:00-1:40 pm*		

CHEMISTRY 321
ORGANIC CHEMISTRY 1
FALL 2016

Instructor: Dan Adsmond adsmondd@ferris.edu
Office: 3009 Arts and Sciences Complex, Phone: 591-5867
Office Hours: Mon & Wed 11:00-11:50; and Thu 1:00-2:50
or by appointment or whenever the door is open.

Prerequisite: Chem 122 - General Chemistry 2 (grade of C- or higher)

Course Details: 5 credit hours
Lecture: SCI 102: Mon, Tue, Wed, Fri 10:00-10:50 AM
Laboratory: SCI 328: Sec 231 - Thu 8:00-10:50AM Sec 232 - Wed 3:00-5:50PM
Sec 233 - Tue 12:00-2:50PM Sec 234 – Mon 3:00–5:50PM

Text: Organic Chemistry, Ninth Edition, loose leaf version of text with 24 month OWL access code
John McMurry, Cengage Learning, Boston. Bundle ISBN 9781305780170

Packet: Chem 321 Organic Chemistry 1 Handout Packet Fall 2016 - Prof Dan Adsmond
(available ONLY at Great Lakes Books)

Model Set: Molymod Organic Chemistry Molecular Model Set. (order from www.indigo.com SKU: 62053
(also available at the B&N book store on campus)

Course Description:

Modern bonding theory in organic molecules, theory of reactions, stereochemical principles, chemistry of alkanes, cycloalkanes, alkenes, dienes, alkynes, and aromatics with special emphasis on reaction mechanisms. Concurrent laboratory includes basic laboratory techniques, synthesis, TLC, GC, and IR spectroscopy.

Learning Outcomes for Organic Chemistry I (all instructors)

1. Demonstrate an understanding of the functionality and nomenclature of organic compounds by **identifying functional groups** in chemical structures, systematically **naming molecules** given their structures, and **drawing structures** given their names.

2. **Predict** relative physical and spectral **properties** of organic compounds based on chemical structures.

3. **Predict** chemical **reactivity** of organic compounds based on their chemical structure—functionality, size, shape, regio-, and stereochemistry—emphasis on the chemistry of hydrocarbons and haloalkanes.

4. Demonstrate a basic understanding of the energetic and mechanistic pathways of organic reactions by **drawing reaction energy profile diagrams** and **illustrating reaction mechanisms**.

5. **Develop the techniques** necessary to plan and execute the synthesis, **purification**, and **characterization** of organic compounds.

Two Additional Learning Outcomes

6. **Apply** the above knowledge **in effective problem solving** processes.

7. **Communicate** effectively **using the language** of organic chemistry.

Grading:

4 Exams (100 pts each)	400 pts
Assignments (OWL and other)	~100 pts
Laboratory	~200 pts
Final Exam	150 pts
	850 pts

A	786-850
A-	765-785
B+	743-764
B	701-742
B-	680-700
C+	646-679
C	586-645
C-	552-585
D+	518-551
D	459-517
D-	425-458
F	below 425

Attendance: Regular attendance in lecture is expected. In-class assignments (announced and unannounced) may be given ranging in value from 4 to 20 points. Missed assignments will result in a zero grade. Attendance at exams and laboratory sessions is mandatory. Make a note of exam dates immediately! NO MAKEUP EXAMS WILL BE GIVEN. In the event of an excused absence on an exam the final exam score will be multiplied by 1.67.

Exam 1: Fri, Sep 23; Exam 2: Fri, Oct 14; Exam 3: Fri, Nov 4; Exam 4: Wed, Nov 23

AN ABSENCE IS EXCUSED IF: 1) you were ill and have a written doctor's excuse, 2) you need to attend a required university function (previous notification and permission from the Academic Vice Presidents Office required), 3) there is a death in the immediate family, or 4) you are required to serve on jury duty or are subpoenaed for court testimony (previous notification required).

Unexcused laboratory absences will dramatically lower your final grade in the course.

# of unexcused lab absences	1	2	3	4	5
points lost from final grade	20	40	80	160	200

Reading: Daily reading assignments are listed on the course schedule that follows. It is expected that students will have read the appropriate textbook pages and/or handouts before coming to lecture.

OWL: The OWL electronic homework is to be completed in preparation for class, as indicated on the course schedule, but will be accepted until 5:00 PM on Friday of the week during which it is due. All assignments for a given week should be released to you at 1:00AM the Monday of the preceding week.

Homework: Non-OWL homework problems will be assigned each class day and should be completed before the next class meeting. Some of the problems will relate to material already discussed in lecture and some will relate to the reading assignment that usually will not have been discussed. My expectation is that you will make a good attempt to solve each problem and that if you get stuck, you will write down a specific question that you need to have answered in order to complete the problem. Since exam questions will be similar to those seen in the homework, doing the homework regularly is a prerequisite to your success in the course.

Expectations: My expectations are that students arrive at class at 10:00AM sharp, prepared to THINK and PARTICIPATE. My teaching style requires that students participate in class by asking and answering questions, working in groups, solving problems at the board, and participating in class discussion. Students should feel free to ask questions at any time and are encouraged to do so. My job is to help you learn. Take advantage of the opportunity!

Classroom Ground Rules:

1. Address the instructor in an appropriate manner.
2. Respect the views and opinions of the other students.
3. Work only on material pertaining to the class.
4. No swearing or use of profanity.
5. No electronic communication devices.
6. No children allowed.

Final Exam: Tue, Dec 13, 10:00 – 11:40 AM

I reserve the right to make changes in the course that are appropriate within the context of the class.

Date	Chap	Reading and OWL Assignments (complete before class)	Topic
Aug 29			Course Intro
30	**1**	p 1-11 OWL Intro 1-4	**Structure and Bonding - Lewis structures**
31	**2**	p 28-40	**Polar Covalent Bonds** - Formal charge and resonance
Sep 2	1	p 12-20	Hybrid orbitals and molecular shape
5		**NO CLASSES**	**LABOR DAY**
6	**3**	p 60-65 CH1:MM 1-6, CH1:Ma 1-8	**Organic Compounds** - Functional groups
7	2&3	P 54-56, 78-79, Handout	Intermolecular attractions and physical properties
9			IA&PP cont'd
12	1&3	p 21-27, 66-72 OWL CH2:EOC 1-4, CH3:Ma 1-3, CH3:EOC 1,6	Drawing chemical structures, **Alkanes**
13	3	p 73-77 OWL CH3:EOC 2,4,7,8,15	Naming alkanes
14	3	p 80-88 OWL CH3:MM 1,CH3:Ma 4-5, CH3:EOC 5,9,10,11,12	Conformations & energy of alkanes
16	**4**	p 89-95 OWL CH3:MM 2-3, CH3:Ma 6, CH3:EOC 3,13,14	**Cycloalkanes** – naming cycloalkanes, cis & trans isomers
19	4	p 95-99 OWL CH4:MM 2, CH4:Mas 1-3, CH4:EOC 1,3,5	Heat of combustion, cycloalkane conformation
20	4	p 99-110 OWL CH4:MM 1, CH4:EOC 2,4,	Chair conformation of cyclohexane
21	4	p 110-114 OWL CH4:MM 3, CH4:EOC 6,7	Polycyclics
23		**EXAM #1**	
26	**5**	p 115-124	**Stereochemistry** – Symmetry, chirality, optical activity
27	**5**	p 124-130	Using the R & S designations
28	5	p 131-141, 145-148a OWL CH5:Mas 1-5 CH4:EOC 1,10	Diastereomers
30	6&2	p 42-53, 149-15 OWL CH5:Mas 6-9, CH4:EOC 2-4, 6,11,12,17	**Acids & bases**

Tentative 321 Lab Schedule F16

Week of	Experiment	Graded Assignments	pts
1 – 8/29	Check in,	Preparation/technique points 2 pts/wet lab day	20
2 – 9/5	Labor Day Week (no labs)		
3 – 9/12	Cooperative Unknown Week 1		
4 – 9/19	Cooperative Unknown Week 2: experiment continued		
5 – 9/26	Cooperative Unknown Week 3: Discussion. Group unknown identification and completion of report sheet.	Individual report sheet due at beginning of lab. Group report sheet due at end of lab.	08 14
6 – 10/3	TLC of Analgesics	Procedure, solvent choice, and prediction due as ticket to enter lab Cooperative unknown quiz in lecture	 18
7 – 10/10	Distillation Week 1: Simple distillation experiment	TLC formal report due on lab day. (w/partner)	20
8 – 10/17	Distillation Week 2: Investigation of efficiencies of various distillation apparatus. GC demo.	Distillation questions due at beginning of lab.	08
9 – 10/24	Gas Chromatography of distillation products, identification of IR unknowns.	IR identification sheet due on lab day.	10
10 – 10/31	Acid/Base Extraction Week 1: acid/base extraction workshop. Individual flow diagram explanation.	Distillation formal report due on lab day (w/partner).	20
11 – 11/7	Acid/Base Extraction Week 2: Mixture separation by acid/base extraction	A/B flow diagram due as ticket to enter lab.	05
12 – 11/14	Acid/Base Extraction Week 3: Extraction experiment cont'd		
13 – 11/21	Thanksgiving Week (no labs)		
14 – 11/28	Synthesis and analysis of an organic compound. Weigh A/B products, calc % recovery, take melting points, and complete A/B report sheet.	A/B report sheet due on lab day Flow diagram and half report sheet due as ticket to enter lab A/B Quiz in lecture	12 08 18
15 – 12/5	Analyze product Cleanup & checkout	Organic synthesis report sheet due on lab day (w/partner). Written lab final exam	12 27

Syllabus - CHEM 322, Organic Chemistry 2, Spring 2016

Instructor: Dan Adsmond E-mail: adsmondd@ferris.edu, Phone: 591-5867
Office: ASC 3009, Office Hours: Mon-Wed 9-9:50 AM, Thu 12-12:50 PM
or by appointment or whenever the door is open.

Prerequisite: Chem 321 – Organic Chemistry 1

Course Details: 5 credit hours
Lecture SCI 102: Mon, Tue, Wed, Fri 8:00-8:50 AM
Laboratory: SCI 328 Sec 211 - Thu 8:00-10:50 PM; Sec 212 – Wed 3:00-5:50 PM
Sec 213 – Tue 12:00-2:50 PM

Text: Organic Chemistry, Ninth Edition
John McMurry, Thomson Brooks/Cole Publishing Company, Boston.
packaged with OWL (OWL may be purchased separately)

Packet: Chem 322 Lecture Handout Packet Spring 2016 – Prof Dan Adsmond
(available ONLY at Great Lakes Books)

Lab: Composition book (for a lab notebook), NMR tube (at least one), Goggles

Course Description: Study of benzene compounds, alcohols and phenols, ethers and epoxides, carbonyl-containing compounds, aldehydes, ketones, carboxylic acids and their derivatives, carbanion chemistry, aliphatic and aromatic nitrogen-containing compounds. Concurrent laboratory includes synthesis, spectroscopic analysis, and identification of organic compounds with emphasis on chemical separation and purification techniques.

Course Outcomes: The six major outcomes of Chem 322 may be classified under the three headings listed below. A student successfully completing this course will:

FACTUAL KNOWLEDGE AND FUNDAMENTAL PRINCIPLES

1) become familiar with the structure, nomenclature, physical properties and chemical reactions of benzene compounds, alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids, acid derivatives, and amines.
2) understand the relationship between the structure and physical properties as well as the relationship between structure and chemical reactivity of the aforementioned compounds.

THINKING AND PROBLEM SOLVING

3) be able to propose reasonable mechanisms for reactions of the aforementioned compounds.
4) be able to design multistep syntheses of organic compounds.
5) be able to understand, modify, and follow laboratory procedures for the synthesis, separation, purification, and analysis of organic compounds as well as being able to apply the underlying principles in developing and selecting appropriate procedures.

EFFECTIVE COMMUNICATION

6) learn to communicate effectively using the vocabulary of organic chemistry both orally and in written form.

Grading:		
	3 Exams (100 pts each)	300 pts
	Group Puzzles	036 pts
	Group Quizzes	060 pts
	OWL homework	070 pts
	Laboratory	184 pts
	Final Exam	150 pts
		800 pts

A	740-800
A-	720-739
B+	700-719
B	660-699
B-	640-659
C+	610-639
C	550-609
C-	520-549
D+	490-519
D	430-489
D-	400-529
F	below 400

Attendance: Regular attendance in lecture is expected. In-class assignments and quizzes will be given ranging in value from 4 to 15 points. Missed assignments and quizzes will result in a zero grade. Attendance at exams and laboratory sessions is mandatory. Make a note of exam dates immediately! NO MAKEUP EXAMS WILL BE GIVEN. In the event of an excused absence on an exam the final exam score will be multiplied by 1.67.

Exam 1: Fri, Feb 12; Exam 2: Fri, Mar 18; Exam 3: Fri, Apr 22

Unexcused **lab** absences will dramatically lower your final grade in the course.

# of unexcused lab absences	1	2	3	4	5
points lost from final grade	20	40	80	160	184

AN ABSENCE IS EXCUSED IF: 1) you were ill and have a written doctor's excuse, 2) you need to attend a required university function (previous notification and permission from the Academic Vice Presidents Office required), 3) there is a death in the immediate family, or 4) you are required to serve on jury duty or are subpoenaed for court testimony (previous notification required).

Reading: Daily reading assignments are listed on the course schedule which follows. It is expected that students will have read the appropriate textbook pages and/or handouts before coming to lecture.

OWL: The daily OWL homework is mastery based meaning that you will have up to 10 attempts to get the full points for each problem in an assignment. Each assignment will contain one of three possible types of problems: Multimedia (MM), Mastery (Mas), and End of Chapter (EOC). You may have up to three different assignments for a single day depending on the types of problems assigned. **The OWL electronic homework is to be completed in preparation for class**, as indicated on the course schedule, but will be accepted until 5:00 PM on Friday of the week during which it is due. Please contact me with any OWL issues you are having, **but do not expect extensions if you encounter OWL or computer issues while completing OWL after class on Friday.**

You may access OWL through Blackboard. There is a folder in our Blackboard Course that has instructions for getting started. Anyone who has purchased the 3-hole punched version of the 9th edition of McMurry textbook already has purchased an OWL access code. DO NOT PURCHASE another. If you have registered for the OWL Organic Chemistry 2 course before Jan 6 please see me ASAP.

Homework: Non-OWL homework problems will be assigned each class day and should be completed before the next class meeting. Some of the problems will relate to material already discussed in lecture and some will relate to the reading assignment that usually will not have been discussed. My expectation is that you will make a good attempt to solve each problem and that if you get stuck, you will write down a specific question that you need to have answered in order to complete the problem. Since exam questions will be similar to those seen in the homework, doing the homework regularly is a prerequisite to your success in the course.

Group work: During the second week of class you will be assigned to a group of 4. You will work together as a group on weekly Friday puzzles and group quizzes. Your experience working together on the Friday puzzles should greatly aid in your ability to perform on group quizzes.

My expectations are that students arrive at class at 8:00 AM sharp with textbook in hand, prepared to THINK and PARTICIPATE. My teaching style requires that students participate in class by asking and answering questions, working in groups, solving problems at the board, and participating in class discussion. Students should feel free to ask questions at any time and are encouraged to do so. My job is to help you learn. Take advantage of the opportunity!

Classroom Ground Rules:
1. Address the instructor in an appropriate manner.
2. Respect the views and opinions of the other students.
3. Work only on material/homework pertaining to the class.
4. No swearing or use of profanity.
5. No electronic devices.

Final Exam: Wed, May 4, 8:00 AM – 9:40 AM

Note: I reserve the right to make changes in the course that are appropriate within the context of the class.

Tentative Reading & OWL Schedule
Chem 322 Spring 2016

Date	Chapt	Read/OWL Assignment (read/do before class)	Topic
January 11			Course Intro
12	**16**	478-493	**Benzene: Electrophilic Aromatic Substitution**
13	"	493-503 OWL MM16.1	Benzene: EAS substituent effects
15	"	503-505 OWL Mas16.1, EOC16.1	Benzene: additivity of substituent effects, synthesis
18		NO CLASSES	MARTIN LUTHER KING JR DAY
19	"	505-514 OWL Mas16.2, EOC16.2	**Benzene: nucleophilic aromatic substitution, benzyne, oxidation, reduction**
20	"	514-524 OWL MM16.2, EOC16.3	Benzene: synthesis
22		 OWL EOC16.4	Friday Puzzle
25	**17**	525-534 OWL MM17.1	**Alcohols and Phenols:** naming, physical properties, acidity & basicity
26	"	535-543 OWL Mas17.1, EOC 17.1	A&P: alcohol preparation by addition and reduction (Grignards)
27	"	543-552 OWL MM17.2, Mas17.2, EOC17.2	A&P: alcohol reactions
29		 OWL Mas17.3, EOC17.3	Friday Puzzle
February 1	"	553-555 OWL EOC17.4	A&P: multistep Grignard synthesis
2	"	555-567 OWL Mas17.4, EOC17.5	A&P: phenols, spectroscopy
3	**18**	568-573 OWL MM18.1	**Ethers:** naming, properties, & preparation
5		 Mas18.1, EOC18.1	Friday Puzzle
8	"	573-575 OWL MM18.2	Ethers: synthesis and reactions
9		577-583 OWL EOC18.2	Ethers: epoxides
10	"	583-594 OWL Mas18.2, EOC18.3	Ethers: spectroscopy, thiols, sulfides, applications
12		**EXAM #1**	
15		Handout	**Molecular Recognition**
16			M.R. cont'd
17		595-603	**Carbonyl Preview**
19			Friday Puzzle
22	**19**	604-610	**Aldehydes & Ketones:** naming, preparation, &

		OWL	oxidation
23		610-619 OWL	A&K: nucleophilic addition of carbon, oxygen, and nitrogen nucleophiles
24	"	619-629 OWL	A&K: Wittig, Cannizzaro, and conjugate addition
26			Friday Puzzle
29	"	630-639 OWL	A&K: nuc add'n cont'd
March 1	"	640-648 OWL	A&K: Spectroscopy and synthesis
2	**20**	653-663 OWL	**Carboxylic Acids & Nitriles:** naming, physical properties, and acidity
4		OWL	Friday Puzzle
7-11		NO CLASSES	SPRING BREAK
14	"	664-666	Carboxylic Acids: synthesis
15	"	667-678 OWL	Carboxylic Acids: reactions, spectroscopy
16	**21**	679-688 OWL	**Acid Derivatives:** nomenclature, nucleophilic substitution (addition/elimination)
18		**EXAM #2**	
21	"	688-701 OWL	Acid Derivatives: nucleophilic substitution cont'd
22	"	701-712 OWL	Acid Derivatives: nucleophilic substitution cont'd
23			"Friday Puzzle"
24-25	"	NO CLASSES	EASTER BREAK
28		713-718 OWL	**Acid Derivatives: thiol esters & polymers**
29	"	718-726	Acid Derivatives: spectroscopy, synthesis
30	**22**	727-733	**Carbonyl Alpha Substitution Reactions:** enols
1	"	734-739 OWL	CASR: enolates
4			Friday Puzzle
5	"	739-752	CASR: malonic ester & acetoacetic ester syntheses
6	**23**	753-759 OWL	**Carbonyl Condensation Reactions:** aldols
8			Friday Puzzle
11	"	760-764	CCR: aldol syntheses
12	"	764-770 OWL	CCR: Claisens

13	"	770-783 **OWL**	CCR: Michaels, Storks, & Robinsons
15	"		Friday Puzzle
18			CCR: Enolate synthesis - putting it all together
19	**24**	787-797 OWL	**Amines:** naming physical properties, basicity
20	"	798-806 OWL	Amines: preparation
22		**EXAM #3**	
25	"	806-816 OWL	Amines: reactions
26	"	 OWL	Amines: synthesis
27	"	816-831 OWL	Amines: heterocycles & spectroscopy
29			Final Study/Review Session

GEOL 121, Physical Geology
Course Syllabus for Fall 2016

This course explores the processes that continuously interact to cycle rock and water through the earth system, thus shaping the surface of our dynamic earth. Plate tectonics is the thread that ties the study of earthquakes, volcanoes, and mountain belts; weathering, erosion, and deposition. The interrelation of humans and the earth system is a recurring theme. This course meets General Education requirements: Scientific Understanding, Lab. (4 Credits)

Instructor: Dr. Fred Heck
Office: Commons Building 3013
Office Hours: Monday 9am to 12pm; Thursday 2pm to 3pm; or by appointment
Phone: Office, 591-2588; Cell/Text, 231-349-9435
Email: heckf@ferris.edu

Lecture: M-W-F from 2:00 to 2:50 pm in IRC 120
Laboratory: Section 211 on Thursday from 12:00 to 1:50 pm in SCI 138
Section 212 on Thursday from 9:00 to 10:50 am in SCI 138
Section 213 on Tuesday from 9:00 to 10:50 am in SCI 138

Required Materials: Reynolds, Exploring Geology, 4th ed CONNECT/Smartbook, ISBN: 1259292215

Your daily pre-class assignments will be a reading from the Reynolds text (Smartbook) and completion of question probes that will ensure you have understood the reading. These assignments will be accessible through the McGraw Hill Connect/Smartbook which includes an e-text, the question probes, and other resources that will help you learn the material.

To register for CONNECT so you can get to the e-text and Smartbook assignments, you need to go into Blackboard and go to the Geology 121 course. Click the "CONNECT Assignments" button on the left-hand menu bar; click on "Chapter 1 CONNECT Assignments"; click on the LearnSmart assignment that is posted. You will then be presented with the option to purchase the registration code ($85), enter the registration code you purchased from the bookstore, or select courtesy access.

Courtesy access will allow free access to CONNECT for 14 days before you need to actually purchase the registration code. This option is helpful if you are waiting for financial aid or are undecided about remaining in the course. **NOTE: You WILL need to purchase the registration code before the 14 days is up in order to continue accessing the assignments.**

Goals and Objectives of this Course:

By the end of this course students will be able to:

1. express a basic understanding of core concepts in the science of geology.
2. apply geologic concepts and principles to understand new information and situations they encounter related to the earth system.
3. explain and apply scientific processes used to investigate the earth system.
4. analyze scientific issues related to humans and geology.

Method of Instruction: My teaching philosophy is grounded in the idea that the more actively involved a person is in their own learning, the better they will learn. This means that you will be doing things inside and outside the classroom to learn the material, and lecture will play a relatively small role in helping you learn. There are a number of strategies I use to help you become "actively involved" in your learning.

- Pre-class reading and questions assignments will prepare you for in-class activities and provide you with a broad knowledge base about geology.
- Concept sketches will be done together in class to help you develop a more in-depth understanding of key geologic concepts.
- In-class, small-group assignments will have you apply what you learn in the reading assignments to understand and analyze geologic questions or issues.
- Labs will be hands-on opportunities to investigate different aspects of the solid earth system in more detail than we can in the classroom.

Becoming more actively involved in your learning, rather than passively listening to lectures, means that you also take the primary responsibility for that learning. My main role will not be that of "a sage on the stage" feeding you information, but of a "guide on the side" helping you understand the information. This class will be an opportunity for you to develop the skills needed to become responsible for your own learning, skills that are essential to becoming a college graduate and successful professional in your field.

Grading: Grades are calculated as points earned divided by points possible with the following approximate point distribution:

LearnSmart Assignments	33 at 5 pts each	165 pts total	~18% of final grade
Chapter Quizzes	15 at 10 pts each	150 pts total	~16% of final grade
Labs	12 at 10 pts each	120 pts total	~13% of final grade
In-Class Assignments	33 at 3 pts each	99 pts total	~10% of final grade
Exams	4 at 100 pts each	400 pts total	~43% of final grade

NOTE: If you must be absent for an exam or a lab, see me beforehand to reschedule. **You must pass the laboratory portion of the course with a 70% average to get a passing grade in this class.**

Grading Scale:

A = 94% – 100%	C+ = 77% - 79.9%	D- = 60% - 62.9%
A- = 90% - 93.9%	C = 73% - 76.9%	F = less than 60%
B+= 87% - 89.9%	C- = 70% - 72.9%	
B = 83% - 86.9%	D+ = 67% - 69.9%	
B- = 80% - 82.9%	D = 63% - 66.9%	

Excused Absences: Excused absences include health, legal, or emergency family problems and school sponsored functions. To receive credit for work missed due to an excused absence you must contact me on the first day you return to discuss making up what you missed. **You must provide written documentation for an excused absence. You will not be allowed to make up any work missed during an unexcused absence.**

Special Circumstances: PLEASE contact me as soon as possible in the event of an extended illness or other special problem that will cause you to miss too much class so we can make special arrangements for completing your assignments.

More About Course Materials and Assignments

Textbook: *Exploring Geology*, by Reynolds, Johnson, Morin, and Carter, 4th Edition is a unique textbook designed to help you learn geologic concepts and processes on your own. Nearly all the information in the book is built around illustrations and photographs, rather than being in long blocks of text. The entire book consists of a series of two-page spreads organized into chapters. Each two-page spread has a unique number (e.g., 12.4), and these numbers are referenced for quizzes and other course assignments. Each two-page spread is a self-contained block of information about a specific topic and has a short list indicating what you should be able to do before you leave these pages. The items from these lists are your guide to what is important and all quizzes are derived from this list. If, when studying from the book, you construct your own answer to each item on the What-To-Know List, then I predict you will do well in the class

LearnSmart: LearnSmart is a very helpful tool for learning the course material. The goal of LearnSmart is to help you learn the topics presented in each assignment. Each LearnSmart activity includes a reading assignment followed by a series of questions that adapt to your strengths and weaknesses to guide you through the material you need to learn. I think you will find that it's fun and effective way to learn about geology.

Labs: Weekly laboratory activities are an essential aspect of this course. They provide an opportunity for hands on experiences that help illustrate, clarify and reinforce principles learned in the classroom. **You must pass the laboratory portion of the course with a 70% average to get a passing grade in this class.**

In-Class Assignments: Most days in class will include an individual or small-group activity where you apply information you learned from the text or classroom activities. In most cases there will be required points attached to these assignments. In some cases they will be for extra-credit points.

Quizzes: For each chapter, you will complete a quiz that covers information from the textbook. You can use your textbook or your notes to answer these quizzes, but not another person. Each quiz has a time limit of 30 minutes, which will not be enough to look up every answer from scratch during a quiz. In other words, you will need to read and understand the textbook before beginning the time-limited quiz. Use the What-to-Know list as your guide of what to study in preparation for the quizzes.

In-Class Exams (concept sketches): Every few weeks there will be an in-class exam consisting of two concept-sketch style questions. In advance of each in-class exam, you will be given a list of 10 to 12 possible concept-sketch questions, and two of these will be on the exam word for word. There are no multiple-choice questions on exams.

THE LAST DAY TO DROP THIS CLASS WITH A "W" GRADE IS THURSDAY, NOVEMBER 3, 2016

GEOLOGY 121

Tentative Course Schedule Fall 2016

---------- *WEEK 1* ----------

Aug. 29 M Introduction to Geology 121
31 W Getting Started: Connect/Smartbook and Concept Sketches
Sep. 2 F The Nature of Geology, part 1. LearnSmart assignment due by 2:00 pm class time.
Lab: No lab

---------- *WEEK 2* ----------

5 M Labor Day: No Class
7 W The Nature of Geology, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 1: Nature of Geology. Available at 3:00 pm and **DUE BY Friday** at 2:00 pm class time.
9 F Investigating Geologic Questions, part 1. LearnSmart assignment due by 2:00 pm class time.
Lab: FIELD EXERCISE: Earth as a System

---------- *WEEK 3* ----------

12 M Investigating Geologic Questions, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 2: Investigating Geologic Questions. Available at 3:00 pm and **DUE BY Wednesday** at 2:00 pm.
14 W Plate Tectonics, part 1. LearnSmart assignment due by 2:00 pm class time.
16 F Plate Tectonics, part 2. LearnSmart assignment due by 2:00 pm class time.
Lab: Topographic maps

---------- *WEEK 4* ----------

19 M Plate Tectonics, part 3. LearnSmart assignment due by 2:00 pm class time.
Quiz 3: Plate Tectonics. Available at 3:00 pm and **DUE BY Friday** at 2:00 pm.
21 W TBA
23 F **EXAM 1**
Lab: Plate Tectonics

---------- *WEEK 5* ----------

26 M Minerals. LearnSmart assignment due by 2:00 pm class time.
28 W Igneous Environments. LearnSmart assignment due by 2:00 pm class time.
Quiz 4: Minerals/Igneous Environments. Available at 3:00 pm and **DUE BY Friday** at 2:00 pm.
30 F Volcanoes and Volcanic Hazards, part 1. LearnSmart assignment due by 2:00 pm class time.
Lab: FIELD TRIP: Sleeping Bear Dunes on Thursday, September 29

---------- *WEEK 6* ----------

Oct. 3 M Volcanoes and Volcanic Hazards, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 5: Volcanoes and Volcanic Hazards. Available at 3:00 pm and **DUE BY Wednesday** at 2:00 pm.
5 W Sedimentary Environments and Rocks, part 1. LearnSmart assignment due by 2:00 pm class time.
7 F Sedimentary Environments and Rocks, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 6: Sed. Environments and rocks. Available at 3:00 pm and **DUE BY Monday** at 2:00 pm.
Lab: Forensic Geology

---------- *WEEK 7* ----------

10 M Deformation and Metamorphism, part 1. LearnSmart assignment due by 2:00 pm class time.
12 W Deformation and Metamorphism, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 7: Deformation and Metamorphism. Available at 3:00 pm and **DUE BY Monday** at 2:00 pm.
14 F TBA
Lab: Minerals and Rocks

---------- *WEEK 8* ----------

17 M **EXAM 2**
19 W Geologic Time, part 1. LearnSmart assignment due by 2:00 pm class time.
21 F Geologic Time, part 2. LearnSmart assignment due by 2:00 pm class time.
Lab: FIELD EXERCISE: Gravel Pit

---------- *WEEK 9* ----------

24 M Geologic Time, part 3. LearnSmart assignment due by 2:00 pm class time.
Quiz 8: Geologic Time. Available at 3:00 pm and **DUE BY Wednesday** at 2:00 pm.
26 W Mountains, Basins, and Continents, part 1. LearnSmart assignment due by 2:00 pm class time.
28 F Mountains, Basins, and Continents, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 9: Mountains, Basins, Continents. Available at 3:00 pm and **DUE BY Monday** at 2:00 pm.
Lab: Geologic Maps

---------- *WEEK 10* ----------

31 M Earthquakes and Earth's Interior, part 1. LearnSmart assignment due by 2:00 pm class time.
Nov. 2 W Earthquakes and Earth's Interior, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 10: Earthquakes and Earth's Interior. Available at 3:00 pm and **DUE BY Friday** at 2:00 pm.
4 F Weathering, Soil, and Slopes, part 1. LearnSmart assignment due by 2:00 pm class time.
Lab: FIELD EXERCISE: Streams

---------- *WEEK 11* ----------

7 M Weathering, Soil, and Slopes, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 11: Weathering, Soil, and Slopes. Available at 3:00 pm and **DUE BY Friday** at 2:00 pm.
9 W TBA
11 F **EXAM 3**
Lab: Stream discharge

---------- *WEEK 12* ----------

14 M Streams and Flooding, part 1. LearnSmart assignment due by 2:00 pm class time.
16 W Streams and Flooding, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 12: Streams and Flooding. Available at 3:00 pm and **DUE BY Friday** at 2:00 pm.
18 F Water Resources, part 1. LearnSmart assignment due by 2:00 pm class time.
Lab: Groundwater

---------- *WEEK 13* ----------

21 M Water Resources, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 13: Water Resources. Available at 3:00 pm and **DUE BY Monday** at 2:00 pm.
23 W Thanksgiving Holiday: No Class
25 F Thanksgiving Holiday: No Class
Lab: Thanksgiving Holiday: No Lab

---------- *WEEK 14* ----------

28 M Glaciers, part 1. LearnSmart assignment due by 2:00 pm class time.
30 W Glaciers, part 2. LearnSmart assignment due by 2:00 pm class time.
Quiz 14: Glaciers. Available at 3:00 pm and **DUE BY Friday** at 2:00 pm.
Dec. 2 F Climate Change. LearnSmart assignment due by 2:00 pm class time.
Lab: FIELD EXERCISE: Glacial landforms

---------- *WEEK 15* ----------

5 M Energy and Mineral Resources. LearnSmart assignment due by 2:00 pm class time.
Quiz 15: Climate Change; Energy/Mineral Resources. Available at 3:00 pm and **DUE BY Friday** at 2:00 pm.
7 W TBA
9 F **EXAM 4**
Lab: TBA

---------- *WEEK 16* ----------

CUMULATIVE FINAL EXAM
ON THURSDAY, DECEMBER 15
FROM 2:00 PM TO 3:40 PM
IN ROOM IRC 120

---------- ***END OF TERM. HAVE A GOOD BREAK!!!!!*** ----------

Math 115-003: Intermediate Algebra (with SLA)

3 credits • Spring 2016 • January 11 – May 6

Section 003 Lecture: MWF 9-9:50 AM in STARR 108

SLA: MW 6-7:15PM in STARR 202

INSTRUCTOR:

Laura Forbes
ASC 2037; (231) 591-2564
forb5@ferris.edu

Office Hours:
Wed 10:15-11:15 AM FLITE 108

SLA WORKSHOP FACILITATOR:

Stephanie Aigboduwa
aigbods@ferris.edu

COURSE DESCRIPTION:

A study of complex fractions, first and second degree equations and inequalities, exponents, radicals, and introduction to complex numbers, logarithms, and systems of equations.

Prerequisite: Math 110 or placement by examination. If you are required to go on to other math course, you will need to earn a C- or better in this course.

LEARNING OUTCOMES

Students who have completed MATH 115 are expected to be able to:

1. Solve a variety of equations (e.g. linear, quadratic, rational, radical, absolute value, exponential, logarithmic, and systems)
2. Solve a variety of inequalities (e.g. linear, absolute value, compound)
3. Graph a variety of functions (e.g. linear, quadratic, exponential, logarithmic)
4. Use standard function notation.
5. Factor algebraic expressions.
6. Find the slope of any line.
7. Write equations of lines.
8. Determine whether lines are parallel or perpendicular.
9. Perform addition, subtraction, multiplication, division of radical expressions
10. Simplify radical expressions.
11. Perform arithmetic operations with complex numbers.
12. Evaluate logarithmic and exponential expressions.
13. Use the properties of logarithms.
14. Solve application problems using a variety of equations (e.g. linear, quadratic, radical, exponential, logarithmic)

COURSE MATERIALS:

The textbook associated with this course is Gustafson/ Karr/ Massey *Beginning & Intermediate Algebra – An Integrated Approach*, 7th Ed. (published by Brooks/ Cole/ Cengage Learning). You do NOT need to purchase the text, but you DO need to purchase Enhanced WebAssign, which comes with an e-text. If you used WebAssign in your Math 110 class or a previous Math 115 class, you should not have to re-purchase access – this semester will be free.

WebAssign Class Key: **ferris 0150 4584**

Other supplies needed include:

- A scientific calculator (cell phone or graphing calculators are NOT allowed). TI-30XIIB (battery) or TI-30XIIS (solar) are GREAT calculators; but the TI-30XA model should NOT be used. I will provide TI-30XIIS calculators on quiz and test days throughout the semester.
- One 2 inch or larger 3 ring binder with dividers
- At least 200-pp. College rule notebook paper; two spiral notebooks (for your work associated with the online homework) would be helpful but are not a requirement.
- One small package of graph paper
- Several pencils + a good eraser
- Ruler/Straight-edge

COURSE HOMEPAGE:

- Important dates, the syllabus, grades, announcements, notes, et cetera can be found on Blackboard. You should log in regularly on MyFSU to check for announcements or new postings at the Bb link.

LECTURE ATTENDANCE:

Barring unforeseen circumstances, I will be in class for each session. If, for some reason, I cannot be in class, I will either (a) inform you ahead of time, (b) inform you via email that class is cancelled, or (c) make arrangements with another faculty member to be present.

Your attendance to every class is both my expectation and to your advantage, since research shows there is a positive correlation between attendance and class performance. There may, of course, be situations in which you will miss class. I do not take off points for your absences, but rather, if you are absent, you miss out on some perks of being in class, which are as follows:

If you have ***3* or less absences** you may drop your lowest test score AND your lowest quiz score. If you have ***5* or less absences** you may drop only your lowest quiz score. Blackboard will automatically drop your two lowest homework scores no matter what your grade or attendance status in the class. Again, these are PERKS of being in class – they are not automatically available to everyone regardless of their classroom attendance – they have to be earned by being present in class!

A cumulative final exam is MANDATORY for anyone who has lower than a 75% in the class **after test 4**, or anyone with more than 4 absences.

3 Tardies = 1 Absence, so be on time to class, please. Coming to class and sleeping counts as an absence as well. Cell phone usage in class counts as a Tardy; 3 cell phone uses in class counts as an Absence. If you have a special condition that limits your mobility and prevents you from being timely, please talk to me outside of class.

If you know in advance that you will need to miss class, please notify me so that we can make arrangements for makeup assessments or notes.

Making up lecture absences:

Because this is an SLA course, there is ONE way you can MAKE UP absences. IF you have an 85% or better in the class (so IF you are **not** required to attend SLA), you can attend 2 SLA sessions during that time, and that will allow you to make up one classroom absence. You can make up a MAXIMUM of THREE classroom absences. If you are already required to attend SLA because your grade is lower than an 85%, then your attendances do not count as makeups.

SLA WORKSHOP ATTENDANCE:

Please refer to the fourth page of this syllabus, where SLA workshop attendance and policies are discussed.

IMPORTANT DATES:

January:

Thurs 1/14: Drop/Add closes at 5:00 PM
Fri 1/15: **Quiz 1**
Mon 1/18: **No Class** (MLK Day)
Fri 1/22: **Quiz 2**
Fri 1/29: **Quiz 3**

February:

Fri 2/05: **Test 1**
Fri 2/12: **Quiz 4**
Wed 2/17: Meet in FLITE 110, Project 1 Intro
Fri 2/19: **Quiz 5**
Fri 2/26: **Test 2**

March:

Wed 3/02: Project 1 due; Meet in FLITE 110
Fri 3/04: Meet in FLITE 110; **Quiz 6**
3/07-3/11: Spring Recess
Fri 3/18: **Quiz 7**
Wed 3/23: Last day to "W" with grade
Fri 3/25: **No Class** (Easter Break)

April/May:

Fri 4/01: **Test 3**
Fri 4/08: **Quiz 8**
Fri 4/15: **Quiz 9**
Fri 4/22: **Test 4**
Mon 4/25: Project 2 due
Fri 4/29: **Quiz 10** (This quiz CANNOT be dropped or skipped!)

Comprehensive FINAL EXAM

Monday May 2
8-9:40 AM
STARR 108

GRADING:

10%	Homework (roughly 30 graded assignments)
10%	Projects (Individual and Group)
25%	Quizzes
45%	Tests
10%	Final Exam

Occasionally, online practice quizzes will be made available the evening before a test or quiz. If marked as extra credit, they will be worth the following point values, according to your scores, and will be applied to the quiz portion of your grade:

Score	Extra Credit Earned
0-30%	0 points
31-60%	1 point
61-100%	2 points

Your overall average will be rounded to the nearest whole number and letter grades will be recorded as:

A	93% or higher
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%
C+	77-79%
C	73-76%
C-	70-72%
D+	67-69%
D	63-66%
D-	60-62%
F	59% or lower

This is a set scale and will NOT be changed. I do not give extra credit other than the occasional online practice assessments mentioned above. In this course you will be provided with extra opportunities to learn the material through homework and projects, and therefore to excel. If you want an "A", be sure you do the homework and practice, practice, practice. THE CHOICE IS YOURS.

Nothing can stop the man with the right mental attitude from achieving his goal; nothing on earth can help the man with the wrong mental attitude. (Thomas Jefferson)

Success is the sum of small efforts, repeated day in and day out. (Robert Collier)

I reserve the right to make needed and appropriate adjustments in this syllabus. It is very common for plans to change; ... you can pretty much count on it!

FAQ's:

- *What if I miss a test?*

  Make-up tests are allowed for extenuating circumstances but there is neither partial credit nor extra credit on a make-up test, and your test will be different than the one administered in class. Each student is allowed **ONLY ONE** makeup assessment – that is, one test OR one quiz, and **you need to contact me to schedule a makeup within 24 hours of missing the assessment**. Any missed tests or quizzes beyond that one, or one that you didn't bother to contact me about, becomes a zero.

- *Is the final mandatory? Is it cumulative?*

  It is not mandatory if you keep your grade a 75% or better, and have good attendance. Those with poor grades or poor attendance are required to take the CUMULATIVE final exam.

- *What if I need more help?*

  You can visit me anytime I am in my office, and I'd be happy to help you. Beyond that, free tutoring is available in ASC 1017. Some students choose to reserve the same time for a group of them from the same class – this seemed to work very well for my students last year. The tutoring center has computers so you can work on your WebAssign homework and get help right there. I suggest you use this SUPERB, FREE resource!

- *What is your **cell phone policy**?*

  Cell phones must be set to silent and put away, unless you are expecting an important call (family member dying, etc.) – in which case you must CLEAR it with me first (tell me the situation, privately, at start of class), and then you can leave your phone out on your desk for that day only.

  If you are caught with your cell phone out during class, I will make a mark by your name on the attendance sheet – I will usually not 'call you out' or disrupt class to ask you to put it away. Just understand that this counts against your attendance – 3 cell phone usages in class equals one absence. And yes, my vantage point allows me to see what you are doing under the table, etc – be wise!! This policy also includes iPods, laptops, or other digital devices that cause distraction to your classmates and yourself. Yes, it IS that serious – this is a matter of academic honesty and a reflection of your integrity. *It's your choice - is it really worth checking that text, or can you honestly wait until after class?*

SLA
STRUCTURED LEARNING ASSISTANCE

This is a Structured Learning Assistance (SLA) supported course. SLA enhances student learning by combining successful learning strategies with activities designed to review lecture and printed materials. On average, SLA supported sections have lower rates of failure and withdrawal than non-SLA sections and students who participate believe they score at least one half to one full letter grade higher in the course as a result of SLA.

Your SLA facilitator is Stephanie Aigboduwa, and her email address is aigbods@ferris.edu. The SLA meets Mondays and Wednesdays from 6-7:15PM in STARR 202. Attendance at SLA workshops is mandatory until the results from the first test on Friday February 5 are received, at which time only students with an overall grade below **85%** will be required to attend. Students scoring an overall 85% or higher in the class at that time are encouraged to attend but are not required. Students will have the opportunity with each test to change their SLA attendance status, and it is the students' responsibility to know their SLA attendance status. Test results and grades will be posted on Blackboard by the Monday after each test. Students who are required to attend who accrue more than four unexcused absences in SLA must withdraw ('W') from the course if possible or receive an 'F' as a final grade.

Your facilitator will provide you with a copy of the SLA Attendance and Workshop Policies the first day of workshop. The SLA facilitator will thoroughly review this document, and students must sign the statement of understanding before participating. I fully support the SLA Attendance and Workshop Policies.

SLA WORKSHOP ATTENDANCE:

SLA absences are counted separately from lecture absences!

All students are required to attend until the first **test** occurs. After the first **test**, those with 85% or better overall, and **less than 5** classroom absences can choose to opt out of SLA, but if their score drops below an 85% after any **test**, or they accrue more than 5 classroom absences, then those students must return to SLA until their tests scores bring them up again and their absences are 'made up'.

The SLA policy states that **you will fail the course upon your fifth unexcused-required SLA absence.**

Workshop absences are handled by Stephanie and she should be contacted if you have an excuse.

GENERAL EDUCATION OUTCOMES:

Mathematics serves as a context for the development of quantitative skills by facilitating the development of students' abilities to solve real world problems, make intelligent (more informed) decisions, evaluate quantitative information, and reason more effectively.

Students who have completed the quantitative skills requirement should be able to:

1. Perform basic operations (e.g., addition, subtraction, multiplication, and division) in the context of both arithmetic and algebra;
2. Solve a variety of equations (e.g., linear, quadratic, radical, exponential, logarithmic, or trigonometric equations);
3. Estimate and approximate answers to a variety of problems (i.e., recognize both the range of possible answers and when an "answer" is outside the range of possible answers);
4. Demonstrate a conceptual understanding of mathematics (e.g., represent mathematical information using symbols, graphs, tables and verbal explanations);
5. Demonstrate a procedural understanding of mathematics (i.e., carry out the steps required to arrive at a final answer or conclusion);
6. Explain and demonstrate the relevance of mathematics to the real world (e.g., give examples of how mathematics is used in the real world);
7. Represent real-world problems using mathematics (i.e., model real-world problems);
8. Solve both real-world problems and problems that exist within the context of mathematics itself;
9. Select an appropriate formula for a given real-world problem, and use it to solve the problem;
10. Demonstrate the appropriate use of computing technology to solve quantitative problems.

Math 120 – Trigonometry
Spring 2016 Syllabus

Section: Days, Time, Room **Credit Hours: 3.0**
006: MW 4:30-5:45, STR 108

Instructor: Matthew McCullen
Phone: 796-7651 ext. 223, 796-2327
E-mail: mccullm4@ferris.edu, mmcculle@brps.org
Office Hours: MW 5:45-6:15 in STR 108

Textbook: *Trigonometry,* 10th edition by Lial, Hornsby, Schneider, Daniels – Pearson Education

Prerequisites: A grade of C- or higher in Math 115 or 24 ACT or 560 SAT

Course Description: A study of trigonometric functions and their properties, solving right and oblique triangles, radian measure, graphs, trigonometric identities and trigonometric equations. Calculators with trigonometric functions are required.

Course Content: The sections of the text we will cover in this course are, in this order:

1.1 – 1.4	Trigonometric Functions
2.1 – 2.5	Acute Angles and Right Triangles
7.1 – 7.5	Applications of Trigonometry and Vectors
3.1, 3.2, 3.4	Radian Measure and the Circular Functions
4.1, 4.2	Graphs of Circular Functions
5.1 – 5.4	Trigonometric Identities
6.1, 6.2	Inverse Circular Functions and Trigonometric Equations

Student Learning Outcomes: Students who have completed MATH 120 are expected to be able to:

1. Solve problems based on angle relationships and similar triangles.
2. Define the trigonometric functions.
3. Convert degree, degree/minute/second, and radian measures.
4. Evaluate trigonometric functions without using a calculator for angles whose reference angles are special angles.
5. Use a calculator to evaluate trigonometric functions and to determine the angle using the inverse trigonometric functions.
6. Find the area of a triangle or sector of a circle.
7. Find linear and angular speed.

8. Solve triangles, both right and oblique.
9. Identify the domain and range and graph trigonometric functions.
10. Verify trigonometric identities and apply the identities to find the values of trigonometry functions.
11. Solve trigonometric equations.
12. Apply basic vector operations.
13. Solve practical problems.

Exams: There are three exams and a cumulative final exam. The approximate dates are:

Exam 1	Wednesday, February 10, covering chapters 1 and 2
Exam 2	Wednesday, March 2, covering chapter 7
Exam 3	Wednesday, April 13, covering chapter 3 and 4 and 5.1-5.3
Final Exam	Covers 5.4, 6.1, 6.2 and cumulative topics. Date TBA

These dates may change based on our pace.

Grading: Each exam will count for 100 points. Several quizzes will also be included in your grade. There are no makeups for missed quizzes but I will throw out your lowest quiz score. **Makeup exams will only be given if permission is sought prior to the exam and if the instructor approves reason.**

Grading scale	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
% needed	93	90	87	83	80	77	73	70	67	63	60	under 60

Attendance: In order to be successful in this course, attendance is extremely important. This being the case, I'm offering a huge incentive to you. If you are not absent or tardy more than once (including leaving early), and if you complete the final exam review packet, I will let you choose whether or not you take the final exam. Also, if you meet this attendance requirement and choose to take the final exam, I will not count it if it will lower your grade. So come to class everyday!

Homework: I will assign problems at the end of every class. I won't collect them on a daily basis, but I will use similar problems on tests and quizzes. If you keep all assignments in an organized notebook and turn it in at the end of the semester, I will raise your final exam score by 5%. You may also do homework online, which I will discuss in class.

Calculators: A calculator capable of computing trigonometric expressions is required for this course. I reserve the right to disallow calculators for particular quizzes or exams. Cell phones and other communications devices are unacceptable for use as calculators or for keeping track of time during the exams.

My Background: I grew up in Saginaw. My undergraduate degree is from Michigan Tech in electrical engineering. I earned my teaching certificate from Western Michigan University and my Master's Degree from Central Michigan University. This will be my 27^{th} year teaching. I am married and have 3 kids.

Math courses are known to be difficult for many students. However, if you attend class every day, try the homework problems, ask questions in class and seek help when needed, you can be successful! I've taught many students over the years who doubt their math ability at the beginning of our course but who grow in confidence and become very successful as the course progresses. You can do it! I'm excited to be your instructor and I look forward to a fun, productive class.

SYLLABUS
Math-130, Advanced Algebra & Analytical Trigonometry, 4 Credits, Section 003
Spring 2016, M, T, W, R, 12:00 – 12:50 PM, STR #120

Instructor: Dr. Siddikov

Office: ASC 2030

Phone: 591 - 5913

E-mail: SiddikoB@ferris.edu , http://faculty.ferris.edu/siddikov/ (faculty personal webpage)

Office hours: M, W: 5:00 – 6:00 PM, F: 2:00 – 3:00 PM, and by appointment

Text: *Precalculus: Mathematics for Calculus* by James Stewart, Lothar Redlin, and Saleem Watson, Sixth Edition (2012), Thomson Brooks/Cole Publishing Company.

Brief Course Description: The student will learn real numbers equations, inequalities, graphs and functions, polynomial, rational, exponential, logarithmic functions, analytic trigonometry, sequences, and series.

Course Content: Chapters 1.5-1.8, 2.1-2.7 (omit 2.3, 2.4), 3.1-3.7, 4.1-4.6, 5.1-5.5, 7.1-7.5, 12.1-12.6 (omit 12.4)

Prerequisites: C- or higher grade in Math-120, or its equivalent.

Course Learning Outcomes: Students who have completed Math 130 should be able to:
Demonstrate a conceptual understanding of the function concept (e.g., using symbols, graphs, and/or diagrams);
Graph a variety of basic functions (e.g., constant, identity, squaring, square root, cubing, cube root, absolute value, reciprocal, quadratic, exponential, logarithmic, and trigonometric);
Graph transformations of basic functions;
Find both real and complex zeros of polynomial functions;
Solve a variety of equations (e.g., quadratic, trigonometric, exponential, and logarithmic);
Demonstrate a conceptual understanding of one-to-one functions and their inverses (e.g., show that a given function is one-to-one and find its inverse and show that two functions are inverses of one another);
Demonstrate a conceptual understanding of composite functions (e.g., write a given function as the composition of two functions);
Use exponential functions to model growth and decay problems;
Demonstrate knowledge of basic trigonometric identities and use them to rewrite trigonometric expressions;
Verify trigonometric identities;
Use the binomial theorem to expand a binomial expression raised to a positive integer power;
Demonstrate a conceptual understanding of arithmetic and geometric sequences (e.g., find the nth term of a given sequence and find the sum of the first n terms of a sequence).

Technology: Scientific calculator.

Exams: There will be the final exam and four midterm exams (closed book and closed notes).
All students are required to take the final and four midterm exams.
Check the schedule for dates of the final and midterm exams.

Makeups: All students are required to take the final exam and four midterm exams.
A makeup exam (or other arrangement) will only be given for reasons approved by the instructor.
In this case permission should be sought prior to the exam.

Homework: Homework will be assigned regularly and discussed during the next class meeting.
Although it will not be collected, it is important to work the problems.
Many exam questions will be similar to homework problems.

Attendance: **Regular attendance is required.**

Total Points:

Midterm Exams	= 400 (4 midterm exams, each worth 100 points)
Final Exam	= 100
Total Points Possible	= 500

Grading Scale (percent):

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	0-59

Remark: While credit is earned for any grade of D- or above, if you plan to take the next course, the prerequisite for all Ferris State University 100 level mathematics courses, and Math 216, 220, 251, is a C- or higher in the previous courses.

APPROXIMATE SCHEDULE

Math – 130/003, Spring 2016, M, T, W, R, 12:00-12:50 PM, STR #120. Instructor: Dr. Siddikov

DATE		CHAPTERS AND SECTIONS	EXAMS AND REVIEWS	HOMEWORK PROBLEMS
Month	Day			
January	11	1.5		15, 27, 39, 43, 45, 57
	12	1.5		63, 75, 87, 97, 105, 111
	13	1.6		23, 33, 39, 43, 59, 63, 73
	14	1.7		17, 25, 33, 47, 55, 67, 79, 85, 101
	19	1.8		3, 11, 15, 21, 29, 31
	20	1.8		45, 59, 69, 73, 85, 93
	21	2.1		15, 23, 27, 33, 45, 55, 67
	25	2.2		9, 19, 27, 39, 45, 57, 65
	26	2.5		1, 7, 13, 25, 35, 43
	27	2.5		47, 55, 63, 79
	28	2.6		5, 7, 19, 25, 37, 43, 53, 57
February	01	2.7		13, 19, 23, 39, 47, 53, 61, 75
	02		**Review**	
	03		**EXAM I**	
	04	3.1		7, 13, 23, 33, 43, 53, 65
	08	3.2		5, 19, 31, 37, 51, 63, 77
	09	3.3		17, 29, 39, 45, 55, 65
	10	3.4		9, 19, 29, 41, 47
	11	3.4		53, 59, 69, 77, 81, 87
	15	3.5		17, 25, 33, 41, 55, 61, 71
	16	3.6		7, 17, 21, 25, 29, 31
	17	3.6		35, 41, 49, 59, 65, 71
	18	3.7		11, 25, 35, 43, 57, 65, 69
	22		**Review**	
	23		**EXAM II**	
	24	4.1		3, 11, 17, 27, 33, 49, 53
	25	4.2		3, 7, 9, 11, 13, 21, 33
	29	4.3		7, 11, 23, 31, 39, 47, 51, 63, 75, 83
March	01	4.4		11, 15, 23, 31, 37, 47, 55, 61, 65
	02	4.5		5, 9, 19, 27, 31, 43, 53, 67, 75
	03	4.6		5, 13, 16, 19
	14	4.6		21, 23, 27, 35
	15		**Review**	
	16		**EXAM III**	
	17	5.1		3, 19, 25, 41, 47, 51, 55
	21	5.2		7, 19, 31, 35, 51, 57, 69, 75
	22	5.3		5, 13, 21, 29, 39
	23	5.3		47, 53, 71, 77

DATE		CHAPTERS AND SECTIONS	EXAMS AND REVIEWS	HOMEWORK PROBLEMS
Month	Day			
March	28	5.4		3, 5, 9, 17, 23
	29	5.4		29, 35, 47, 53
	30	5.5		3, 7, 9, 15, 19
	31	5.5		23, 29, 31, 39, 41
April	04	7.1		5, 17, 29, 37, 45, 55, 69, 75, 87, 93
	05	7.2		5, 13, 17, 21, 27, 35, 57, 63
	06	7.3		3, 15, 19, 23, 33
	07	7.3		37, 57, 65, 71, 75, 87
	11	7.4		9, 17, 27, 33, 37, 43, 51
	12	7.5		3, 11, 25, 33, 41, 45, 53
	13		**Review**	
	14		**EXAM IV**	
	18	12.1		5, 13, 27, 35, 43, 55, 63, 75
	19	12.2		7, 11, 17, 23, 35, 41, 47, 59
	20	12.3		5, 11, 17, 23, 35, 41, 47, 55, 63
	21	12.5		3, 7, 11, 15
	25	12.5		19, 21, 25, 31
	26	12.6		3, 9, 13, 19, 21
	27	12.6		27, 35, 41, 47, 51
	28		**Review**	
FINAL EXAM. Tuesday, May 3, 2016, 12:00 – 1:40 PM, STR #120				

MATH 220 – Analytical Geometry & Calculus I – Spring 2016 Syllabus

Course Section: MATH 220-003 **Credit Hours:** 4.0
Days, Times and Rooms: M 3:00 – 3:50, Starr 105
T/Th 3:00 – 4:15, Starr 122

Instructor: Dr. Michael Dekker

- Office: ASC 2038
- Office Phone: (231) 591-2566 or 1-800-4-FERRIS and ask for x2566
- Email: dekkerm@ferris.edu
- Office Hours: M 1pm – 3pm, T/Th 10am – 11am and by appointment

Textbook: MATH 220 Spring 2016 Course Pack – available at the Ferris bookstore.

Prerequisite: MATH 130, proper ACT score, or placement exam

Course Description: MATH 220 is the first of a three-semester sequence in analytical geometry and calculus. Topics include the limit, the derivative, differentiation of algebraic and transcendental functions, and definite and indefinite integration.

Supplies: The course pack, paper and a three-ring binder for holding the course pack. There will be additional handouts for this course, and each will be three-hole-punched. A scientific calculator will be necessary for some computations, but you are not required to have a graphing calculator. In addition, cell phones and other communication devices are unacceptable for use as a calculator during the exams and quizzes.

Blackboard: Some course material can be found on Blackboard, including:

- The course calendar, which features the in-class agenda for each meeting, the lab schedule, quiz and exam dates, and due dates for the labs and homework
- Copies of handouts not included in the course pack
- Answers to selected homework problems

Exams: There will be four midterm exams and a final exam. The ***tentative*** dates for the exams are:

Exam I	Tuesday, February 2 covering sections 1 and 2
Exam II	Thursday, March 3 covering sections 3-5
Exam III	Tuesday, April 7 covering sections 6 and 7
Final Exam	Monday, May 2 at 2pm covering sections 1-9

Any student who fails to take an exam on the scheduled date will receive a score of 0 for the exam unless I am notified of the absence ***before*** the exam is given. Only students with a legitimate, university-approved reason for absence will be allowed to take a make-up exam, at a time and date arranged by the instructor and student.

The Final Exam: The final exam will consist of four parts: Parts I – III will correspond to Exams I – III and be worth 25 points each. Part IV is a 75-point exam on sections 8 and 9. If you do better (percentage-wise) on one of Parts I – III than you did on the corresponding exam, I will replace your original score on that exam with the score you received on that part of the final. I will only make this replacement for one of the first three exams. If you do better on multiple parts of the final than you did on the corresponding exams, I will make the replacement that is the most beneficial for you. Example: suppose you get a score of 60/75 = 80% on Exam I but then on Part I of the final exam, you score 24/25 = 96%. I will change your score on Exam I to 72/75 = 96%. However, if you also got 50/75 = 67% on Exam II and then got 22/25 = 88% on Part II of the final, I would instead change your Exam II score to 66/75 = 88%, but I would NOT change your Exam I score, since going from 67% to 88% on Exam II is a bigger increase than going from 80% to 96% on Exam I. Basically, if you do poorly on one of the first three exams, you have the opportunity to make up for that score on the final exam.

Homework: Homework problems from the course pack will be assigned for each section that we cover. Some of these problems will be collected and graded. Each set of graded homework problems will be worth 10 points. Late homework will not receive full credit, or might not be accepted at all. However, I will drop your lowest homework score.

Although not all the homework problems from the textbook will be collected, it is important that you do every problem that is assigned. The exam problems will be similar in nature to the problems in the homework. Learning to do mathematics well is accomplished through plenty of practice, and working ALL the assigned homework problems is the best way to practice. Usually, some classroom time can be spent on your homework questions.

Quizzes: Six short quizzes will be given during class. Each quiz will be announced beforehand, and each quiz will be worth 10 points. I will only allow makeup quizzes for those with a legitimate, university-approved reason for missing the quiz. However, I will drop your lowest quiz score.

***Mathematica* Labs:** *Mathematica* is a powerful computer algebra system that can perform many mathematical operations faster than you or me. On most Mondays we will meet in Starr 105 and you will explore calculus with *Mathematica*. These labs will be turned in for grading, and each will be worth 10 points. Late labs will not receive full credit, or might not be accepted at all. However, I will drop your lowest lab score.

Course Evaluations: I offer extra credit points in order to encourage students to complete online evaluations of the course and of my instruction. However, I am only told the percentage of the students that complete the evaluations, so I do not know which students complete the evaluations. As such, every student will receive extra credit in this way: if the response rate is over 90%, 5 points for each student; between 70% and 90%, 4 points each; between 50% and 70%, 3 points each; less than 50%, nothing. You should receive email reminders numerous times when the evaluations are available (usually the last four weeks or five weeks of the semester).

Attendance: I will keep track of your attendance. While absences could lead to poor scores on labs and quizzes, it is also no surprise that students with poor attendance typically receive lower scores on homework and the exams as well. Regardless of the reason for any absence, you are responsible for all material covered in class.

We do not have class on Monday, January 18 (Martin Luther King Jr. Day) and Thursday, March 24 (mid-semester recess).

Tardiness: Class will begin on time. In order to avoid continual interruptions during the first few minutes of class, please make every effort to arrive before we start. I reserve the right to begin imposing penalties on latecomers if excessive tardiness becomes a problem.

Grading: Your final grade will be determined by the percentage of the possible points that you earn on the exams, the final, the quizzes, the labs, and the graded homework problems. The point distribution is as follows:

Exams I – III	38%	OR	225 points (75 points each)
Final Exam	26%		150 points
Quizzes	9%		50 points
Mathematica Labs	14%		80 points
Homework	14%		80 points
TOTAL	100%		585 points

The grading scale for this class is as follows, as a percentage of the possible points earned:

93% up to 100%	= A	80% up to 83%	= B-	67% up to 70%	= D+
90% up to 93%	= A-	77% up to 80%	= C+	63% up to 67%	= D
87% up to 90%	= B+	73% up to 77%	= C	60% up to 63%	= D-
83% up to 87%	= B	70% up to 73%	= C-	less than 60%	= F

Learning Outcomes

1. Limits – Estimation: Students will be able to estimate a limit using a numerical and graphical approach.
2. Limits – Evaluation: Students will be able to evaluate a limit using properties of limits.
3. Function Continuity: Students will be able to determine the continuity of functions.
4. Differentiation: Students will be able to determine the derivatives of functions using the definition of the derivative and rules of differentiation.
5. Implicit Differentiation: Students will be able to determine derivatives using implicit differentiation.
6. Graphing: Students will be able to determine for a function: intervals of increase/decrease and concavity, relative extrema using derivative tests, and inflection points; and use these concepts to sketch the graph.
7. Absolute Extrema: Students will be able to determine the absolute extrema of a function on a closed interval.
8. Optimization: Students will be able to solve optimization problems.
9. Integration: Students will be able to determine the antiderivatives of functions using various integration techniques.
10. Evaluating Definite Integrals: Students will be able to evaluate definite integrals by using their properties.
11. Fundamental Theorem of Calculus: Students will be able to use the Fundamental Theorem of Calculus to compute definite integrals.
12. Area: Students will be able to find area using definite integrals.
13. Approximating Definite Integrals: Students will be able to approximate definite integrals using numerical methods.
14. Logarithmic Differentiation: Students will be able to determine the derivatives of functions using logarithmic differentiation.

My Background: I grew up on the southeast side of Grand Rapids, went to GR Christian High School, and received my undergraduate degree in math and physics from Calvin College. I received my doctoral degree in topology (a fun field of mathematics) from the University of Notre Dame. This is my 13th year at Ferris, where I've taught a broad range of different courses. I still live on the SE side of Grand Rapids with my wife, four kids – two girls, ages 14 and 11, and two boys, ages 8 and 5 (from July to March their ages form an arithmetic sequence) – a cat, and a Sheltie puppy. Current and classic music likes: Twenty One Pilots, The Fratellis, Sufjan Stevens, Weezer, Wilco, Radiohead, Macklemore, U2, Beck, R.E.M., Sarah McLachlan, Matthew Sweet, John Denver, Fatboy Slim and others. My sports teams: The Fighting Irish, Tigers, Red Wings, Pistons, Lions and Denver Broncos. I will defeat you in a Star Wars trivia contest and I have probably seen Episode VII more times than you. Other stuff I find myself doing: serving at church; watching good movies and TV; maintaining the yard; drinking fine beer; reading good books; coaching tee-ball; and building with LEGOs.

Finally: I reserve the right to alter anything in this document, including exam dates and course policies.

Math 251-004: Statistics for the Life Sciences

3 credits • Spring 2016
MW 3-4:15 in SCI 136
CRN: 12443

INSTRUCTOR:

- Professor: Holly Price
- Office: ASC 2032
- Phone: (231) 591-3884
- Email: priceh@ferris.edu

OFFICE HOURS:

To best use the limited time during office hours, you are expected to have specific questions over the notes, homework, tests, quizzes, or the material. These following times are first-come, first-served (no appointment): **Mon. 2-2:50, Tues. 1:30-2:20, and Wed. 1-2:50.** Other times are available but require an appointment.

COURSE DESCRIPTION:

F.S.U. Course Catalog Description: A first course in statistics, including a broad range of applications from science. Topics include: Data display, descriptive statistics, probability, estimation, inference, and regression. Prerequisite: C- or better in Math 130 (Pre-Calculus) or placement based on testing.

LEARNING OUTCOMES:

Upon successful completion of this course, students should be able to...

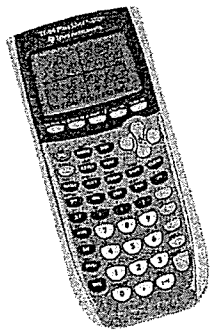
- Define basic statistical terms.
- Interpret/create visual displays of data.
- Interpret/compute statistical summaries of data.
- Calculate probabilities by applying various methods (e.g. counting methods, probability distributions, central limit theorem).
- Compute/interpret point and interval estimates of the mean and proportion.
- Perform hypothesis tests for means and proportions and interpret the results.
- Identify linear relationships and describe the strength and significance of the relationship.

MATERIALS:

Calculator: You are required to have a (Texas Instruments) TI-84 calculator.

1. You may use a TI-83 but there are 1 or 2 things the calculator cannot do so you will need to use handouts/formulas which I will teach. Also, this calculator cannot be updated.

2. You may instead use a TI-89 or TI-Nspire but I cannot assist you with these models. You may need to find the tools/functions from the manual. In addition, the Nspire may require the TI-84 faceplate if you have a model with removable faceplates.



There is no textbook but lecture notes will be provided. If you want to go deeper into a topic I recommend the following websites:

- StatTrek.com
- KhanAcademy.org
- WolframAlpha.com

If you still want a textbook, I recommend any edition of:

- ***The Practice of Statistics*** by Yates, Moore, and Starnes (Freeman)
- ***Statistics: Informed Decisions Using Data*** by Sullivan (Pearson/Prentice Hall)

HOMEPAGE:

This course is organized via BlackBoard. Course information like important dates, answer keys, the syllabus, grades, and announcements can be located there. You should check the page regularly (every 2-3 days). Login at: myfsu.ferris.edu

ATTENDANCE:

Attendance is strongly recommended but not included in your grade. I record attendance to satisfy federal financial aid requirements using a sign in sheet.

ASSESSMENTS:

There will be four quizzes and four tests which will coincide.

On an 'assessment day,' the first 15-20 minutes will be spent on a quiz which will be collaborative and cover the concepts (multiple choice, true/false, fill-in-the-blank, matching, etc.)

The remaining 55-60 minutes of an assessment day will be spent on a test which will be individual and cover the more computational type of problems (calculations, drawing graphs, etc.)

Assessment dates will be determined by class votes so we can avoid dates you have biology or chemistry tests. The material covered on each assessment day will be:

- Assessment 1 covers chapters 1-3 which includes data types, data collection, data displays, and data summaries/measurements.
- Assessment 2 covers chapters 4-5 which includes counting techniques, probability rules, and probability distributions.
- Assessment 3 covers chapters 6-8 which covers sampling distributions, confidence intervals, and hypothesis testing for means.
- Assessment 4 covers chapters 9-10 which covers hypothesis testing for proportions, chi-square tests, and regression.

Please be aware that Prof. Price will be keeping your tests (not quizzes). You will be able to see each test in the class after it was taken or in office hours. Practice problems and practice tests are included in the lecture notes.

There is an optional cumulative test/final on Tues. 5/3 from 2-3:40. You may use one sheet of paper (standard size, front and back) on the final.

GRADING:

$$Overall\ Course\ Average = \frac{Average\ Quiz\% + T1\% + T2\% + T3\% + T4\%}{5}$$

If you take the optional cumulative final exam, it replaces your lowest test score in the formula above. If your final is lower than your lowest test, I don't use the final exam score.

Your average is rounded to the nearest whole number and letter grades will be recorded as:

A	93% or higher
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%
C+	77-79%
C	73-76%
C-	70-72%
D+	67-69%
D	63-66%
D-	60-62%
F	59% or lower

Grades are updated on BlackBoard with each test.

OTHER IMPORTANT INFORMATION:

Make-Up Test Policy:

Make-up tests are only allowed for excused absences. The F.S.U. policy states...

The only excused absence that is a part of University policy involves institutional travel which must be approved by the Vice President for Academic Affairs. Students participating in approved University-related travel are to be excused from classes but are still responsible for making up any missed assignments and/or tests.

If you miss a test for any other reason, you will need to take the final exam to replace the zero grade. Quizzes cannot be made up but MAY be excused from your grade if you have an excused absence.

Class Disruption Policy:

If you are routinely distracting the class (habitually tardy or leaving the class, cell-phone noises, talking to your classmates while lecturing, etc.) and it distracts other students (which means I received a complaint) then you will get one warning. If the problem reoccurs after your warning, then you will no longer receive partial credit on your tests and you will no longer be allowed to work on your quizzes collaboratively. If the problem further persists, you will be removed from the class permanently.

Grade Negotiation Policy:

My grading formula is clear and my final exam policy allows you a second chance for improvement, the bottom line is...

GRADES ARE NOT NEGOTIABLE!!!

You will not get a grade 'bump,' there will not be anything 'extra' you can do at the end of the semester, and I'm sorry if you find yourself 'close' to the next grade.

It doesn't matter if you are in 'pre-pharm' or you 'need' a higher grade...you will get the grade determined by the formula stated previously.

Entitlement is a serious problem these days, each year I have more and more students asking for exceptions and hand-outs which simply isn't fair to the other students in the class.

If you attempt to negotiate your grade with me at the end of the semester, I will deduct 5% from your overall course average.

NOTE: Prof. Price is human and may make an error, there is no penalty for pointing out a mistake in your grade and it will be happily corrected. This policy doesn't apply to mistakes! Typos happen, miscounting happens, etc.

Undergraduate Tuition - Freshman/Sophomore					
Michigan Resident		U.S. Non-Resident		International	
Semester	Year	Semester	Year	Semester	Year
$5,348	$10,696	$8,022	$16,044	$8,624	$17,248
$382 per credit hour		$573 per credit hour		$616 per credit hour	

Undergraduate Tuition - Junior/Senior					
Michigan Resident		U.S. Non-Resident		International	
Semester	Year	Semester	Year	Semester	Year
$5,488	$10,976	$8,232	$16,464	$8,820	$17,640
$392 per credit hour		$588 per credit hour		$630 per credit hour	

Physics 130: Concepts in Physics – Fall 2016
COURSE SYLLABUS

- COURSE IDENTIFICATION

Dept./Discipline:	Physical Sciences/Physics
Title & Number	**Concepts in Physics (PHYS 130)**
Credit Hours:	4 (3 lecture & 2 lab per week)
Instructor:	Dr. Thomas E. Brennan
Lecture:	Monday & Wednesday, 3:00–4:15 pm in SCI 120
Lab Sections:	211: SCI 116 1:00–2:50 pm Friday. 212: SCI 116 Noon–1:50 pm Tuesday. 213: SCI 116 2:00–3:50 pm Tuesday.
Office Number:	ASC 3017
Office Hours:	12 – 4 pm Thursday
Classroom:	SCI 102
E-mail address:	**ThomasBrennan@ferris.edu**
Prerequisites:	MATH 010 with at least a C–; Math ACT> 15; or Math SAT> 350.
Semester & Year:	Fall 2016
Final Exam:	Tuesday, December 13, 2016, from 2-3:40pm in SCI 102

- TEXTBOOKS AND SUPPLIES (purchased by student)
  - Required textbook: Conceptual Physics Fundamentals, 1st edition, by Paul G. Hewitt, Addison-Wesley/Pearson, 2008, ISBN#0-321-50136-5 (paperback).
  - Other items: A non-smartphone scientific calculator, this syllabus, and general school supplies like pen, pencil, paper, etc.

- COURSE DESCRIPTION FROM CATALOG

A survey of physical concepts including mechanics, wave motion, heat, electricity and magnetism, light, and selected topics in modern physics. A minimum of mathematics is utilized to develop problem solving skills. Emphasis is placed on concept development so that science in a modern society may be recognized and appreciated. This course meets General Education requirements: Scientific Understanding, Lab.

- COURSE COMPONENTS

Lectures: Students should expect to be actively involved in learning during every lecture. I will frequently pass out worksheets for students to complete, due at the end of lecture. Also, be ready to be called on during class.

Quizzes: I will give one quiz per week, covering the material from lecture and readings since the last quiz. The quiz will be at the end of lecture, but students who arrive more than five minutes after lecture has begun will not be allowed to join the class or take the quiz. It will consist of five short answer questions. The quizzes will comprise 15% of your final grade. No make-up quizzes will be given.

Homework/Worksheets: I will give one homework assignment per week, consisting of five problems from your textbook. I will also pass out 'active learning' worksheets in lecture that either will be due at the end of lecture, or are to be taken home as homework. These assignments will be old-fashioned paper assignments that I will grade by hand and pass

back. I believe that the writing process is an essential component of learning, and I hope that you benefit from this traditional scholarly practice. Homework will comprise 10% of your grade. No late homework will be accepted.

Laboratories: Labs occur once a week in room SCI 116, meeting 13 times, beginning the second week of the semester. See the schedule on the last page of the syllabus. Labs comprise 25% of your final grade.

No make-up labs will be given, and your lowest lab grade will be dropped. Most labs will be relevant to material covered in the current lectures. Students will work in assigned two-person groups, and both students in a group are expected to contribute to the lab report. Most labs follow a script which serves as the lab report form which I distribute at the beginning of each period. The appearance of your signature on the report is a testimony that you have made a substantial contribution to the report. Everyone in the group typically receives the same score unless there are extenuating circumstances (tardy, non-participatory, horseplay or other safety violation, etc.).

Be sure to arrive at lab in a timely manner. Instructions on how to do the lab are typically given within the first few minutes. Some labs may be shorter than the full lab period. If you are excessively tardy (more than 5 minutes) you may not be admitted at all or be required to do the lab individually.

Midterm Exams: There will be two midterm tests – please refer to the course calendar for test dates. The midterms consist of calculations and/or short-answer response questions. I will hand out a study guide before each test which you will be allowed to bring to the test along with a sheet of your own notes. Any make-up tests will be handled under the official absence policy. There will be no retakes, and a zero will be recorded for any missed test. The midterm tests comprise 30% of your final grade.

Final Exam: The Final Exam will be on Tuesday, December 13, 2016 from 2-3:40 pm in SCI 102. A zero will be recorded if you miss the final exam. The final exam will comprise 20% of your final grade.

- ABSENCES

Course attendance is required for legal and financial aid purposes and thus is accounted for. Missed or late quizzes, homework, or worksheets are not accepted, except for official excused absences. The university encourages faculty to accommodate only the following types of absences:

- A University-sponsored event in which an official excused absence form is presented to me (e.g, sports travel, or approved field trips for another class).
- Death in the family. Appropriate verification will be needed.
- Medical emergencies. A doctor's note is needed, but this does not include routine doctor appointments – due not schedule a routine appointment during class time and expect to be excused.
- Being in court (being called to testify or jury duty—not for being arrested). Verification is required.
- Active military duty. Verification is required.
- Official Ferris Snow Days. These are very rare and I've heard it said that 'Ferris is always open.'

By the way, don't tell me that you "already bought plane tickets" and expect to be excused from a test, quiz or lab. You will not be allowed a make-up.

- INSTRUCTIONAL METHODOLOGY

The methods of instruction used throughout this class will include lecture, presentation, written exercises, problem solving, laboratory assignments, handouts, demonstrations, and classroom question/answer. Students are expected to check their progress and look for materials on Blackboard.

- GRADING POLICY

I tend to write challenging tests, so because of this, my grading scale may seem different than what you're used to. I also give a lot of homework and quizzes. If you can accumulate more than 87% of the points available to you, then you'll likely get an A– or above. The best way to get a good grade in my class is to just show up and hand everything in. If you do this, the chances of getting a B are enormous! Woody Allen once said that 70% of life is just showing up. With me, just showing up and handing everything in is even better, like a B. But if you don't show up and accumulate a lot of zeros in my grade book, expect something below a C. No make-ups will be given except by prior permission from me for officially excused absences.

I do not assign final letter grades according to a strict mathematical table like many instructors do. I also do not curve the final grades based upon a statistical distribution. Grading is a moral decision, not a mathematical one, and I believe that a flexible grading policy is more fair than a blind grading formula. Every instance of this course is slightly different, and exactly where the line between an A and a B should be varies. I also take into account intangibles, such as how much I feel you've improved since the beginning of the semester. Because of this, keep in mind that the following grading table should only be viewed as an approximate guide to the correspondence between point percentage and final letter grade.

Grade	Percentage	Grade	Percentage	Grade	Percentage
A–	87–92.99	A	93–100		
B–	72–74.99	B	75–80.99	B+	81–86.99
C–	60.0–62.99	C	63–65.99	C+	66–71.99
D–	50–52.99	D	53–55.99	D+	56–59.99
		F	0–49.99		

However, the following table will be used reliably in calculating weighted point percentages:

Quizzes	15%	Multi-chapter tests	30%
Laboratories	25%	Final Exam	20%
Homework	10%	Total	100%

I do assign midterm grades. Your midterm grade is a good indicator of what grade you can expect at the end of the semester if you maintain the same level of performance.

- PHONE, TABLET AND LAPTOP POLICY

I do not allow the use of phones, tablets or laptops in lecture or lab, because they are disruptive and distracting. I require that everyone take old-fashioned, hand written notes during my lectures because I believe that hand writing is an essential part of the

learning process. You're not allowed to take photos of my lecture slides, even at the end of lecture when I put up the homework assignment. **You must obtain a non-smartphone calculator for use during lectures, labs and tests.** Wearing of ear-buds or headphones during lecture or lab is also prohibited. I also do not allow the use of devices to record lecture unless it's prescribed because of a disability – see below.

- DISABILITIES

  The University makes provisions for students with documented disabilities, either physical or learning. Please contact the appropriate office for details. Students with documented disabilities may be allowed to use devices during lecture or lab if they are essential, prescribed learning aides.

- ASSIGNED SEATING

  You will receive assigned seats for both lecture and lab at the beginning of the semester. If you are unhappy with your assigned seat because you cannot see or hear adequately, let me know right away and I'll give you a new seat closer to the front.

- DISRUPTIONS AND DISCIPLINE: RESPECT THE PROCESS.

  For various reasons, sometimes some students choose to act out in class, disrupt the lecture, or otherwise interfere with the learning process. In case this happens, I want to clearly state here how I will deal with this.

  If I feel that a student or a group of students is being disruptive, I will first tell them to stop. If the student doesn't stop, then I will dismiss them from lecture for that day. Because quizzes and homework are administered and collected at the end of lecture, they will receive a grade of zero for the quiz, homework or worksheet that day, or a zero for that day's lab as a penalty for the disruption. This should serve as a deterrent against further disruption.

  There are many different ways of being disruptive other than simply chatting with your neighbor. It can be anything that upsets the flow of the lecture, or degrades the learning environment. Posing certain types of questions can be disruptive or disrespectful. If a student has a question relevant to the subject matter being discussed that day, they may raise their hand and wait to be called on. However, questions about 'grading policy' or "Is this gonna be on the test..." are examples of disruptive questions and comments. Save all of those types of questions for after lecture, (meaning not in front of the whole class), or office hours.

  Another type of disruption I call being the 'dumb police.' Please don't complain in front of the whole class that I'm moving too fast, that I simply don't make sense, or that the material is too hard. Remember that physics is an inherently difficult subject. If you don't understand something right away, be patient and look inward to yourself first, rather than just deciding that I'm not teaching it right. If you're unhappy with how a midterm test went, just come to office hours and let me know that you're having a hard time and need some help. I'm a caring, merciful teacher, and I want you to succeed.

  Arriving to lecture or lab late is disruptive. If a student arrives more than five minutes after we have begun, I will not allow them to join the class. They will receive a grade of zero for that day's homework, worksheet, quiz or lab.

  There are a myriad of other behaviors that could be considered disruptive. For example, eating food or chewing gum or tobacco are not allowed, but you may bring a drink

container. When in doubt, just use common sense – otherwise you'll get a warning first, and if it continues you'll be dismissed.

When communicating with me by email, keep your messages concise and calm in tone. Please don't email me with questions about grading policy or complaints like the test was too hard or unfair. You will not get a response. I will only answer those types of questions in person: after class or in office hours.

As we go thru the semester, please be very respectful in your conduct towards other students, myself, and this whole process. Remember, we're all here to learn.

- SYLLABUS ATTACHMENT

  Many standard policies are covered in the College of Arts and Sciences Syllabus Attachment. Please refer to it regarding important dates, including withdraw dates. Also included are the withdrawal procedure, incomplete policies, graduation, inclement weather conditions, academic misconduct, more on disruptive behavior, and where to go for various kinds of help and related resources (disabilities, etc.).

- SCHEDULE

  The schedule on the following page will be followed as closely as possible. However, changes to the schedule or syllabus may be made at my discretion.

Physics 130 Lecture, Lab and Exam Schedule – Fall 2016				
Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Aug 29 Lec 1	Aug 30 No Lab No Lab	Aug 31 Lec 2	Sep 1 Office Hours	Sep 2 No Lab
Sep 5 No Lec	Sep 6 Lab 1 Lab 1	Sep 7 Lec 3	Sep 8 Office Hours	Sep 9 Lab 1
Sep 12 Lec 4	Sep 13 Lab 2 Lab 2	Sep 14 Lec 5	Sep 15 Office Hours	Sep 16 Lab 2
Sep 19 Lec 6	Sep 20 Lab 3 Lab 3	Sep 21 Lec 7	Sep 22 Office Hours	Sep 23 Lab 3
Sep 26 Lec 8	Sep 27 Lab 4 Lab 4	Sep 28 **Exam 1**	Sep 29 Office Hours	Sep 30 Lab 4
Oct 3 Lec 9	Oct 4 Lab 5 Lab 5	Oct 5 Lec 10	Oct 6 Office Hours	Oct 7 Lab 5
Oct 10 Lec 11	Oct 11 Lab 6 Lab 6	Oct 12 Lec 12	Oct 13 Office Hours	Oct 14 Lab 6
Oct 17 Lec 13	Oct 18 Lab 7 Lab 7	Oct 19 Lec 14	Oct 20 Office Hours	Oct 21 Lab 7
Oct 24 Lec 15	Oct 25 Lab 8 Lab 8	Oct 26 Lec 16	Oct 27 Office Hours	Oct 28 Lab 8
Oct 31 **Exam 2**	Nov 1 Lab 9 Lab 9	Nov 2 Lec 17	Nov 3 Office Hours	Nov 4 Lab 9
Nov 7 Lec 18	Nov 8 Lab 10 Lab 10	Nov 9 Lec 19	Nov 10 Office Hours	Nov 11 Lab 10
Nov 14 Lec 20	Nov 15 Lab 11 Lab 11	Nov 16 Lec 21	Nov 17 Office Hours	Nov 18 Lab 11
Nov 21 Lec 22	Nov 22 No Lab No Lab	Nov 23 No Lec	Nov 24 Thanks- giving	Nov 25 No Lab
Nov 28 Lec 23	Nov 29 Lab 12 Lab 12	Nov 30 Lec 24	Dec 1 Office Hours	Dec 2 Lab 12
Dec 5 Lec 25	Dec 6 Lab 13 Lab 13	Dec 7 Lec 26	Dec 8 Office Hours	Dec 9 Lab 13
Dec 12	Dec 13 **Final**	Dec 14	Dec 15	Dec 16

Fall 2016 PHYS 211
Introductory Physics I (Mechanics, Heat, and Sound)

COURSE INFORMATION

This course includes the basic concepts and applications of motion, force, energy, fluids, heat and sound. This course meets General Education requirements: Scientific Understanding, Lab.

- **Prerequisite**: MATH 116 or 120 with a grade of C- or better or 26 on ACT or 590 on SAT
- **Credits**: 4 (3 for lecture and 1 for lab).

INSTRUCTOR

- **Name**: Dr. Bo Lou, Office: ASC 3090, Phone: (231)591-5874, Email: **loub@ferris.edu**
- **Office hours**: Monday **and** Friday from 12:00 P.M. to 12:50 P.M. **and** from 2:00 P.M. to 2:50 P.M

LECTURES

Monday, Wednesday, and Friday from 1:00 P.M. to 1:50 P.M. in SCI 102.

Lecture attendance is expected. Random quizzes are given throughout the semester. You must take the quiz to get credits.

LABORATORIES

- **Section 211 (CRN 82689)**: Thursday from 3:00 P.M to 5:50 P.M. in SCI 114
- **Section 212 (CRN 82690)**: Thursday from 12:00 P.M to 2:50 P.M. in SCI 114
- **Section 213 (CRN 82691)**: Wednesday from 3:00 P.M to 5:50 P.M. in SCI 114
- **Section 214 (CRN 82693)**: Tuesday from 12:00 P.M to 2:50 P.M. in SCI 114

REQUIRED MATERIALS

1. **Textbook**: "College Physics", 7th edition by Jerry D. Wilson, Anthony Buffa, and Bo Lou.
2. **Student Study Guide**: "Student Study Guide and Selected Solutions Manual (Vol 1)", 7th edition by Bo Lou.
3. **Lab Manual**: "Physics 211 Lab Manual" by Bo Lou.
4. **Others**: Scientific calculator, ruler, and protractor.

COURSE OBJECTIVES

1. To introduce students basic concepts and principles in mechanics, heat, and sound ranging from Newton's laws to standing waves, at the introductory level.
2. To help students become adept in logic thinking and problem solving within the framework of this course.
3. To enlighten students with mathematical and physical concepts and to help students use those concepts to explain their significance to mankind.

GRADING SYSTEM (percentage system)

Four Tests	4×10% = 40%
One Exam	1×16% = 16%
Thirteen Labs	13×1.85% = 24%
Ten Quizzes	10×2% = 20%
Semester Total	100%

A	90% and above	**A−**	88% - 90%	**B+**	85% - 88%
B	80% - 85%	**B−**	78% - 80%	**C+**	75% - 78%
C	70%- 75%	**C−**	68% - 70%	**D+**	65% - 68%
D	60% - 65%	**D−**	58% - 60%	**F**	Below 58%

POLICIES / TEST CALENDAR

1. The grading scale is exactly as the above tables.
2. The four tests and one exam are all close book (no formulas are given and no formula sheets are allowed), and multiple–choice. The tests are tentatively scheduled on **September 16, October 7, October 28, and November 18**. The final exam is scheduled on **Wednesday, December 14 from 12:00 – 1:40 P.M. in SCI 102.**
3. The quiz questions and problems are very similar, if not identical, to homework assignments.
4. University policy states that the only official excuse of absence is institutional travel. It is up to the discretion of instructor whether other extenuating circumstances (hospitalization, etc.) should be considered for absence.
5. If you are excused for an absence, you need to let the instructor know in advance so the make-ups can be planned.
6. Make-up tests are also written and the difficulty level is not guaranteed to be the same as the regular tests.

HOMEWORK

You **must** finish and know how to do all those assigned questions and problems to get reasonable score on quizzes and tests.

Chapters	Sections	Homework Assignments
Chapter 1 Measurement and Problem Solving	1, 2, 3, 4, 5, 7	**Multiple Choice:** 3, 5, 11 **Conceptual Question:** 9, 13, 23 **Exercises:** 5, 9, 13, 17, 23, 29, 61, 63, 67
Chapter 2 Kinematics: Description of Motion	1, 2, 3, 4, 5	**Multiple Choice:** 3, 7, 11 **Conceptual Question:** 3, 7, 17 **Exercises:** 1, 7, 11, 17, 23, 27, 37, 39, 45, 59, 65, 71
Chapter 3 Motion in Two Dimensions	2, 3, 4*	**Multiple Choice:** 5, 7, 9 **Conceptual Question:** 5, 9, 11 **Exercises:** 19, 23, 27, 29, 35, 49, 51, 55, 57, 69
Chapter 4 Force and Motion	1, 2, 3, 4, 5, 6	**Multiple Choice:** 3, 11, 15 **Conceptual Question:** 1, 9, 13 **Exercises:** 5, 13, 15, 19, 23, 33, 41, 45, 53, 63, 71
Chapter 5 Work and Energy	1, 3, 4, 5, 6	**Multiple Choice:** 3, 9, 19 **Conceptual Question:** 1, 9, 15 **Exercises:** 3, 9, 11, 29, 31, 33, 39, 45, 51, 53, 69
Chapter 6 Linear Momentum and Collisions	1, 2, 3, 4	**Multiple Choice:** 3, 7, 11 **Conceptual Question:** 3, 5, 11 **Exercises:** 3, 5, 7, 21, 27, 31, 39, 43, 45, 69
Chapter 7 Circular Motion and Gravitation	1, 2, 3, 4	**Multiple Choice:** 7, 9, 13 **Conceptual Question:** 5, 7, 13 **Exercises:** 5, 11, 13, 19, 23, 31, 37, 45, 47, 49
Chapter 8 Rotational Motion and Equilibrium	2, 3, 5	**Multiple Choice:** 8 (a), 11, 19 **Conceptual Question:** 11, 15, 21 **Exercises:** 11, 13, 21, 23, 35, 36 [(a) 22.5 kg · m^2 (b) 62.5 kg · m^2 (c) 85.0 kg · m^2], 37, 65, 69, 71
Chapter 9 Solids and Fluids	2, 3, 4	**Multiple Choice:** 7, 9, 16 (d) **Conceptual Question:** 9, 15, 23 **Exercises:** 21, 23, 27, 31, 39, 43, 45, 51, 57, 61
Chapter 10 Temperature and Kinetic Theory	1, 2, 3, 4, 5	**Multiple Choice:** 3, 5, 9, 11 **Conceptual Question:** 3, 9, 13 **Exercises:** 3, 7, 11, 15, 21, 23, 27, 37, 39, 45, 55, 57
Chapter 11 Heat	1, 2, 3, 4	**Multiple Choice:** 3, 5, 9, 11 **Conceptual Question:** 3, 5, 11, 15 **Exercises:** 3, 7, 9, 13, 15, 17, 27, 29, 35, 39
Chapter 12 Thermodynamics	2, 3, 4, 5, 6	**Multiple Choice:** 5, 9, 13, 17 **Conceptual Question:** 5, 13, 19, 23 **Exercises:** 3, 5, 7, 9, 21, 23, 25, 33, 35, 39, 49, 51, 53
Chapter 13 Vibrations and Waves	1, 2, 3, 4, 5	**Multiple Choice:** 3, 9, 17 **Conceptual Question:** 3, 5, 11, 17 **Exercises:** 5, 7, 9, 11, 23, 27, 35, 41, 49, 51, 55, 63, 69, 73
Chapter 14 Sound	1, 2, 3, 5, 6	**Multiple Choice:** 3, 7, 15 **Conceptual Question:** 1, 7, 19 **Exercises:** 1, 9, 13, 21, 25, 27, 39, 49, 59, 65, 67

LABORATORIES

Lab attendance is **mandatory**. Lab cannot be made-up unless the absence is excused.

1. A ruler, a protractor, a scientific calculator, the lab manual and the Physics book are required for every laboratory.
2. You will be working in groups of no more than four for most of the experiments. Each one of you should turn in a report for each experiment. The report must be finished during the lab period.
3. To get full credit, you keep working until the instructor is satisfied with your work and a complete report without mistakes is turned in. Then you need to clean up your workspace and return the equipment to the moving cart.
4. Two tardiness to labs (within 15 minutes after the start of the lab) counts as one missed lab. If you are late more than 15 minutes to a lab, a missed lab will be recorded.
5. To make up a lab, you write a paper (minimum two pages with three references) addressing a related physical phenomena.

Tentative Lab Schedule

Lab	Week Beginning	Experiment
1	August 29	Graphics and Data Analysis
*	**September 5**	**No Lab (Labor Day Week)**
2	September 12	Simple Pendulum-Scientific Method
3	September 19	Free Fall
4	September 26	Vectors
5	October 3	Projectile Motion
6	October 10	Friction
7	October 17	Equilibrium
8	October 24	Rotational Dynamics
9	October 31	Buoyancy
10	November 7	Linear Expansion
11	November 14	Calorimetry
*	**November 21**	**No Lab (Thanksgiving Break)**
12	November 28	Simple Harmonic Motion
13	December 5	Speed of Sound

GENERAL EDUCATION OUTCOMES (Scientific Understanding Outcomes Criteria)

This course meets the general education requirements for Scientific Understanding. Students who have successfully completed their coursework in scientific understanding should:

1. have a working knowledge of the fundamental principles of a natural science discipline;
2. be able to use appropriate scientific reasoning skills to interpret and analyze content in the natural sciences;
3. have a basic understanding of the scientific method, scientific concepts, and the evolution of scientific ideas;
4. have a more positive attitude toward science and an increased confidence in their ability to understand science;

Students should recognize that:

1. the physical universe is understandable;
2. scientific ideas are not static, but rather are dynamic and change over time;
3. scientific principles are testable;
4. scientific knowledge is based on a vast number of observations.

COURSE LEARNING OUTCOMES FOR PHYS 211

1. Students will develop a good functional understanding of mechanics, thermodynamics & wave motion (including sound);
2. Students will begin developing expert-like problem solving skills;
3. Students will develop lab skills;
4. Students will improve their communications, interpersonal, and questioning skills;
5. Students will develop attitudes and beliefs that are favorable to learning physics.

Ferris State University
COURSE SYLLABUS

I. COURSE INDENTIFICATION

Dept./Discipline:	Physical Sciences/Physics.
Title & Number	Introductory Physics 2 (PHYS 212).
Credit Hours:	4 (3 lecture & 3 lab per week).
Instructor:	Dr. Keith G. Calkins.
Lecture:	TΘ 15:00–16:15 in SCI 120.
Lab Sections:	211: SCI 110 15:00–17:50 (3:00–5:50 pm) Wednesday (W). 212: SCI 110 12:00–14:50 (noon–2:50 pm) Tuesday (T). 213: SCI 110 15:00–17:50 (3:00–2:50 pm) Monday (M).
Note:	Lab sections 211 and 213 are hosted by [Richard] James Weaver.
Office Number:	ACS 3018
Office Hours:	MWΘ 16:30–17:50 or by appointment.
Classroom:	SCI 120.
Telephone:	messages: 231 591-5369.
E-mail address:	**calkins@andrews.edu**, KeithCalkins@ferris.edu or via Blackboard.
Prerequisites:	PHYS 211 with $\geq$ C−.
Semester & Year:	Fall 2015.

II. TEXTBOOKS AND/OR EQUIPMENT/SUPPLIES (*purchased by student*)

A. Highly recommended textbook: College Physics, 7th edition, by Wilson, Buffa, and Lou, Addison-Wesley/Pearson, 2010, ISBN#978-032160183-4;

B. Recommended Study Guide: Student Study Guide & Selected Solutions Manual, 7th edition, Volume 2 by Bo Lou, Addison-Wesley, ISBN#978-032159278-1;

Calculator: scientific or graphing (not smart phone!), **stitched** lab book, pen, syllabus, ruler, protrator, soft eraser, and #2 pencil.

III. COURSE DESCRIPTION FROM CATALOG

Continuation of PHYS 211. Basic concepts and applications of electricity, magnetism, light[,] and modern physics. This course meets General Education requirements: Scientific Understanding, Lab.

IV. COURSE COMPONENTS

Quizzes: Quizzes/daily activities (typically 5 points each) covering lecture, reading material, and problems will be given during the semester. Although most quizzes will be group activities, some may be individual. Quizzes are somewhat for attendance purposes, hence expect at least one daily. As such they cannot be made up but copies will be made available. If there are more than 26 quizzes, some may be dropped.

Lectures: Students are responsible for understanding the content of all lectures and reading assignments. It is expected that students read and study the material before lecture. Students should expect to be actively involved in learning during every lecture period. When group activities occur, all students are expected to be actively involved, and only active members of the group should turn in the activity and/or put his/her name on such. The course will follow the topics in the order given in the textbook. The

course covers Chapters 15–30, applying approximately equal weight to each chapter and each covered section within each chapter.

Homework will be done online within Blackboard. You will have the opportunity to redo it for a higher grade until the test over the material. All homework must be done individually by the student. However, working in groups is encouraged. Assignments will only be accepted after the test date at the discretion of the instructor—see especially the absence policy. Each chapter homework will be 10 points but Blackboard thinks they are "test" points. The highest fifteen homework scores will be included in your grade. Assigned problems from the textbook will be discussed extensively in class. It is expected that students will attempt and study these problems before-hand.

To increase the probability of getting a higher grade you should solve additional problems from the textbook and study guide until you are confident that you will be able to solve new problems. You should develop problem solving ability, not just the memorization of solutions. Homework problems become test/exam problems and thus if you have any difficulty with textbook problems you will have difficulty with test/exam problems!

Laboratories (labs) occur weekly in room SCI 110. Thirteen labs are scheduled. Your lowest lab will be dropped. The second lowest lab will count as bonus. Most labs will be relevant to material covered in proximate lectures. Students typically work in pairs as assigned by the lab instructor. All students in a group are expected to contribute to the lab report. The appearance of your name on the report signifies that you have made a substantial contribution to the report.

A stitched/permanent lab notebook is required. Entries should be made in ink. A table of contents on the first page or two is expected. Each page should be dated and signed when completed and empty space filled with a fill indication. The lab cycle varies due to various holidays and thus due diligence is required to make up a lab if necessary. Each lab is 20 points of which 5 are for using a stitched lab notebook.

Tests are multi-chapter, multiple choice, and a bubbling must be completed. The scheduled tests dates are as follows: Sep. 22, Oct. 13, Nov. 10, and Dec. 8. Each test (100 points) will cover three to five chapters. There will be about six lecture sessions between each test. Any make-up tests will be handled under the official absence policy. There will be no retakes. A zero will be recorded for any missed test. The lowest test score will be dropped.

Some calculation may be required to solve many test problems. Sharing of calculators is not permitted. Calculator notes are not permitted. An 8.5" by 11" sheet of notes is allowed on each test. Suggested contents are formulae, constants, and worked problems. Notes should be readable by the normally aided eye and should be uniquely created by each student for their own individual use.

Exam: The final exam schedule is determined by the College of Arts and Sciences. The final for this semester for this course is set as Monday, Dec. 14, 2015 between 2:00 and 3:40 pm in room SCI 120. A zero will be recorded if you miss the final exam.

V. GOALS, OBJECTIVES, and OUTCOMES

This course may be used to help fulfill the general education requirements for Scientific Understanding With Lab. The departmental agreed upon course learning outcomes in TRACDAT are:

1. Students will demonstrate competency in problem solving, teamwork and communication with regard to general physical principles relating to the area of electricity, magnetism, optics[,] and atoms.
2. Students will use tools and instruments that allow them to design, analyze[,] and evaluate physical principles and display data graphically, numerically[,] or by text to illustrate those principles.
3. Students will understand the fundamental composition of matter with respect to electric charges and the concepts of electric and magnetic fields and forces, voltages[,] and electric power.
4. Students will be able to analyze simple Ohmic circuits.
5. Students will be able to describe the process of atomic emission and absorption and calculate the energy and wavelengths of photons.
6. Students will understand the process of nuclear decay via the mechanisms of alpha decay, beta decay[,] and gamma decay.
7. Students will be able to describe qualitatively and quantitatively the optical properties of eyeglasses and other lens combinations.

VI. ABSENCES

Course attendance is required for legal and financial aid purposes and thus will be accounted for. Missed work is often difficult to make up or cannot fairly be made up at all. The university encourages faculty to accommodate only the first of the following types of absences. The rest are excused only at the discretion of the instructor.

- University-sponsored event in which an excused absence form from the University is presented to the instructor beforehand (*i.e.* sports travel, approved field trips for another class).
- Death in the family. Appropriate verification will be needed.
- Extended hospitalization. A doctor's note is needed. This does not include routine doctor appointments.
- Being in court (for being called to testify or jury duty—not for being arrested). Verification is required.
- Active military duty. Verification is required.
- Commuters who are absent when local authorities consider driving to be unsafe.

VII. INSTRUCTIONAL METHODOLOGY

The methods of instruction used throughout this class will include lecture, presentation, written exercises, problem solving, computer-aided instruction, laboratory assignments, handouts, demonstrations, and classroom question/answer.

VIII. GRADING CRITERIA AND REQUIREMENTS

Grades will be determined on the following basis.

Daily activities/quizzes	13%	Multi-chapter tests	30%
Homework	15%	Final Exam	20%
Laboratories	22%	Total	100%

The required final exam is scheduled by the College of Arts and Sciences for Monday, Dec. 14, 2015 2:00–3:40 pm in SCI 120.

IX. GRADING SCALE

Grade	Percentage	Grade	Percentage	Grade	Percentage
A−	89.5–94.49	A	94.5–99.49	A+	>99.5
B−	74.5–79.49	B	79.5–84.49	B+	84.5–89.49
C−	59.5–64.49	C	64.5–69.49	C+	69.5–74.49
D−	44.5–49.49	D	49.5–54.49	D+	54.5–59.49
		F	0–44.49		

X. MAKE-UP POLICY

No make-ups will be given except by prior permission from the instructor for offically excused absences.

XI. ASSIGNMENT SCHEDULE

The schedule and syllabus will be followed as closely as possible; however, changes may be made at the instructor's discretion.

XII. DISABILITIES and DISRUPTIONS

The University makes provisions for students with documented disabilities, either physical or learning. Please contact the appropriate office for details.

Fellow faculty with far more experience at Ferris have found it necessary to include the following policies.

- The learning environment will be respectful, comfortable, and constructive.
- Cell phones must be turned off or set to silent mode.
- Pagers, CD players, radios, I-pods, MP3 players, and similar devices are likewise prohibited.
- Calculators may not be shared during testing.
- No sleeping in class—else you may be asked to leave.
- Address the instructor in an appropriate and respectful manner.
- Swearing, use of profanity, and personal (abusive) misconduct behavior will not be tolerated and may result in dismissal from the course.
- All individual questions regarding tests, exams, and grades should be discussed and answered during office hours, not during class or lab.
- No chewing tobacco.
- No food in class. (Liquids are permitted.)
- Work only on course material during class.

XIII. SYLLABUS ATTACHMENT

Many standard policies are covered in the College of Arts and Sciences, Fall 2015, Syllabus Attachment. Please refer to it regarding important dates, including drop (Sep. 3) and withdraw dates (Nov. 5). Also included are attendance, withdrawal procedure, incomplete policies, graduation, inclement weather conditions, academic misconduct, disruptive behavior, and where to go for various kinds of help and related resources (disabilities, *etc.*).

General Physics 1 (PHYS 241, 5cr.)
Fall Semester, 2015

Instructor:	Jeff Christafferson	Office & Phone:	ASC 3015, Ext. 2585
email:	christaj@ferris.edu	Office Hours:	Mon., Wed., & Fri.
cell:	616-581-6499		10 – 11:30
			(and by appointment)

Class/Lab Time Class meets Mon – Thurs, 12-12:50, in SCI 117. Lab meets Friday in SCI 114 from 12 – 2:50.

Required Materials

1. Textbook: PHYSICS FOR SCIENTISTS & ENGINEERS with Modern Physics, 3rd edition, by Randall Knight
2. Subscription to MasteringPhysics.com (http://www.masteringphysics.com). When registering for Mastering Physics, select PHYSICS FOR SCIENTISTS & ENGINEERS with Modern Physics, 3rd edition, by Randall Knight as the textbook for this course and join my class: **MPCHRISTAFFERSON241.** New copies of the textbook should include a subscription key to the website. If you have a used copy, you will need to purchase a subscription separately.
3. Scientific Calculator, Clear Plastic Ruler, and a Protractor

Course Description: Principles and practical applications of motion, force, energy, fluids, heat and sound. Intended for science and engineering majors. Calculus is utilized. This course meets General Education Designation: Scientific Understanding Lab. **Requires:** MATH 220 with a grade of C- or better

General Education Outcomes: Physics 241 satisfies the scientific understanding component of the general education requirements at Ferris State University. Students who actively participate in and complete the requirements of PHYS 241 will

- gain a working knowledge of the fundamental concepts and principles of motion, force, energy, momentum, thermodynamics, and wave motion.
- be able to use appropriate scientific reasoning skills and content knowledge to interpret and analyze events that occur in the natural world;
- have a basic understanding of the scientific method and the evolution of scientific ideas;
- have a more positive attitude toward science and an increased confidence in their ability to understand science.

PHYS 241 Course Outcomes:

- Students will develop a good functional understanding of mechanics, thermodynamics, & wave motion (including sound).
- Students will begin developing expert-like problem solving skills.
- Students will develop lab skills.
- Students will improve their communications, interpersonal, and questioning skills.
- Students will develop attitudes and beliefs that are favorable to learning physics.

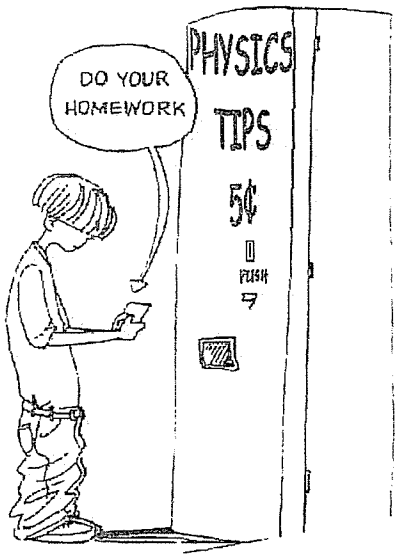
Student Learning Outcomes: Students who actively participate in and complete the requirements of PHYS 211 will be able to:

- Describe and explain physics concepts relevant to mechanics, thermodynamics, & wave motion (including sound).
- Solve challenging problems including multi-concept problems, multi-step problems, problems requiring qualitative reasoning, and context-rich ("real world") problems.
- Design, execute, analyze, and explain a scientific experiment to test a hypothesis.
- Discuss experimental observations and findings.
- Demonstrate an understanding of the principles of scientific inquiry.

Making the Grade: The grade earned in this course is certainly an indication of how well you have mastered the subject material. But it will also reflect, in some measure, the *sweat equity* you have invested. The quizzes and examinations scheduled throughout the course measure your understanding of the material presented and the lion's share of your grade (60%) will be based on these performances. However, the effort you put into this class will also contribute significantly to your final grade. This *effort component* will be evaluated through attendance and participation in the lecture, homework assignments, and laboratory work.

In-Class Activities For most students, attendance is critical for performing well in this class. Given the pace and structure of the class, a poor attendance record usually results in a lower grade than could have been earned otherwise. Most of you know this already. Yet despite this common knowledge, students are often tempted to skip class due to the weather, the demands of other classes, a sense of security (false or otherwise) of your academic standing in the class, etc., etc., etc. To encourage you to come to class *and participate*, you will have the opportunity to earn some extra credit through a variety of in-class activities. You must be present in class to participate and earn the extra credit.

Homework (15% of your grade) If preparing for and participating in each classroom discussion is important to learning, your own studying outside of class is almost certainly twice as important. Working independently or in a small group, you begin to construct your own *personal* understanding of the material by reflecting upon and applying the ideas presented in the classroom and textbook. You will also discover (more importantly) where your understanding is rather meager and in need of further support. This is the reason I require students to complete homework assignments in all of my classes.



The homework assignments chosen for the class represent those concepts and applications (of the concepts) that I feel you need to know from each chapter. And by "knowing" I mean much more than simply memorizing the answer. You need to understand "why" the answer is what it is and "how" to construct solutions utilizing your own personal knowledge of the concepts involved. Remember, solutions do not miraculously appear but are carefully constructed from well understood principles and concepts. Reflect upon your own understanding while working on the assignments. If you are not satisfied that your understanding is adequate, be sure to ask questions and get the help you need to fully understand the physics involved.

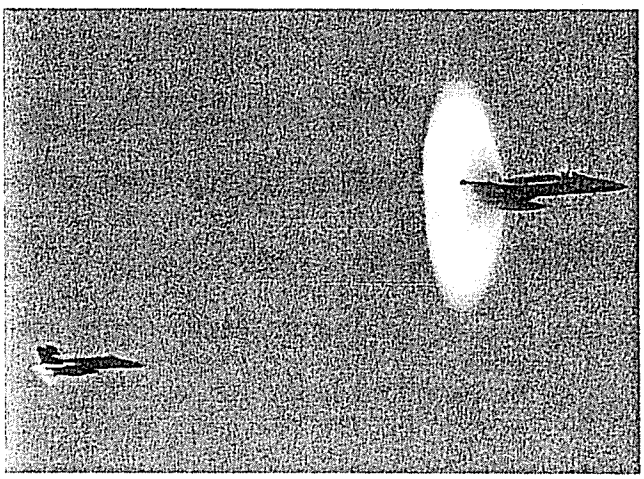
It will be in your best interests to create a permanent record of your work in this area as it will serve as a valuable resource for test preparation. I recommend the following method to get the most out of the homework assignments:

- Work cooperatively on assignments when possible. Giving and receiving help on homework is one of the best ways to learn physics.
- Solve the problems on scrap paper first. Once you are confident of the solution, work the problem from the beginning (trying not to refer back to your previous attempts) to see if you can solve it correctly.
- Copy a neat & legible solution into a notebook for reference. I recommend using one side of the notebook page for your homework solutions.

To earn credit for your completed homework assignments, your solutions must be submitted online at Mastering Physics before the specified due date. Late assignments will not be accepted.

Once logged in you will find this course using the following ID: **MPCHRISTAFFERSON241.**

"What's In This Picture?": A Real World Application of Physics (5% of your grade)



You may recall once or twice (hopefully more!) seeing a photograph and wondering, "What is going on here?" Often times the image represents a neat demonstration of physical concept (or several) that you may already understand or will learn about in this class. This photograph, for example, shows a jet fighter breaking the sound barrier. Questions that one may ask about the photo are "How fast is the jet moving?" or "Why does the cloud form around the jet?"

For this project I want you to find a picture of an event that takes place in the natural world and provide a sound physical explanation of the image. As in this photograph, several questions may be asked and answered. This modest project will give you an opportunity to apply the physical concepts learned to real world phenomena. Consequently, you may find that *science* can enhance both your understanding of and appreciation for the world we live in.

The guidelines for the picture project are as follows:

1. You are required to submit a hard copy of your picture no later than the end of the fourth week of class for approval. This will insure that your project is neither trivial nor too ambitious. Please note that often a seemingly simple picture can be used to demonstrate an important physical concept.

   No pictures will be accepted after the fourth week of class (i.e., you will get 0% for this project if you have not submitted a picture for approval by the deadline).

2. Your photo must demonstrate concepts addressed as part of this class. It can be an event that occurs naturally or it may be contrived, but it cannot be an illustration.

3. You must submit a 2-4 page written report outlining the relevant physical concepts demonstrated by the image and how they can be applied to understand what the image depicts. Your report should be both engaging and understandable to your classmates. Project reports that are too complex to be understood by the average PHYS 241 student are not acceptable. (To help you to focus your energies in the right direction, be sure to read the scoring rubric for the project.)

My suggestion for these projects is to get started as soon as possible. If you have an idea by the end of the first week, great! If you do not have an idea by the end of the third week, ask for suggestions. Rough drafts may be submitted but are not required. I will make every effort to provide you with the necessary support to insure that your project is completed on time, but in the end the final result will depend on the time and effort you put into it.

***Please note that it is understood that several pictures may be submitted demonstrating the same concept. Each individual, however, is responsible for constructing their own explanation and composing their own paper. If it is clear that the paper submitted is based largely on the work of another, zero credit will be given. Furthermore, if a paper completely plagiarizes the work of another individual, zero credit will be given and the matter may be referred to the University for Disciplinary Action.

"What's In A Picture?" Project Scoring Rubric

CATEGORY	3 points	2 points	1 point	0 points
Picture Relevance	Photograph clearly relates to the physical principles presented in PHYS 242 *and* includes an appropriate analysis.			Photograph does not relate to a topic in PHYS 242 *or* does not include an analysis.
Defining the Problem	More than one question is proposed by the author. Questions are relevant to the picture and meaningful in the context of the physical phenomena being demonstrated. A reasonable attempt was made to answer each question.	Only one question is proposed by the author. Question is relevant to the picture and meaningful in the context of the physical phenomena being demonstrated. A reasonable attempt was made to answer the question	Questions are proposed by the author. Questions are relevant to the picture but are trivial (easily answered; obvious) in the context of the physical phenomena being demonstrated. Answers are provided to the proposed questions.	No questions are proposed by the author *or* questions are presented with no attempt made to answer the questions.
Solution Plan	Supporting theory is clearly identified and appropriate for the physical situation depicted. Solution plan explicitly connects the theory presented to the physical phenomena depicted and explains (to the reader) how the theory will be used to answer the proposed questions.	Supporting theory is clearly identified and appropriate for the physical situation depicted. Solution plan explicitly connects the theory presented to the physical phenomena depicted but does not explain (to the reader) how the theory will be used to answer the proposed questions.	Supporting theory is clearly identified and appropriate for the physical situation depicted. Solution plan does not connect the theory presented to the physical phenomena depicted; explanation does not demonstrate how the theory will be used to answer the proposed questions.	Supporting theory is not presented or is not relevant to the physical situation depicted.
Solution	The solution to the proposed questions is presented in a logical sequence. The solution **(1)** includes a pictorial representation (motion diagram and a free-body diagram) consistent with the picture, **(2)** clearly identifies known, measured, and estimated quantities, **(3)** clearly outlines any approximations necessary to the solution, and **(4)** includes a mathematical representation consistent with the theory and pictorial representation. All physical quantities presented are expressed with appropriate units. Final result is clearly expressed.	The solution to the proposed questions is presented in a logical sequence. The solution **(1)** includes a pictorial representation (motion diagram and a free-body diagram) consistent with the picture, **(2)** clearly identifies known, measured, and estimated quantities, **(3)** includes a mathematical representation consistent with the theory and pictorial representation. All physical quantities presented are expressed with appropriate units. Final result is clearly expressed.	The solution to the proposed questions is presented in a logical sequence. The solution **(1)** includes a pictorial representation (motion diagram and a free-body diagram) consistent with the picture, **(2)** clearly identifies known, measured, and estimated quantities, **(3)** includes a mathematical representation consistent with the theory and pictorial representation. Some or all of the physical quantities presented are not expressed with appropriate units. Final result is clearly expressed.	Solution presented does not follow a logical sequence. It lacks one or more of the following: a pictorial representation, a listing of known and measured physical quantities, and a mathematical representation. Solution is incorrect.
Evaluation	A critical evaluation of the final result is presented: Is your final result reasonable? Are the units appropriate? Does the result make sense in the context of the picture?			Final result is not evaluated.
Mechanics	No grammatical, spelling or punctuation errors are present in the paper.	No more than 2 grammatical, spelling or punctuation errors are present in the paper.	2-4 grammatical spelling or punctuation errors are present in the paper.	More than 4 grammatical spelling or punctuation errors are present in the paper.

Laboratory (20%) The laboratory serves many functions for this class. It provides an opportunity to learn about, practice, and improve techniques utilized for scientific investigation, to apply the physical relationships presented in the lecture, and study new topics which are related to but not presented as part of the lecture. Active (and constructive) participation in each laboratory investigation is expected to earn full credit for this component of your grade.

Due to the nature of a laboratory investigation, involving extensive use of equipment to gather data and cooperative work within a small group, laboratory assignments cannot be made-up if you miss a scheduled lab meeting. If you know you will be unable to attend you scheduled lab meeting time, try to attend the other lab section meeting that week. For those cases of excused absences, university rules apply.

Absences- Excused with Documentation:

- University-sponsored events in which an excused absence form from the University is presented to the instructor (i.e. sports travel, approved field trip with another class).
- Death in the family. Appropriate verification will be needed such as obituary in the newspaper, funeral card, or note from the funeral home.
- Extended hospitalization. Appropriate verification will be required from your physician and hospital. (This does not include emergency room visits or doctor appointments as excused).
- For students who are commuters-dangerous weather conditions in which driving is considered by local police authorities to be unsafe.
- Being called to testify in court case. (but not for being arrested). Verification required.
- Jury duty. (Verification required.)
- Active military duty. (Verification required.)

Exams (60%): The examinations scheduled throughout the course measure your understanding of the material presented and the lion's share of your grade will be based on these scores. Much of what you see on the exams is derived from the homework assignments, so completing each homework will be critical to performing well on the exams. Each exam will be preceded by a *pretest* on Mastering Physics. Your two test scores will be combined in the following manner: Pretest - 30% of total, In-Class Exam: 70% of total. For example, if you score 90% on your pretest, and 70pts on your in-class exam, your final grade will be (90x0.3) + (78x0.7) = 81.6 pts. If you do not complete the pre-test, your final test score will be the total of the in-class exam score.

Grading Scale The grading scale is as follows:

{100% - 95%} A	{89.9% - 86%} B+	{79.9% - 76%} C+	{69.9% - 66%} D+
{94.9% - 90%} A-	{85.9% - 83%} B	{75.9% - 73%} C	{65.9% - 63%} D
	{82.9% - 80%} B-	{72.9% - 70%} C-	{62.9% - 60%} D-

General Classroom/Laboratory Policies

It is my intention to provide a constructive, comfortable, and respectful learning environment for each student enrolled in my classes. To that end, please read and follow the guidelines below:

- Cell phones **must be** set to silent put away.
- Participate fully and actively in classroom/laboratory activities. If you sleep, read the paper, listen to your music player, text your friends, etc., etc., etc. you will be asked to leave the classroom/laboratory.
- Work only on course material during the lecture/laboratory.
- Work with other students and/or individually when requested to do so and maintain a positive attitude about your own learning and that of others.
- Address the instructor in an appropriate and respectful manner and respect the views and opinions of the other students.
- Swearing, use of profanity, and personal (abusive) misconduct behavior will not be tolerated and may result in dismissal from the course.

Course Calendar

Please note that this schedule is tentative and subject to change depending upon the progress of the class. If the class gets off schedule, some of the chapter sections may be skipped. Please make sure you note these changes on the schedule as they occur.

Date	Discussion Topic
Aug 31	Intro to the Course
Sept 1	Concepts of Motion
Sept 2	Velocity & Acceleration
Sept 3	Kinematics: Mathematical Descriptions of Motion
Sept 7	***Labor Day Holiday: No Class***
Sept 8	Solving Motion Problems Using Kinematics
Sept 9	Solving Motion Problems Using Kinematics
Sept 10	Special Case: Free Fall & Inclines
Sept 14	Motion in Two Dimensions: Projectile Motion
Sept 15	Motion in Two Dimensions: Projectile Motion
Sept 16	Motion in Two Dimensions: Circular Motion
Sept 17	**Test #1: Chapters 1, 2 & 4**
Sept 21	Force: Newton's 1^{st} & 2^{nd} Laws
Sept 22	Force: Newton's 1^{st} & 2^{nd} Laws
Sept 23	Force Vectors & Free Body Diagrams
Sept 24	Force Vectors & Free Body Diagrams
Sept 28	Dynamics: Applying Newton's 2^{nd} Law
Sept 29	Dynamics: Applying Newton's 2^{nd} Law
Sept 30	Dynamics: Applying Newton's 2^{nd} Law
Oct 1	Newton's 3^{rd} Law & Force Interaction
Oct 5	Newton's 3^{rd} Law & Force Interaction
Oct 6	Dynamics & Circular Motion
Oct 7	Dynamics & Circular Motion
Oct 8	**Test #2: Chapters 5, 6, 7 & 8**
Oct 12	Impulse & Momentum
Oct 13	Momentum Conservation
Oct 14	Kinetic & Potential Energy
Oct 15	Mechanical Energy Conservation
Oct 19	Mechanical Work & Energy
Oct 20	Power
Oct 21	Torque and Rotational Dynamics
Oct 22	Static Equilibrium

Midterm Grades Available October 26st

Date	Discussion Topic
Oct 26	Rotational Inertia
Oct 27	Rotational Kinetic Energy & Angular Momentum
Oct 28	Rotational Kinetic Energy & Angular Momentum
Oct 29	**Test #3: Chapters 9, 10, 11 & 12**
	Last Date for "W" Grade is Thursday, November 5th
Nov 2	Pressure & Temperature in a Gas
Nov 3	Ideal Gases
Nov 4	Ideal Gas Processes
Nov 5	Ideal Gas Processes
Nov 9	Heat & The First Law of Thermodynamics
Nov 10	Specific Heat, Latent Heat, & Calorimetry
Nov 11	Specific Heat, Latent Heat, & Calorimetry
Nov 12	Heat Transfer Mechanisms
Nov 16	The Second Law of Thermodynamics
Nov 17	Turning Heat into Work
Nov 18	Heat Engines & Refrigerators
Nov 19	**Test #4: Chapters 16, 17 & 19**
Nov 23	Simple Harmonic Motion
Nov 24	Simple Harmonic Motion
Nov 25	***Thanksgiving Holiday Begins @ 12:00pm***
Nov 26	***Thanksgiving Holiday***
Nov 30	Traveling Waves
Dec 1	Sound & Light
Dec 2	Sound Intensity
Dec 3	The Doppler Effect
Dec 7	Standing Waves
Dec 8	Wave Interference
Dec 9	Wave Interference
Dec 10	**Test #5: Chapters 14, 20 & 21**
Dec 15	***Final Exam, 12-1:40pm***

General Physics 2 (PHYS 242, 5 cr. hrs.)
Spring Semester, 2016

Instructor:	Jeff Christafferson	Office & Phone:	ASC 3015, Ext. 2585
email:	christaj@ferris.edu	Office Hours:	Mon.&Thurs., 12 - 2
cell:	616-581-6499		*(and by appointment)*

Required Materials:

1. Textbook: PHYSICS FOR SCIENTISTS & ENGINEERS (1^{st}, 2^{nd}, or 3^{rd} edition), by Randall Knight
2. A subscription to Mastering Physics (http://www.masteringphysics.com). New copies of the textbook should include a subscription key to the website. Once registered, choose the 3^{rd} edition of Knight's PHYSICS FOR SCIENTISTS & ENGINEERS as the textbook for the course. Find and enroll in this class using the ID **MPCHRISTAFFERSON35940**.
3. Scientific Calculator, Clear Plastic Ruler, and a Protractor

Course Description: Continuation of PHYS 241. Principles and practical applications of electricity, magnetism, light and modern physics. This course meets General Education requirements: Scientific Understanding, Lab.

Requires: PHYS 241 and MATH 230 with a grade of C- or better

General Education Outcomes

Physics 242 satisfies the scientific understanding component of the general education requirements at Ferris State University. Students who actively participate in and complete the requirements of PHYS 242 will

- associate fundamental concepts and principles of geometric and physical optics, electromagnetism (including circuit analysis), and quantum physics with observations made in the lab as well as their daily lives.
- apply scientific reasoning skills and content knowledge to interpret and analyze events that occur in the natural world;
- discuss the scientific method as it relates to the development of scientific evidence and the evolution of scientific ideas;
- develop a positive attitude toward science and an increased confidence in their ability to understand science.

PHYS 242 Course Outcomes:

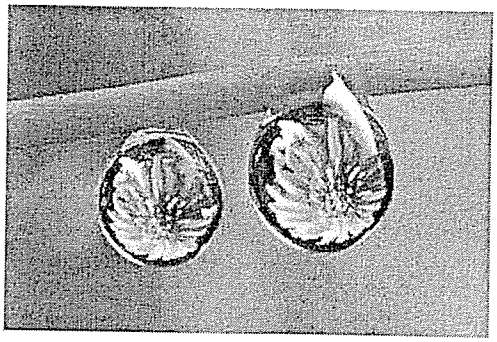
- Students will develop a good functional understanding of both the wave and particle model of light, electrostatics, electric circuits, magnetism, electromagnetism, and atomic structure.
- Students will begin developing expert-like problem solving skills.
- Students will develop lab skills.
- Students will improve their communications, interpersonal, and questioning skills.
- Students will develop attitudes and beliefs that are favorable to learning physics.

Student Learning Outcomes: Students who actively participate in and complete the requirements of PHYS 211 will be able to:

- Describe and explain physics concepts relevant to the wave and particle nature of light, electrical interactions, electric circuits and electric energy, electromagnetism, and atomic theory.
- Solve challenging problems including multi-concept problems, multi-step problems, problems requiring qualitative reasoning, and context-rich ("real world") problems.
- Design, execute, analyze, and explain a scientific experiment to test a hypothesis.
- Discuss experimental observations and findings.
- Demonstrate an understanding of the principles of scientific inquiry.

Making the Grade: The grade earned in this course is certainly an indication of how well you have mastered the subject material. But it will also reflect, in some measure, the *sweat equity* you have invested. The quizzes and examinations scheduled throughout the course measure your understanding of the material presented and the lion's share of your grade (60%) will be based on these performances. However, the effort you put into this class will also contribute significantly to your final grade. This *effort component* will be evaluated through attendance and participation in the lecture, homework assignments, and laboratory work.

Picture Problems (5% of your grade)

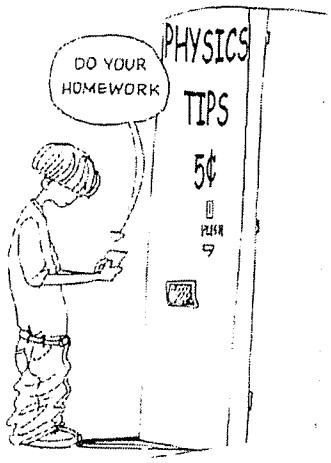


You may recall once or twice (hopefully more!) seeing a photograph and wondering, "What is going on here?" Often times the image represents a neat demonstration of physical concept (or several) that you may already understand or will learn about in this class. This photograph, for example, shows an image of a flower in water droplets. A few questions that one may ask about the photo are "How are these images produced? Are the images real or virtual? How big is the flower that produced these images?" etc., etc., etc..

You will be provided with a picture of an event that takes place in the natural world each week (along with a question to answer) for which you will construct a sound physical explanation of what is observable in the image. This modest project will give you an opportunity to apply the physical concepts learned to real world phenomena. Consequently, you may find that science can enhance both your understanding of and appreciation for the world we live in.

Weekly Laboratory (20%) The laboratory serves many functions for this class. It provides an opportunity to learn about, practice, and improve techniques utilized for scientific investigation, to apply the physical relationships presented in the lecture, and study new topics which are related to but not presented as part of the lecture. Active (and constructive) participation in each laboratory investigation is expected to earn full credit for this component of your grade. Due to the nature of a laboratory investigation, involving extensive use of equipment to gather data and cooperative work within a small group, laboratory assignments cannot be made-up if you miss a scheduled lab meeting. If you know you will be unable to attend you scheduled lab meeting time, try to attend the other lab section meeting that week. For those cases of excused absences, university rules apply.

Homework (15% of your grade) If preparing for and participating in each classroom discussion is important to learning, your own studying outside of class is almost certainly twice as important. Working independently or in a small group, you begin to construct your own *personal* understanding of the material by reflecting upon and applying the ideas presented in the classroom and textbook. You will also discover (more importantly) where your understanding is rather meager and in need of further support. This is the reason I require students to complete homework assignments in all of my classes.



The homework assignments chosen for the class represent those concepts and applications (of the concepts) that I feel you need to know from each chapter. And by "knowing" I mean much more than simply memorizing the answer. You need to understand "why" the answer is what it is and "how" to construct solutions utilizing your own personal knowledge of the concepts involved. Remember, solutions do not miraculously appear but are carefully constructed from well understood principles and concepts. Reflect upon your own understanding while working on the assignments. If you are not satisfied that your understanding is adequate, be sure to ask questions and get the help you need to fully understand the physics involved. To earn credit for your completed homework assignments, your solutions must be submitted online at Mastering Physics before the specified due date. Late assignments will not be accepted.

Once logged in you will find this course using the following ID: **MPCHRISTAFFERSON35940**

Exams (60%): The examinations scheduled throughout the course measure your understanding of the material presented and the lion's share of your grade will be based on these scores. Much of the exam will be based on the homework assignments. However, the effort you put into the other aspects of this class will also have a positive effect on your overall exam performances. For example, subjects discussed during the lectures and investigated in laboratory may pop up on the exams. If you have a poor attendance record, you will have a difficult time with these individual exam items.

Grading Scale The grading scale is as follows:

{100% - 95%} A	{89.9% - 86%} B+	{79.9% - 76%} C+	{69.9% - 66%} D+
{94.9% - 90%} A-	{85.9% - 83%} B	{75.9% - 73%} C	{65.9% - 63%} D
	{82.9% - 80%} B-	{72.9% - 70%} C-	{62.9% - 60%} D-

General Classroom/Laboratory Policies

It is my intention to provide a constructive, comfortable, and respectful learning environment for each student enrolled in my classes. To that end, please read and follow the guidelines below:

- Soft drinks, coffee, juice and water are permitted, however eating is not permitted.
- Remove headphones before class/lab begins.
- Cell phones **must be** turned off (or set to silent mode) and be put away.
- Participate fully and actively in classroom/laboratory activities. If you sleep, read the paper, listen to your MP3 player (etc., etc., etc.) you will be asked to leave the classroom/laboratory.
- Work only on course material during the lecture/laboratory.
- No leaving the classroom/laboratory without notifying the instructor.
- Work with other students and/or individually when requested to do so and maintain a positive attitude about your own learning and that of others.
- Address the instructor in an appropriate and respectful manner and respect the views and opinions of the other students.
- Swearing, use of profanity, and personal (abusive) misconduct behavior will not be tolerated and may result in dismissal from the course.

Absences - Excused with Documentation:

- University-sponsored events in which an excused absence form from the University is presented to the instructor (i.e. sports travel, approved field trip with another class).
- Death in the family. Appropriate verification will be needed such as obituary in the newspaper, funeral card, or note from the funeral home.
- Extended hospitalization. Appropriate verification will be required from your physician and hospital. (This does not include emergency room visits or doctor appointments as excused).
- For students who are commuters-dangerous weather conditions in which driving is considered by local police authorities to be unsafe.
- Being called to testify in court case. (but not for being arrested). Verification required.
- Jury duty. (Verification required.)
- Active military duty. (Verification required.)

Course Calendar

Please note that this schedule is tentative and subject to change depending upon the progress of the class. If the class gets off schedule, some of the chapter sections may be skipped. Please make sure you note these changes on the schedule as they occur.

Date	Discussion Topic	Laboratory
Jan 11	The Wave Nature of Light/Electromagnetic Spectrum	
Jan 12	Wave Interference Phenomena	Interference & Diffraction of Light
Jan 13	Light Diffraction	
Jan 14	Light Diffraction	
Jan 18	*Martin Luther King Day*	
Jan 19	Light Interference	The Diffraction Grating
Jan 20	Light Interference	
Jan 21	Light Refraction and Reflection	
Jan 25	Ray Optics: Simple Lenses & Mirrors	
Jan 26	Ray Optics: Simple Lenses & Mirrors	Refraction and Snell's Law
Jan 27	Ray Optics: Simple Lenses & Mirrors	
Jan 28	**Test #1**	
Feb 1	Fundamentals of Electrostatics	
Feb 2	Charge & Electric Forces	Electrostatics
Feb 3	Charge & Electric Forces	
Feb 4	Charge & Electric Forces	
Feb 8	The Electric Field	
Feb 9	The Electric Field	Electric Fields
Feb 10	The Electric Field	
Feb 11	Electric Potential Energy	
Feb 15	Electric Potential Energy	
Feb 16	Electric Potential	Electric Potential Energy
Feb 17	Electric Potential	
Feb 18	**Test #2**	
Feb 22	Electric Potential & Field	
Feb 23	Electric Potential & Field	Capacitors
Feb 24	Electric Potential & Field	
Feb 25	Current & Resistance	
Feb 29	Current & Resistance	
March 1	Current & Resistance	Ohm's Law
March 2	Current & Resistance	
March 3	Fundamentals Of Circuits	
March 7-11	*Spring Break Week* *Midterm Grades Distributed March 7th*	

Date	Discussion Topic	Laboratory
March 14	Fundamentals Of Circuits	
March 15	Fundamentals Of Circuits	Electric Power & Energy
March 16	Fundamentals Of Circuits	
March 17	**Test #3**	
March 21	The Magnetic Field	
March 22	The Magnetic Field	Magnetic Field Mapping
March 23	The Magnetic Field	
March 24	***Mid-Semester Recess: No Class***	

Last Day to Withdraw From Semester Classes: March 23th

March 28	Electromagnetic Induction	
March 29	Electromagnetic Induction	Faraday's Law of Electromagnetic Induction
March 30	Electromagnetic Induction	
March 31	Electromagnetic Induction	
April 4	Electromagnetic Fields & Waves	
April 5	Electromagnetic Fields & Waves	Polarization
April 6	Electromagnetic Fields & Waves	
April 7	**Test #4**	
April 11	Einstein's Theory of Special Relativity	
April 12	Einstein's Theory of Special Relativity	Student Inquiry Lab
April 13	Einstein's Theory of Special Relativity	
April 14	Einstein's Theory of Special Relativity	
April 18	The Foundations of Modern Physics	
April 19	The Foundations of Modern Physics	Student Inquiry Lab
April 20	The Foundations of Modern Physics	
April 21	The Foundations of Modern Physics	
April 25	Quantization	
April 26	Quantization	Student Inquiry Lab
April 27	Quantization	
April 28	Quantization	
Monday, May 2nd	***Final Exam, 10 – 11:40***	

CURRICULUM VITAE

Karen M. Strasser

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Education

Ph.D. University of Louisiana, Lafayette, Louisiana, Environmental and Evolutionary Biology, graduation: December 12, 1998 , GPA: 4.0 (4.0 scale)
D.L. Felder advisor

B. S. University of Tampa, Tampa, Florida, double major: Marine Science/Biology, minor: chemistry
Graduation: May 1994 GPA: 3.86 (4.0 scale)

Research Interests

I. Systematics and Biogeography of Decapod Crustaceans
   A. Comparative studies of larval development (including observations on morphology, number and duration of larval stages) to infer phylogenetic associations.
   B. Comparative morphology of adults

II. Larval ecology- Effects on development, dispersal, settlement, recruitment, and behavior of marine invertebrate larvae (particularly with decapod crustaceans).
   A. Environmental factors such as temperature, salinity and light.
   B. Biological factors such as conspecifics, competitors, predators, tannins, and other species associated with the adult habitat.
   C. Human impacts such as pollutants, pesticides, fertilizers.

III Burrowing behavior of postlarvae; effects of sediment type, grain size, presence of organics, and other species.

Professional Experience

7/07 to present	Department Head, Department of Biological Sciences, Ferris State University, Big Rapids, Michigan.
7/06 to 7/07	Interim Department Head, Department of Biological Sciences, Ferris State University, Big Rapids, Michigan.
8/05 to present	Associate Professor of Biology; Ferris State University, Big Rapids, Michigan. Courses taught: Environmental Conservation (upper level majors), General Biology I and II (for biology majors), Developmental Biology (upper level majors)
8/02 to 9/05	Assistant Professor of Biology; Ferris State University, Big Rapids, Michigan. Courses taught: Biological Concepts (non-majors biology), Environmental Conservation (upper level majors), General Biology I and II (for biology majors), Developmental Biology Lab (upper level majors)
8/99 to 5/02	Assistant Professor of Biology; The University of Tampa, Tampa, Florida. Courses: Ecology, Ecology Lab, Conservation Biology, Biological Diversity, Environmental Science, Senior Seminar, Gateways (Freshman seminar).
5/99	Member of Organizing Committee for the Crustacean Society Meeting in Lafayette, Louisiana.
1/99 to 5/99	Visiting Assistant Professor; University of Tampa; Tampa, Florida. Courses: Conservation Biology, Environmental Science, and Marine Biology;
Summer, 1998	Instructor; Biology 101 (for majors); University of Louisiana; at Lafayette Lafayette, Louisiana.
5/95	Research cruise to the Dry Tortugas, Florida, on the R/V Bellows; trip sponsored by the University of Florida. Survey of Florida Straits decapod fauna by dermersal sampling.
Fall 1995, 1996, 1997	Lab Instructor; Invertebrate Zoology; University of Louisiana; Lafayette, Louisiana. Set up labs, ordered and collected specimens, prepared lab handouts, held review sessions, set up and administered lab practicals, and lectured for Dr. Felder as needed.
6/94 to 6/95	Research Assistant; Dr. Julie Bailey-Brock; University of Hawaii, at Manoa; Honolulu, Hawaii. Gained experience in benthic sampling, elutriation, and identification of polychaete worms. Assisted with the generation of reports and data entry into the ODES network.

Spring 1994	Teaching Assistant; University of Tampa; Tampa, Florida. Biology Laboratory (for non-majors): Assisted in lab set up, tutored and held review sessions for students.
5/93 to 5/94	Lab Assistant; Thornton Laboratories; Tampa, Florida. Worked in the Bioassay Department culturing *Pimephales promelas* and *Cyprinella leedsi,* conducted acute and chronic tests, and monitored pH, DO, conductivity, alkalinity, and hardness of breeding tanks.
Fall 1992, 1993	Teaching Assistant; University of Tampa; Tampa, Florida. Introductory Biology Lab (for majors), set up practical exams, tutored, and held review sessions for students.
5/93 to 8/93	Research Assistant; Dr. Stan Rice; University of Tampa; Tampa, Florida. Cultured and assisted with feeding experiments of the wood-boring isopod *Sphaeroma terebrans*, and gathered data on his barnacle settlement study.

Classes taught

General Biology I (BIOL 121, Ferris State University) Lecture and Lab
General Biology 2 (BIOL122, Ferris State University) Lab and Lecture
Developmental Biology (BIOL 370, Ferris State University) Lab and Lecture
Environmental Conservation (BIOL 347, Ferris State University) Lab and Lecture
Biological Concepts (BIOL 103, Ferris State University) Lab and lecture
Ecology (BIO 212, University of Tampa) Lab and Lecture
Conservation Biology (BIO 346, University of Tampa) Lecture and seminar sections
Biological Diversity (BIO 203, University of Tampa) Lecture and Lab
Environmental Science (BIO 112, University of Tampa) Lecture only
Marine Biology (MAR 126, University of Tampa) Lecture only
Gateways I and II (Freshman seminar GTW 100, 102, University of Tampa)
Senior Seminar (BIO 410, University of Tampa) lecture only
Biology II (Majors biology, BIO 102, University of Louisiana) Lecture only
Invertebrate Zoology (BIO 410L, University of Louisiana) lab only

Committee Work (since employed at Ferris State University)

IACUC committee (Fall 2006 →)
Biotech Advisory Board (Fall2006→)
Card Wildlife Center Advisory Board Fall 2006 →)
University Enrollment Task Force (Fall 2006 →)
Chair, Search committee for 2 tenure track positions in Physiology (Fall 2006→ Sp 2007)
National Competitive Scholarship Committee (Fall 2005 → 2007)
CAS Online Learning Steering Committee (Fall 2005→Winter 2006)

CAS Scientific Understanding Committee (Fall 2004→)

Chair, Search committee for 4 tenure track positions in Biology (Fall 2004-Winter 2005)

College Board CLEP National Test Development Committee (July 2004 -->)

Departmental Faculty Development Committee (Fall 2003 -->Winter 2006)

Departmental Planning Committee (Fall 2003 --> Winter 2006)

College of Arts and Sciences Graduate Education Committee (Fall 2003 –Fall 2004)

University Arts and Lectures Committee (Fall 2003 --> Winter 2006)

Chair, Laboratory Tech Search Committee (Winter 2004)

Chair, Department Microscope Committee (Fall 2003, 2006)

Academic Honors, Awards and Fellowships

University of Louisiana Doctoral Fellowship. Stipend and tuition waver. $12,000/yr 1995-1999.

University of Tampa Outstanding Graduate in Biology 1994

Honors Program Member at the University of Tampa. 1990-1994.

Crawford and Company Scholarship. 1992-1994. Merit scholarship helped defray costs of housing and books at the University of Tampa.

University of Tampa Presidential and Life Science Scholarships. 1990-1994. Merit scholarship that covered tuition costs at the University of Tampa.

Reviewerships

Marine Biology

Journal of Crustacean Biology

NSF Division of Ocean Sciences

NSF Assembling the Tree of Life (AToL)

Memoirs of Museum Victoria

Gulf of Mexico Science

Scientia Marina

Gulf and Caribbean Research

Invertebrate Biology

Professional Affiliations

The Crustacean Society

The Society for Conservation Biology

Research Support

Pierce Cedar Creek Institute, Muter B., Strasser KM, Watson P. Approx. $7000 as part of the Undergraduate Research Grant in Environmental Science Program. Funds for summer stipend for B. Muter and equipment to support the project. Summer 2005

Ferris State University Faculty Research Grant, $6,563 to purchase equipment. 2003-2004.

USGS, Felder DL, Strasser KM, Klerks P. - $36,014 funded by as part of the Tampa Bay Project. 2001, and 2002

Delo Grant , The University of Tampa- $5000. 2001-2002

Dana Grant , The University of Tampa - $1700. Summer 2001

Dana Grant, The University of Tampa – $1275. Summer 2000

Graduate student fellowship-- Smithsonian Institution. Provided stipend to work at the Smithsonian Marine Station at Linkport for ten weeks. $3000, 1997.

Graduate student research grant-- Louisiana Universities Marine Consortium. Supplies for dissertation research. $2000, 1996-1998.

Graduate student research grants-- Graduate Student Organization at the University of Louisiana. Covered cost of supplies for dissertation research and travel expenses. $160, Spring 1996; $160, Summer 1996; $240, Spring 1998.

Undergraduate research internship-- NSF Research Experience for Undergraduates. Stipend and supplies for summer research at Shannon Point Marine Center in Anacortes Washington. $2200, 1992.

Honors Research Fellowship-- University of Tampa Honors Program. Merit award for undergraduate research. $1000, 1992-1993; $1000, 1993-1994.

Presented Papers at Professional Meetings

The larval development of two sibling species of hermit crabs in the genus *Paguristes* (Crustacea: Anomura: Diogenidae) under laboratory conditions. Poster presentation at the Annual meeting of the Society of Integrative and Comparative Biology (SICB) January, 2003 in New Orleans, Louisiana. . (K. Strasser)

Settlement Cues determining the distribution and host preference of *Tunicotheres moseri* (Rathbun) in the Tampa Bay, FL. Poster presentation at the Crustacean Society Meeting June, 2003 in Williamsburg, Virginia. (J. Ambrosio, W. Price, and K. Strasser).

Settlement cues determining the distribution and host preference of *Tunicotheres moseri* (Rathbun) in Tampa Bay. March 20-23, 2003. Poster presentation at the Southeastern Estuarine Research Society Meeting, Atlantic Beach, NC (J. Ambrosio, W. Price, and K. Strasser)

Preliminary evidence of molecular variability among populations of the hermit crab *Paguristes tortugae* (Diogenidae), on the basis of the 16s rRNA gene.November 2002. Poster presentation at the Congresso Brasileiro Sobre Crustáceos, Sao Paulo, Brazil (Biagi, Mantelatto, Strasser and Felder).

Effects of ghost shrimp on Tampa Bay sediment characteristics. Poster presentation at the Second Annual Science Conference, Gulf of Mexico Estuaries Integrated Science Tampa Bay Pilot Study, Sept. 2002 in St. Petersburg, FL. (Klerks, Paul, Darryl Felder , Karen Strasser, Pete Swarzenski).

Protracted larval development in *Axianassa australis* (Thalassinidea: Axianassidae). Poster presentation at the 8th Colloquium Crustacea Decapoda Mediterranea, September, 2002 in Corfu Isl., Greece. (Strasser, K. M. & D.L. Felder)

Preliminary evidence of molecular variability among populations of the hermit crab *Paguristes tortugae* (Diogenidae), on the basis of the 16S rRNA gene. Poster presentation at the 8th Colloquium Crustacea Decapoda Mediterranea, September, 2002 in Corfu Isl., Greece. (Garcia, R.B., F.L. Mantelatto, K. Strasser & D.L. Felder)

Factors determining host selection of the symbiotic copepod *Clausidium dissimile* Wilson, 1921 (Crustacea: Cyclopoidia: Clausiidae) in sympatric populations of *Sergio trilobata* (Biffar 1970) and *Lepidophthalmus louisianensis* (Schmitt 1935) (Crustacea: Decapoda: Callianassidae) Poster presented at the National Honors Collegiate Conference Nov. 4 to Nov. 7, 2001 in Chicago, and in March, 2002 at the Benthic Ecology Meeting in Orlando, Florida. (J. Corsetti and K.M. Strasser)

Investigation of the population biology of the ghost shrimp *Sergio trilobata* (Biffar 1970) (Crustacea: Decapoda: Thalassinidea). Poster presented in February, 2002 at the Southeastern Estuarine Research Society meeting in South Carolina. (J. Corsetti and K.M. Strasser)

Preliminary observations on the symbiotic Relationship between the pea crab *Tumidotheres maculatus* and the sea squirt *Styela plicata* in Tampa Bay, FL. Poster presentation at the Southeastern Research Society in Charleston, SC March 29 – 31, 2001 (Jeff Grim, Anthony DiGirolamo, and K.M. Strasser)

Sand as a stimulus for settlement in the ghost shrimp shrimp *Callichirus major* (Say) and *C.islagrande* (Schmitt) (Crustacea: Thalassinidea: Callianassidae). May, 1999. Oral presentation at the Crustacean Society Meeting in Lafayette, Louisiana.

Settlement cues in successive developmental stages of the ghost shrimp *Callichirus major* and *C. islagrande* (Crustacea: Decapoda: Thalassinidea). March, 1998. Oral presentation at the Benthic Ecology Meeting in Melbourne, Florida. (K.M. Strasser and D.L. Felder).

A comparison of settlement cues in the Gulf of Mexico and western Atlantic populations of the ghost shrimp *Callichirus major* (Crustacea: Decapoda: Thalassinidea). January, 1998. Oral presentation at the annual meeting of the Society for Integrative and Comparative Biology in Boston, Massachusetts. (with published abstract, *American Zoologist* 37 (5): 409. (K.M. Strasser and D.L. Felder).

Settlement cues in the Gulf of Mexico population of the ghost shrimp *Callichirus major* (Crustacea: Decapoda: Thalassinidea). May, 1997. Oral presentation at the summer meeting of the Crustacean Society in Mobile, Alabama, 1997. (K.M. Strasser and D.L. Felder).

The hermit crabs of Tampa Bay, Florida. Oral presentation at the annual meeting of Tri Beta regional conference in Tuscalusa, Alabama, 1992, and at the Florida Academy of Science in Tallahassee, Florida, 1994. (K.M. Strasser and W.W. Price).

Publications

Klerks, Paul L., Felder, Darryl L., **Strasser,** Karen, Swarzenski, Peter W. 2007. Effects of ghost shrimp on zinc and cadmium in sediments from Tampa Bay, FL, *Marine Chemistry* 104: 17-26.

Strasser , K. M. and D. L. Felder. 2005. Larval development of the mud shrimp Axianassa australis (DecapodA: Thalassinidea) under laboratory conditions. Journal of Natural History. 39:2289-2306.

Corsetti, J.L and K. M. **Strasser.** 2003 Host selection of the symbiotic copepod *Clausidium dissimile* in two sympatric populations of ghost shrimp. Marine Ecology Progress Series 256 : 151-159.

Corsetti, J.L. and K. M. **Strasser**. 2003 Population biology of the ghost shrimp *Sergio trilobata* (Biffar 1970) (Crustacea: Decapoda: Thalassinidea). Gulf and Caribbean Research. 15: 13-19.

Strasser K. M., and D. L. Felder. 2001 Effect of decreased salinity on development of the ghost shrimp *Callichirus islagrande* and two populations of *C. major* (Crustacea: Decapoda: Thalassinidea).Gulf and Caribbean Research 13:9-19.

Strasser K. M., and D. L. Felder. 2000. Larval development of the ghost shrimp *Callichirus islagrande* (Decapoda: Thalassinidea). Journal of Crustacean Biology 20(1):100-117

Strasser K. M., and D. L. Felder. 1999. Larval development of two populations of the ghost shrimp *Callichirus major* (Decapoda: Thalassinidea). Journal of Crustacean Biology 19(4):844-878.

Strasser K. M., and D. L. Felder. 1999. Sand as a stimulus for settlement in the ghost shrimp Callichirus major and C. islagrande (Crustacea: Decapoda: Thalassinidea). Journal of Experimental Marine Biology and Ecology 239: 211-222.

Strasser K.M. and D. L. Felder. 1999. Settlement cues in an Atlantic coast population of the ghost shrimp *Callichirus major* (Crustacea: Decapoda: Thalassinidea). Marine Ecology Progress Series 183: 217-225.

Strasser, K. M. and W. W. Price. 1999. Species composition and spatial distribution of hermit crabs in Tampa Bay, Florida and surrounding waters. Gulf Research Reports 11: 33-50.

Strasser , K. M. and D. L. Felder. 1998. Settlement cues in successive developmental stages of the ghost shrimp *Callichirus major* and *C. islagrande* (Crustacea: Decapoda: Thalassinidea). Marine Biology 132: 599-610.

Referees:

1) Matthew Klein, Dean, College of Arts and Sciences
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2) Mary Murnik, Professor, Department of Biological Sciences
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3) Darryl L. Felder, Professor and Head, Department of Biology (Ph.D. Advisor)
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5) Dr. Kevin Beach, Associate Professor of Biology (Colleague at University of Tampa)
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6) Dr. Wayne Price, Professor of Biology (Colleague at University of Tampa)
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Curriculum Vitae

Daisy L. Daubert

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Residence
1304 Darwin Ave.
Big Rapids, MI 49307
Ph: (503) 421-4882

Education:

B.S.	December 1998	Washington State University Pullman, Washington Major: Animal Science Minor: Neuroscience
Ph.D.	June 2006	Oregon Health & Science University Integrative Biomedical Science Program

Teaching Experience (* Denotes new prep)

Ferris State University

Fall 2013	Human Physiology and Anatomy I (BIOL 321) 4 lecture and lab sections *Basic Human Anatomy-Physiology (BIOL 109) 4 lecture sections
Summer 2013	Human Physiology and Anatomy II (BIOL 322) 1 lecture and lab section
Spring 2013	Human Physiology and Anatomy II (BIOL 322) 3 lecture and lab sections Pathophysiology (BIOL 300) 1 lecture section
Fall 2012	Human Physiology and Anatomy I (BIOL 321) 4 lecture and 3 lab sections *Endocrinology (BIOL 421) 1 lecture section
Summer 2012	Human Physiology and Anatomy II (BIOL 322) 1 lecture and lab section
Spring 2012	Human Physiology and Anatomy II (BIOL 322) 3 lecture and lab sections Pathophysiology (BIOL 300) 1 lecture section
Fall 2011	Human Physiology and Anatomy I (BIOL 321) 3 lecture and lab sections

	Pathophysiology (BIOL 300) 1 lecture section
Summer 2011	Human Physiology and Anatomy II (BIOL 322) 1 lecture and lab section
Spring 2011	Human Physiology and Anatomy II (BIOL 322) 2 lecture and lab sections Pathophysiology (BIOL 300) 1 lecture section Human Anatomy and Physiology (BIOL 205) 1 lab section
Fall 2010	Human Physiology and Anatomy I (BIOL 321) 2 lecture and 3 lab sections *Pathophysiology (BIOL 300) 1 lecture section
Summer 2010	Human Physiology and Anatomy II (BIOL 322) 1 lecture and lab section
Spring 2010	*Human Physiology and Anatomy II (BIOL 322) 3 lecture and lab sections *Human Anatomy and Physiology (BIOL 205) 1 lab section
Fall 2009	*Human Physiology and Anatomy I (BIOL 321) 2 lecture and 4 lab sections

Research Experience:

1) Summer 1993. Technical Assistant: Dept. of Veterinary Microbiology and Pathology, Washington State University, Pullman, WA. Dr. Thomas Besser.
2) 1994. Technical Assistant: Field Disease Investigative Unit, Washington State University, Pullman, WA. Dr. Thomas Besser.
3) 1995-1996. Animal Technician: Wegner Hall Vivarium, Washington State University, Pullman, WA.
4) 1996-1999. Technical Assistant: Dept. of Veterinary and Comparative Anatomy, Pharmacology and Physiology, Washington State University, Pullman, WA. Dr. Robert Speth.
5) 1999. Graduate Student: Neuroscience Program, Veterinary Comparative Anatomy, Pharmacology and Physiology, Washington State University, Pullman, WA. Dr. Robert Speth.
6) 1999-2006. Graduate Student: Integrative Biomedical Science, Department of Physiology and Pharmacology, Oregon Health & Sciences University, Portland, OR. Dr. Virginia Brooks.
7) 2006. Postdoctoral Fellow: Department of Pharmacology, University of Missouri-Kansas City, Kansas City, MO. Dr. Deborah Scheuer.
8) 2006-2009. Postdoctoral Associate: Department of Physiology and Functional Genomics, University of Florida, Gainesville, FL. Dr. Deborah Scheuer.
9) Summer 2012. Visiting Scientist: Oregon Health & Sciences University, Portland, OR. Dr. Virginia Brooks.
10) Summer 2013. Research Volunteer: University of Florida, Gainesville, FL. Dr. Deborah Scheuer

Memberships:

American Physiological Society: 2003-present.

Human Anatomy and Physiology Society: 2011-present

Grants:

American Heart Association pre-doctoral fellowship: $40,000, July 2003-July 2005.

Awards:

One of the four best writing portfolio submissions for Fall 1998 at Washington State University

N.L. Tartar Trust Research Fellowship: July 2001-July 2002.

Oregon Health & Science University student research forum best student talk award: May 2004.

FASEB Summer Research Conferences; Neural Mechanisms in Cardiovascular Regulation travel award: July 2004.

2005 Caroline tum Suden/Frances A. Hellebrandt Professional Opportunity Award

Committee Service:

Biology Awards Committee: 2010-present
Biology Faculty Development Committee: 2010-present
Chair 2012-present
Biology Planning Committee: 2011-present
Academic Senate: 2012-present
Health Promotion Committee: 2012-2013
Biology Geneticist Faculty Search Committee: 2012-2013

Conferences Attended:

Experimental Biology April 2010
Human Anatomy and Physiology Society May 2011
CUR Beginning a Research Program in the Natural Sciences at a Predominantly Undergraduate Institution November 2011

Professional Development:

Attended Faculty Center for Teaching and Learning workshop on using the smart classroom, Fall 2009

Attended Faculty Center for Teaching and Learning new faculty transition seminar series, Spring 2010

Presented a poster at Experimental Biology, April 2010

Attended Faculty Center for Teaching and Learning Presentation Zen, Summer 2010

Attended Human Anatomy and Physiology Society conference, May 2011

Attended Pearson Publishers seminar on the use of different computer/web programs in biology education, March 2011

Attended Academically Adrift seminar at Central Michigan University, October 2011

Attended Faculty Center for Teaching and Learning the Naked Presenter, Spring 2012

Did research with Virginia Brooks at Oregon Health & Science University, May-June 2012

Did research with Deborah Scheuer at the University of Florida, May-June 2013

Attended McGraw Hill seminar on the use of LearnSmart adaptive learning program and Tegrity, September 2013

Continue to work on research started in at the University of Florida, July 2013-present

Abstracts:

Daubert D.L., Meadows G.G., Wang J.H., Sanchez P.J., and Speth R.C.. 1998. Changes in angiotensin II receptors in dopamine-rich regions of the mouse brain with aging and ethanol consumption. Society for Neuroscience Abstracts, 24:2180.

Daubert D.L., Meadows G.G., Sanchez P., and Speth R.C.. 1999. Chronic ethanol consumption increases adrenal angiotensin II receptor density in female mice in an age and time dependent manner. Society for Neuroscience Abstracts, 25:2200.

Daubert D.L., Giraud G.D., Brooks V.L. 2003. Role of nitric oxide in impaired baroreflex function during pregnancy in conscious rabbits. The FASEB Journal, 17:A23.

Daubert D.L., Brooks V.L. 2004. Role of angiotensin II (AngII) and nitric oxide (NO) in the decreased baroreflex gain of pregnancy. The FASEB Journal, 18:A1078.

Daubert D.L., Brooks V.L. 2004. Stress decreases baroreflex gain (BRG) through increased nitric oxide (NO). The FASEB Journal, 18:A294.

Daubert D.L., Chung M-Y, Brooks V.L. 2005. Decreased insulin sensitivity: mechanism for decreased baroreflex gain during pregnancy? The FASEB Journal, 19:A576.

Daubert D.L., Chung M-Y., Brooks V.L. 2006. Decreased insulin sensitivity: mechanism for decreased baroreflex gain during pregnancy? The FASEB Journal, 20:A359.

Daubert D.L., Looney B.M., Su Y. and, Scheuer D.A. 2008. Corticosterone in the dorsal hindbrain does not alter the number of neurons in cardiovascular brain regions activated by stress. The FASEB Journal, 22: 1171.5

Looney B.M., **Daubert D.L.**, Su Y., and Scheuer D.A. 2008. Low doses of corticosterone act in the dorsal hindbrain to enhance the arterial pressure response to both acute and repeated stress. The FASEB Journal, 22: 1171.4

Su Y., **Daubert D.L.**, Sumners C., Speth R., Li H., and Scheuer D.A. 2008. Glucocorticoids enhance expression of angiotensin II type 1 receptors in the dorsal hindbrain. The FASEB Journal, 22: 1171.6.

Daubert D.L., Dong Y., Scheuer D.A. 2010. Chronic increases in dorsal hindbrain (DHB) corticosterone (Cort) enhance the blood pressure response to restraint stress without changing peripheral Cort. The FASEB Journal, 24: 1019.18

Publications:

Daubert, D.L., Meadows, G.G, Wang, J.H., Sanchez, P.J, Speth, R.C. 1999. Changes in angiotensin II receptors in dopamine-rich regions of the mouse brain with aging and ethanol consumption. Brain Research, 816:8-16.

Speth, R.C., **Daubert, D.L.**, Grove, K.L. 1999. Angiotensin II: a reproductive hormone too? Regulatory Peptides, 79:25-40.

Braileanu, G.T., Simasko, S.M., Speth, R.C., **Daubert, D.**, Hu, J., Mirando, M.A. 2002. Angiotensin II increases intracellular calcium concentration in pig endometrial stromal cells through type 1 angiotensin receptors, but does not stimulate phospholipase C activity or prostaglandin F2alpha secretion. Reproduction Fertility and Development, 14:199-205.

Daubert, D.L., Brooks, V.L. 2007. Nitric oxide impairs baroreflex gain during acute psychological stress. American Journal of Physiology, 292(2): R955-61.

Daubert, D.L., Liu, D., Zucker, I.H., Brooks, V.L. 2007. Roles of nitric oxide and angiotensin II in the impaired baroreflex gain of pregnancy. American Journal of Physiology, 292(6): R2179-87.

Daubert, D.L., Chung M.Y., Brooks, V.L. 2007. Insulin resistance and impaired baroreflex gain during pregnancy. American Journal of Physiology, 292(6): R2188-95.

Daubert D.L., McCowan M., Erdos B., Scheuer D.A. 2012. Nucleus of the solitary tract catecholaminergic neurons modulate the cardiovascular response to psychological stress in rats. Journal of Physiology, 590(Pt 19): 4881-95.

Publications in Preparation:

Daubert, D.L. and Scheuer, D.A. Involvement of corticosterone and vasopressin in cardiovascular and neuroendocrine responses to psychological stress in rats. Submitted to the Journal of Physiology.

Curriculum Vitae

Christopher DeFraia

Assistant Professor, Ferris State University
Phone: (845) 901-0676
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Address: 441 Madison Ave Apt. 3
Grand Rapids, MI 49503

EDUCATION

2010 **Ph.D.**, Microbiology and Cell Science (Molecular Biology), University of Florida.
Dissertation: Characterization of NPR1 suppressors and their role in plant immunity. Advisor: Dr. Zhonglin Mou.

2005 **B.S.**, Biotechnology, *cum laude*, Rutgers University.
Thesis: Molecular characterization of dissimilatory arsenate respiring prokaryotes using an arsenate respiratory reductase gene (*arrA*) as a biomarker. Advisor: Dr. Lily Young.

UNIVERSITY TEACHING EXPERIENCE

Spring 2014 **Visiting Assistant Professor of Biology**, Department of Biology, Kenyon College, Gambier, OH.
Instructor, Applied Bioinformatics (BIOL 391)
-Developed a new upper-level bioinformatics computer laboratory course for biological science majors
-Taught analysis of single gene and genomic sequence data
-Oversaw presentation and peer-review of independent research projects
Lecturer, Genetic Analysis (BIOL 255)
-Course is a survey of the principles and applications of genetics
-Taught a lecture class of 15 biology majors and non-majors
-Taught students to read and evaluate primary literature

Fall 2013 **Visiting Professor**, Department of Biology and Earth Science, Otterbein University, Westerville, OH.
Lecturer: Genetics (BIO 2010)
-Taught 72 biological science majors the principles and applications of genetics
-Developed two new lectures on epigenetics and RNA interference
-Collaborated with Otterbein faculty to enrich the genetics laboratory course

2005-2006 **Graduate Student,** Department of Microbiology and Cell Science,

University of Florida, Gainesville, FL.

Teaching Assistant, Bacterial Genome Sequencing Analysis (MCB 4320C)

-Taught computer laboratory section of the course in which students annotated genes from a novel bacterium

-Created computer laboratory activities and assessments

-Oversaw independent student projects and creation of manuscripts

Lead Instructor, Basic Biology of Microorganisms Laboratory (MCB 3020L)

-Taught microbiological techniques and theory to 36 microbiology majors in this intermediate-level, six hour/week class.

-Supervised three undergraduate teaching assistants

RESEARCH EXPERIENCE

2013-Present **Postdoctoral Researcher**, Department of Molecular Genetics, Ohio State University, Columbus, OH.
Research topic: Architecture and movement of the nucleus
Advisor: Dr. Iris Meier

2010-2013 **Postdoctoral Fellow**, Department of Molecular Genetics, Ohio State University, Columbus, OH.
Research topic: Epigenetic silencing of transposable elements
Advisor: Dr. R. Keith Slotkin

2005-2010 **Graduate Research Fellow**, Department of Microbiology and Cell Science, University of Florida, Gainesville, FL.
Research topic: Identification and characterization of genes essential for disease resistance in plants.
Advisor: Dr. Zhonglin Mou

2004-2005 **Undergraduate Research Fellow,** Department of Environmental Sciences, Rutgers University, New Brunswick, NJ.
Research topic: Identification and sequencing of an arsenic respiration gene from a novel bacterium.
Advisor: Dr. Lily Young

2003 **Undergraduate Researcher**, Biotechnology Center for Agriculture and the Environment, Rutgers University, New Brunswick, NJ.
Research topic: Histidine Biosynthesis in *Arabidopsis thaliana*
Advisor: Dr. Thomas Leustek

UNDERGRADUATE RESEARCH MENTORING

2013-Present **Anisa Moussa**, Undergraduate Researcher, Ohio State University
-Research topic: Isolation of nuclearmembrane mutants.

2011-2013 **Erica Thomas**, Undergraduate Researcher, Ohio State University

-Research topic: Production of mutant plants with active transposons
-Will pursue a Ph.D. in molecular biology

2010-2011 **Jennifer Bosse**, Undergraduate Researcher, Ohio State University
-Research topic: Genotyping of plant transposon silencing mutants
-Currently a graduate student at Ohio State University

Summer 2008 **Mallory Bembry**, NSF REU Undergraduate Research Fellow, University of Florida
-Research topic: Genetic analysis of an immunocomprimised mutant
-Obtained B.S. in Plant Science Biotechnology from Fort Valley State University

2007-2010 **George Marek**, Undergraduate Researcher, University of Florida
-Research topic: Isolation of immunocompromised mutant plants using a bacterial sensor
-Obtained B.S. in Microbiology from the University of Florida
-Currently a MD-PhD student at the University of Florida

PUBLICATIONS

1. **DeFraia, C,** & Slotkin, R. K. (2014). Analysis of retrotransposon activity in plants. Methods in Molecular Biology (Clifton, NJ), **1112**, 195–210.
2. **DeFraia C***, Wang Y*, and Mou Z. (2013). The histone acetyltransferase activity of Elongator subunit 3 is essential for its role in plant immunity. *BMC Plant Biology*. **13**:102. (2013). *Indicates equal contribution.
3. Nuthikattu S, McCue AD, Panda K, Fultz D, **DeFraia C**, Thomas EN, Slotkin RK. The initiation of epigenetic silencing of active transposable elements is triggered by RDR6 and 21-22 nucleotide small interfering RNAs. *Plant Physiol.* May;**162(1)**:116-31. (2013).
4. **DeFraia, C** and Mou, Z. The role of the Elongator complex in plants. *Plant Signal Behav* 6 (2). (2011).
5. **DeFraia C**, Zhang X, and Mou Z. Elongator subunit 2 is an accelerator of immune responses in *Arabidopsis thaliana*. *Plant J.* 64 (3):511–523. (2010).
6. Xiong Y, **DeFraia C**, Williams D, Zhang X, and Mou Z. Deficiency in a cytosolic ribose-5-phosphate isomerase causes chloroplast dysfunction, late flowering and premature cell death in Arabidopsis. *Physiol Plant* **137**: 249–263. (2009).
7. Xiong Y, **DeFraia C**, Williams D, Zhang X, Mou Z. Characterization of Arabidopsis 6-phosphogluconolactonase T-DNA insertion mutants reveals an essential role for the oxidative section of the plastidic pentose phosphate pathway in plant growth and development. *Plant Cell Physiol* **50** (7): 1277–1291. (2009).
8. **DeFraia C**, Schmelz E, and Mou Z. A rapid biosensor-based method for quantification of free and glucose-conjugated salicylic acid. *Plant Methods* **4**, 28. (2008).
9. Zhang X, Xiong Y, **DeFraia C**, Schmelz E, and Mou Z. The Arabidopsis MAP Kinase Kinase 7: A crosstalk point between auxin signaling and defense responses? *Plant Signal Behav* **3**, 272-274. (2008).

10. Zhang X, Dai Y, Xiong Y, **DeFraia C**, Li J, Dong X, and Mou Z. Overexpression of Arabidopsis *MAP Kinase Kinase 7* leads to activation of plant basal and systemic acquired resistance. *Plant Journal* **52**, 1066-1079. (2007).
11. Perez-Jimenez J, **DeFraia C**, Young L. Arsenate respiratory reductase gene (*arrA*) for *Desulfosporosinus* sp. strain Y5. *Biochem Biophys Res Commun* Dec **16**:(2):825-9 (2005).

ABSTRACTS

1. **DeFraia C**. and Slotkin RK. "Transgenerational Epigenetic Silencing of Transposable Elements in Arabidopsis Pollen." Ohio State University Comprehensive Cancer Center Symposium. Columbus, OH. (2013).
2. **DeFraia C**. and Slotkin RK. "Epigenetic Silencing of Transposons by sRNAs in Arabidopsis." Ohio State University Comprehensive Cancer Center Symposium. Columbus, OH. (2013).
3. **DeFraia C**., McCue A., and Slotkin, RK. "Transgenerational activation of transposable elements in Arabiodopsis." Cell Symposia: Epigenetics and the Inheritance of Acquired States. Boston, MA. (2011).
4. **DeFraia C**., Zhang X., Mou., Z."A genetic screen for suppressors of *npr1*-mediated SA toxicity identifies a novel positive regulator of salicylic acid-mediated immunity." 21st International Conference on Arabidopsis Research. Yokohama, JP. (2010).
5. **DeFraia C**. and Mou Z. "A rapid and biosensor-based method for quantification of free and glucose-conjugated salicylic acid." 19th International Conference on Arabidopsis Research. Montreal, CA. (2008).
6. **DeFraia C**. and Mou Z. "Suppressor mutants of *npr1* restore salicylic acid tolerance and pathogen resistance in Arabidopsis thaliana." Florida Genetics. Gainesville, FL. (2007).

FELLOWSHIPS AND AWARDS

2011-2013	Pelotonia Postdoctoral Fellowship
2010	IFAS/CALS Graduate Student Travel Grant
2009	Davidson Graduate Student Travel Scholarship
2005-2009	University of Florida Alumni Fellowship
2004	Center for Environmental Bioinorganic Chemistry Research Fellowship
2003	Rutgers Undergraduate Research Fellows Award

PROFESSIONAL ACTIVITIES

2014	Invited Speaker, Otterbein University
2013	Manuscript Reviewer, Public Library of Science (PLOS) Genetics
2012	Manuscript Reviewer, The Plant Cell
2006-Present	Member, American Association for the Advancement of Science

COMMUNITY SERVICE

2011-2012	**Planning Committee Member**, Tour-de-H2O. Helped plan and execute a charity bike ride to fund clean water projects in African villages.
2008	**Panel Member**, Café Scientifique. Discussed transgenic plants and genetically modified organisms in a public forum.
2007	**Presenter**, Sunbelt Agricultural Expo. Discussed the state of plant disease resistance research with farmers and the public.

UNIVERSITY SERVICE

2012-2013	**Co-Instructor,** Young Scholars Program, 7th grade biology. Taught 7th grade students the scientific method through plant biology experiments
2010	**Poster Judge**, University of Florida Undergraduate Research Symposium.
2006-2007	**Graduate Representative**, University of Florida Career Fair. Discussed graduate school and career opportunities with undergraduates.
2005-2006	**Chair**, Invited Speaker Committee for Microbiology and Cell Science.

LABORATORY SKILLS

Confocal and fluorescence microscopy, real time PCR, microarray analysis, northern blot, fluorescence-activated cell sorting, genetic screening, map-based cloning, construction of transgenic plants, next-generation sequencing, western blot, yeast two-hybrid, recombinant protein expression and purification, bisulfite sequencing, chromatin immunoprecipitation, enzyme activity assays, subcellular fractionation, HPLC.

COMPUTER SKILLS

Blackboard, Moodle, DNA and protein sequence analysis, microarray data analysis, Graphpad Prism, ImageJ, Galaxy/Bowtie (analysis of genomic deep sequencing data).

OLUKEMI FADAYOMI
Department of Biological Sciences

Arts and Sciences Commons 2009
Ferris State University
Big Rapids, MI 49307
Telephone: (231) 591-5628
Fax: (231) 591-5240
Email: fadayok@ferris.edu

EDUCATION

Ph.D. North Texas State University, Denton, Texas, Biology (Immunoparasitology) 1986
MS Stephen F. Austin State University, Nacogdoches, Texas Biology (Microbiology) 1982
B.Sc. East Texas Baptist College, Marshall, Texas Biology 1980

PROFESSIONAL HISTORY

Fulbright Scholar, University of Namibia 2003

Biotechnology Program Coordinator, Ferris State University 2000 to 2003

Professor of Biology, Ferris State University 1997 to present

Visiting Fellow, Centers for Disease Control and Prevention, Atlanta, GA 1994 to 1996

Associate Professor of Biology, Ferris State University 1992 to 1997

Assistant Professor of Biology, Ferris State University, 1987 to 1992

Visiting Assistant Professor of Biology, Virginia Commonwealth University, Richmond, VA 1986 to 1987

TEACHING EXPERIENCES

Ferris State University (Courses taught)

General Biology 1 and II (zoology and botany)
Cell and Molecular Biology
Introduction to Biotechnology
Medical Parasitology
Advanced Immunology laboratory
Current Topics in Biology

University of Namibia

General Microbiology
Advanced Microbiology

Virginia Commonwealth University 1986-87 (Courses taught)

General Parasitology
Cell Biology
General Microbiology
General Biology

COLEGE/UNIVERSITY SERVICES

University:

Academic Program Review	2005- present
Senate Diversity Committee	2000 - 2003
Distinguished Teacher Award Committee	2000 - 2001
Scientific Understanding Committee	1999 - 2001
Faculty Research Grant Committee	1998 - 2000
Academic Senate	1997 - 98
Diversity Counts	1997 - 99
Animal Care and Use Committee	1988 – 89, 1990 - 94
Graduate and Professional Council	1992 - 94
Radiation Safety Committee	1990 - 93

College:

Sabbatical Leave Committee	1996 - 97
Curriculum Committee	1991 - 93
Minority Retention Task Force	1990 - 94
Pre-Optometry Advisory Board	1989 - 94, 1997 - 99

Department:

Present or past chair in

Biotechnology Advisory Board	2000 - 03
Department Tenure Review Committee	1996 - 98
Faculty Development Committee	1996 - 97
Candidate Tenure Committee	1996 - 98
Curriculum Committee	1990 - 93
Faculty Development Committee	1989 - 91
General Biology Committee	1988 - 94

Member

Planning Committee	2001- 03
Arts and Science Remodeling Subcommittee	1989 - 90
Curriculum Committee	1988 - 89
General Biology Committee	1987 – present

PROFESSIONAL HONORS, FELLOWSHIPS, LISTINGS, AWARDS, AND RESEARCH SUPPORT

Merit promotion 2007
Fulbright Scholar Award (Namibia, Africa), 2003
College of Arts and Sciences Deans Initiative Grant, 1999, 2002
Michigan Association of Governing Boards' of State Universities Distinguished Faculty Award, 1997
Development of a Multimedia and Interactive Approach to Teaching Laboratory Biology Courses. Ferris State University Faculty Development Grant, 1997.
Establishment and Maintenance of the Life Cycle of the Human Blood Fluke *Schistosoma mansoni.* Ferris State University. Ferris State University Faculty Research Grant, 1997.
Visiting Scientist Fellowship, National Centers for Infectious Diseases, Centers for Disease Control, Atlanta, GA, 1995 –96

Who's who of American Women, 1991
Selected to participate in a two-week intensive NSF workshop on Introduction of Molecular Biology to Undergraduate Curriculum, 1993
Role of Immune Response in the Protection against *Trichinella spiralis*. Ferris State University Faculty Research, 1989.

REPRESENTATIVE PROFESSIONAL ACTIVITIES

Consultancies

- Wadsworth Publishing Company, 2002
- Williams and Wilkins Publishers, 1991
- Wm. C. Brown Publishers, 1989 - 90
- McGraw-Hill Publishing Company, 1989

Membership

- Association of College and University Biology Educators 1997 - present.
- American Society of Tropical Medicine and Hygiene 1994 – present
- International Alliance of Teacher Scholars, Inc. 2001-2002

Publications

- Adewusi, O.I, R. Mitchell III and D. Stewart 1999. "General Biology Laboratory Manual", Kendall/ Hunt Publishing Company, Dubuque, IA. 203 pages

- Adewusi, O.I, Nix, N.A., Lu, X., Colley, D.G. and Secor, W.E. 1996. *"Schistosoma mansoni*: Relationship of tumor Necrosis Factor-∝ to Morbidity and Collagen deposition in Chronic Experimental Infection." *Experimental Parasitology* 84: 115-123.

- Adewusi, O.I., Colley, D.G., and Secor, W.E. 1996. "Association Between TNF-α and Morbidity During Experimental Chronic Schistosomiasis," *FASEB.*

- Adewusi, K. and Goven, A.J. 1987. "Enhanced Lysophospholipase Activity in Sensitized Mice Challenged with *Trichinella spiralis*: A Role for Cell-cooperation." *Developmental and Comparative Immunology* 11: 215-225.

- Adewusi, K. And Goven, A.J. 1987. "The Effect of Anti-thymocyte Serum on the Eosinophil and Lysophospholipase Responses in Mice Infected With *Trichinella spiralis*." *Parasitology* 94: 115-122.

- Adewusi, K. and Goven, A.J. 1986. "Enhancement of Lysophospholipase Activity with *Trichinella spiralis* Antigen: Evidence for Cell Cooperation." *Journal of Parasitology* 72: 716-722.

- Adewusi, Kemi 1982. "Fine Structure of the Tegument and Associated Structures in the Tapeworm *Cittotaenia*." *Journal of Texas Society for Electron Microscopy* 13:15.

Presentations

- Advances in Agricultural Biotechnology. March 2003. Neudamm College, Windhoek Namibia

- Adewusi, OI, Freeman Jr.GL, Colley, DG, and Secor, WE. December 1996. "Production of TNF-α by Spleen Cells of Mice with Chronic *Schistosoma mansoni* Infections," American Society of Tropical Medicine and Hygiene, Baltimore, MD.

- Adewusi, OI, Colley DG, and Secor WE. June 1996. "Association between TNF-∝ and Morbidity during Experimental Chronic Schistosomiasis." America Association of Immunologists Annual Meeting, New Orleans, Louisiana.

- Adewusi, OI, Colley, DG, and Secor, WE. November 1995. "Association of Hypersplenomegaly Syndrome and High TNF-α Levels in the Liver Homogenates of Mice with Chronic Schistosomiasis." American Society of Tropical Medicine and Hygiene, San Antonio, Texas.

- Adewusi, OI. October 1995. "The Role of Tumor Necrosis Factor-alpha in Chronic Schistosomiasis." Fancy Gap Immunological Meeting, Fancy Gap, Virginia.

- Adewusi, OI., 1994. "Women of Other Cultures ", Ferris Professional Women's Conference, Big Rapids, MI

- Adewusi, O.I., 1994. "Women's Issues and the Healing of Racism" Big Rapids, MI.

- Adewusi, Olukemi 1992. "Effects of Ivermectin on the Cyclophillidean Tapeworm, *Railletina salmoni."* Annual Midwestern Conference of Parasitologists, Eau Claire, Wisconsin.

- Adewusi, Olukemi 1991. "The Role of Eosinophilic Lysophospholipase in Immune Response against *Trichinella spiralis*." International Symposium of Tropical Diseases, Haikou, Hainan, People's Republic of China.

- Adewusi, Olukemi 1990. "Animals and Parasites," Annual Meeting of American Association of Laboratory Animal Science, Lansing MI.

- Adewusi, Olukemi 1990. "The Protective Role of Eosinophils in Selected Helminth Infections." Department of Immunology and Microbiology, California State University, San Bernardino, California.

- Adewusi, Olukemi 1989. "The Effect of Anti-thymocyte Serum on the Production of Lysophospholipase in Mice Infected with *Trichinella spiralis*" Ferris State University Science Week.

- Adewusi, K.I. 1986. "Eosinophil Mediated Damage to Parasites via Lysophospholipase Activity." Virginia Commonwealth University: Faculty Research Session.

- Adewusi, K.I. and Goven, A.J. 1986. "Enhanced Synthesis of Phospholipase B in mice infected with *Trichinella spiralis*: Evidence for cell cooperation." American Society for Microbiology, Boston MA.

- Adewusi, K.I. and Goven, A.J. 1986. "Effect of Anti-thymocyte serum on phospholipase B activity in mice infected with *Trichinella spiralis*. Southwestern Association of Parasitologists.

- Adewusi, K.I. and Goven, A.J. 1984. " Phospholipase B: Confirmation of the Eosinophil as the Sole Leukocyte Source in an Inflammatory Reaction." Southwestern Association of Parasitologists.

Attendance

- Annual Meeting of American Society of Tropical Medicine and Hygiene, Denver, CO November 2002
- Lily Conference on College and University Teaching, Ferris State University, September 2002
- AAC&U General Education and The Assessment of Student Learning, Dallas, TX. February 2002
- National Association of Biology Teachers' Convention, Montreal, Canada November 2001
- Lily Conference on College and University Teaching, Ferris State University, September 2001
- Association of Biology Education Conference University of Chicago, June 2001
- Critical Thinking Workshop/Think Tank session with Richard Paul, Ferris State March 2001
- McGraw/Hill General Biology Road show, Chicago, IL March 2001
- Diversity in the New Millennium. Eastern Michigan University, Ypsilanti March 2000
- National Science Foundations' Regional Grants Conference, Lawrence, Kansas October, 1998
- Diversity Conference, Central Michigan University, Mt. Pleasant MI, October 1997.
- CDC, Atlanta, GA November 1997
- AAC&U Diversity Network Workshop, Ann Arbor, MI April 1997
- Minority Equity Conference Western Michigan University, Kalamazoo, MI March 1997.
- Campus Climate Imperatives: Building a Just Responsive Community, Central Michigan University, Mt. Pleasant, MI October 1997
- Project Kaleidoscope, a NSF workshop on revitalizing undergraduate biology curriculum, Morehouse College, Atlanta, GA, November 1996.
- International Symposium on Tropical Diseases, Haikou, China November 1991.
- AAAS Symposium on "Biology of Parasitism", New Orleans, LA February 1990.

Chautauqua courses for college teachers:

- Molecular Epidemiology (May 2001)
- Internet and the World Wide Web (May 1997).
- Virology in the Nineties (1993)
- Recombinant DNA: Technology and Application (May 1991),
- Advances in Immunology (February 1989)

Ferris State University Workshops:

- Connecting with the Learners, Summer 2000
- Comprehensive Guidance Program: Re-Awakening the Soul of Education, February 2000
- Faculty winter institute: Development of web-based instruction using Webct, January 1999
- Health Professions Education Futures Conference, Holiday Inn Conference center, March 1997.
- Antibody Mutagenesis In vitro., Biology Lecture Series November 1997
- Cellular Schizophrenia, Biology Lecture Series , February, 1998

CIVIC AND COMMUNITY ACTIVITIES

- Monday/Tuesday Night Technology (presentation of hands-on biology lab experience to area middle school students) 1999 – present
- K-12 Science Olympiad (judge) 1998

- Odyssey of the Mind (judge and facilitator) 1998
- EXCEL (Founding member. Parental organization for enhancement of education of academically gifted K-12 students.) 1997 - 2001
- Girls' Scout (troop leader) 1994 - 96
- Big Rapids Forum on the Healing of Racism 1992 - 94
- Michigan Department of Education Workshops. (ACT preparatory workshop for economically disadvantaged high school students in rural areas) 1992.
- Wade McCree Program (Presented biology workshops for minority students from urban Detroit) 1992, 1993.
- Martin Luther King Jr./Caesar Chavez/Rosa Parks College day program (Provided hand-on experience for minority high school students) 1990 - 92.
- Muskegon Area Explorations in Math and Science (presenter). A conference for 7th and 8th Grade girls 1990.

January 2014

Clifton V. Franklund

Personal Information:

Office Address:	Department of Biological Sciences Ferris State University 820 Campus Drive, ASC 2011 Big Rapids, MI 49307
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FAX Number:	(231) 591-2540
E-MAIL:	franklc@ferris.edu
Web Site:	http://franklund-micro.com
Twitter:	@Dr_Franklund
Blog:	http://www.wordpress.com/assessmentinaction

Professional Employment:

Associate Professor	Department of Biological Sciences, Ferris State University, Big Rapids, MI	2009 – present
Assistant Professor	Department of Biological Sciences, Ferris State University, Big Rapids, MI	2006 – 2009
Assistant Professor	Department of Biological Sciences, California State University, Long Beach, Long Beach, CA	2000 – 2006
Research Associate	Department of Microbiology and Immunology, Virginia Commonwealth University, Richmond, VA	1999 – 2000
Adjunct Professor	Division of Natural Sciences, Piedmont Virginia Community College, Charlottesville, VA	1996 – 1999

Post-Doctoral Training:

University of Virginia, School of Medicine, Department of Microbiology. Charlottesville, Virginia 22908. February 1997 to 1999. Was a research associate in the laboratory of Dr. Joanna Goldberg, Associate Professor of Microbiology.

University of Virginia, School of Medicine, Department of Microbiology. Charlottesville, Virginia 22908. January 1991 to January 1997. Was a research associate in the laboratory of Dr. Robert J. Kadner, Professor of Microbiology.

Education:

Medical College of Virginia/Virginia Commonwealth University, Health Sciences Division. Richmond, Virginia 23298. August 1986 to December 1990. Ph.D. Department of Microbiology and Immunology. Advisor: Dr. Phillip Hylemon, Professor of Microbiology.

North Dakota State University, Fargo, North Dakota 58105. August 1984 to July 1986. M.S. Department of Bacteriology. Advisor: Dr. Thomas Glass, Associate Professor of Bacteriology.

Concordia College, Moorhead, MN 56560. August 1980 to May 1984. B.A. Major: Biology. Minor: Philosophy.

Professional Affiliations:

American Society for Microbiology, Michigan Regional Branch of the American Society for Microbiology, Sigma Xi Honor Society, and the Anaerobe Society of the Americas

Professional Roles:

Academic Affairs assessment coordinator
Ferris State University Quality Matters Trainer
Ferris State University Online Instruction Trainer
Ferris State University Blackboard Learn 9.1 Mentor (assigned 33 faculty members)
Assessment coordinator for the department of Biological Sciences
Co-program coordinator for the B.S. in Biological Science

Awards:

Top 25 STEM Professor in Michigan (2013)
Ferris State University Distinguished Teacher of the Year (2012)
Softchalk Higher Education Online Challenge Winner (2011)
Exemplary On-Line Course, Web Enhanced (2007)

Certificates:

Certificate of Online Adjunct Teaching, University of Maryland (2013)
Assessment Specialist Graduate Certificate, James Madison University (Begun 2013)

Courses Taught at Ferris State University:

BIOL108: *Medical Microbiology.* (2006 - present)
This three-unit course is taught every semester and is part of the core curriculum for allied health sciences majors at Ferris State University. The class focuses upon the diversity of microbial life forms, the basis of a protective immune defense, and a brief survey of important microbial pathogens. The laboratory covers essential microbiological techniques and includes a group-based directed research project on a topic of the students' choosing.

BIOL286: *General Microbiology.* (2006 - present)
This three-unit course is taught every semester and is part of the curriculum for the clinical laboratory sciences program at Ferris State University. The lectures serve as a brief introduction to the microbial world including microbial structure, function, metabolism, classification, genetics, control of microbial growth and immunity. The laboratory provides practical experience with fundamental concepts, techniques and instrumentation and includes fieldtrips to the Big Rapids wastewater treatment plant. I am also attempting to coordinate visits to the Yoplait plant in Reed City, the Big Rapids hospital diagnostic lab, and the Big Rapids water treatment plant.

BIOL387: *Microbiology and Immunology.* (2008 and 2009)
This three-unit course is taught every semester and is part of the curriculum for the clinical laboratory sciences program at Ferris State University. The lectures serve as a brief introduction to the microbial world including microbial structure, function, metabolism, classification, genetics, control of microbial growth and immunity.

BIOL472: Proteins. (2013)
This three-unit course is taught every other year and is part of the curriculum for the Biotechnology program at Ferris State University. The class covers protein structure, function, purification, and characterization with an emphasis on lab applications, problem solving, and trouble-shooting.

Courses Taught at Other Institutions:

MICR320: *Bacterial Pathogenesis.* CSULB (2000 – 2006)
This five-unit course is taught every semester and is part of the core curriculum for Microbiology majors at CSULB. Lectures were focused upon molecular mechanisms of host-parasite interactions in a broad range of human pathogens.

MICR471: *Bacterial Physiology.* CSULB (2000 – 2006)
This is a three-unit course that is taught once per year during the spring semester. Using a comparative approach, the growth, metabolism, nutrition, and ecology of bacteria and archaebacteria are discussed. Recent publications are used to compare and contrast the diverse strategies employed by prokaryotes to adapt to their environment.

BIOL696: *Research Methods.* CSULB (2002 – 2006)
This three-unit, course is offered during the fall semester for graduate students in the process of completing their thesis. Topics covered include experimental design, data presentation, computer graphics, and technical writing. The class culminates with formal oral, written, and poster presentation of their research.

BIOL220H: *Introduction to Bioinformatics.* CSULB (2004)
This two-unit, team-taught course is offered during the fall semester to honors students in the department. Topics covered include the nature of biological information, database design and queries, sequence comparisons, phylogenetic analyses, and predictions of structure and function based upon sequence data. One half of the course time is dedicated to using current computer algorithms for actual sequence analyses.

MICR200: *General Microbiology for Health Professionals.* CSULB (2005)
This is a general microbiology course for those planning careers in nursing, health care and education, and foods and nutrition. This course offers a broad overview of the structure, function, and diversity of microorganisms with an emphasis on their roles in human health. I served as a laboratory instructor.

NAS185: *Microbiology.* Piedmont Virginia Community College (1997 – 1999)
This four-unit course provided an introduction to microorganisms, their metabolism, and involvement in human disease. Emphasis was placed upon prokaryotic metabolism and genetics as well as the molecular and cellular aspects of the human immune system.

BIO101/102: *Introductory Biology Laboratory.* Piedmont Virginia Community College (1996 –1999)
Laboratory sessions included exercises spanning Botany, Animal Physiology, Biochemistry, Genetics, and Molecular Biology. As laboratory instructor, I prepared, presented, and graded all lab materials, quizzes, and practical exams.

Research Funding:

Faculty Research Grant – Lipopolysaccharide sialation in *Fusobacterium nucleatum*
Faculty Research Committee, Ferris State University 2007
Role: P.I.

3 S06 GM 063119-02S2 (Kingsford, Laura) 2003 - 2005
Support for Continuing Research Excellence (SCORE)
Role: P.I.

2 R25 GM 0089-04 (Bauer, Roger) 2003 – 2004
Bridges to the Future: Baccalaureate Bridge Program
Role: Faculty participant.

Committee Appointments at Ferris State University:

Department:

Department Planning Committee (2011-present) – currently serving as chair

Department Awards Committee (2012-present)

Geneticist Faculty Search Committee (2012-2013)

Microbiologist Faculty Search Committee (2010-2011)

Developmental Biologist Faculty Search Committee (2007-2008)

Department Curriculum Committee (2007-2009)

Department Assessment Committee (*ad hoc*) (2009-present) – currently serving as chair

College:

College of Arts and Sciences Dean Search Committee (2011-2012)

College of Arts and Sciences Planning Committee (2011-present)

College of Arts and Sciences Assessment Committee (2012-present, current chair)

College of Arts and Sciences Assessment Committee (2007-2013)

University:

Vice-President of Student Affairs Search Committee (2013, co-chair)

National Competitive Scholarships Committee (2006-2007)

Human Subjects Review Committee (2006-2013)

General Education Scientific Understanding Committee (2008-2010)

University Assessment Committee (2012-present, current chair)

Directed Student Research at Ferris State University:

Student Name	Program	Tenure	Current Position
1. Peter Wissink	Pre-medicine	2013	Calvin College
2. Jennifer Franklund	Biology	2012	Southern Illinois Univ.
3. Tracy Elliott	Pre-Dentistry	2011	Student at FSU
4. Ewa Slotwinski	Biotechology	0211	Student at FSU
5. Alicia Weeks	MSTS	2011	High school
6. Jason Workman	Biotechnology	2010	Student at FSU
7. Allison Wyatt	Biotechnology	2010	Student at FSU
8. Jeremy Way	Pre-Medicine	2009	Student at FSU
9. Akshay Chellappa	Biotechnology	2009	Student at FSU
10. Erika Dittmar	Pre-Medicine	2008	USDA Forest Service
11. Ashley Pointdexter	MSTC	2008	High school
12. Bridgette Buse	MSTC	2008	High school
13. David Bosak	College of Optometry	2008	DO program
14. Brad Christopherson	College of Optometry	2008	DO program

I directed an additional 30 students while a faculty member at California State University, Long Beach

Selected Professional Development Training Attended:

New Faculty Orientation Week
Using RSS Feeds for Teaching or Research
Ways to Conduct & Manage Class Discussions
CAS Outcomes-Assessment
Motivating Students
McGraw-Hill Microbiology Symposium, Atlanta, GA
Managing a College Classroom--Control, Community and Discipline
SLI 2007, Creating a Learning-Centered University
Conducting Effective Class Discussion
Faculty Writing Institute
Online Instructor Certification
2008 NC State Undergraduate Assessment Symposium
Making a Difference in Student Learning: Assessment as a Core Strategy, HLC (2009)
New Faculty Orientation Week, Planning session (2011 and 2012)
Inquiries into Teaching and Learning (2010 and 2011)
Lilly North Conference, Traverse City, MI. 2007, 2008, 2009, 2010
IUPUI Assessment Institutes (2012 and 2013)
North Central Association – HLC (2012 and 2013)
HLC-NCA Assessment Academy (2013)
Improving the Validity and Reliability of Your Tests or Quizzes (2010)
Planning an Assessment of Student Learning (2011)
Inquiries into Teaching and Learning dinner (2011)
Welcome Back! Faculty Professional Development Day (2012 and 2013)
Evidence-Based Teaching: A Journal Club on Research in Teaching and Learning (2011 and (2012)
Best Practices Workshop (2012)
Quality Matters Training (2012)
Blackboard Learn 9.1 Training (both modules 1 and 2) (2012)

Abstracts:

1. Creating Institutional Processes that Enhance Faculty Engagement in Learning Assessment. HLC-NCA Assessment Workshop. 2013.
2. **Franklund, C.V.**. Facilitating Collaborative Learning with Google Apps. Lilly Conference on College and University Teaching. 2010.
3. Woodman, H., **C.V. Franklund**, and C. Conley-Sowels. Rubrics + Readability = Retention -- The 3 Rs: Making the Connection. Lilly Conference on College and University Teaching. 2010.
4. Woodman, H., **C.V. Franklund**, and C. Conley-Sowels. Rubrics Rock! Using Rubrics to Assess Authentic Student Learning. Texas A&M Assessment Conference. 2010.
5. Woodman, H., **C.V. Franklund**, and C. Conley-Sowels. Rubrics Rock! Rubistar and Beyond: Rubrics to Use Monday Morning. Lilly Conference on College and University Teaching. 2009.
6. **Franklund, C.V.** Using Computer-Assisted Formative Feedback to Enhance Learning in an Introductory-Level Microbiology Course. Lilly Conference on College and University Teaching. 2008.
7. Nolan, D., H. Abdelhadi, and **C.V. Franklund**. Cloning and Characterization of the *recA* Gene from *Fusobacterium nucleatum* 10953. National Meeting of the American Society for Microbiology. 2003
8. Raps, A., and **C.V. Franklund**. Cloning and Analysis of a Lipopolysaccharide Core Gene from *Fusobacterium nucleatum*. National Meeting of the American Society for Microbiology. 2002.

9. Raps, A., and **C.V. Franklund**. Cloning and Analysis of a Lipopolysaccharide Core Gene from *Fusobacterium nucleatum*. Southern California Branch Meeting of the American Society for Microbiology. 2001.
10. Krebs, T., **C.V. Franklund**, and J.B. Goldberg. Function Analysis of Enzymes in Lipopolysaccharide Biosynthesis. Annu. Meet. of the Virginia Branch of the Amer. Soc. for Microbiol. 1999. (Honorable Mention).
11. Dean, C.D., **C.V. Franklund**, J.D. Retief, M.J. Coyne, Jr., K. Hatano, D.J. Evans, G.B. Pier, and J.B. Goldberg. Sequence Analysis of the O Antigen Locus from the Serogroup O11 *Pseudomonas aeruginosa* Strain PA103. Abstr. Annu. Meet Am. Soc. Microbiol. 1998.
12. **Franklund, C.V.** and J.B. Goldberg. Cloning and Characterization of GltX from *Pseudomonas aeruginosa*. Abstr. Annu. Meet. Am. Soc. Microbiol. 1998.
13. **Franklund, C.V.** and R.J. Kadner. Regulation of *btuB* in *Escherichia coli*. Abstr. Annu. Meet. Am. Soc. Microbiol. 1996.
14. Baron, S. F., **C. V. Franklund**, and P. B. Hylemon. Cloning, Sequencing, and Expression of the Gene coding for 7a-hydroxysteroid dehydrogenase from *Eubacterium* sp. VPI 12708. Southeastern Microbial Physiology and Genetics Conference 1994.
15. Baron, S. F., **C. V. Franklund**, and P. B. Hylemon. Characterization of the Bile Acid-Inducible NADH:Flavin Oxidoreductase Gene from *Eubacterium* sp. VPI 12708. Annu. Meet. of the Virginia Branch of the Am. Soc. for Microbiol. 1993.
16. Baron, S. F., **C. V. Franklund**, and P. B. Hylemon. Characterization of the Bile Acid-Inducible NADH:Flavin Oxidoreductase Gene from *Eubacterium* sp. VPI 12708. Abstr. Annu. Meet. Am. Soc. Microbiol. 1993.
17. **Franklund, C.V.**, and P.B. Hylemon. Purification and Characterization of a 7a - Hydroxysteroid Dehydrogenase from *Eubacterium* sp. Strain VPI 12708. Annu. Meet. of the Virginia Branch of the Am. Soc. for Microbiol. 1989. (Outstanding Speaker Award)
18. **Franklund, C.V.**, and P.B. Hylemon. Evidence for a Multiprotein Complex Containing the Cholate-Inducible NADH:Flavin Oxidoreductase from *Eubacterium* sp. Strain VPI 12708. Abstr. Ann. Meet. Am. Soc. Microbiol. 1988.
19. **Franklund, C.V.**, and P.B. Hylemon. Evidence for a Multiprotein Complex Containing the Cholate-Inducible NADH:Flavin Oxidoreductase from *Eubacterium* sp. Strain VPI 12708. Annu. Meet. of the Virginia Branch of the Amer. Soc. for Microbiol. 1988.
20. **Franklund, C.V.**, and T.L. Glass. Glucose Uptake by the Cellulolytic Rumen Anaerobe *Bacteroides succinogenes* S85. Annu. Meet. of the North Dakota Branch Am. Soc. Microbiol. 1986.
21. **Franklund, C.V.**, and T.L. Glass. Glucose Uptake by the Cellulolytic Rumen Anaerobe *Bacteroides succinogenes* S85. Abst. Ann. Meet. Am. Soc. Microbiol. 1986.

Peer Reviewed Publications:

1. Pandak, W.M., P. Bohdan, **C. Franklund**, D.H. Mallonee, G. Eggertsen, I. Björkhem, Z.R. Vlahcevic, and P.B. Hylemon. Expression of Sterol 12a-Hydroxylase Alters Bile Acid Pool Composition in Primary Rat Hepatocytes and *In Vivo*. Gastroenterology **120**:1801-9 (2001).
2. Dean, C.D., **C.V. Franklund**, J.D. Retief, M.J. Coyne, Jr., K. Hatano, D.J. Evans, G.B. Pier, and J.B. Goldberg. Characterization of the O Antigen Locus from the Serogroup O11 *Pseudomonas aeruginosa* Strain PA103: Identification of the O Antigen Polymerase Gene. J. Bacteriol. **181**: 4275–4284 (1999).
3. **Franklund, C.V.**, and J.B. Goldberg. Cloning and Characterization of *gltX* from *Pseudomonas aeruginosa* PAK. J. Bacteriol. **181**:3582-3586 (1999)

4. **Franklund, C.V.** and R.J. Kadner. Multiple Transcribed Elements Control Expression of the *Escherichia coli btuB* Gene. J. Bacteriol. **179**:4039-4042 (1997)
5. Aitchison, Paul M., Spencer B. Gay, **C.V. Franklund**, and J.J. Jackson. A Web-based End of Rotation Quiz. Acad. Radiol. **4**: 860-61 (1997).
6. **Franklund, C.V.**, S.F. Baron, and P.B. Hylemon. Characterization of the baiH Gene Encoding a Bile Acid-Inducible NADH:Flavin Oxidoreductase from *Eubacterium* sp. Strain VPI 12708. J. Bacteriol. **175**:3002-3012 (1993).
7. Baron, S.F., **C.V. Franklund**, and P.B. Hylemon. Cloning, Sequencing, and Expression of the Gene Coding for Bile Acid 7-Hydroxysteroid Dehydrogenase from *Eubacterium* sp. Strain VPI 12708. J. Bacteriol. **173**:4558-4569 (1991).
8. Hylemon, P.B., P.D. Melone, **C.V. Franklund**, E. Lund, and I. Björkhem. Mechanism of Intestinal 7-dehydroxylation of Cholic Acid: Evidence that Allo-Deoxycholic Acid is an Inducible Side-Product. J. Lipid Res. **32**: 89-96 (1991).
9. **Franklund, C.V.**, P. de Prada, and P.B. Hylemon. Purification and Characterization of a Microbial, NADP-Dependent Bile Acid 7-Hydroxysteroid Dehydrogenase. J. Biol. Chem. **265**: 9842-9849 (1990).
10. White, W.B., **C.V. Franklund**, J.P. Coleman, and P.B. Hylemon. Evidence for a Multigene Family Involved in Bile Acid 7-Dehydroxylation in *Eubacterium* sp. Strain VPI 12708. J. Bacteriol. **170**: 4555-4561 (1988).
11. **Franklund, C.V.**, and T.L. Glass. Glucose Uptake by the Cellulolytic Rumenal Anaerobe *Bacteroides succinogenes*. J. Bacteriol. **169**: 500-506 (1987).

Non-Peer Reviewed Publications:

1. Lathrop, J.T., **C.V. Franklund** and R.J. Kadner. Communication Between Membranes in TonB-Dependent Transport Across the Bacterial Outer Membrane. In W.N. Kohings, H.R. Kaback and J.S. Lolkema (eds). Handbook of Biol. Phys. Vol. 2. Elsevier Press (1996).
2. **Franklund, C.V.** Microbiology. Chancellors Learning Systems, Fishers, IN. (2004).

DAVID M. GRIFFITH

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ASC 2004
Ferris State University
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davidgriffith@ferris.edu

521 Linden St
Big Rapids, MI
49307

EDUCATION

Ph.D. in Biology, University of Illinois at Chicago, 1990
Concentration: Evolution and Environment
Dissertation: Ecology and evolution of predatory behavior in the carabid cave beetle *Neaphaenops tellkampfi*

B.S. in Biology, Hillsdale College, Hillsdale, Michigan, 1983

PROFESSIONAL EXPERIENCE

Visiting Assistant Professor of Biology, Ferris State University, Big Rapids, MI. 2003-present

Substitute Teacher and stay at home dad, Pike County (606) 433-9300 and Pikeville Independent Boards of Education (606) 432-8161. 1997-2003

Adjunct Professor of Biology, Prestonsburg Community College, Prestonsburg, Kentucky 1996-1997

Assistant Professor of Biology, Pikeville College, Pikeville, Kentucky 1993-1996

University Lecturer in Biology, Governors State University, University Park, Illinois 1990-1993

COURSES TAUGHT

Ferris State University: Biol 121: General Biology (majors), Biol 205: Human Anatomy & Physiology. Biol 344: Entomology; Biol 442: Ecology

Pikeville College: Human Anatomy, Ecology, Genetics, Principles of Biology I and II for majors, Introduction to Biology (non-majors), Invertebrate Zoology, Special Topics (Cave Ecology), and Comparative Anatomy.

Governors State University: General Biology, Human Physiology (a two semester sequence for Nursing majors), General Zoology, Human Genetics (non-majors), and Ecology.

Prestonsburg Community College: Human Anatomy and Physiology

PUBLICATIONS

Griffith, D. and T. Poulson, 1993. Mechanisms and consequences of intraspecific competition in a carabid cave beetle. Ecology **74**: 1373-1383

Griffith, D. and J. Brown. 1992. A null model of patch assessment with an application to a carabid cave beetle. Oikos **64**: 523-526.

Griffith, D. 1991. The effects of substrate moisture on survival of adult cave beetles (*Neaphaenops tellkampfi*) and cave cricket eggs (*Hadenoecus subterraneus*) in a sandy deep cave site. Bulletin of the National Speleological Society **53**: 98-103.

Griffith, D. 1990. Laboratory studies of predatory behavior in two subspecies of the carabid cave beetle *Neaphaenops tellkampfi*. International Journal of Speleology **19**: 29-38.

GRANTS

National Speleological Society Grant: Ecology of a terrestrial cave community; January-December 1986. $140.00

Karst Research Grant, Cave Research Foundation: The dynamics of a terrestrial cave predator-prey system: abiotic and biotic interactions; January-December 1987. $1,000.00

University of Illinois at Chicago Travel Grant, August 1987. $200.00

PRESENTATION OF PAPERS

"Ecology of a Terrestrial Cave Community." Presented at the Sigma Xi Graduate Student Forum, UIC, March, 1986.

"The Dynamics of a Terrestrial Cave Predator-prey System: Biotic and Abiotic interactions." Presented to the UIC Committee on Evolutionary Studies, April, 1986.

"Coevolution in a Cave Predator-Prey system." Presented at the National Speleological Society Annual Convention, Marquette, Michigan, June, 1987.

"Measuring Patch Assessment by a Carabid Cave Beetle: A Model and a Test." Presented at the 76th Annual Ecological Society of America meeting, San Antonio, Texas, August, 1991.

PUBLISHED ABSTRACTS

Griffith, D. 1988. Evolutionary and ecological interactions between the cave beetle *Neaphaenops tellkampfi* (Coleoptera: Carabidae) and the cave "cricket" *Hadenoecus subterraneus* (Orthoptera: Rhaphidophoridae) in Mammoth Cave National Park. Abstracts of the fourteenth annual scientific research meeting, Great Smoky Mountains National Park, May 12-13, 1988.

PUBLICATIONS IN NON-REFEREED JOURNALS

Griffith, D. 2004. Mark-recapture studies of cave beetles: a review and new methods. Cave Research Foundation Annual Report.

Griffith, D. 1985. Investigation of a predator-prey system found in Great Onyx Cave, Kentucky. Cave Research Foundation Annual Report.

Poulson, T., D. Griffith, and K. Schmidt. 1991. Energetic advantage of interspecific competition in *Neaphaenops t. tellkampfi*. Cave Research Foundation Annual Report.

COMMITTEE WORK

Governors State University: Division of Science Safety Committee (we developed a new set of rules and guidelines for safety in the science laboratories)

Pikeville College: Special Events Committee

PERSONAL DATA

Married to Jeannette; Children: Joseph and Matthew. Member of Tri-Beta Biology Honor Society, Captain of Hillsdale Soccer Club, Life Scout, Youth Soccer Coach for the Pikeville Area YMCA, 1993-2003.
JV Soccer Coach and Assistant Varsity Soccer Coach, Reed City High School, 2006
Hobbies: Chinese Philosophy and Language (Mandarin); Soccer, Nature Photography

PROFESSIONAL ASSOCIATIONS

Michigan Entomological Society
National Speleological Society
Human Anatomy & Physiology Society

REFERENCES

Dr. Robert Friar
Professor of Biology
Ferris State University
ASC 2019
Big Rapids, MI 49307
231-591-2542

Dr. James Hoerter
Professor of Biology
Ferris State University
ASC 3087
Big Rapids, MI 49307
231-591-2563

Mr. John Johnson
Adjunct Instructor
Biology Department
Ferris State University
Big Rapids, MI 49307
231-591-5849

Scott M. Herron
Associate Professor of Biology, Ferris State University
820 Campus Dr. ASC 2017, Big Rapids, Michigan 49307-2225
Phone 231-591-2087; fax 231-591-2540, herrons@ferris.edu

Education:

2002 **Southern Illinois University,** Carbondale, IL - **Ph.D., Plant Biology**
Honor: Phi Kappa Phi, GPA 4.0
Specialization: Ethnobotany, Plant Taxonomy, and Cultural Anthropology
Dissertation: Ethnobotany of the Anishinaabek Northern Great Lakes Indians
Advisor: Dr. Donald Ugent

1998 **Grand Valley State University,** Allendale, MI - **B.S., Biology & Botany.**
Honor: Cum Laude, GPA: 3.80

Botanical Work Experience

1997 Frederik Meijer Botanical Garden; *Horticulture Intern*. Grand Rapids, Michigan.
1996-97 The GVSU Arboretum; *Arborist Intern*. Office of the Vice President for Finance and Administration, Grand Valley State University.
1996 Motman's Greenhouse; *Horticultural Assistant*. Grand Rapids, Michigan.

Teaching Appointments:

2008-10 ***Visiting Associate Professor*;** University of Michigan Biological Station, Pellston, Michigan. College of Literature, Science and the Arts, University of Michigan
2008- ***Tenured Associate Professor;*** Biological Sciences Department. Ferris State University, Big Rapids, Michigan.
2007- ***Associate Professor;*** Biological Sciences Department. Ferris State University, Big Rapids, Michigan.
2004-07 ***Assistant Professor;*** Biological Sciences Department. Ferris State University, Big Rapids, Michigan.
2004-08 ***Visiting Assistant Professor*;** University of Michigan Biological Station, Pellston, Michigan. College of Literature, Science and the Arts, University of Michigan
2003 ***Lecturer of* Ethnobotany;** University of Michigan Biological Station, Pellston, Michigan. Department of Ecology and Evolutionary Biology, University of Michigan
2002-04 ***Adjunct Assistant Professor;*** Biological Sciences Department. Ferris State University, Big Rapids, Michigan.
2001-02 ***Part-time Biology Instructor***; Life Science Department. John A. Logan College, Carterville, Illinois.
2001 ***Co-coordinator;*** Economic Botany Seminar Series with Dr. Don Ugent. Department of Plant Biology. Southern Illinois University, Carbondale, Illinois.
1997-98 ***Supplemental Instructor, Peer Mentor;*** Minority Science Education Center. Office of Minority Affairs. Grand Valley State University, Allendale, Michigan.

Courses Taught:

2009-10:
Integrated Ecology (INBI 303): 4 credits- 1 lecture and 1 lab section (Grand Rapids)
Basic Botany (Biology 113): 3 credits- 1 lecture and 1 lab section
Microbial Ecology (Biology 218): 3 credits- 1 lecture and 1 lab section
Plant Propagation & Horticulture Seminar (Horticulture 152 & 250): 2+1 credits- 1 lecture and 1 lab section, 1 seminar section
Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)

2008-09:
Integrated Ecology (INBI 303): 4 credits- 1 lecture and 1 lab section
Basic Botany (Biology 113): 3 credits- 1 lecture and 1 lab sections

Microbial Ecology (Biology 218): 3 credits- 1 lecture and 1 lab section
Plant Propagation & Horticulture Seminar (Horticulture 152 & 250): 2+1 credits- 1 lecture and 1 lab section, 1 seminar section
Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)

2007-08:

Integrated Ecology (INBI 303): 4 credits- 1 lecture and 1 lab section
Basic Botany (Biology 113): 3 credits- 1 lecture and 1 lab sections
Microbial Ecology (Biology 218): 3 credits- 1 lecture and 1 lab section
Plant Propagation & Horticulture Seminar (Horticulture 152 & 250): 2+1 credits- 1 lecture and 1 lab section, 1 seminar section
Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)

2006-07:

Integrated Ecology (INBI 303): 4 credits- 1 lecture and 1 lab section
Basic Botany (Biology 113): 3 credits- 1 lecture and 2 lab sections
Microbial Ecology (Biology 218): 3 credits- 1 lecture and 2 lab sections
Plant Propagation & Horticulture Seminar (Horticulture 152 & 250): 2+1 credits- 1 lecture and 1 lab section, 1 seminar section
Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)

2005-06:

Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 3 lab sections
Basic Botany (Biology 113): 3 credits- 1 lecture 2 lab sections
Microbial Ecology (Biology 218): 3 credits- 1 lecture and 2 lab sections
Plant Propagation (Horticulture 152): 2 credits-1 lecture and 1 lab section
Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)

2004-05:

Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 3 lab sections
Basic Botany (Biology 113): 3 credits- 1 lecture 2 lab sections
Microbial Ecology (Biology 218): 3 credits- 1 lecture and 2 lab sections
Plant Propagation (Horticulture 152): 2 credits-1 lecture and 1 lab section
Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)

2003-04:

Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 3 lab sections
Microbial Ecology (Biology 218): 3 credits- 1 lecture and 2 lab sections
Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 2 lab sections
Ethnobotany (EEB 455): 5 credits- Lecture/Lab/Field Course (UMBS Spring Term)

2002-03:

Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 3 lab sections
Majors Biology (Biology 121): 4 credits- 1 lab section
Non-Majors Biology (Biology 103): 4 credits- 1 lecture and 2 lab sections
Microbial Ecology (Biology 218): 3 credits- 1 lecture and 1 lab section
Ethnobotany (EEB 455): 5 credits- Lecturer/TA (UMBS Spring Term)

2001-02:

Non-Majors Biology (Biology 100): 3 credit hours- 1 section lecture and lab
Human Anatomy and Physiology (Biology 106): 4 credit hours- 1 section lecture and lab
Non-Majors Biology (Biology 100): 3 credit hours- 2 lecture and 2 lab sections

Grants

2010 Student Research Grant with Lauren Mitten and Joshua Byers. FSU College of Arts and Sciences- $1000 (Pending)

2010 Lower Michigan Wild Rice Camp (workshop) September 2010. Ferris Foundation Exceptional Merit Grant, $5860

2010 Travel and Presentations to Ecological Society of America's Annual Meeting, Pittsburgh, Pennsylvania, August 1-6, 2010. Timme Travel Grant, $850

2009 Lower Michigan Wild Rice Camp (workshop) September 10-13. Great Lakes Regional Water Program. Co-PI with Patrick Robinson, University of Wisconsin-Extension, Green Bay, and Great Lakes Regional Water Progam, $6000

2009	Faculty and Staff Diversity Mini-Grant (lead investigator), Raising Expectations with Handicapped Accessible Raised Bed Gardens, $4000
2009	Biology Department Travel Grant-Michigan Academy Annual Meeting, Presentation by Dr. Herron's research team of undergraduates: Crystal Phillips, Chris LaVelle, Michael Reynolds, and Lauren Mitten, $300
2008	Student Research Grant-Crystal Phillips, Chris LaVelle, Michael Reynolds, FSU College of Arts and Sciences- $2000
2007	Great Lakes Regional Water Program; Wild Rice Camp (White Earth, MN) Travel Grant, University of Wisconsin Extension, $750
2007	Political Engagement Project Resource Grant (Integrated Ecology course), FSU- $242
2006	Political Engagement Project Resource Grant (Integrated Ecology course), FSU- $250
2006	Special Opportunity Grant for Wild Rice Coalition & Conference, Great Lakes Aquatic Habitat Network & Fund, Tipp of the Mitt Watershed Council, Petoskey, Michigan- $400
2005-06	Environmental Leadership Program Activity Fund award recipient-$6000
2006	Professional Development Grant, FSU Academic Senate; Wild Rice Restoration and Preservation: Professional Development in Ecology-$1213
2006	Student Research Grant-Elizabeth Mansfield, FSU College of Arts and Sciences- $500
2005	Student Research Grant-Melissa Holman, FSU College of Arts and Sciences- $500
2002	Travel Grant from Dean of Arts and Science to present a paper at Great Lakes United Indigenous Peoples Hub Workshop on Indigenous Organizational Development sponsored by the Great Lakes Aquatic Habitat Network and Fund, Sugar Island Cultural Camp, Sault Ste. Marie, MI.-$500
2000	James E. Ozment Achievement Award in Natural History. Southern Illinois University Foundation and the College of Science.-$600
1998	Michigan Botanical Club Annual Spring Foray Award. White Pine Chapter Foundation. -$1000
1997	Salski Award Grant. Department of Biology, Grand Valley State University.-$500

Research Fellowships & Professional Awards:

2010	Cambridge Who's Who VIP Member, Executive Professionals http://www.cambridgewhoswho.com/Members/MI/Scott-Herron-983839.html
2008-10	Carnegie/AASCU Scholar of Political Engagement
2006-	Golden Key International Honor Society Honorary Member
2005-	Environmental Leadership Program, senior fellow
2004-05	Environmental Leadership Program, national fellow
2005-06	Featured Teacher in 2005-06 Edition of Marquis Who's Who in Science and Engineering
2001-02	Dissertation Research Assistantship (DRA) Fellowship. *Graduate School*, Southern Illinois University-Carbondale.
1998-01	Illinois Minority Graduate Incentive Program (IMGIP) Fellowship. *State of Illinois*, Southern Illinois University-Carbondale.
1998	Thomas M. Seykora Award for Outstanding Volunteer Contribution. *Grand Valley State University*
1996-97	Outstanding Biology Student Awards. *Grand Valley State University.*

Professional Development Activities:

2009	Ethnobiology & Wild Rice Presentation. Protectors of the Earth Youth Camp. Seventh Generation Cultural Center. Saginaw Chippewa Indian Tribe of Mt. Pleasant. July 29th.
2008	Political Engagement Project Meeting (national report to PEP and NY Times) at New York Times Headquarters, Manhattan, NY, January 25, 2008. Ferris report to PEP, NYT given with co-authors: Anthony Baker and Connie Meinholdt
2006-10	*Native Wild Rice Coalition, Co-Chair*; Regional coalition of governmental agencies, universities, tribal community colleges, graduate student researchers, tribal community members, non-profits, tribal governments and community groups funded through grants and administrated through the University of Wisconsin Extension through the Great Lakes Regional Water Program. Co-Chair, Patrick Robinson, UWEX-Green Bay.

2007	Traditional Wild Rice Camp, August 30-September 2. White Earth, Minnesota. Hosted by the Sah-kay-tay Indigenous Preservation Society.
2007	*Native Wild Rice Coalition,* Strategic Planning Meeting, March 6; College of Menominee Nation, Keshena, Wisconsin.
2006	Pere Marquette Sea Lamprey Symposium on October 14, 2006 at West Shore Community College.
2006	56th Annual Meeting of the Eastern Region of the International Plant Propagators Society on October 4-7, 2006 at the Amway Grand Plaza Hotel in Grand Rapids, Michigan.
2006	*Wild Rice Conference brochure and website;* Design and development with Patrick Robinson and Rebecca Power-University of Wisconsin Extension; summer 2006. *http://www.uwex.edu/ces/regionalwaterquality/wildrice/index.htm*
2006	*Northern Michigan University Special Topics Course Proposal, Manoomin Niikaanisag: Wild rice and all its relations;* 3/13/06; approved as NAS 298 for 3 credits through the NMU Center for Native American Studies; Instructor Donald Chosa; 9 students enrolled and completed the class held at Wild Rice Conference.
2005	Professional Development Plan revised for the Environmental Leadership Program.
2004	Professional Development Plan developed and peer reviewed for the Environmental Leadership Program.
2003-06	Protectors of the Earth Youth Camp executive committee: Chair of Equipment and Supplies committee (2003-2005); Member of Evaluation Team (2003-2006); Chaperone and Camp Counselor (2003-2004)

Published Papers

2010	Herron, S.M.; Human History (Chapter 1) in *The Changing Environment of Northern Michigan: A Century of Science and Nature at the University of Michigan Biological Station;* editors: Knute Naddelhoffer, Alan Hoag & Brian Hazlett. University of Michigan Press.
2009	Robinson, P., Herron, S., Power, R, and D. Zak; *A regional multicultural approach to sustaining wild rice. Journal of Extension*, Vol. 47 (6):1-5. http://www.joe.org/joe/2009december/pdf/JOE_v47_6iw6.pdf
2003	Herron, S.M.; Catnip, *Nepeta cataria,* a morphological comparison of mutant and wild type specimens to gain an ethnobotanical perspective. *Economic Botany*, Vol. 57(1): 135-142.
2003	Herron, S.M.; American Indian use of the natural resources in the Muskegon River watershed (Pre-contact). *River View: News from the Muskegon River Watershed Assembly*. Vol. 1(8): 3.
2000	Herron, S.M.; Ethnobotanical Crisis as the US Government Attempts to Utilize Biowarfare to Unwisely Combat the War on Drugs. *Ethnobotanical Leaflets*, Spring-Summer 2000, www.siu.edu/~ebl/scott.htm.
1999	Herron, S.M.; The Natural History of Mahogany. *Ethnobotanical Leaflets*, Spring 2000, www.siu.edu/~ebl/leaflets/mahogany.htm.
1998	Herron, S.M.; Medicinal Plants Usage of the Anishinaabek Great Lakes Indians. Ningiziwaush Press, Detroit, Michigan.
1996	Herron, S.M. and M. L. Hulls; *Within the Depths of Peyote.* A video produced, edited, filmed, and narrated by Scott Herron and Michelle Hulls. SHMH Productions, Allendale, Michigan.

Published Abstracts

2010	Dr. Scott Herron, Josh Byers, Brenna Chencinski, Andrea Lodholtz, Lauren Mitten, Nicole Patrosso, Michael Reynolds, and Sarah Thompson. *The Importance of Wild Rice Camps for the Continued Research and Harvesting of Wild Rice in Lower Michigan.* Michigan Academician: Papers of the Michigan Academy of Science, Arts and Letters. Volume XXXX (4). http://webcache.googleusercontent.com/search?q=cache:usNE3pJXT_cJ:themichiganacademy.org/Content/Documents/Document.ashx%3FDocId%3D115280

2009 Phillips, C. and S. Herron. COS 97-10: *Wild Rice population resiliency in response to fungal smut pathogen.* 94th Ecological Society of America Annual Meeting. http://esameetings.allenpress.com/2009/Paper16743.html

2009 Mitten, L. and S. Herron. COS 94-3: *Viability and germination studies to elucidate the dynamics of wild rice restoration from northwestern to southeastern populations in the Great Lakes region.* 94th Ecological Society of America Annual Meeting. http://esameetings.allenpress.com/2009/Paper18425.html

2009 Mitten, D. and S. Herron. *COS 5-4 The politics of green: Civically engaging undergraduate students.* 94th Ecological Society of America Annual Meeting. http://esameetings.allenpress.com/2009/Paper18442.html

2009 Herron, S. M., P. Robinson, and R. LaBine. *COS 115-2 Incorporating traditional ecological knowledge into wild rice research, education and management efforts in the Great Lakes region.* 94th Ecological Society of America Annual Meeting. http://esameetings.allenpress.com/2009/Paper17575.html

2009 Crystal Phillips, Michael Reynolds, Chris LaVelle, Lauren Mitten, and Scott M. Herron. *Wild Rice Viability and Germination Testing to Compare Southern and Northern Ecotypes of Northern Wild Rice, Zizania aquatica Var. angustifolia, for Restoration Potential in Michigan.* Michigan Academician: Papers of the Michigan Academy of Science, Arts and Letters. Volume XXXIX (4):263-264. http://www.thefreelibrary.com/Botany+and+plant+ecology.-a0219833051

2008 Herron, S. M. *The use of ecological Detrended Correspondence Analysis (DCA) in evaluating the dissemination of ethnobotanical knowledge within the Anishinaabek Great Lakes Indian culture;* Michigan Academician, Volume XXXVII(4). *A Published Abstract* from presentation at Michigan Academy of Science, Arts, and Letters Annual Meeting; *Botany and Plant Ecology Section,* at Oakland University on March 3, 2006

2008 Herron, S., P. Robinson, E. Hoagland, W. Paulson, P.David, D. M. Zak, and R. Power. PS 87-151: *Native Wild Rice Coalition's cultural and ecological restoration.* 93rd Ecological Society of America Annual Meeting. http://eco.confex.com/eco/208/techprogram/P14632.HTM

2008 Herron, Scott. *Coalition Building as a Model to Address Regional Environmental Issues in Restoration Ecology: A Case Study to Sustain Wild Rice.* Michigan Academician: Papers of the Michigan Academy of Science, Arts and Letters. Volume XXXVIII (4):16. http://goliath.ecnext.com/coms2/gi_0199-10351687/Botany-plant-ecology.html

University Service Load:

2009-11 Biology Curriculum Committee
2008-09 American Democracy Project (ADP)-Political Engagement Project (PEP) Council
2008-11 College of Arts and Sciences Diversity Committee
2007-10 Senate Diversity Committee, Chair (2007-2009)
2007-08 Equity Conference Planning Committee, hosted by FSU March 30-April 2, 2008.
2004-10 Biology Education Coordinator and Advisor
2007-09 Diversity Planning Committee, University-wide committee chaired by Dr. David Pilgrim.
2006-07 University Chief Diversity Officer hiring committee (hired David Pilgrim).
2005-10 College of Arts and Sciences' Education Program Coordinators (Secondary Education) committee
2005-06 Diversity Incidents Team, FSU campus wide committee advocating justice, equality, and equity within the campus community 2005-2006
2005 Program Review Panel Member (Elementary Education BS of Science Degree)
2005 Program Review Panel Member (Ornamental Horticulture Technology AAS Degree)
2004-05 College of Arts and Sciences' Integrated Science Teaching Minor (Elementary Education) committee
2004 Biology Department's Lab Prep Supervisor hiring committee (hired Andrea Bruziac)
2004-05 Biology Department's Vertebrate Biologist hiring committee (hired Dr. Joseph Lipar)
2004-05 Biology Department's Cell and Molecular Biology hiring committee (hired Dr. Brad Isler)
2004-05 Biology Department's General Biology hiring committee (hired Dr. Paul Klatt)
2004-07 Biology Department Planning Committee

2003, 06	Biology Department Microscope Committee
2003-06	Student Affairs/Academic Affairs Divisions Hispanic (Minority) Recruitment Initiative
2002-04	Office of Minority Student Affairs - American Indian consultant and advisor,
2002-06	Rankin Center Art Gallery – American Indian art acquisition project
2002-05	American Indian and ethnic minority recruiter; Admissions and Records under Assistant Director Cathryn Claerhout and Vice President Dan Burcham.

Current Professional and Academic Association Memberships:

2005-10	Ecological Society of America; *Traditional Ecological Knowledge section member; Plant Population Ecology Section member; Education Section member; Environmental Justice section member; Microbial Ecology Section member*
2004-10	Michigan Academy of Science, Arts, and Letters; *Botany and Plant Ecology Section Vice-Chair (2005-07); Co-Chair (2007-09).*
2000-10	Society of Ethnobiology.
1998-10	Society for Economic Botany; member- *Student Advisory Committee member (1999-2002)*
2003-05	American Association of Plant Taxonomists
2001-03	Phi Kappa Phi Honor Society
2001-03	Society of Ecological Anthropology
1998-02	WDBX 91.1 FM-Carbondale, IL – "Native Voices"- American Indian Radio Show; *Co-host and co-producer.*
1998-00	American Indian Association; *Vice President.* Southern Illinois University.
1994-98	Native American Student Association; *President, Senior Advisory Council Member, Director of Subcommittees.* Grand Valley State University.
1995-98	Minority Student Organization Council; *Board Member.* Grand Valley State University.

Professional Presentations:

2010	*Translating Wetland Field Experiences into Classrooms at* Get Wet and Wild: Aquatic Academy for Teachers. Muskegon River Watershed Assembly, Camp Newaygo http://www.mrwa.org/repository/pdf/brochure-2010.pdf (workshop leader).
2010	Dr. Scott Herron, Josh Byers, Brenna Chencinski, Andrea Lodholtz, Lauren Mitten, Nicole Patrosso, Michael Reynolds, and Sarah Thompson 2010. *The Importance of Wild Rice Camps for the Continued Research and Harvesting of Wild Rice in Lower Michigan.* Michigan Academy of Science, Arts and Letters: Botany and Plant Ecology Section, Calvin College (oral).
2009	Phillips, C. and S. Herron. COS 97-10: *Wild Rice population resiliency in response to fungal smut pathogen.* 94th Ecological Society of America Annual Meeting. (oral).
2009	Mitten, L. and S. Herron. COS 94-3: *Viability and germination studies to elucidate the dynamics of wild rice restoration from northwestern to southeastern populations in the Great Lakes region.* 94th Ecological Society of America Annual Meeting. (oral).
2009	Mitten, D. and S. Herron. *COS 5-4 The politics of green: Civically engaging undergraduate students.* 94th Ecological Society of America Annual Meeting. (oral).
2009	Herron, S. M., P. Robinson, and R. LaBine. *COS 115-2 Incorporating traditional ecological knowledge into wild rice research, education and management efforts in the Great Lakes region.* 94th Ecological Society of America Annual Meeting. (oral).
2009	A hands-on learning approach-wild rice conservation, harvesting, restoration, processing, and environmental analyses research at an undergraduate teaching university in Michigan. Scott Herron, Andrea Lodholtz, Crystal Phillips, Michael Reynolds, Chris LaVelle, and Patrick Robinson. National Water Conference, St. Louis, MO (poster).
2009	Multistate Knowledge of Wild Rice Cultural and Ecological Knowledge. Scott Herron, and Patrick Robinson. National Water Conference, St. Louis, MO (oral).
2009	Wild Rice Restoration and Preservation: Michigan's Aquatic Gardens. Michigan Wildflower Confereence, Kellog Center, East Lansing. (invited oral plenary).
2009	Wild rice viability and germination testing to compare southern and northern ecotypes of northern wild rice, *Zizania aquatica* var. *angustifolia*, for restoration potential in

Michigan. Scott Herron, Crystal Phillips, Michael Reynolds, Chris LaVelle, and Lauren Mitten. Michigan Academy of Science, Arts, and Letters, Wayne State University (oral)

2008 *Native Wild Rice Coalition's cultural and ecological restoration.* Scott Herron (presenter), Patrick Robinson, Earl Hoagland, William Paulson, Peter David, Deborah Zak, and Rebecca Power. Ecological Society of America Annual Conference, Milwaukee, Wisconsin, August 2008. (poster).

2008 Wild Rice Roundtable Discussion. Ecological Society of America Annual Conference, Milwaukee, Wisconsin, August 2008.

2008 *The role of traditional drums in the bridging of traditional ecological knowledge from the past to the future.* Scott Herron, Society for Ethnobiology Annual Conference, Fayetteville, AR, April 17, 2008. (oral).

2008 *Wild rice ecosystems: The place to be for bird watching and food harvesting!* Scott Herron, Michigan Botanical Club-White Pine Chapter, Grand Valley State University, March 22, 2008. (oral).

2007 *Sustaining wild rice through multicultural partnerships.* Patrick Robinson, Rebecca Power, and Scott Herron, Outreach Scholarship Conference, University of Wisconsin-Madison, October 8, 2007. (oral).

2007 *Wild Rice Coalition building in the Great Lakes.* Scott Herron and Patrick Robinson, Society of Ethnobiology 30th Annual Conference, University of California-Berkeley, CA, March 28-31, 2007. (oral).

2007 *Coalition building as a model to address regional environmental issues in restoration ecology: A case study to sustain wild rice.* Scott Herron and Patrick Robinson, Michigan Academy of Science, Arts, and Letters, *Botany and Plant Ecology Section*, at Ferris State University on March 9, 2007. (oral).

2007 *What is Ethnobotany? Career prospects and educational pathways (workshop)*; Protectors of the Earth Youth Camp; Bay Mills Community College on July 31, 2007.

2006 *The Journey Ahead: Building a Regional Network to Sustain Wild Rice/Manoomin (keynote address);* Wild Rice Restoration and Preservation Conference; Lac Vieux Desert Resort and Conference Center in Watersmeet, Michigan, August 7-10, 2006.

2006 *Native Harvested Plants: Ethnobotany of the Lake Superior Anishinaabek (workshop)*; Protectors of the Earth Youth Camp; Bay Mills Community College on August 1, 2006.

2006 *Wild Rice Restoration and Coalition Building on Hamlin Lake & the Ludington Area*; Hamlin Township Hall in Ludington on June 22, 2006.

2006 *Wild Rice's status in Michigan & Houghton Lake: What is happening in the restoration and coalition movements;* Houghton Lake Improvement Board meeting on April 25, 2006

2006 *Wild Rice Restoration and Coalition Building on the Muskegon River Watershed*; Grand Valley State University Annis Water Institute in Muskegon on April 10, 2006.

2006 *The use of ecological Detrended Correspondence Analysis (DCA) in evaluating the dissemination of ethnobotanical knowledge within the Anishinaabek Great Lakes Indian culture;* Michigan Academy of Science, Arts, and Letters Annual Meeting; *Botany and Plant Ecology Section,* at Oakland University on March 3, 2006. (oral).

2005 *The role of forensic insects in deposition of pollen at a death scene.* Rebecca J Kirby, Anita L. Guedea, Phillip L. Watson, Roger E. Mitchell and Scott M. Herron. American Academy of Forensic Sciences meeting in New Orleans in February 2005.

2005 *Wild Rice Coalition Building;* Ziibiwing Museum of the Saginaw Chippewa Indian Tribe in Mt. Pleasant, MI on December 1, 2005 (oral).

2004 *Ethnobotany of the Lake Superior Anishinaabek (workshop)*; Protectors of the Earth Youth Camp; Sugar Island Culture Camp on Sugar Island, near Sault Ste. Marie, August 1-6, 2004.

2004 *Wild Rice Restoration & Population Ecology on the Muskegon River Watershed;* Scott Herron and Gale Nobes, Michigan Academy of Science, Arts, and Letters Annual Meeting; *Botany and Plant Ecology Section* at Grand Valley State University on March 5-6, 2004. (oral).

2003 *Outdoor Life & Survival Skills of the Great Lakes Indians (workshop with Bucko Teeple)*; Protectors of the Earth Youth Camp; Clear Lake Camp near Shingleton, Michigan, August 8-16, 2003.

Bradley Jacob Isler

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Professional Experience

***Associate Professor of Biology and Biotechnology Program Coordinator,* Ferris State University, Big Rapids, Michigan, 2005 - present**

- Responsible for the instruction of several biology and biotechnology courses
- As coordinator of the biotechnology program, responsible for recruiting, advising, and supervision of curricular activities
- Current research project: A study of the genetic differences between normally sighted and anophthalmic rats

***Research Geneticist,* U.S. Meat Animal Research Center, Clay Center, Nebraska, 2003 - 2005**

- Postdoctoral position
- Area of focus: Quantitative and molecular genetics of sheep
- Primary research project: Investigation of genomic regions associated with carcass and meat quality traits in sheep
- The U.S. Meat Animal Research Center is a unit of the United States Department of Agriculture and the Agricultural Research Service

Education

***The Ohio State University*, Columbus, Ohio, 1997 - 2003**

- Ph.D. in Animal Genetics, March 2003
- M.S. in Animal Genetics, December 1998
- Area of focus: Quantitative and molecular genetics of swine
- Cumulative GPA: 3.70 / 4.00
- Advisor: Dr. Keith Irvin
- Ph.D. dissertation title: An investigation of the associations between several candidate genes and reproductive traits in swine
- M.S. thesis title: Association between the estrogen receptor gene and reproductive components in swine

***Iowa State University*, Ames, Iowa, 1996 - 1997**

- Attended graduate school
- Major: Molecular, Cellular, and Developmental Biology
- Cumulative GPA: 4.00 / 4.00
- Advisor: Dr. Donald Beitz

***Ohio Northern University*, Ada, Ohio, 1992 - 1996**

- B.S. in Biochemistry, with High Distinction
- Biochemistry degree certified by the American Chemical Society
- Cumulative GPA: 3.80 / 4.00

Teaching Experience

***Associate Professor of Biology,* Ferris State University, August 2005 - present**

- Biology 101 (Genetics: Human Aspects)
  - Course designed for non-science majors
  - Taught fall semesters 2005-09
- Biology 122 (General Biology 2)
  - Second course in the two semester general biology series
  - Taught spring semesters 2005-06, summer semesters 2006-09
- Biology 174 (Introduction to Biotechnology)
  - Course designed to introduce students to the biotechnology program at Ferris State and the biotechnology industry as a whole
  - Newly developed fall 2006
  - Taught fall semester 2006-07
- Biology 375 (Principles of Genetics)
  - Junior-level general genetics course for biology and biotechnology students. Serves a prerequisite for many other courses.
  - Taught spring semester 2008-present
- Biology 491 (Biotechnology Internship)
  - Internship course for biotechnology students.
  - Taught as needed, usually in summer.
  - Redesigned in summer 2009.
- Biology 475/490 (Bioinformatics)
  - Course designed to explore the newly emerging field of bioinformatics, which combines molecular biology and information technology
  - Newly developed spring 2006
  - Taught spring 2006

***Instructor,* The Ohio State University, 2002**

- Animal Sciences 320 (Principles of Genetic Improvement)
  - Course designed to introduce students to the basics of animal breeding and genetics
  - Fully responsible for all aspects of course
  - Taught winter semester 2002

***Teaching Assistant,* The Ohio State University, 1997 - 2001**

- Animal Sciences 320 (Principles of Genetic Improvement)
  - Prepared and taught daily lectures during professor's absence
  - Prepared and graded student examinations and quizzes
  - Managed supplemental student project (cow herd computer simulation)
- Animal Sciences 543 (Swine Production)
  - Assisted students in laboratories
- Animal Sciences 600 (Capstone Current Issues and Writing Course)
  - Assisted students in preparation of group presentations
  - Prepared and graded student examinations
  - Presented a special lecture on biotechnology and the future of animal agriculture

***Teaching Assistant,* Iowa State University, August 1996 - December 1996**

- Biology 201L (General Biology Laboratory)
  - Prepared and taught weekly lectures and laboratory experiments
  - Prepared and graded examinations, quizzes, and reports

Research Experience

***Associate Professor of Biology,* Ferris State University, 2005 - present**

- Investigating the genetic differences between normally sighted and anophthalmic rats
- Four biotechnology students and one high school student have assisted with this project

***Research Geneticist,* U.S. Meat Animal Research Center, 2003 - 2005**

- Investigated the relationship between regions of the sheep genome and economically important traits
- Performed a genome scan for quantitative trait loci that are associated with production and carcass traits in sheep
- Investigated the PRNP locus in sheep, which codes for the prion protein and is related to scrapie, one of the transmissible spongiform encephalopathies

***Research Assistant,* Department of Animal Sciences, The Ohio State University, 1997 - 2003**

- Studied the effect of candidate genes on reproductive tract components in several breeds of swine
  - Study involved the discovery and analysis of novel polymorphisms in a variety of candidate genes: estrogen receptor-α, estrogen receptor-β, paternally expressed 1, paternally expressed 3, H19, prolactin receptor, and retinol binding protein-4
- Studied the genetic and meat quality issues surrounding the Rendement Napole condition in swine

***Research Assistant,* Molecular, Cellular, and Developmental Biology Program, Iowa State University, 1996 - 1997**

- Participated in the molecular, cellular, and developmental biology rotation program
- Studied a variety of topics in molecular and cellular biology, including the role of G-proteins in tumor formation, the porcine PIT-1 gene, and methods to increase the concentration of conjugated linoleic acid in the rumen of dairy animals

University and Community Service

- Biotechnology program coordinator, 2005-present
- Summer registration advisor, 2006-present
- Co-advisor for Delta Nu Alpha (biotechnology student organization), 2006-present
- Biotechnology Summer Academy for high school students
  - Camp director, 2007-09
  - Camp assistant, 2006
- Invited presentations
  - 2007 FSU-Grand Rapids Career Pathways Teachers Academy, summer 2007
  - Honors program "Lunch and Learn" series, fall 2007
  - CARE 102 Career and Education Planning course, fall 2007
- Search committee membership
  - Biology department head, September-November 2006
  - One year developmental biologist, summer 2007
  - Tenure-track developmental biologist, 2007-08 and 2008-09
  - Tenure-track anatomist and physiologist, 2008-09.
  - General biology advisor, summer 2008.
  - One year protein biochemist, summer 2009.
- General committee membership
  - University institutional animal care and use (IACUC), 2006-present
  - Honors program nationally competitive scholarship, 2007-present
  - College of Arts and Sciences standards and policies, 2006- 009
  - College of Arts and Sciences advising excellence, 2007-present
  - College of Arts and Sciences sabbatical leave committee, fall 2009-present
  - Biology department planning, 2007-present
  - Biology department awards committee, 2008-present
- Ferris State faculty representative for the Udall Scholarship
- Recruitment activities.
  - Honors symposium, February 2006.
  - Phone recruitment drive, Spring 2009
- Judge for the local competition of the International Engineering and Science Fair, March 2008 and 2009.

Honors and Awards

- L.E. Kunkle Award, 2003
  - Awarded annually to the outstanding animal sciences graduate student at the Ohio State University
- Charles E. Thorne Memorial Scholarship, 2001
  - Awarded to a single outstanding graduate student selected from all agricultural science graduate students at The Ohio State University
- National Swine Improvement Federation Outstanding Graduate Student Award, 1999
  - Awarded annually to the outstanding swine genetics graduate student in the United States
- Gamma Sigma Delta National Agriculture Honorary, 1999

Grants

- College of Arts and Sciences Dean's grant. A study of the genetic differences between normally sighted and SDF/Fsp-*anop* anophthalmic rats. $4287. 2007-2008.
- Ohio Pork Producers Council. $4,500. Examination of the Relationship between Several Candidate Genes and Reproductive Traits in Swine. 2001-2002

Reviewerships

- *Journal of Animal Science* Editorial Board, 2009- present
- *Human Heredity*, Cummings, Eighth Edition
- *Theriogenology*

Professional Memberships

- American Society of Animal Science, 1997-present

Publications and Presentations

Isler, B.J., B.A. Freking, R.M. Thallman, M.P. Heaton and K.A. Leymaster. 2006. Evaluation of associations between prion haplotypes and growth, carcass, and meat quality traits in a Dorset x Romanov population. Journal of Animal Science. 82: 783-788.

Isler, B.J, B.A. Freking, K.A. Leymaster, and M.A Heaton. 2004. Investigation of the association between prion genotype and economically important traits in sheep. Journal of Animal Science. 83(Suppl. 2): 44 (Abstract).

Isler, B.J, B.A. Freking, and K.A. Leymaster. 2004. 2003-2004 U.S. Meat Animal Research Center annual report to NC-109. Paper presented at the 2004 NC-109 annual sheep research meeting in Duluth, Minnesota.

Isler, B.J., K.M. Irvin, S.M. Neal, S.J. Moeller, and M.E. Davis. 2002. Examination of the relationship between the estrogen receptor gene and reproductive traits in swine. Journal of Animal Science. 80:2334-2339.

Isler, B.J., K.M. Irvin, S.M. Neal, S.J. Moeller, and M.E. Davis. 2002. Examination of the relationship between the paternally expressed gene 3 and reproductive tract components in swine. Proceedings of the 7th World Congress of Genetics Applied to Livestock Production. CD-Rom Communication. N° 08-28.

Isler, B.J., K.M. Irvin, S.M. Neal, S.J. Moeller, and M.E. Davis. 2002. Investigation of the relationship between the estrogen receptor beta gene and reproductive components in swine. Journal of Animal Science. 80(Suppl. 1): 378 (Abstract).

Isler, B.J., K. M. Irvin, M.F. Rothschild, and G.J. Evans. 2001. Examination of the relationship between the prolactin receptor gene and reproductive components in swine. Research and Reviews: Swine 2001, OARDC special circular 185. 83-86.

Isler, B.J., K. M. Irvin, M.F. Rothschild, and G.J. Evans. 2000. Association between the prolactin receptor gene and reproductive components in swine. Poster presented at the 2000 Annual Conference of the National Swine Improvement Federation.

Isler, B.J., K. M. Irvin, M.F. Rothschild, and G.J. Evans. 2000. Association between the prolactin receptor gene and reproductive components in swine. Proceedings of the 27th Conference of the International Society of Animal Genetics. CD-Rom Communication. N° C032. (Abstract).

Isler, B.J., K.M. Irvin, S.M. Neal, S.J. Moeller, M.E. Davis, and D.L. Meeker. 1999. Examination of the relationship between the estrogen receptor gene and reproductive traits in swine. Presentation at the 1999 Annual Conference of the National Swine Improvement Federation.

Isler, B.J., K. M. Irvin, S. M. Neal, S.J. Moeller, M.E. Davis, and D.L Meeker. 1999. The effect of estrogen receptor genotype, breed, and parity on litter traits and reproductive tract traits in swine. Journal of Animal Science. 77(Suppl. 1): 131 (Abstract).

Isler, B.J., K. M. Irvin, S. M. Neal, S.J. Moeller, and M.E. Davis. 1999. Association between the estrogen receptor gene and reproductive components in swine. Journal of Animal Science. 77(Suppl. 1): 32 (Abstract).

Isler, B.J., K. M. Irvin, S. M. Neal, S.J. Moeller, M.E. Davis, and D.L Meeker. 1999. The effect of the estrogen receptor gene on litter traits in swine. Research and Reviews: Poultry and Swine, OARDC special circular 171. 50-53.

Isler, B.J., K. M. Irvin, and S. M. Neal. 1999. Examination of the relationship between the estrogen receptor gene and reproductive tract components in swine. Research and Reviews: Poultry and Swine, OARDC special circular 171. 54-59.

Isler, B.J., K. M. Irvin, and S. M. Neal. 1998. Investigation of the estrogen receptor gene and its association with reproductive tract traits in swine. Research and Reviews: Poultry and Swine, OARDC special circular 164. 49-51.

Isler, B.J., K. M. Irvin, and S. M. Neal. 1998. Investigation of the estrogen receptor gene and its association with reproductive tract traits in swine. Ohio Swine Day 98 Proceedings: Issues For a Healthy Pork Industry.

Irvin, K.M., S. M. Neal, S. J. Moeller, D. L. Meeker, B. J. Isler, R. Emnett, S. Kacirek, and M. Barhorst. 1997-98 Ohio annual report to NC-220. Paper presented at the 1998 NC-220 Annual Meeting in Auburn, Alabama.

PAUL H. KLATT

CURRENT POSITION

Ferris State University. Associate Professor of Biology. 2008-present.

EDUCATION

North Dakota State University. Ph.D. Zoology. 2002. Major Professor: Dr. Nuechterlein.
Eastern Kentucky University. MS. Biological Sciences. 1992. Major Professor: Dr. Ritchison.
University of Illinois at Urbana-Champaign. BS. Psychology. 1988.

TEACHING EXPERIENCE

Ferris State University

- 2008-present, Associate Professor of Biology
- 2005-2008, Assistant Professor of Biology

Course	Description	Enrollment
Biology 121	General Biology I (2005-2008)	100
Biology 122	General Biology II (2006-2009)	100
Biology 347	Environ. Conservation (2006-2008)	40
Biology 348	Animal Behavior (2007-2009)	40
Biology 492	Biology Internship (2007-2009)	4

University of North Dakota

- 2002-2005, Visiting Assistant Professor of Biology

Course	Description	Enrollment
Biology 338	Animal Behavior (2002-2004)	40
Biology 332	General Ecology (2002, 2003)	100
Biology 370	Vertebrate Zoology (2003-2005)	40
Biology 432	Fish and Wildlife Disease (2004)	30

North Dakota State University

- 1997-2002, Graduate Teaching Assistant, General Biology, General Zoology, and Human Anatomy and Physiology.
  - instruction of labs, writing and grading exercises and quizzes

Course	Description	Enrollment
Zoology 360	Animal Behavior (2000)	70
Zoology 170	General Zoology (1997)	250

  - taught full courses as a graduate student

University of Alberta

- 1993-1996, Graduate Teaching Assistant, Introductory Biology, General Zoology, Natural History of the Vertebrates, Mammalogy, and Ornithology.
  - instruction of labs, writing and grading quizzes and lab practical exams

Eastern Kentucky University

- 1988-1991, Graduate Teaching Assistant and 1991-1992, Part-Time Faculty, Introductory Biology.
  - instruction of labs, writing and grading exercises and quizzes

RESEARCH EXPERIENCE

FSU Student Research

Bobby Hathaway Jr. Continue counting, banding, and observing the birds of Pierce Cedar Creek. 2007.

Kari Kammer. Counting, banding, and observing the birds of Pierce Cedar Creek. 2006.

Research Associate with Bridget J.M. Stutchbury, Ph.D., York University. Incubation feeding and extra-pair paternity in Scarlet Tanagers. 2003-2005.

Doctorate Research - Territorial Behavior of Red-necked Grebes. 1993-2002.

Research Associate with Gary Ritchison, Ph.D., Eastern Kentucky University and David Westneat, Ph.D., University of Kentucky. Mate guarding and extra-pair paternity in Northern Cardinals. 1992-1993.

Master's Research - The effect of mate removal on the vocal behavior of male and female Eastern Screech-Owls. 1988-1992.

Undergraduate Research Assistant to Nancy Burley, Ph.D. and Lowell Getz, Ph.D., Dept. of Ecology, Ethology, and Evolution, University of Illinois at Urbana-Champaign. 1986-1988.

FSU SERVICE

- College of Arts and Sciences, Promotion Committee (2008-present).
- Developmental Biologist Search Committee (2007-present).
- Anatomy and Physiology Search Committee (2008-present).
- Academic Senate (2006-present).
    - Ad Hoc Emeriti sub committee (2006-present).
- Registered Student Organization Advisor to Ferris Recyclers (2006-present).
- Registered Student Organization Advisor to Table Tennis Club (2008-present).
- Ferris Foundation Grants and Gifts Committee (2006-present).
- Faculty Research Committee (2008-present).
- Faculty Development Committee Chair, Biological Sciences (2006-present).
- Biology, Environmental Biology Concentration Head (2006-present).
- Biology Department Head Search Committee (2005-2006).

ORGANIZATIONS AND HONORS

Pierce Cedar Creek Institute for Environmental Education

- Advisory Board and Research Review Committee (2006-present).

Association of Field Ornithology (2006).

Waterbird Society (2005).

American Ornithologist's Union (2003).

NDSU Wildlife Graduate Student of the Year (2000).

Dr. Harvey K. Nelson Award - excellence in aquatic biology, NDSU Zoology (1999).

NDSU Zoology Graduate Student Representative to the Faculty (1999-2000).

Raptor Research Foundation (1993).

Cooper Ornithological Society - student membership award (1991).

Phi Sigma National Biological Honor Society (1990).

Animal Behavior Society (1988).

GRANTS

Pierce Cedar Creek Institute, Hastings, MI. Continue counting, banding, and observing the birds of Pierce Cedar Creek. 2007. $6,000.

Pierce Cedar Creek Institute, Hastings, MI. Counting, banding, and observing the birds of Pierce Cedar Creek. 2006. $6,000.

Animal Behavior Society. The dispersion of Red-necked Grebes breeding in territories and colonies. 1997. $300.

Canadian Circumpolar Institute, Edmonton, AB. Territory-size regulation in Red-necked Grebes. 1994. $1,500.

PRESENTED PAPERS

2004 Annual meeting of the Cooper Ornithological Society - Female Scarlet Tanagers called when their mates were temporarily removed during incubation. Paul H. Klatt, University of North Dakota and Bridget J.M. Stutchbury, York University.

2003 Annual meeting of the American Ornithologists Union - Incubation feeding by male Scarlet Tanagers: a removal experiment (poster presentation). Paul H. Klatt, University of North Dakota and Bridget J.M. Stutchbury, York University.

2001 Annual meeting of The Animal Behavior Society - From colonial to solitary: territorial behavior and nesting dispersion in Red-necked grebes. Paul H. Klatt, North Dakota State University. W.C. Allee Student Award Session.

1996 Annual meeting of the Association of Field Ornithologists - Genetic evidence that Eastern Screech-Owls do not engage in extra-pair copulations (poster presentation). Sunni Lawless and Gary Ritchison, Eastern Kentucky University, Paul H. Klatt, University of Alberta, and David F. Westneat, University of Kentucky.

1993 Annual meeting of The Raptor Research Foundation - Effect of mate removal on the vocal behavior and movement patterns of Eastern Screech-Owls. Paul H. Klatt and Gary Ritchison, Eastern Kentucky University.

1992 Annual meeting of The American Ornithologists Union - Duetting behavior of male and female Eastern Screech-Owls. Paul H. Klatt and Gary Ritchison, Eastern Kentucky University.

1992 Annual meeting of The Animal Behavior Society - Effect of mate removal on the singing behavior of male and female Eastern Screech-Owls. Paul H. Klatt and Gary Ritchison, Eastern Kentucky University.

1991 Fall Meeting of The Kentucky Ornithological Society - Effect of mate removal on the singing behavior of male and female Eastern Screech-Owls. Paul H. Klatt and Gary Ritchison, Eastern Kentucky University.

1990 Meeting for The Kentucky Academy of Sciences - Activity levels and the natal dispersal of Eastern Screech-Owls. Gary Ritchison and Paul H. Klatt, Eastern Kentucky University, and James R. Belthoff, Clemson University.

1990 Midwest Regional Animal Behavior Conference - Activity levels and the dispersal of juvenile Eastern Screech-Owls. Gary Ritchison and Paul H. Klatt, Eastern Kentucky University, and James R. Belthoff, Clemson University.

PUBLICATIONS

1) **Klatt, Paul H.**, Bridget J.M. Stutchbury, and Melissa Evans. 2008. Incubation feeding by male Scarlet Tanagers: a mate removal experiment. Journal of Field Ornithology 79(1):1-10.

2) **Klatt, Paul H**. and Cynthia A. Paszkowski. 2005. Intruder pressure explains more of the variation in territory size than fish abundance for Red-necked Grebes (*Podiceps grisegena*) breeding on small boreal lakes. Ornis Fennica 82:129-136.

3) Paszkowski, Cynthia A., Beverly A. Gingras, Kayedon Wilcox, **Paul H. Klatt**, and William M. Tonn. 2004. Stable isotope analysis of trophic relations of the Red-necked Grebe on lakes in the western boreal forest. Condor 106:638-651.

4) **Klatt, Paul H.**, Gary L. Nuechterlein, and Deborah Buitron. 2004. Frequency and distribution of behaviour of Red-necked Grebes breeding in a colony and in classic territories. Behaviour 141:263-277.

5) **Klatt, Paul H**. 2003. Territorial behavior and nesting dispersion in Red-necked Grebes. Waterbirds 26(1):94-99.

6) Lawless, Sunni, Gary Ritchison, **Paul H. Klatt**, and David F. Westneat. 1997. The mating strategies of Eastern Screech-Owls: a genetic analysis. Condor 99:213-217.

7) Ritchison, Gary, **Paul H. Klatt**, and David F. Westneat. 1994. Mate guarding and extra-pair paternity in Northern Cardinals. Condor 96:1055-1063.

8) **Klatt, Paul H**. and Gary Ritchison. 1994. The effect of mate removal on the vocal behavior and movement patterns of male and female Eastern Screech-Owls. Condor 96:485-493.

9) **Klatt, Paul H**. and Gary Ritchison. 1993. Duetting behavior of Eastern Screech-Owls. Wilson Bull. 105:483-489.

REFERENCES

Karen Strasser, Ph.D., Biology Department Head, Associate Professor of Biology, Ferris State University, Big Rapids, Michigan 49307. 231-591-2543.

Phillip Watson, Ph.D., Candidate Tenure Committee Chair, Professor of Biology, Ferris State University, Big Rapids, Michigan 49307. 231-591-2558.

Michelle Skedgell, Executive Director, Pierce Cedar Creek Institute, Hastings, Michigan 49058. 269-721-4770.

Bridget J.M. Stutchbury, Ph.D., Research Associate, Professor of Biology, York University, Toronto, Ontario M3J 1P3. 416-736-2100.

CURRICULUM VITAE

ROGER E. MITCHELL II

Department of Biological Sciences
Ferris State University
820 Campus Dr.
Big Rapids MI 49307-2225
Phone: (616)-591-5879
E. Mail: mitchelr@ferris.edu

CAREER GOAL

To teach biology in a college or university setting, with botanical research as a secondary goal.

EDUCATION

B.S., Molecular Biology, 1984, University of Wisconsin (Madison).

- Only 2 classes short of a chemistry major.

Ph.D., Genetics, University of Minnesota (Twin Cities), 1992.

- Thesis advisor, Dr. Irwin Rubenstein. Informal advisor, Dr. David Somers.
- Thesis, "Expression of Zein Associated Protein Genes" in the developing endosperm of *Zea mays* L. (corn).
- Applied a wide range of molecular and tissue culture research techniques to plant systems.
- Classroom emphases: genetics, plant breeding, applied statistics.
- Corn breeding.

POSTDOCTORAL RESEARCH

1993, Louisiana State University, Department of Plant Pathology and Crop Physiology.

- Principal investigator, Dr. Norimoto Murai.
- Gene expression in common bean (*Phaseolus vulgaris* L.).

TEACHING EXPERIENCE

Georgia Southern University in Statesboro, Georgia, Temporary, full-time assistant professor of biology, Winter and Spring quarters, 1994. Courses taught:

- Bio. 151 lecture: Introductory biology for non-majors. Topics: biology as science, survey, ecology, genetics, molecular genetics.
- Bio. 152 lecture: Introductory biology for non-majors. Topics: evolution, biochemistry, plant biology, vertebrate anatomy and physiology.
- Bio. 370 lab: Cell biology lab for mid-level biology majors. Taught: microscopy, cell anatomy, enzymology.

CURRICULUM VITAE

Ferris State University in Big Rapids, Michigan, Temporary, full-time assistant professor of biology, 1994-95 and 95-96 terms. Tenure-track assistant professor of biology, Fall 1996, associate professor, fall 1999 to present, tenured, Fall 2001, Courses taught:

- Biol. 113, lecture and lab: Botany for horticulture majors. Topics: taxonomy, anatomy, physiology, biochemistry
- Biol. 121, lecture and lab: Introductory biology for biology majors. Topics: genetics, evolution, survey, ecology, plant biology.
- Biol. 122, lecture and lab: Introductory biology for biology majors. Topics: zoology, vertebrate anatomy and physiology, biochemistry, molecular genetics.
- Biol. 207 lab only: Forensic Biology for the criminal justice and the forensic biology programs. In Fall '04, I took over the teaching of the DNA-related labs in this course. Dr. Philip Watson teaches the lecture an the remainder of the labs.
- Biol. 353, lecture and lab: Plant physiology for biology majors. Topics: anatomy, water relations, biochemistry, photosynthesis, cellular respiration, growth and hormones.
- Biol. 407, lecture and lab: Forensic DNA lab for forensic biology majors (a track within the B.S. in Biology). This class was new and began in Winter '05. It teaches the theory and methods used by the modern forensic community to solve crimes using DNA evidence.
- Biol. 460 lecture: Senior seminar for biology majors. Students prepare posters and monographs that review a current topic in biology. Includes computer instruction.
- Biol. 471 lab: Recombinant DNA lab for biotechnology majors. Teaches modern methods including cloning, bacterial transformation, DNA purification, Southern hybridization, sequencing, PCR. Includes computer instruction.

RELATED EXPERIENCE

Teaching:

- Teaching assistant, University of Minnesota.
- Three years teaching research methods to undergraduates in graduate lab.
- Attended peer review of teaching workshop, winter '96.
- Attended the Research Link 2000 workshop for biology research, August '00. at Ferris State University in August 2000.

Computers:

- Proficient in wide range of computer word-processing, statistics, graphics, taxonomy, and presentation applications.
- Studied three computer programming languages.

- Set up or upgraded several personal computers.
- Sold computers briefly.
- Teach Microsoft Word, Excel, and PowerPoint, as well as Adobe PhotoShop in two of my classes (BIOL. 353 and BIOL. 471), Fall '94 through present.

Communication:

- Competitive forensics and debate in high school.
- High school debate judge while in college.

UNIVERSITY SERVICE

- Committee service: terms are academic years (Fall and the following Winter/Spring semester), present is the '09 - '10 academic year:
  - Course:
    - Introductory lab revision committee ('94 -' 95 and '96 - '97 through Fall '02), occasional meetings, replaced by:
    - Introductory lab preparation and coordination committee (Winter '03 though present), weekly meetings. Co-chair, then chair, Fall '04.
    - Introductory biology textbook selection committee (Winter '95 and winter '04).
  - Program:
    - Biotechnology program coordination committees ('94 - '95 through present).
    - Biotechnology program review committee ('97 - '98 through present).
    - Forensic Biology program coordination committee ('03 – '04 through present)
  - Department:
    - Department planning committee ('96 - 97 through '99 - '00 and '02 - '03 through '07 - '08), chair, last three terms.
    - Department curriculum committee ('98 - '99 through '01 - '02), chair, last two terms.
    - Department professional development committee ('96 - '97, '99-'00, and '00 - '01, chair, last term).
    - Four search committees, two for 9-month positions, one for a single tenure-track position, and one for four tenure-track positions (three filled)).
    - Department tenure committee, chair ('03 – '04 through present, chair).
    - Candidate tenure committee, for Dr. Scott Herron ('03 – '04 through '07 - '08), Dr. Bradley Isler ('05 – '06 through present),

Dr Joseph Lipar ('05 – '06 through present, chair) and (Dr. Changqi Zhu ('09 - '10 through present, chair).

- Interdepartmental:
  - Forensic science track in criminal justice development committee ('96 - '97).
- College:
  - Sabbatical leave committee ('01 - '02 through '06 - '07), chair, five terms ('02 - '03 through '06 - '07).
  - Standards and policies ('03 - '04).
- University:
  - University scientific understanding committee ('00 - '01 through '03 - '04), chair last term.
  - All university sabbatical leave committee ('04 - '05 and '05 – '06), chair, first term.

- Coordinator of introductory biology (BIOL. 121 and 122) labs. This position involves chairing the introductory biology lab committee, editing and writing new material for the lab manual, training new faculty in the labs, coordinating textbook selection, and coordinating and developing assessment for the courses.
- Helped plan, develop and teach first biotechnology workshop for high school students and teachers (Winter '95).
- Prepared poster for, and represented biotechnology program at, Autumn Adventure, a high school recruitment event (Fall '94 through its discontinuation after Fall '01).
- Supervised two biotechnology student interns in the summer of '97, and again in the summer of '98. Shared supervision of a fifth student in the fall of '98. Supervised two more biotechnology student interns in the summer of '99. Shared supervision of an eighth student Summer '02 through Winter '03.
- Supervised undergraduate student independent study, Winter '97, Winter '98, Fall '98, Fall '00, Winter '03, Summer '03, and fall '08 - Spring '09.
- Supervised high school (Math and Science Center) student projects, '00 - '01, '01 - '02, and '02 - '03.
- Supervised student assistants in my main research program on *Rosa* (rose) species breeding,
- Assessment projects.
  - I served on the committee that wrote the short pre/post test used for the BIOL. 121-122 sequence, and I organize its administration in the labs (Fall '07 - present). I am currently writing a new, expanded version. This test assesses student leaning in the intro sequence, which is programmatically critical.

- I wrote a brief pretest on biologically important chemistry, which I have administered to all of my classes since Fall '07 (some every time the class meets, some selected semesters only). Chemistry competence is highly predictive of student success in biology classes, and I use the results as a basic for advising individual students in BIOL. 353. The chemistry classes required for various biology degrees are also a critical programmatic issue, and I have sought cooperation of other instructors in administering this test in a range of courses.
- I administer the Biology Field Exam to my BIOL. 471 class, representing the seniors in the Biotechnology program. This comprehensive, nationally recognized, standardized exam is also administered to Biology BS students, so it serves as an final assessment of our department's graduating majors.
- I am developing a set of shared questions related to plant biology to administer as a part of regular graded exams in the two classes in which the topic is covered (BIOL. 121, mostly first-semester freshmen and BIOL. 353, juniors and seniors) to asses this topic from a programmatic standpoint.
- I have been selectively breaking down regular graded lecture exam and lab quiz questions to address specific course assessment issues. This most often relates to teaching methodology. For example, compare student performance in BIOL. 353 and 407 on material that is/is not included on sample or is/is not covered by their textbooks.

OTHER ACTIVITIES

- Regularly attend the American Academy of Forensic Sciences yearly meeting ('04, '05, '06) and attended a workshop on the forensic role in terrorism at Duquesne Univeristy ('04).
- Carry out lily breeding program and very large rose breeding program (fall '06 through present).
- Carried a out lab research project on lily (*Lilium*) species taxonomy, utilizing DNA sequencing, Polymerase Chain Reaction (PCR), and other methods. This work is supported by grants from the North American Lily Society, the Wisconsin Regional Lily Society, and the Ferris State University professional development fund. Summer '06 - Fall '00. I presented a talk about this research at FSU in November '00.
- Carried out lab research project on rose (*Rosa*) species seed germination.
- I am very active on the Rose Hybridizing Society's open internet forum. I read it regularly during most of the year, and make contributions when I feel I have something to contribute. This serves to enhance my own research by exchanging information, to document my own work,

and in an educational role, since the other participants often are not scientifically trained, and benefit form explanations of that aspect of the subject.

- I have produce materials on my rose breeding program that have been added to my faculty materials on the FSU web site. This helps to communicate and document my work, as well as providing exposure for FSU to the community of rose breeders.
- Carried out a lab research project on Wisconsin Fast Plants (*Brassica rapa*) salt tolerance.
- Carry out a lab research project on plant chromosome characterization.
- Member of several horticultural societies: North American Lily Society (NALS), Species Lily Preservation group (within NALS), Rose Hybridizers Association, American Rose Society.
- Wrote newsletter articles for, and served as assistant editor of, the Wisconsin Regional Lily Society newsletter.
- Served as flower exhibit chairman for Wisconsin Regional Lily Society.
- Served as an accredited judge for the North American Lily Society.
- Write fiction as a hobby.

PUBLICATIONS:

Peer-reviewed journal:

- Mitchell RE (2009) The Inheritance of Juvenile Recurrence in Rosa Species Hybrids. Floriculture and Ornamental Biotechnology 3 (Special Issue 1), 46-52

Non-peer-reviewed journals, newsletters, books, etc.:

- "Expression of Zein Associated Protein Genes," Roger E. Mitchell II, Ph.D. thesis, University of Minnesota, St. Paul Minnesota, Jan. 1992.
- "Lily hybridizing: Something for everyone," Roger E. Mitchell II, Quarterly Bulletin of the North American Lily Society, vol. 49, #1, March 1, 1995.
- Mitchell, R., "New Genes for Lilies," Yearbook of the North American Lily Society, 1997, pp. 67-68. Subject: genetic engineering of flower crops.
- Mitchell, R., "Colder-Climate Trumpets: Trumpet Lily Hybrids," Yearbook of the North American Lily Society, 1997, pp. 77-80. Subject: horticulture. I have been told by society members, including the yearbook editor, that this article was very well received.
- Mitchell, R., "Species DNA Research Report," Quarterly Bulletin of the North American Lily Society, March 1, 1998, Vol. 52, No. 1, pp. 8-9.
- Mitchell, R., "Lily Hybrids: Understanding Without Intimidation," Yearbook of the North American Lily Society, 1998, pp. 54-62. Subject:

how classical genetics is used by breeders. I have received a lot of favorable feedback about this article, as well.

- Mitchell, R., "What Causes Lily Decline?," Yearbook of the North American Lily Society, 1999, pp. 20-35. Subject: horticulture. This article was the best received in the recent history of the yearbook, according to its editor.
- Mitchell, R., "Rose Hybridizing in the Summer Greenhouse," Rose Hybridizers' Association Newsletter, 2001. The RHA web site is www.rosehybridizers.org
- Mitchell, R., "Rose Hybridizing in the Greenhouse," in "Rose Hybridizing - The Next Step," Rose Hybridizers' Association, John and Mitchie Moe, editors, 2002.
- Mitchell, R., "Rose Hybridizing in Big Rapids, Michigan," Rose Hybridizers' Association Newsletter, 2006.
- Mitchell, R., "Accidental Ground Cover Roses," Rose Hybridizers' Association Newsletter, Spring 2006
- Mitchell, R., "High-Volume Growing and Selection of Rose Seedlings," Rose Hybridizers' Association Newsletter, Spring 2007.
- Mitchell RE (2008) Strategies to maintain species percentage in hybrids. Rose Hybridizers Association Newsletter 39 (1), 15-20
- Mitchell RE (2008) Managing Rose Seedlings. Rose Hybridizers Association Newsletter 39 (3), 7-8
- Mitchell RE (2008) Fertile Seed Parents and a Dilemma Involving Miniature Roses. Rose Hybridizers Association Newsletter 39 (4), 6-7
- Mitchell RE (2009) A miniature Note on Miniatures. Rose Hybridizers Association Newsletter 40 (1), 13
- Mitchell RE (2009) Breeding with *Rosa spinosissima* and its Relatives. Rose Hybridizers Association Newsletter 40 (1), 6-10
- Mitchell RE (2009) Breeding with *Rosa gallica* Relatives, Including 'Alika.' Rose Hybridizers Association Newsletter [published, I need to look up the information]
- Mitchell RE (2009) Classifying the Pimpinellifoliae. Rose Hybridizers Association Newsletter [published, I need to look up the information]

Meeting abstracts:

- "Transient expression of foreign genes in endosperm tissue," Roger E. Mitchell II and Irwin Rubenstein, Maize Genetics Cooperation Newsletter, #64, 1990.
- "Simplified cloning techniques utilizing kanamycin resistant plasmids," Roger E. Mitchell II, John Hunsperger, and Irwin Rubenstein, Maize Cooperation Newsletter, #64, 1990.

PROFESSIONAL MEETINGS ATTENDED:

CURRICULUM VITAE

- North American Lily Society annual meetings ('96 - '03, '05, '06)
- World Federation of Lily Societies ('04)
- American Rose Society spring meeting ('06)
- Rose Hybridizers' Association meeting ('06)
- American Academy of Forensic Sciences annual meeting ('04 – '07)
- meeting on forensic response to biological terrorism ('04)

Curriculum vitae

Mary Rengo Murnik

Department of Biological Sciences
Ferris State University
Big Rapids, Michigan 49307

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FAX 231-591-2540
email: murnikm@ferris.edu

Education

Michigan State University, Ph.D., Zoology (Genetics)
Michigan State University, B.S. *With High Honor*, Zoology (Honors College)
Marquette University, Biology

Professional Experience

Professor, Department of Biological Sciences, 1992-
Professor & Head, Dept. of Biological Sciences, Ferris State University, 1980-92
Acting Head, Dept. of Physical Sciences, Ferris State University, 1983-84
Assistant Professor to Professor, Biology, Western Illinois University, 1970-80
Sabbatical, Rutgers University, Dept. of Psychology (Behavior Genetics), 1979
Assistant Professor, Fitchburg State College, Massachusetts, 1968-70

Professional Memberships

American Association for the Advancement of Science, Sigma Xi, American Society of Genetics, National Science Teachers Association, American Biology Teachers Association, National Center for Science Education

Professional Subscriptions

Science, Genetics, The American Biology Teacher, Journal of College Science Teaching, American Scientist, The Scientist, Natural History, Science News, Discover, Scientific American

Courses Taught:

BIOL 101 Genetics: Human Aspects
BIOL 375 Principles of Genetics
BIOL 340 Evolution
FSUS 100 Ferris State University Seminar

Advisor: Pre-dental advising chair

Awards and Honors

Ferris Distinguished Teacher award, 2007
Dr. Martin Luther King "Social Justice Award", 2004
Ferris Faculty Merit Award, 2002, 2006
Ferris Professional Women *Woman of the Year,* 1998
Michigan Association of Governing Boards' Award for Teaching Excellence,1998

Professional Workshops/Seminars Presented (recent)

2011 "Genes,bacteria environmental influences and your weight." FSU Honors Program lunch + learn series
2008 "New insights about the nature of the gene", FSU Honors Program lunch + learn series
2007 "Genomic Imprinting and Epigenesis", FSU STEM seminar

2005 "Strategies to encourage students to *think* biologically", National Association of Biology Teachers annual meeting, Milwaukee
2004 "Critical Thinking in College Biology Courses", 24th International Conference on Critical Thinking, Palo Alto, CA
2004 "How to Think about Weird Things", with Judith Hooper, Critical Thinking Conference for Educators, Ferris Applied Technology Center, Grand Rapids
2004 "Rosalind Franklin, the Dark Lady of DNA", FSU Chemistry Club seminar
2004 "Genetics, Development and Human Sexual Orientation" presentation with Dr. Robert Friar to DSAGA
2003 "Rosalind Franklin, the Dark Lady of DNA, and You", Select 60 Lecture Series, FSU
2003 "Critical Thinking Tips for Teachers", Critical Thinking Institute, Ferris State University
2003 "Critical Thinking in Science Courses", Critical Thinking in Higher Education Conference, Northwest Michigan College, Traverse City
2003 "Critical Thinking Tips for Teachers", Critical Thinking in Higher Education Conference, Northwest Michigan College, Traverse City
2002 "Pursuing careers in Science", Ferris YBBW 2002 Annual Conference

Recent Professional Meetings and Workshops

2010 DAT Biology Test Construction Committee workshop, American Dental Association, Chicago
2010 OAT Biology Test Construction Committee workshop, American Dental Association, Chicago
2009 Drosophila Research Conference, Chicago
2009 DAT Biology Test Construction Committee workshop, American Dental Association, Chicago
2009 OAT Biology Test Construction Committee workshop, American Dental Association, Chicago
2008 DAT Biology Test Construction Committee workshop, American Dental Association, Chicago
2008 American Biology Teachers Annual Meeting, Boston
2007 Dental Admission Test Item Writing Workshop, American Dental Association, Chicago
2006 Teaching Evolution: Applying Critical Thinking and Other Effective Strategies, Chautauqua short course for College Science Teachers, Dayton
2006 OAT/DAT Biology Test Construction meeting, American Dental Association, Chicago
2005 Dental Admission Test Item Writing Workshop, American Dental Association, Chicago
2005 "Making a Difference", FSUS Faculty Development Conference, Ferris State University
2004 24th Annual International Conference on Critical Thinking, Palo Alto
2003 1st Annual Scientific Thinking Conference, Sonoma State University
2002 9th Annual National Academy on Critical Thinking, Sonoma State University
2002 Mentorship training in Critical Thinking, Sonoma State Univ.

Research projects with students (recent)

2007-8 Quinn,Ashley(Math/Science/Technical Center), Induction of sex-linked recessive lethal mutations by resorcinol in *Drosophila melanogaster*
2006-7 Sarkozi, Rebecca (Math/Science/Technical Center), Muller-5 analysis of the mutagenicity of resorcinol in *Drosophila melanogaster*
2006 Trombley, Jamie, Toxicity assays with *Drosophila melanogaster*
2005-6 Winowiecki, Jenice, Effects of resorcinol on the life cycle of *Drosophila melanogaster*

Reviewer, recent, textbooks
Jones Bartlett Publishers, Thomson Brooks/Cole, W.H. Freeman&Co, Wm. C. Brown, Publishers, McGraw Hill Companies

Publications

Instructional Materials, recent

2010 Evolution: Lecture Guide, for BIOL 340- Evolution, Ferris State University, 200 p. (annual editions since 2000)
2010 Genetics: a Lecture Guide for BIOL 375- Principles of Genetics, Ferris State University, 333 p. (annual editions)
2010 Genetics: Human Aspects, Lecture Guide for BIOL 101, Ferris State University, 298 p.(annual editions)
2010 BIOL 101 Laboratory Manual, Ferris State University, 197 p. (annual editions)

Professional Service since 2002

Academic Program Review, Biology B.S., B.A. panel, 2008-9
2008-10 FSU Diversity Planning Committee
2008- FSUS Board
2008 Judge, Honors Senior Symposium, FSU Honors Program
Faculty sponsor, Ferris Pre-dental Club, 2007-
Faculty sponsor, Ferris Pre-dental Club, 1987-
Dental Admission Test Constructor, Biology Content Area, American Dental Association, 2006-
Ferris Accreditation Task Force Committee, 2005-2006
Ferris Distinguished Teacher Award Committee, 2003-2006
Volunteer docent for Ferris State University "Jim Crow Museum", 2001-
Judge MOISD Science Fair, Ferris State University, annually, 2001-8
Scientific Understanding Outcomes and Assessment Committee, 2003-8
Biology Department Search Committee (four tenure-track positions), 2004-2005
Biology Department Planning Committee, 2001- 2004, 2006-8
Faculty Mentor, Dr. Karen Strasser, 2002-6
Faculty Mentor, Dr. Bradley Isler, 2005-9
Member, Zimmer Tenure Committee, 2007-
Chair, Strasser Tenure Committee, 2002-6
Chair, Isler Tenure Committee, 2005-9
Member, Klaat Tenure Committee, 2005-9
Ferris Strategic Direction Committee 2002-3
Academic Program Review, Secondary and Vocational Ed. B.S. panel, 2002-3
Academic Program Review, Applied Biology B.S. panel, 2002-3

Faculty Panel, Student Leadership Conference, 2002-2004
Select 60, Ferris mentorship program, 2001-
Chair, Pre-Dental Advisory Committee, 1995-
Pre-Med Advisory Committee, 1995-

CURRICULUM VITAE (last update: 3 June 2009)

MICHAEL DENNIS RYAN

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Home Address:
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Big Rapids, MI 49307
(231) 796-2264

Born: 25 March 1947
Pittsburgh, PA

Married: Mary Balestra Ryan
Children: Shawn, Patrick, Kevin, Michael

TEACHING/RESEARCH EXPERIENCE

Professor Department of Biological Sciences Ferris State University	1987-88 to Present
Associate Professor Department of Biological Sciences Ferris State College	1981-82 to 1986-87
Visiting Associate Professor Department of Biology Central Michigan University Mt. Pleasant, MI	1983 Fall Semester
Assistant Professor Department of Biological Sciences Ferris State College	1977-78 to 1980-81
Laboratory Teaching Assistant Department of Microbiology SUNY at Buffalo, School of Medicine Buffalo, NY 14214	1974-75 to 1975-76
Microbiology Tutor School of Dentistry SUNY at Buffalo	1974-75 to 1975-76
Research Technician Department of Microbiology School of Medicine SUNY at Buffalo	1972 - 1973

Teaching Assistant — **1969-70 to 1970-71**
Department of Biological Sciences
Duquesne University
Pittsburgh, PA

Laboratory Teaching Assistant — **1967-68 to 1968-69**
Chemistry Department
St. Vincent College
Latrobe, PA

FELLOWSHIP

NIH Pre-Doctoral Fellowship — **1971, 1974 to 1976-77**
School of Medicine SUNY at Buffalo

EDUCATION

Ph.D. Microbiology — **1980**
Department of Microbiology
School of Medicine
SUNY at Buffalo
Buffalo, NY

Dissertation: "Studies on the Pathogenesis of Infection and the Accompanying Immune Response in Inbred Guinea Pigs Inoculated with *Mycoplasma pneumoniae*"

M.S. Biology — **1971**
Department of Biological Sciences
Duquesne University
Pittsburgh, PA

Thesis: "Comparative Double Diffusion Studies of Saline Extracted Complement Fixing Antigens of *Fasciola hepatica* and *Fascioloides magna*"

B.A. Biology — **1969**
St. Vincent College
Latrobe, PA

PRESENTATIONS/PUBLICATIONS (2002-2007 in Bold)

"Strategic Preparation for Bargaining." Presenter/Panel Discussion Leader. Michigan Association for Higher Education 2007Conference, Lansing, Michigan, 19 October 2007.

"2005 Current Issues and National Trends in Higher Education" Michigan Education Association. Presenter/Panel Discussion Leader. Bargaining Conference, Dearborn, MI. 5 February 2005.

"Higher Education Forum: Impact of GATS on the Future of Higher Education" National Education Association, Midwest Leadership Conference. Presenter/ Panel Moderator. St Louis, MO. 22 January 2005.

"Status and Concerns: Higher Education Re-Authorization Legislation 2004" Michigan Education Association, Higher Education Forum. Presenter. Professional Development Conference, Dearborn MI 4 December 2004

"Managing Campus Crisis: A Workshop". Presenter. Southern Illinois University, Carbondale, IL 14-17 Feb 2004.

"2004 Current Issues and National Trends in Higher Education" Michigan Education Association. Presenter/Panel Discussion Leader. Bargaining Conference, Dearborn, MI 7 February 2004.

"Higher Education Forum: Higher Education Re-Authorization Legislation" National Education Association, Midwest Leadership Conference. Presenter / Panel Moderator. Sioux Falls, SD. 24 January 2004.

"2003 Current Issues and National Trends in Higher Education" Michigan Education Association. Presenter/Panel Discussion Leader. Bargaining Conference, Dearborn, MI 11 February 2003.

"Higher Education Re-Authorization and Federal Legislation Update 2003" Michigan Education Association, Higher Education Forum. Presenter. IPD Conference, Dearborn MI. 2 December 2003

"2002 Current Issues and National Trends in Higher Education" Michigan Education Association. Presenter/Panel Discussion Leader. Bargaining Conference, Dearborn, MI 9 February 2002.

"Higher Education Re-Authorization and Federal Legislation 2002 Update" Michigan Education Association, Higher Education Forum. Presenter. IPD Conference, Dearborn MI. 4 December 2002

"Common Sense Answers to the Current Anthrax Threat". TV Interview, TV 9/10's "The Evening News". Cadillac , MI 16 October 2001.

Hartley, F.A., Hoeksema, W.D. and Ryan, M.D. Fundamental Microbiology for the Health Care Sciences. Fourth Edition. 2001. Kendall-Hunt Publishing Co., Dubuque, IA. 206 pages

"Is This Any Way to Run a Railroad?" A book review. Management Fads in Higher Education: Where They Come From, What They Do and Why They Fail. Robert Birnbaum, Jossey-Bass Press, 2001. In "Thought and Action", Volume XVII, Number 1, Summer 2001

"The Role of Faculty in the Evolution of Technologically Based Higher Education." Presenter and panel discussion member. Washington State Higher Education Association, State Meeting. Seattle/Tacoma, WA. 23-25 February 2001.

"The Role of Technology in Higher Education" Lecturer and panel discussion member. Ferris State University's Futures Conference. 2 September 1999.

"Recent advances in Vaccine Research and Development. A continuing education seminar for the FSU Health Center's Staff Physicians and Nurses. 24 August 1999

"Recent Advances in Vaccines and You". TV Interview. TV 9/10's "Michigan This Morning Show". Cadillac, MI 17 June 1999.

Hartley, F.A., Hoeksema, W.D. and Ryan, M.D. Fundamental Microbiology for the Health Care Sciences. Third Edition. 1995. Kendall-Hunt Publishing Co., Dubuque, IA. 227pages

"Immunological Basis of Ocular Inflammation and Pathology". Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture. Ferris State University, College of Optometry. East Lansing, MI, June 24, 1995.

"Immunological Basis of Ocular Inflammation and Pathology". Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture. Ferris State University, College of Optometry. Iron Mountain, MI, May 20, 1995.

"Immunological Basis of Ocular Inflammation and Pathology". Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture. Ferris State University, College of Optometry. Big Rapids, MI, May 16, 1995.

"Immunology and the Western Blot Technique". Ferris State University/ The Upjohn Company Biotechnology Workshop for Community College Teachers and their Students. Big Rapids, MI. April 8, 1995.

Hartley, F.A., Hoeksema, W.D. and Ryan, M.D. Fundamental Microbiology for the Health Care Sciences. Second Edition. 1993. Kendall-Hunt Publishing Co., Dubuque, IA. 210 pages.

"World of Microbes". Hillcrest Elementary School. April 1992

"Attainment of a doctoral Degree in Microbiology while Maintaining Full-Time Employment" with Drs. Debra Stai and Walter Hoeksema. Presented by Dr. Stai at the 89th Annual International Meetings of the American Society for Microbiology, New Orleans, LA, May 14-18, 1989. Published in the Abstracts of the 89th Annual Meeting, ASM, page 492.

"Immunological Basis of Ocular Inflammation and Pathology." Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture. Ferris State University, College of Optometry, Big Rapids MI, January 22, 1989.

"Immunological Basis of Ocular Inflammation and Pathology." Basic Concepts of Ocular Therapeutics Conference. Three hour continuing optometry education lecture , Ferris State University, College of Optometry, Big Rapids MI, January 15, 1989.

"Monoclonal Antibodies: Concept and Applications." Drug Manufacturing Quality Control Training Course for Federal Drug Agency Investigations, October 17, 1988.

Hartley, F.A., Hoeksema, W.D. and Ryan, M.D. Fundamental Microbiology for the Health Care Sciences. 1986. Kendall-Hunt Publishing Co., Dubuque, IA. 175 pages.

"Pre-medical Career Advising." Cmte on Grad./Prof. Studies. Michigan Association of Collegiate Registrars and Admissions Officers (MACRAO) Annual Meeting, Shanty Creek, Oct. 1986

Ryan, M.D., P. Noker and L.L. Matz. 1975.Immunological properties of glycolipids from membranes of *Acholeplasma laidlawii.* Infection and Immunity 12(4): 799-807.

NOMINATIONS/AWARDS

FSU Martin Luther King Social Justice Award (2005)

Michigan Association of Governing Boards (MAGB)
1985-86 Distinguished Faculty Member Award Winner

Nominee, Outstanding Advisor Award (1985)
ACT/NACADA National Recognition Program for Academic Advising

Nominee, Outstanding Institutional Advising Program Award, 1985
ACT/NACADA National Recognition Program for Academic Advising

Ferris Greek Educator of the Year (1981-82)

CONTINUING EDUCATION

(2002-2009 in Bold)
"The Twelfth Annual Conference on Vacine Research. Sponsored by the national Foundation for Infectious Diseases. Baltimore, Maryland. 27-29 April 2009.

"The One Health Initiative: The Interrelationship between Humans, Animals and Pathogens." ASM-MI Branch Spring Meeting, Delta College,University Center, MI. 27-28 March 2009.

"Beneficial Microbes: How Bacteria Impact Human Health!" ASM-MI Branch Fall Meeting Eastern Michigan University, Ypsilanti, MI October 10-11, 2008,

"Small solution to a big problem: Microbes and Alternative Energy" ASM-MI Branch Spring Meeting Central Michigan University, Mount Pleasant, MI April 11-12, 2008.

"Critical Issues in Higher Education" Fall 2007 MEA Conference Kellogg Center, MSU, East Lansing, MI. 19-20 October 2007.

"Emerging Infectious Diseases". ASM-MI Branch Fall Meeting, Traverse City, Michigan. 12-13 October 2007.

"New Risks and New Defenses: The Technology of Bioterrorism". ASM-MI Branch Spring Meeting, Wayne State University, Detroit, MI 13-14 April 2007.

"Critical Issues in Higher Education" Fall 2006 MEA Conference, Kellogg Center, MSU, East Lansing, MI. 13-14 October 2006.

"Biofilms" ASM-MI Branch Fall Meeting Fall 2006, Lansing Community College, Lansing Mi, 7 October 2006.

"Microbial Physiology in the Genomics Era",ASM-MI Branch Spring Meeting, Ferris State University, Big Rapids, Mi, 1 April 2006.

"New Perspectives and Paradigms in Environmental Microbiology". ASM-MI Branch Fall Meeting. Dearborn. MI. 8 October 2005

"Responses to Infectious Diseases after Natural Disasters". ASM-MI Branch Spring Meeting. Delta College, University Center, MI. 2 April 2005.

"Dimensions of Diversity: The Changing World of Higher Education". National Council for Higher Education (NCHE). San Antonio, TX. 4-6 March 2005.

"Microbial Products; From Arsenic and Steroids to Wine and Cheese". ASM-MI Branch Fall Meeting. Bellaire, MI. 9 October 2004.

"The Seventh Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC), National Foundation for Allergy and Infectious Diseases and International Society for Vaccines, among others. Crystal City, MD. May 24-26, 2004.

"Infectious Causes of Neuropsychiatric Disorders Disorders". ASM-MI Branch Spring Meeting Eastern Michigan University, Ypsilanti, MI 20 March 2004.

"Higher Education on Dangerious Ground: Defending a Public Good". National Council for Higher Education (NCHE). Seattle, WA. 5-7 March 2004.

"Life in Extreme Environments". ASM-MI Branch Spring meeting. Western Michigan University, Kalamazoo, MI. 4 October 2003

"The Sixth Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC), National Foundation for Infectious Diseases, International Society for Vaccines, (among others). Crystal City, MD. May 6-8, 2003.

ASM-MI Branch Spring Meeting. "Emerging and Re-emerging Pathogens II ". Ann Arbor, Mi. 5 April 2003

"Critical Issues in Higher Education 2003: Process and outcome of Higher Education Accreditation." National Council for Higher Education (NCHE). Washington DC, 1-4 March 2003.

"The Fifth Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Baltimore, MD. May 6-8, 2002.

"Critical Issues in Higher Education 2002: The Promise and the Reality of Distance Education." National Council for Higher Education (NCHE). San Antonio, TX. 1-4 March 2002.

"The Distributed Learning Workshop: Developmental Update" Sponsored by the Midwest Higher Education Commission. Minneapolis, MN 13-15 September 2001.

"The Fourth Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Arlington, MD. May 30-June 2, 2001.

"Critical Issues in Higher Education 2001: The Higher Education Enterprise: Partners, Profits and Politics." National Council for Higher Education (NCHE). San Diego, CA 1-4 March 2001.

"Learning, the Learner and Teaching Methodology: a course for teachers". FSU Center for Teaching, Learning and Faculty Development (CTL&FD). Winter Semester 2001.

"Critical Issues In Higher Education: The Twin Challenges of For-profit and Dis-intermediation" National Council for Higher Education (NCHE). Washington, D.C. 26-28 January 2001

"Restructuring Higher Education To Meet the Challenges of A Global Economy". NEA Higher Education President's Meeting. Minneapolis, MN 1-5 August 2000

"The Third Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Washington, D.C. May 30-June 2, 2000.

"Critical Issues in Higher Education 2000: Technology in Education." National Council for Higher Education (NCHE). Atlanta, GA April 6-9 2000.

"The Distributed Learning Workshop: Initial Developmental Update." Sponsored by the Midwest Higher Education Commission Emeryville, CA 18-21 January 2000.

"The Second Annual International Conference on Vaccine Research" Jointly sponsored by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Bethesda, MD. D.C. May 31-June 1, 1999.

"Critical Issues in Higher Education 1999: Distance Education". National Council for Higher Education (NCHE). San Antonio, TX. March 6-9 1999.

"The First Annual International Conference on Vaccine Research". Jointly sponcered by the Centers for Disease Control and Prevention (CDC) and the National Foundation for Infectious Diseases. Washington D.C. May 31-June 1, 1998.

"The Immune System: Minding the Body, Embodying the Mind". Mind Matters Seminar Series (Mountain View, California) delivered at Grand Rapids, Michigan. March 25, 1998.

"On the Cutting Edge of Quality". National Council for Higher Education. Savannah, Georgia. March 4-6, 1998.

"Critical Issues Seminar: Quality Teaching and Learning Across the Disciplines". National Education Association. Washington, DC. May 29-31, 1997.

"Molecular Approaches to the Control of Infectious Diseases". A Cold Springs Harbor Laboratory Conference. Cold Springs Harbor, New York. September 9-13 1996.

"A Guide to the Internet and the World Wide Web", NSF Chautauqua Course taught by Dr. Wayne Summers (Arizona State University) taught at Dayton, Ohio. May 8-10,1996

"50th Anniversary of Universidad Autonoma de Guadalajara, Pre-medicine Advisors' Conference". Guadalajara, Mexico. October 25-29, 1995.

"IBM Seminar: Think Pad Applications in Higher Education". Detroit, MI, October 1995.

"Pre-medical Advisors Conference". Michigan Medical Schools Council of Deans. University of Michigan, School of Medicine, Ann Arbor, Mi. April 1994.

"Human Immunodeficiency Virus Biology and Clinical Latency". Michigan Branch of the American Society for Microbiology, Ann Arbor, MI. April 1994.

"Basic Biology of Cancer". NSF Chautauqua Course taught by Dr. Kenneth J. Soprano (Temple University, School of Medicine) taught at Dayton, Ohio. March 1994.

"Pre-medical Advisors Conference". Michigan Medical Schools Council of Deans. Wayne State University, School of Medicine, Detroit, MI. April 1993.

"Fundamentals of Virology for the Nineties and Beyond", NSF Chautauqua Course taught by Dr. Linda Pifer (University of Tennessee, School of Medicine) taught at Memphis, TN, March, 1993.

"Critical thinking Workshop", Foundation for Critical Thinking (Sonoma State University) taught at Chicago, IL. March 13-14, 1993

"Equity in the Classroom", Michigan Department of Education, Lansing, MI, April 1993.

"Pathogenic Mechanisms and the Immune Response". Michigan Branch of the American Society for Microbiology, Ann Arbor Michigan, April 1993.

"Critical Thinking in Biology and Physical Science Courses", workshop sponsored by FSU Biological and Physical Sciences Departments, taught by Dr. Craig Nelson of Indiana University, Big Rapids, MI, September, 1992

"Pre-medical Advisors Conference". Michigan Medical Schools Council of Deans. Michigan State University, Schools of Human Medicine and Osteopathic Medicine. East Lansing, MI. April 1992.

"Changing Science Courses to promote Critical Thinking", NSF Chautauqua Course taught by Dr. Craig E. Nelson (Indiana University) taught at Dayton , Ohio, March 1992.

"Mechanisms of Pathogenicity and Immunology", Michigan branch of the American Society for Microbiology. Ann Arbor, MI, September 1993.

"Changing Role of the Pre-health Advisor", national meeting of the National Association of Advisors of Health Professionals, Milwaukee, WI, June 17-21, 1992 .

"Changing Sciences Courses to Promote Critical Thinking", NSF Chautauqua Course, Dayton OH, May 27-29,1992.

"Equity in the Classroom", Sponsored by the Michigan Department of Education and Michigan's Colleges and Universities, Lansing, MI March 27-28, 1992.

CONTINUING EDUCATION (Professor: December 1987 to December 1991)

"Biotechnological Techniques in a Clinical Setting" American Society for Microbiology, Michigan Branch University of Michigan, Flint Campus, Flint, MI April 1991

"Transplantation Immunology" American Society for Microbiology, Michigan Branch University of Michigan, Flint Campus, Flint, MI April 25, 1990

"Methods of Immunological Research and Diagnosis". World Health Organization at-the-bench laboratory program, The Ernest Witebsky Center for Immunology Department of Microbiology, SUNY/AB, Buffalo, NY June 14-23, 1989

"Lyme Disease" American Society for Microbiology, Michigan Branch Eastern University October 1989

"Advances in Immunology: Experimental Approaches and Clinical Application." Chautauqua Short Course, University of Georgia, Atlanta, GA, March, 1989

"Immunology and Immunopathology of the Alimentary Canal." Eleventh International Convocation on Immunology, The Ernest Witebsky Center for Immunology, Department of Microbiology, School of Medicine, SUNY/AB, Buffalo, NY, CME credit, June 12-16, 1988

"Immunology, Virology, and Their Interaction." Chautauqua Short Course, University of Georgia, Atlanta, GA, March, 1988

"Basic Immunology." Chautauqua Short Course, University of Georgia, Atlanta, GA, April, 1987

CONTINUING EDUCATION (Associate Professor: 1981-82 to 1986-87)

"Vaccines: New Concepts and Developments" 10th International Convocation on Immunology The Ernest Witebsky Center for Immunology. School of Medicine. SUNY/AB. Buffalo, NY CME July 14-17, 1986

"Clinical Microbiology for Teachers and Practitioners" Department of Microbiology and Molecular Genetics. Harvard Medical School. Boston, MA CME Credit April 15-19, 1985

"Herpes, Hepatitis and AIDS: Current Concerns of the Health Practitioner" School of Dentistry. The University of Michigan. Ann Arbor, MI CME Credit . November 16, 1983

"Current Topics in Clinical Chemistry and Immunology" Department of Postgraduate Medicine and Health Professions Education. School of Medicine. The University of Michigan. Ann Arbor, MI CME Credit March 10-12, 1982

"Clinical Immunology and Allergy Conference".Department of Postgraduate Medicine and Health Professions Education School of Medicine.The University of Michigan.Traverse City, MI CME Credit June 6-8, 1981

"Current Concepts in Clinical Microbiology: Antibiotic Susceptibility".Department of Postgraduate Medicine and Health Professions Education. School of Medicine.The University of Michigan Ann Arbor, MI. CME Credit. March 27-28, 1981

"Mechanisms of Microbial Pathogenesis: Human Anaerobic Infections" 0.6 CEU Credit
"Detection of Clostridium botulium and its Toxins: Latest Methods" 0.6 CEU Credit
"Mechanisms of Pathogenicity of the Aerobic Cocci" 0.6 CEU Credit February 27- March 1, 1981
American Society for Microbiology. Dallas, TX

CONTINUING EDUCATION (Assistant Professor: 1977/78 to 1980/81)

"Symposium: Frontiers in Biomembrane Research". The Biomembrane Research Center. Wayne State University. Detroit, MI. March 15-16, 1980

"Ocular Bacteriology and Mycology".American Society for Microbiology. Las Vegas, NV.0.4 CEU Credit. May 14, 1978

TEACHING ASSIGNMENTS: FERRIS (assignments during 2002-09 in bold)

BIOL 108 Medical Microbiology (Nursing, Allied Health students)
BIOL 308 Adv. Medical Microbiology/Immunology (Nursing students) * Discontinued in 2000
BIOL 286 General Microbiology (Med. Tech.)
BIOL 280 Applied Fermentation: Wine and Cheese of Italy
(Open to all students, Scientific Understanding Credit)
BIOL 386 General Microbiology and Immunology (Pre-Med/Dent., Biotechnology)
BIOL 387 Clinical Microbiology and Immunology (Pharmacy)
BIOL 438 Microbiology for Optometry
BIOL 460 Current Topics (mentor to 1-3 Applied Biology majors/semsester 1998-2004)
BIOL 480 Microbiology for Optometry (Optometry students) * Discontinued in 2004
BIOL 430/530 Contemporary Microbiology: Basic Concepts and Applications
(High school teachers, special summer course/workshop)
FSUS 100/101 First-Year Transition Seminar
FSUSH 290 Orientation to Medical, Dental and Veterinary Schools

VISITING TEACHING ASSIGNMENTS:

Central Michigan University
Fall Semester 1993: BIO 537 Immunology (Med. Tech., biology majors: grad/undergrad.)
Union Graduate School (Cincinnati, Ohio):
Adjunct Professor/ doctoral thesis advisor, Debra Stai, Ph.D.

NON-TEACHING ASSIGNMENTS/ ACTIVITIES: (2002-2009 in bold)

Member, Board of Directors MESSA (MI Education Special Services Association) (2008- present)
Member of the Editorial Board, Journal of Collective Bargaining in the Academy (2008- present)
(National Center for the Study of Collective Bargaining in Higher Education and the Professions)
Member. Board of Directors, American Society for Microbiology, Michigan Branch (2005- Present)
President –elect, American Society for Microbiology, Michigan Branch (2007-08)
President, American Society for Microbiology, Michigan Branch (2008-09)
Member, Board of Directors, National Education Association, Higher Education at-Large (2002 to 2005)
Member, (non-voting), Board of Directors, Michigan Education Association (2002 to 2005)
Member, NEA, Midwest Leadership Conference Planning Cmte/Conference Facilitator (2002-2005)
Member, NEA, Higher Education Advisory Group (2002-2005)
Member, NEA, Higher Education House of Rep./Senate Lobbying Group
Member, NEA, Continuing Education Distance Learning "Platform Selection" Group
Member, MEA Executive Cmte. (2002-2005)
Member, MEA Board of Directors (2002-2005)
Member, MEA, Local Affiliates Commission (2002-Present)
Member, MEA Area 13, Executive Committee (2002-2005)
Member, MEA Area 13 and 13A Region Leadership Group (2002-2005)
Intel Fellow as Science Judge in the Intel International Science and Engineering Fair (May 2000)
New FSU Faculty Orientation. Annual Presentation on Tenure / Promotion Procedures. (1999-2003) (2004- 2008)

Question author, NY Board of Reagents Exam microbiology section (1999, 2000)
Michigan Optometry Board Exam: Immunology Questions (1989 -1994)
Member, Board of Directors/VP for Four-year Colleges/ Univ. Michigan Assn. for Higher Education (1998- 2006)
Member, Board of Directors, Michigan Assn for Higher Education (1994 to Present)
Member, Board of Directors, Friends of Ferris. A registered political action committee for FSU (1996- present)
FSU Presenter, Michigan House Higher Education Appropriations Subcmte (1996-1999)
Member of the National Association of Advisors for the Health Professions (1984 to present)
Applied Biology (Pre-medicine tract) Advisor: graduation clearance (1996 to present)
Outside Reviewer for International Journal of Pharmacognacy (1998-99)
Participant in Ferris Dental Hygiene Program National Accreditation Site Visit (Nov. 1998)
Member, American Society for Microbiology (1970-1988) **(2006- Present)**
Member, Buffalo Collegium of Immunology (An Invitation only international association) (1977 to present)
Member, Connecting With the Learner Committee, State of Michigan, Department of Education (1997-98)

FSU SERVICE ACTIVITIES (2002-2009 in bold)

Departmental:

Microbiology Candidate Selection Cmte	**(2005-06)**
Individual Tenure Review Subcmte, (Herron), member	**(2002-03 to present)**
Individual Tenure Review Subcmte. (Franklund). Chair	**(2005-06 to present)**
Curriculum Cmte.	**(1998-99 to 2002-03)**
	(1984-85 to 1992-93)
	(1979-80 to 1981-82)
Department Rep. Athletic Recruiting	**(1995-96 to 2002-03)**
Chair, Kenneth E. Spoerk Memorial Award Cmte	**(1982-83 to present)**
Planning Cmte. Chair	(1991-92 to 1994-95)
Biotechnology Advisory Cmte.	(1985-86 to 1994-95)
Ad Hoc Biotechnology Group	(1985-86 to 1994-95)

COLLEGE OF ARTS AND SCIENCES:

College Planning Cmte	**(1999-00 to 2007-08)**
	(1991-92 to 1995-96)
First-Year Transition Program, faculty	(1996-97 to 1997-98)
Academic Advisor: CAS Registration Program	**(1987-88 to 2004-05)**
Pre-medical Advisory Cmte., Chair	**(1978-79 to present)**
Pre-dental Advisory Cmte.	**(1982-83 to present)**
First-Year Challenge Retention Program, Guide	**(1993-94 to 1995-96)**
Re-vision Cmte (Semester Conversion)	**(1990-91 to 1991-92)**
Promotion/Merit Cmte., Chair	(1982-83 and 1983-84)
Member	**(2004-05)**

UNIVERSITY-WIDE: (2002-2009 in bold)

Student Organizations:

Lead, Pre-medical Club Faculty Advisor	**(1978-79 to present)**
Phi Delta Chi, Faculty Advisor	(1979-80 to 1999)

Ferris Faculty Association:

Member, FSU Board-President-FFA Leadership "Culture Discussion Group"	**(2008- present)**
Past- president	**(2008- present)**
President	**(2005-2007)**
	(1996 to 2003)

Contact Negotiation Team member:	(1983-84) (1986-87) (1994-1997) (2001-02) **(2006-2007) (2009-10)**
Employee Assistance Program Dev. Cmte,	(1997-98)
President's Leadership Council	**(1996-03 (2005-2006-07)**
Semi-monthly Discussions with VPAA/Provost	(1996-97 - **2006-07)**
Executive Board Member (CAS Rep./Past Pres.)	(1989-90) **(2006- present)**
Faculty Workload Review Cmtes.	(1987-92)
Vice-president	(1987-89)
Summer Quarter Employment Cmte	(1984 to 1989)
FSU MLK Program Cmte	(1999-2000)
Recruitment Retention Policy Cmte	**(2000-02)**
Web-Based Instruction Policy Cmte	(2000-2001)
Ferris Communicable Disease Task Force	**(1985-86 - present)**
Strategic Planning and Resources Council (SPARC)	**(2006-07 – present)**
Assessment Tracking System Task Force	**(2006-07)**
Faculty Senate:	
University Planning Cmte.	**(1995-96 to 2002-03)**
Senator, College of Arts and Sciences	**(1995-96 to 2002-03)**
NCA Executive Cmte., Steering Cmte.,	(1992-93 to 1993-94) (1985-86 to 1987-88)
Budget Systems Cmte.	(1994-95 to1995-96)
University Semester Transition Team	(1990-91 to 1991-92)
APR:College of Arts and Sciences (Biotechnology)	(1991-92)
APR:College of Business: Personnel Management	(1990-91)
Chair, Undergraduate Curriculum Council	(1987-88 to 1990-91)
Member, University Curriculum Committee	(1987-88 to 1990-91)
Educational Planning Cmte. (EPC):	
Academic Program Review Cmte	(1986-87)
Chair, EPC	(1985-86)
Senate Formation Election Cmte.	(1986)
New Faculty Orientation Cmte	(1985-86)
Vice-chair, EPC	(1984-85)
Chair, Long-Range Planning Subcommittee	(1983-84)
National Board Examination Review Session (Dental Hygiene)	(1995-96)
Recruiting Advisory Committee, Office of Admissions	(1994-95)
Ferris Chlamydia Research Project, Co-leader	(1985-86 to 1988-89)
All -College Promotion Cmte member/Chair	(1982-83)/ (1983-84)
Ad Hoc FSC Cmte. on Hepatitis B Vaccination	(1983)
Student Health Advisory Cmte.	(1977-78 to 1983-84)

COMMUNITY SERVICE: (2002-2007 in bold)

Member, Board of Directors, Friends of Ferris (PAC)	**(1998- present)**
Big Rapids Friends of the Library, volunteer	**(1996 – present)**
Mecosta Intermediate School Dist., Science Center Adv. Board	(1990-91 to 1993-94)

Curriculum Vitae

James P Scott DVM

Address: Department of Biological Sciences
Ferris State University
820 Campus Drive, ASC 2018
Big Rapids, Michigan 49307

Phone: 231-591-2620

Email: James_Scott@Ferris.edu

Education

1973 –1976 **Central Michigan University** Mt Pleasant, MI

- major in Biology
- minor in Chemistry

1976 – 1981 **Michigan State University** East Lansing, MI

- BS degree Veterinary Science. Major in Fisheries and Wildlife
- Doctorate degree in Veterinary Medicine

Professional Experience:

2004 – Present **Ferris State University** **Big Rapids, MI**

Assistant Professor Of Biology Tenure Tract

- **Teaching responsibilities** include Lecture and Laboratory sections in:
  - Human Physiology and Anatomy for Biology Majors BIOL 321-322, 2004 →
  - Human Anatomy and Physiology for Optometry OPTM 537-538, 2006 →
  - Human General Pathology for Optometry OPTM 630, 2004 →
  - Human Forensic Pathology BIOL 307, 2005 →
  - Pathophysiology BIOL 300, 2005 →
- **University service:**
  - Academic Advising of Pre-Veterinary Medicine and Forensic Science Students
  - Procurement and Care of Ferris State University Human Cadaver collection for use in Anatomy and Physiology Laboratories
  - Supervisor of the Biology Department Animal Use and Care protocols
  - Advisor and instructor of Advanced Biology to high school junior students in the Math Science and Technology Center at Ferris State University
- **University Committee work:**
  - Biology Department Curriculum Committee, 2005 - present
  - Biology Department Faculty Development Committee, 2005 - present
  - Biology Department Head Search Committee, 2005-2006
  - Chair, Biology Department Physiology Faculty Search Committee, 2005 -2006
  - Biology Department Physiology Faculty Search Committee, 2006 - present
  - Ferris State University Institutional Animal Care and Use Committee, 2002 - present
  - Ferris State University AAALAC Accreditation Committee, 2004 – present
  - Forensic Accreditation Review Committee 2006 - present

1987 – Present Ferris State University Big Rapids, MI

Ferris State University Animal Care Facility Attending Veterinarian

- Responsibilities are oversight of the Animal Care Facilities at Ferris State University including treatment and care of all animals used in research projects and teaching laboratories. Since 2004 I have been the only one to carry this responsibility due to the retirement of Dr Norwood Neumann DVM.

1981- present Riversbend Animal Hospital Big Rapids, MI

Doctor of Veterinary Medicine

- Specializing in canine, feline, reptile and avian internal medicine and surgery
- Other clinic duties include; management of employees, ordering and maintenance of supplies and equipment, public relations and client education

1987-2004 Ferris State University Big Rapids, MI

Part Time and Temporary Full Time Adjunct Faculty

- Courses Taught:
  - Human Anatomy and Physiology, BIOL 109 Laboratory 1987 – 1992
  - Human Anatomy and Physiology, BIOL 205 Lecture and Laboratory 1992 – 2004
  - Human Physiology and Anatomy, BIOL 232 Laboratory 1994 – 2000
  - Human Anatomy and Physiology for Optometry, BIOL 431 2000 – 2004
  - General Minors Biology, BIOL 103 Lecture and Laboratory 2000 – 2003
  - General Majors Biology, BIOL 121 -122 Lecture and Laboratory 1994 – 2000
  - Introduction to Human Genetics Lecture and Laboratory 1994-1995
  - Botany, BIOL 113 1993 – 1994
  - Plant Identification II, HORT 112 1996 – 1998
  - Plant Propagation, HORT 152 2000 – 2004
  - Fundamentals of Soil Science, HORT 143 1999 - 2004
- During this time I had also been taught lecture and laboratory sections in Biology/Anatomy and Physiology for High School Juniors in the Math/Science Technology Center from the Mecosta/Osceola School District. This responsibility began in 1998 and continues to this date.

1985-present 7522 East Pierce Drive Big Rapids, MI

Greenhouse Operator

- Own and operate a 1200 square foot greenhouse and small scale plant retail center
- Specialized in annual/ perennial flowers and vegetables from 1985-1995
- Hardwood and softwood cutting experience
- From 1985 until 1993 I had been working extensively with lily breeding and culture until disease and several late frosts forced me into other areas of horticulture
- Since 1995 I have been growing Orchids and now have a collection of over 600 species and hybrids

1976-1981 Giltner Hall Michigan State University East Lansing, MI

Laboratory Animal Care Service

Responsible for care and maintenance of several large colonies of rats and mice used for research at Michigan State University

Continuing Education

1981- present

- Although Michigan State Law does not require continuing education after graduation from medical school for veterinarians, I have earned hundreds of hours of continuing education credits through seminars and short courses since graduation (documentation available upon request)
- **Most recent meetings attended:**
  - American Association for Laboratory Animal Science, Salt Lake City, UT, November 2006
  - American Veterinary Medical Association Eastern States Conference, Orlando FL Jan 2006
  - Michigan Veterinary Medical Association Conference, Lansing, MI, Jan. 2006
  - American Academy of Forensic Sciences Seattle, WA, Feb. 2006

Affiliations

- American Association of Laboratory Animal Care – Member since 2004
- American Veterinary Medical Association 1981-present
- Michigan Veterinary Medical Association 1981-present
- Grand Rapids Small Animal Academy 1981-present
- Big Rapids area Wildlife Rescue advisory Board 1981-1995
- Chief Veterinarian of The Wildlife Rescue Organization 1981-1995
- Pine View School Board Treasurer from 1982-1988
- Trustee of Norwich Township Zoning and Planning Board 1995-2000
- North American Lily Society 1987-present
- American Orchid Society 1994 - present
- Grand Valley Orchid Society – President in 2000-01 and 2003-04
- Master Gardener Certification through Michigan State University

References:

- **Dr. Ray Cross, President**

  Morrisville State College

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  Ferris State University Michigan College of Optometry

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  Big Rapids, MI 49307

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  Math Science and Technology Center Coordinator
  MOISD – Mecosta/Osceola Intermediate School District
  15760 190th Ave
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- **Dr James Hoerter**
  Biology Department Faculty Ferris State University
  820 Campus Drive ASC 2005
  Big Rapids, MI 49307
  231- 591-2563
  James_hoerter@ferris.edu

- **Dr Karen Strasser**
  Ferris State University Biology Department Interim Head
  820 Campus Drive ASC 2004
  Big Rapids, MI 49307
  231- 591-2550
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Anne M. Spain, PhD

Associate Professor
Department of Biological Sciences
820 Campus Drive, ASC 2004
Big Rapids, MI 49307

Primary e-mail: annespain@ferris.edu
Secondary e-mail: anne.m.spain@gmail.com
Office phone: 231.591.3190
Cell phone: 405.250.3294

EDUCATION:

2002-2009. Ph.D. in Microbiology. Department of Botany and Microbiology, University of Oklahoma, College of Arts and Sciences and Institute for Earth and Energy, Norman, OK.

2002. B.S. in Biology, minor in Chemistry (*Summa Cum Laude*). Central Michigan University, College of Arts and Sciences, Mt. Pleasant, MI.

APPOINTMENTS:

2014-Present	Ferris State University	Associate Professor of Biol. Sciences
2011-2014	Ferris State University	Assistant Professor of Biol. Sciences
2009-2011	University of Oklahoma	Postdoctoral Research Associate

TEACHING EXPERIENCE:

2011-Present: Faculty member in the Department of Biological Sciences, Ferris State University (Big Rapids, MI). Courses taught include General Biology 2 (Biol 122; lecture + lab), Medical Microbiology (Biol 108; lecture + lab), Microbial Ecology (Biol 218; lecture + lab) and Current Topics in Biology (Biol 460; lecture).

2008: Graduate Teaching Assistant for Microbial Physiology and Molecular Biology Laboratory (MBIO 4873). Department of Botany and Microbiology, University of Oklahoma, Norman, OK.

2007-2008: Graduate Teaching Assistant for Ecology/Pathology Laboratory (MBIO 4813). Department of Botany and Microbiology, University of Oklahoma, Norman, OK.

2006: Graduate Teaching Assistant for Fundamentals of Microbiology Introductory Laboratory (MBIO 3812). Department of Botany and Microbiology, University of Oklahoma, Norman, OK.

1999-2000: Chemistry Laboratory Aide for Introduction to Chemistry Laboratory. Department of Chemistry, Central Michigan University, Mt. Pleasant, MI.

1998: Anatomy and Physiology Lecture Course Tutor. Central Michigan University, Mt. Pleasant, MI.

RESEARCH EXPERIENCE:

2011- Present: Principal investigator and research advisor for undergraduate students. Department of Biological Sciences, Ferris State University, Big Rapids, MI.

2009-2011: Postdoctoral Research Associate. Department of Botany and Microbiology, University of Oklahoma, Norman, OK. Contact: Lee Krumholz, (405) 325-0427.

2002-2009: Graduate Research Assistant. Department of Botany and Microbiology, University of Oklahoma, Norman, OK. Dissertation title: Characterization of Subsurface Microbial

Communities Involved in Bioremediation of Uranium and Nitrate. Research advisor: Lee Krumholz, (405) 325-0427.

2000-2002: General Student Research Assistant. Biology Department, Central Michigan University. Contact: Elizabeth Wheeler Alm, (989) 774-2503.

2000: Research Technician for Hospital Disinfectant Research and Development. Caltech Industries, Inc., Midland, MI. Contact: Catherine Anders, (800) 234-7700.

PUBLICATIONS:

Spain, A. M., M. S. Elshahed, F. Z. Najar, and L. R. Krumholz. Metatranscriptomic analysis of a high-sulfide aquatic spring reveals insights into sulfur cycling and unexpected aerobic metabolism. Peer J *In review.*

Spain, A. M. and L. R. Krumholz. 2012. Cooperation of three denitrifying bacteria in nitrate removal of acidic nitrate- and uranium-contaminated groundwater. Geomicrobiol J **29:** 830-842

Spain, A. M. and L. R. Krumholz. 2011. Nitrate reducing bacteria at the nitrate and uranium contaminated Oak Ridge Integrated Field Research Challenge Site: A Review. Geomicrobiol J **28:** 418-429.

Spain, A. M., A. D. Peacock, and L. R. Krumholz. 2011. Effects of microbial community structure, terminal electron accepting conditions, and molybdate on the extent of U(VI) reduction in landfill aquifer sediments. Geomicrobiol J **28**:430-443.

Spain, A. M., C. W. Forsberg, and L. R. Krumholz. 2011. Phylum XVII. *Fibrobacteres*, p. 737-746. *In* N. R. Krieg, J. T. Staley, D. R. Brown, B. Hedlund, B. J. Paster, N. Ward, W. Ludwig, and W. B. Whitman (ed.), Bergey's Manual of Systematic Bacteriology, 2nd ed, vol. 4. Springer Verlag, New York.

Istok, J. D., M. Park, M. Michalsen, **A. M. Spain**, L. R. Krumholz, C. Liu, J. McKinley, P. Long, E. Roden, A. D. Peacock, and B. Baldwin. 2009. A thermodynamically-based model for predicting microbial growth and community composition coupled to system geochemistry: Application to uranium bioreduction. J Contam Hydrol **112:**1-14

Spain, A. M., L. R. Krumholz, and M. S. Elshahed. 2009. Abundance, composition, diversity and novelty of soil *Proteobacteria.* ISME J **3:**992-1000.

Michalsen, M. M., A. D. Peacock, A. N. Smithgal, D. C. White, **A. M. Spain**, Y. Sanchez-Rosario, L. R. Krumholz, S. D. Kelly, K. M. Kemner, J. McKinley, S. M. Heald, M. A. Bogle, D. B. Watson, and J. D. Istok. 2009. Treatment of nitric acid-, U(VI)-, and Tc(VII)-contaminated groundwater in intermediate-scale physical models of an in situ biobarrier. Environ Sci Technol **43:**1952-61.

Elshahed, M. S., N. H. Youssef, **A. M. Spain**, C. Sheik, F. Z. Najar, L. O. Sukharnikov, B. A. Roe, J. P. Davis, P. D. Schloss, V. L. Bailey, and L. R. Krumholz. 2008. Novelty and uniqueness patterns of rare members of the soil biosphere. Appl Environ Microbiol **74:**5422-8..

Spain, A. M., A. D. Peacock, J. D. Istok, M. S. Elshahed, F. Z. Najar, B. A. Roe, D. C. White, and L. R. Krumholz. 2007. Identification and isolation of a *Castellaniella* species important during biostimulation of an acidic nitrate- and uranium-contaminated aquifer. Appl Environ Microbiol **73:**4892-904.

Michalsen, M. M., A. D. Peacock, **A. M. Spain**, A. N. Smithgal, D. C. White, Y. Sanchez-Rosario, L. R. Krumholz, and J. D. Istok. 2007. Changes in microbial community composition and geochemistry during uranium and technetium bioimmobilization. Appl Environ Microbiol **73:**5885-96.

Alm, E., J. Burke, and **A. Spain.** 2003. Fecal indicator bacteria are abundant in wet sand at freshwater beaches. Water Research **37:**3978-3892.

ABSTRACTS AND PRESENTATIONS (Names of undergraduate student mentees are underlined)**:**

Muriset, R. and **A.M. Spain**. Characterization of two bacterial soil isolates that display unique surface growth patterns. Presented at the American Society for Microbiology General Meeting. Poster presentation. New Orlean, LA. 2015.

Muriset, R. and **A.M. Spain**. Characterization of growth and surface motility in soil isolates, *Paenibacillus* sp., strains A1 and A3. Presented at the American Society for Microbiology Michigan Branch Fall Meeting. Poster presentation. Traverse City, MI. 2014.

Carr, A. L. and **A. M. Spain**. Prevalence and characterization of tetrathionate-reducing bacteria isolated from environmental samples. Presented at the American Society for Microbiology General Meeting. Poster presentation. Denver, CO. 2013.

Carr, A. L. and **A. M. Spain**. Prevalence and characterization of tetrathionate-reducing bacteria isolated from environmental samples. Presented at the American Society for Microbiology Michigan Branch Spring Meeting. Poster presentation. Big Rapids, MI. 2013.

Spain, A. M., Elshahed, M. S., Najar, F. Z., and L. R. Krumholz. Comparative metatranscriptomic analysis of an anaerobic high-sulfide spring reveals insight into sulfur cycling pathways and unexpected aerobic metabolism. Presented at the American Society For Microbiology General Meeting. Poster presentation. New Orleans, LA. 2011.

Spain, A. M., Krumholz, L. R., and M. S. Elshahed. Composition, diversity, and novelty within soil *Proteobacteria*. Presented at the American Society For Microbiology General Meeting. Poster presentation. Boston, MA. 2008.

Spain, A. M., Senko, J.M., and L. R. Krumholz. Characterization of denitrifying bacteria from a nitrate- and uranium-contaminated aquifer. Presented at the American Society For Microbiology General Meeting. Poster presentation. Toronto, ON, Canada. 2007.

Spain, A. M., Peacock, A. D., Elshahed, Istok, J. D., White, D. C., and L. R. Krumholz. Bioremediation of acidic nitrate- and uranium contaminated groundwater by ethanol results in stimulation of β-Proteobacteria and decrease in bacterial diversity. Presented at the 11th International Symposium for Microbial Ecology. Poster Presentation. Vienna, Austria. 2006.

Spain, A. M., Elshahed, M. S., Najar, F. Z., Roe, B. A., Istok, J, and L. R. Krumholz. Culture-dependent and -independent identification of denitrifying bacteria in an aquifer undergoing bioremediation for nitrate and uranium. Presented at the American Society For Microbiology General Meeting. Poster presentation. Atlanta, GA. 2005.

Spain, A. M., Elshahed, M. S., Najar, F. Z., Roe, B. A., Istok, J, and L. R. Krumholz. Culture-dependent and -independent identification of denitrifying bacteria in Areas 1 and 2 at the FRC. Presented at the Annual Natural and Accelerated Bioremediation Research Program Principal Investigators' Meeting. Poster Presentation. Airlie, VA. 2005.

Spain, A. M., Peacock, A., White, D. C., Istok, J., and L. R. Krumholz. Microbial communities involved in uranium reduction under sulfate-reducing, iron-reducing, and methanogenic conditions. Presented at the American Society For Microbiology General Meeting. Poster presentation. New Orleans, LA. 2004.

Spain, A. M., Peacock, A., White, D. C., Istok, J., and L. R. Krumholz. Microbial communities involved in uranium reduction under sulfate-reducing, iron-reducing, and methanogenic conditions. Presented at the Annual Natural and Accelerated Bioremediation Research Program Principal Investigators' Meeting. Poster Presentation. Airlie, VA. 2004.

Spain, A. M., Senko, J., and L. R. Krumholz. The effect of pH on denitrifying bacteria. Presented at the Joint American Society For Microbiology Missouri Valley Branch Annual Meeting & Midwest Microbiology Educators Conference. Oral presentation. Kansas City, MO. 2004.

INVITED PRESENTATIONS:

Advice to a Young Scientist: Finding Balance in a Scientific Career. Friday, March 23, 2012. College of Science and Technology's Alumni Career Day, Central Michigan University.

Seeing the Unseen: Using Metatranscriptomics to Address Questions in Microbial Ecology. January 12, 2012, Department of Biology, Central Michigan University.

Seeing the Unseen: Using Metatranscriptomics to Address Questions in Microbial Ecology. September 23, 2011. Department of Biological Sciences, Ferris State University.

UNDERGRADUATE STUDENT RESEARCH PROJECTS:

Brett Walker (Fall, 2015). Project title: Molecular identification of *Paenibacillus* strains A1 and A3. This student will complete up to 300 hours of a biotechnology internship (Biol 491) by working in my lab on this project. Ferris State Univ.

Crisha Barrett (Fall, 2015). Project title: Phenotypic characterization of *Paenibacillus* strains A1 and A3. This student is working on her project as a paid research assistant. Ferris State Univ.

Sarah Mathie (2015-Present). Project title: Effects of nutritional parameters on the growth and surface growth pattern of soil isolates *Paenibacillus* species strains A1 and A3. This student was awarded a Summer Research Fellowship (2015) from Ferris State University for her work on this project.

Rebecca Muriset (2014-2015). Project title: The study environmental parameters that affect surface growth and motility patterns of soil isolates *Paenibacillus* species strains A1 and A3. This student completed 400 hours of a biotechnology internship (Biol 491) by working in my lab on this project and was awarded a Student Research Grant from the College of Arts and Sciences to present her research at a national conference. Ferris State Univ.

Megan Knight (Fall, 2014). Project title: Leifson staining procedure on *Paenibacillus taiwanensis* isolates A1 and A3 from soil adjacent to the Muskegon River. This student enrolled in and completed an independent research project (1 credit, Biol 497). Ferris State Univ.

Spencer Crittendon (2013-2014). Project title: Identification and characterization of two soil bacterial isolates that display unique motility features. This student was granted a Student Research Assistant award (2013-2014) from Ferris State University for his work on this project.

Amber Carr (2012-2013). Project title: Prevalence and characterization of tetrathionate-reducing bacteria isolated from environmental samples. This student was awarded a Summer Research Fellowship (2012) from Ferris State University for her work on this project.

Stephanie Demsich (Summer, 2013). Project title: Effects of artificial sweeteners on gastrointestinal tract bacteria. This student enrolled in and completed an independent research project (3 credits, Biol 497). Ferris State Univ.

Chepchumba Kottutt (Spring, 2013). Paper title: Discovering Thiosulfate and Tetrathionate Reduction. This student enrolled in and completed an independent research project (1 credit, Biol 497). Ferris State Univ.

Blaire Kerwin (2011). Project title: Enrichment and enumeration of sulfate-reducing and thiosulfate-disproportionating bacteria from Zodletone source sediment. Univ. Oklahoma.

Foster Dobry (2011). Project title: Microaerophilic sulfur oxidizers from Zodletone Spring. Univ. Oklahoma.

John Frink (2006-2008). Project title: pH-dependent heavy metal (copper, aluminum, and nickel) tolerance in bacteria isolated from nitrate- and uranium-contaminated groundwater. Univ. Oklahoma.

Additional research students (trained/participated on a volunteer basis):

Julie Cohen (Fall, 2012-Spring, 2012)
Chepcumba Kotutt (Fall, 2012)
Zachary Brady (Summer, 2013)
Brett Jenkins (Summer, 2013)
Alexander Totten (Fall/Spring, 2013-2014)
Maria Ilyukhina (Fall, 2013)
Megan Knight (Spring, 2014)
Alyx-Andrea Johnson (Spr-Summer, 2014)
Crisha Barrett (Spring-Summer, 2015)
Elizabeth Utke (Spring, 2015)

DEPARTMENT, COLLEGE, AND UNIVERSITY SERVICE:

2012-Present. Academic Advisor for Biology majors with Pre-Physician Assistant intentions, Ferris State Univ.

2015-Present. Member of the curriculum sub-committee on establishing scientific literacy among Biology majors. Department of Biol. Sciences, Ferris State Univ.

2015-Present. Member of the Standards and Policies Committee, College of Arts and Sciences, Ferris State Univ.

2014-Present. Member of the Promotion/Merit Committee, College of Arts and Sciences, Ferris State Univ.

2012-2015. Member of the Curriculum Committee, Dept. of Biol. Sciences, Ferris State Univ.

2012-2015. Member of the Special Grants Committee, College of Arts and Sciences, Ferris State Univ.

2012-2015. Member of the Health Promotions Committee, Academic Senate, Ferris State Univ.

Fall, 2014. Temporary Coordinator of the "Friday Afternoon Research Talks" seminar series, held by the Dept. Biol. Sciences, Ferris State University.

2013-2014. Member of the Biology Faculty Search Committee (Genetics), Department of Biol. Sciences, Ferris State Univ.

2013. Finalist judge for the Honor's Program Public Address Contest, Ferris State Univ.

2013. Temporary member of the Standards and Policies Committee, College of Arts and Sciences, Ferris State Univ.

2006. Chair of the Graduate Student Committee for the Annual Donald C. Cox Lecture in Microbiology Department of Botany and Microbiology, Univ. Oklahoma

PROFESSIONAL SERVICE:

2012-Present. Board member for the Michigan branch of the American Society for Microbiology (MI-ASM). Served as President-Elect during the 2014-2015 academic year, and have been serving as President of MI-ASM since July 1, 2015.

2015. Oral presentation judge for the spring regional meeting of MI-ASM held at Eastern Michigan University.

2015. Invited reviewer for the journal *PLoS ONE*.

2012 and 2015. Invited reviewer for the journal *Environmental Science and Technology*.

2014. Invited reviewer for the *Journal of Applied Microbiology*.

2012 and 2014. Poster judge for regional meetings of the MI-ASM (held at Central Michigan University in the Spring, 2012 and at Davenport University in the Spring, 2014)

2013. Panelist reviewer for the National Science Foundation's Molecular and Cellular Biosciences Program.

2011 and 2013. *Ad hoc* reviewer for the National Science Foundation's Dimensions of Biodiversity Grant Program.

2013. Planning committee member and co-host for the MI-ASM Spring Meeting at Ferris State University.

2012. Invited reviewer for Central Michigan University's Early Career Grant Program.

2005. Organized and taught a 2-day workshop for the Microbiology department and a visiting research scientist on how to build phylogenetic trees from bacterial 16S rRNA sequences, Univ. Oklahoma.

2005-2006. Volunteered for the Oklahoma Regional Science Bowl.

GRANTS, FELLOWSHIPS, AND SCHOLARSHIPS:

Faculty Research Grant, Ferris State University (2014-2015). Project Title: Effects of Physical and Chemical Parameters on Surface Growth Patterns and Cell Motility of Soil Isolates, *Paenibacillus* species (sp.), Strains A1 and A3. Award total: $7,446.

Faculty Research Grant, Ferris State University (2013-2014). Project Title: Prevalence and Characterization of Tetrathionate-Reducing Bacteria Isolated from Anaerobic Sediments. Award total: $7,270

George L. and Cleo Cross Graduate Scholarship, Department of Botany and Microbiology, University of Oklahoma (2008)

Lois Pfiester Scholarship for Women in Science, Department of Botany and Microbiology, University of Oklahoma (2006).

University of Oklahoma Graduate College Graduate Foundation Fellowship (2002-2006).

International Society for Microbial Ecology Travel Grant Award to attend the 11th International Symposium for Microbial Ecology (ISME-11) in Vienna, Austria, 2006.

American Society for Microbiology Corporate Activities Program Student Travel Grant Award, 2005.

Department of Energy's Natural and Accelerated Bioremediation Research Program Principal Investigators Meeting Student Travel Award, 2004 and 2005.

American Society for Microbiology Undergraduate Research Fellowship (2001). Title: Microbial Community Structure of Arsenic-Contaminated Groundwater.

Arthur Loren Kontio Outstanding Young Biologist Award (2000-2001).

Centralis Gold Scholarship from Central Michigan University (1998-2002).

PROFESSIONAL AFFILIATIONS:

American Society for Microbiology, Member (2012-Present)

American Society for Microbiology, Michigan Branch, Member (2012-Present)

American Society for Microbiology, Postdoctoral Member (2010-2011)

American Society for Microbiology, Student Member (2000, 2002, 2004-2009)

International Society for Microbial Ecology, Student Member (2006)

American Society for Microbiology, Missouri Valley Branch, Student Member (2003-2004, 2011)

American Society for Microbiology, Michigan Branch, Student Member (2002)

Christopher M. Westerkamp

Associate Professor
Biological Sciences Department
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Big Rapids, MI 49307
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(231) 591-2540 (fax)
westerc@ferris.edu

Professional Experience

2010- Associate Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI

2007-2010 Assistant Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI

Education

Ph.D. East Carolina University Greenville, NC 2003- 2007
Dissertation Title: The Role of 5' AMP-activated Protein Kinase in Skeletal Muscle Hypertrophy with Age and Overload
Major: Bioenergetics
Advisor: Scott E. Gordon, Ph.D.

M.A. East Carolina University Greenville, NC 2001-2003
Thesis Title: The Effects of Angiotensin-Converting Enzyme (ACE) Inhibition on Nuclear Proliferation and Hypertrophy in Overloaded Skeletal Muscle
Major: Exercise and Sport Science, Concentration: Exercise Physiology
Advisor: Scott E. Gordon, Ph.D.

B.S. Ball State University Muncie, IN 1997-2001
Major: Exercise Science and Wellness Minor: Anthropology

Teaching Experience (* Denotes new prep)

Ferris State University

Fall 2011 Human Anatomy & Physiology (BIO 109) 4 lecture/ 3 lab sections and Exercise Physiology (BIO 301) 1 lecture section
Sum 2011 Human Anatomy & Physiology (BIO 205) 2 lecture/lab sections and Pathophysiology (BIO 300) 1 lecture section
Spr 2011 Human Anatomy & Physiology (BIO 205) 4 lecture/ 3 lab sections and Pathophysiology (BIO 300) 1 lecture section
Fall 2010 Human Anatomy & Physiology (BIO 109) 4 lecture/ 3 lab sections and *Exercise Physiology (BIO 301) 1 lecture section
Sum 2010 Human Anatomy & Physiology (BIO 205) 1 lecture/lab sections and Pathophysiology (BIO 300) 1 lecture section
Spr 2010 Human Anatomy & Physiology (BIO 205) 2 lecture/lab sections and Pathophysiology (BIO 300) 1 lecture section
Fall 2009 *Human Anatomy & Physiology (BIO 109) 5 lecture/3 lab sections and Pathophysiology (BIO 300) 1 lecture section
Sum 2009 Human Anatomy & Physiology (BIO 205) 1 lecture section, and Pathophysiology (BIO 300) 1 lecture section.
Spr 2009 Human Anatomy & Physiology (BIO 205) 3 lecture/lab sections, and Pathophysiology (BIO 300) 1 lecture section
Fall 2008 Clinical Anatomy and Physiology 1 (BIO 331) 7 lab sections
Sum 2008 Human Anatomy & Physiology (BIO 205) 2 lecture/lab sections

Spr 2008 *Human Anatomy & Physiology (BIO 205) 3 lecture/2 lab sections, and
*Pathophysiology (BIO 300) 1 lecture section
Fall 2007 *Clinical Anatomy and Physiology 1 (BIO 331) 6 lecture sections

East Carolina University

2004 *Physiology of Exercise
Instructor of record for junior/senior level course, and designed all lectures, tests, and quizzes.

2001-2003 *Physiology of Exercise Lab
Organized and taught laboratory lectures.

2002-2007 Undergraduate Independent Study
Instructed undergraduate students with laboratory procedures.

Research Experience

2003-2007 Research Assistant, East Carolina University, Human Performance Laboratory
Conducted research on the impairment of overload-induced hypertrophy in aged skeletal muscle.

2001-2003 Research and Teaching Assistant, East Carolina University, Human Performance Laboratory
Directed graded exercise testing, body composition assessments, and exercise prescriptions. Conducted research examining the proliferative response of myonuclei, endothelial cells, and fibroblasts to skeletal muscle overload.

2001 Undergraduate Intern, Ball State University, Human Performance Laboratory
Duties included exercise testing and prescription. Assisted with master's thesis experiments involving the effects of water loss on body composition measurements and the effects of menstruation on lactate threshold in women.

Professional Organizations and Certifications

2001-present American College of Sports Medicine

2002-present ACSM Certified Exercise Specialist®

2003-present American Physiological Society

2008-present Human Anatomy and Physiology Society

1999-present CPR/AED Certification

Publications

S.E. Gordon, J.A. Lake, **C.M. Westerkamp**, and D.M Thomson. Does AMP-activated protein kinase negatively mediate aged fast-twitch skeletal muscle mass? Exerc. Sport Sci. Rev., Vol. 36, No. 4, pp. 179-186, 2008.

S.E. Gordon, **C.M. Westerkamp**, K.J. Savage, R.C. Hickner, S.C. George, C.A. Fick, and K.M. McCormick, Basal, but not overload-induced, myonuclear addition is attenuated by

N^G–nitro-L-arginine methyl ester (L-NAME) administration, Canadian Journal of Physiology and Pharmacology 2007 85: 646-651.

C.M. Westerkamp and S.E. Gordon, Angiotensin-converting enzyme inhibition attenuates myonuclear addition in overloaded slow-twitch skeletal muscle, Am J Physiol Regul Integr Comp Physiol. 2005 Oct; 289(4): R1223-31.

Abstracts

R. M. Kraus, **C.M. Westerkamp**, T.K. Brtis. The 30-minute Time Trial as a Predictor of Ventilatory Threshold Running Velocity and Heart Rate. ACSM National Conference, Denver, CO. May 2011.

J.D. Redford, E. Coccimiglio, D. Benham, **C.M. Westerkamp**. Skeletal Muscle Hyperplasia in Response to Synergist Removal. Ferris State University College of Arts and Sciences Recognition Event, Big Rapids, MI. April 2011.

T.K. Brtis, **C. M. Westerkamp**, & R. M. Kraus. The 30-minute time trial as a predictor of ventilatory threshold running pace and heart rate: a preliminary report. Midwest ACSM Conference, Indianapolis, IN. October 2010.

S.E. Gordon and **C.M. Westerkamp.** 5'-AMP-activated protein kinase (AMPK) inhibition restores overload-induced growth of fast-twitch skeletal muscle in aged rats. Nathan Shock Center Conference on Aging, San Antonio, TX. October 2007.

S.E. Gordon and **C.M. Westerkamp**, 5'-AMP-activated Protein Kinase (AMPK) Inhibition Restores Overload-induced Growth of Fast-twitch Skeletal Muscle in Aged Rats. American Federation for Aging Research, New York, NY. October 2007.

C.M. Doty, **C.M. Westerkamp**, J.K. LeMoine, R.C. Hickner, D.M. Thomson, L.C. Katwa, and S. E. Gordon. Acute resistance exercise does not increased skeletal muscle fibroblast content in young, untrained men. Med. Sci. Sports Exerc. Vol. 37(5): S242, 2005, ACSM National Conference, Indianapolis, IN. June 2005.

S.C. George, R.C. Hickner, T.P. Gavin, **C.M. Westerkamp**, L.M. Westerkamp, and S.E. Gordon, Effect of L-NAME administration on angiogenesis in overloaded hypertrophying rat skeletal muscle. Med Sci Sports Exerc. 37: 2005, ACSM National Conference, Indianapolis, IN. June 2005.

C.M. Westerkamp, C.A. Fick, E.M. Hedberg, R.C. Hickner, and S.E. Gordon, Effect of L-NAME administration on myonuclear addition in overloaded skeletal muscle, FASEB, Washington, D.C. April 2004.

C.M. Westerkamp, C.A. Fick, E.M. Hedberg, R.C. Hickner, and S.E. Gordon, Effect of L-NAME administration on myonuclear addition in overloaded skeletal muscle, East Carolina University Graduate Student Research Day, Greenville, NC. March 2004.

C.M. Westerkamp & S.E. Gordon, The effects angiotensin-converting enzyme (ACE) inhibition on nuclear proliferation and hypertrophy in overloaded skeletal muscle. FASEB Satellite Cell Summer Research Conference, Tucson, AZ. July 2003.

C.M. Westerkamp, F.W. Booth, R.C. Yeager, T.P. Gavin, and S.E. Gordon, Angiotensin converting enzyme (ACE) inhibition attenuates angiogenesis and overload-induced hypertrophy in skeletal muscle. East Carolina University Graduate Student Research Day, Greenville, NC. April 2003.

C.M. Westerkamp, F.W. Booth, R.C. Yeager, T.P. Gavin, and S.E. Gordon, Angiotensin converting enzyme (ACE) inhibition attenuates angiogenesis and overload-induced hypertrophy in skeletal muscle. Southeast American College of Sports Medicine Conference, Atlanta, GA, February 2003.

Grants

Ferris Foundation Grant, Title: Fiber-type-specific Skeletal Muscle Hyperplasia with Overload, Not Awarded, 2009.

Gatorade Sports Science Institute Student Grant, Title: Prevention of atrophy and apoptosis in unloaded skeletal muscle, Awarded: $3,200, 2005-2006.

NASA Pre-doctoral Student Research Grant, Title: Apoptosis and AMP kinase in skeletal muscle unloading, Not Awarded, 2005.

Service and Awards

Senate Health Promotion and Substance Abuse Prevention Committee member, 2010-.
Senate Liason, Institutional Animal Care and Use Committee, 2009-.
Chair, College of Arts and Sciences Planning Committee, 2009-2011, Member 2008-2011.
Lead Advisor for Pre-Optometry students 2009-.
Chair, Biology Department Planning Committee 2009-2011.
Member, University Planning Committee (SPARC), 2009-.
Dawg Days Volunteer
Pack 3116 Cub Scout Den Leader 2008-.
Northland United Soccer Coach 2008-.

Graduate Scholar Award, Graduate School, East Carolina University 2003-2007.
Dean's Advisory Committee, College of Health and Human Performance, East Carolina University, 2005-06.
Examiner, ACSM Health Fitness Instructor Certification Exam, 2003.
Patient Simulator, ACSM Health Fitness Instructor Certification Exam, 2002.
Graduate Student Organization, College of Health and Human Performance, East Carolina University, 2001-2006.
Youth Soccer Coach, Greenville FutureStars, 2005-2006.
Deans' List, Ball State University, Spring 2001.
Team Captain and Most Valuable Runner, Ball State University Men's Cross-Country, Fall 2000.
President's Scholar-Athlete Award, Ball State University, 1997-2001.

Professional Development

McGraw-Hill Digital Media Symposium February 2008, San Diego, California
Meeting discussing and presenting various uses of digital media in teaching Anatomy & Physiology.

Faculty Center for Teaching and Learning Classroom Project, Spring 2008.
Analysis of student assessment to determine trends in classroom performance based on students' major, first exam grade, and self-reported studying habits.

Grant Writing Seminar, Fall 2008, Ferris State University
Monthly course discussing how to find funding, prepare, write and submit grants for intra- and extramural funding.

Faculty Center for Teaching and Learning Adobe Flash Learning Group, Fall 2008.
Introductory course into use of Adobe Flash animations and their potential use in the classroom.

Faculty Center for Teaching and Learning Advanced Flash Training, Spring 2009.
Course for advanced users of Adobe Flash concentrating on designing Flash animations for use in the classroom.

American Physiological Society Physiological Understanding (PhUn) Week participant, November 2009.

Educational outreach program involving planning and delivering interactive lessons in physiology for elementary students with Biology Education student with visit to St. Mary's school of Big Rapids.

Faculty Center for Teaching and Learning Presentation Zen training, Summer 2010.

Introduction to optimize presentations using Microsoft PowerPoint.

American Physiological Society Physiological Understanding (PhUn) Week participant, November 2010.

Educational outreach program involving planning and delivering interactive lessons in physiology for elementary students with Biology majors with visits to St. Mary's school and the Big Rapids Middle School.

Lilly North Conference attendee, September 2011.

Attended presentations, symposia, and workshops on scholarship of teaching and learning.

Changqi C. Zhu

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Positions at Ferris State University

Associate Professor since August 2012, Department of Biological Sciences, Ferris State University

Assistant Professor (August 2009 – August 2012), Department of Biological Sciences, Ferris State University

- ***Teaching***: **BIOL 121**: **General Biology I** lectures and three labs (Every fall of 2009 – 2013, enrollment: about 90 students per semester)

  BIOL 370: **Developmental Biology** lectures and two labs (Every spring of 2010, 2011, 2012, and 2013, enrollment: about 48 students per semester)

  BIOL 460: **Current Topics in Biology** (15 students per class, both fall and spring of 2009 to 2013)

  BIOL 474: Advanced Cell and Molecular Biology (Every other spring since 2013, about 25 students)

- ***Research***: Activin signaling regulated aging process in adult fruit flies

  Activin signaling regulated female fertility in *Drosophila melanogaster*

  Drosophila follicle cell size and shape regulation

- ***Service:*** University Graduate and Professional Council (2014 - 2016)

  University Core Research Facility Committee (2013 - 2014)

  College of Arts and Sciences Promotion Committee (2012 – 2014)

  Member of biology curriculum committee (2010 – 2013)

  Member of biology faculty development committee (2011 – 2014)

  Member of biology award committee (2010 – 2011)

  Pre-medicine student adviser (2010 – present)

  Biotechnology student adviser (2013 – present)

  Member of Ferris Global Reflection Committee (2012)

- ***Training attended***: Presentation Zen, Ferris State University, fall 2010
  New Faculty Transition Program, Ferris State University, spring 2010
  Critical Thinking, Ferris State University, spring 2010
  New Faculty Transition Program, Ferris State University, fall 2009
  Grant Writing Training, Ferris State University, Ferris State University, fall 2009

Education

Ph.D. in Molecular and Developmental Biology, University of Karlsruhe, Germany, 1998
M.S. in Genetics, Northwestern Agricultural University, China, 1988 – 1991
B.S. in Biology, Shaanxi Normal University, China, 1984 – 1988

Research and Postdoctoral Training

University of Minnesota, Minneapolis, MN, October 2002 – August 2009 (Advisor: Prof. Michael B. O'Connor)
St. Jude Children's Research Hospital, Memphis, Tennessee, December 1999 – August 2002 (Advisor: St. Jude Investigator Dr. Guillermo Oliver)

Honors and Awards

- DAAD (German Academic Exchange Service) fellowship, 1994 – 1995
- Outstanding Graduate Student Award, Northwestern Agricultural University, China, 1991

Media Attention

- CBS Detroit News, Tech Tour Day Eight: Ferris State Biotech Booming At The Edge Of The North Woods, October 23, 2013 8:17 PM (http://detroit.cbslocal.com/2013/10/23/tech-tour-day-eight-ferris-state-biotech-booming-at-the-edge-of-the-north-woods/)

Previous Teaching Experience

- *Adjunct Teaching*: **Lectures and labs of General Biology** course for undergraduate students (two classes, 24 students per class) at **Concordia University**, Saint Paul, MN, September 2008 – May 2009

- *Visit Teaching*: **Molecular and Cellular Biology course** for undergraduates (30 students, 10 lectures, 2 hours/lecture), **Developmental Biology lectures and labs** for graduates (15 students, 6 lectures and 6 labs), **Shaanxi Normal University**, 2005
- *Teaching Assistant:* Genetics course for undergraduates (one semester, 35 students), **Northwestern Agricultural University**, 1990 – 1991

Doctoral and Postdoctoral Research Experience

- *Research Associate*: TGF-β signaling in *Drosophila* nervous system development, Department of Genetics, Cell Biology & Development, University of Minnesota, Minneapolis, MN, October 2002 – August 2009 (Advisor: Prof. Dr. Michael B. O'Connor, Investigator of Howard Hughes Medical Institute)
- *Postdoctoral Research*: Homeobox gene *six3* in mouse visual system development, Department of Genetics, St. Jude Children's Research Hospital, Memphis, Tennessee, December 1999 – August 2002 (Advisor: Dr. Guillermo Oliver, Investigator)
- *Doctoral Research:* Homeobox gene *goosecoid* in mouse embryogenesis, Institute of Genetics, University of Karlsruhe, Germany, 1994 – 1998 (Advisor: Dr. Martin Blum)

Grants

- A written research proposal titled "TGF-beta signaling regulated aging process in fruit fly (*Drosophila melanogaster*)" to be submitted to the National Institute of Health (NIH) in October 2013.
- Ferris State University Student Research Assistant Award $600.00 for lab supply, Fall of 2013 to Spring of 2014.
- Ferris State University Student Summer Fellowship Research Grant: $1,000 for lab supply; Research project: TGF-β signaling regulated aging process in adult fruit flies.
- Ferris Foundation Exceptional Merit Faculty/Staff Award: $3,955 for the study of "Molecular and cellular Mechanisms of Activin Signaling Regulated Aging Process in *Drosophila melanogaster*" from April 2012 to April 2013.
- Ferris State University Faculty Research Grant: $6,960 for the study of "Molecular Mechanisms of Cell Size and Shape Determination Regulated by Activin Signaling in *Drosophila melanogaster"* from March 2012 to April 2013.

- Ferris Foundation Exceptional Merit Faculty/Staff Award: $3,750 for the study of "Activin Signaling Regulated Aging Process in Adult Male and Female Fruit Flies" from April 2011 – April 2012.
- Ferris State University Faculty Research Grant Award: $7,500 for the study of "Molecular Mechanisms of Activin Signaling-regulated Female Fertility in *Drosophila melanogaster*" from March 2010 – April 2011.
- Faculty Start-up fund: $5,000, Fall 2009.

Students Mentored at Ferris State University

Hannah Lamberg (Ferris Pre-Medicine Program Undergraduate), fall 2014 to now, research project: TGF-β signaling regulated aging process in fruit fly (*Drosophila melanogaster*)

Shaughna Langerak (Ferris Biotechnology Program Undergraduate), fall of 2011 to present: Manage daily work in the lab, maintain the fruit fly stocks, and conduct her own research project: TGF-β signaling regulated aging process in fruit fly (*Drosophila melanogaster*)

Alicia Durst (Pre-Medicine Undergraduate), started in the fall of 2012, research project: TGF-β signaling regulated aging process in fruit fly (*Drosophila melanogaster*)

Caitlin Wright (Ferris Pre-Dental Program Undergraduate), fall of 2012 to present. Research project: *Drosophila* follicle cell size and shape regulation

Emily Arnold (Ferris Pre-Dental Program Undergraduate), fall of 2012 to present. Research project: *Drosophila* follicle cell size and shape regulation

Aaron Nicoles (Pre-Physical Therapy Undergraduate), started in the fall of 2013

Richelle Payea (Pre-Medicine Program Undergraduate), started in the fall of 2013

Adam Bringedahl (Ferris Biotechnology Program Undergraduate), fall of 2012 to spring of 2013: The role of dpp singaling in the regulation of the aging process of fruit flies

Jeffrey Ackroyd (Ferris Biotechnology Program Undergraduate), September 2010 to May 2012: Activin signaling regulated aging process in adult fruit flies

Nicole Totten (Ferris Pre-dental program undergraduate student), Spring 2012: The role of Activin signaling in adipose tissue in the regulation of the aging process in adult fruit flies

Justin Cooper (Ferris Biology Pre-medicine Program Undergraduate), Summer 211: The role of muscle cell Activin signaling in the regulation of aging in adult fruit flies

Grace Farrell (Ferris Pre-Optometry Undergraduate), Spring 2010: Fly food preparation and fly culture maintenance

Corey Potter (Ferris Biology Program Undergraduate), Spring 2010: Fly food preparation and fly culture maintenance

Ferris Students' Poster and Oral Presentations

- **Shaughna Langerak.** The dosage effect of TGF-β signaling on aging regulation in fruit flies. On Ferris campus, August 21, 2013
- **Bringedahl A, Langerak S, and Zhu CC.** The dosage effect of TGF-β signaling on longevity of fruit flies. Ferris State University College of Arts & Sciences Student Recognition Event, Rankin Center, May 03, 2013
- **Ackroyd J, Totten N, Langerak S, Cooper J,** and **Zhu CC.** Activin signaling mediated aging process in *Drosophila melanogaster.* Midwest Developmental Biology Meeting at Cincinnati Children's Research Hospital, Cincinnati, Ohio, May 11 – 12, 2012
- **Ackryod J, Cooper J,** and **Zhu CC.** Knocking-down Activin signaling in *Drosophila melanogaster* results in prolonged longevity. West Michigan Regional Undergraduate Science Research Conference at Van Andel Research Institute, Grand Rapids, Michigan, November 12, 2011

Professional Affiliation

Member of the Society for Developmental Biology (SDB)

Publications

1. **Langerak S,** and Zhu CC. The gene dosage effect of *Drosophila* Activin signaling in aging regulation. *In preparation, 2014*

2. **Zhu CC,** Boone JQ, Jensen PA, Hanna S, Podemski L, Locke J, Doe CQ, and O'Connor MB (2008). *Drosophila* Activin-b and the Activin-like product Dawdle function redundantly to regulate proliferation in the larval brain. *Development **135**, 513-521*

3. **Zhu CC***, Bornemann DJ*, Zhitomirsky D, Miller EL, O'Connor MB, and Simon JA. *Drosophila* histone deacetylase-3 controls imaginal disc size through suppression of apoptosis. *PLoS Genetics. 4(2), 1-11, 2008*

4. Lagutin OV, **Zhu CC**, Kobayashi D, Topczewski J., Shimamura K, Puelles L, Russell HRC, McKinnon PJ., Solnica-Krezel L, and Oliver G. 2003. Six3 repression of Wnt signaling in the anterior neuroectoderm is essential for vertebrate forebrain development. *Genes & Development* 17, 368-379
5. **Zhu CC,** Dyer MA, Lagutin O, Uchikawa M, Kondoh H and Oliver G. 2002. Six3-mediated auto-repression and eye development requires its interaction with the Groucho family of corepressors. *Development* 129, 2835-2849
6. Lagutin O, **Zhu CC,** Furuta Y, Rowitch DH, McMahon A.P. and Oliver G. 2001. Six3 promotes the formation of ectopic optic vesicle-like structures in mouse embryos. *Developmental Dynamics* 221, 342-349
7. **Zhu CC,** Yamada G and Blum M. 1999. Retinoic acid teratogenicity: the role of goosecoid and BMP-4. *Cellular and Molecular Biology* 45, 617-629
8. **Zhu CC,** Yamada G, Nakamura S, Terashi T, Schweickert A, and Blum M. 1998. Malformation of trachea, and pelvic region in goosecoid mutant mice. *Developmental Dynamics* 211, 374-381
9. Alex C, **Zhu CC,** Cato A, and Blum M., 1998. Expression of androgen receptor mRNA in mouse embryogenesis. *Mechanism of Development* 72, 175-178
10. **Zhu CC**, Yamada G, and Blum M. 1997. Correlation between loss of middle ear bones and altered goosecoid gene expression in the branchial region following retinoic acid treatment of mouse embryos in vivo. *Biochemical and Biophysical Research Communications* 235, 748-753

Dissertations

- **Ph.D. Thesis (1998):** The homeobox gene *goosecoid:* embryonic expression, loss-of-function phenotype, and regulation by retinoic acid. Institute of Genetics, Department of Biological and Geological Sciences, University of Karlsruhe, Germany
- **Master Degree Thesis (1991):** Induction and screening of *Fusarium graminearum (Gibberella zeae)* toxin-resistant wheat callus tissues cultured from young wheat spikes. Northwestern Agricultural University, China

- **Undergraduate Work (1988):** Karyotype analysis of two plant species *Lysimachia barystachys Bunge* and *Lysimachia stenosepala Hemsl.* Shaanxi Normal University, China

Meetings and Presentations

- Poster presentation titled "*Drosophila* Activin signaling is required for normal egg production and female fecundity" at the 13th International Congress of Invertebrate Reproduction and Development at Wayne State University, Detroit, MI, July 14 – 19, 2013.

- Inaugural HAN-MO KOO Memorial Lecture by 1993 Nobel Prize laureate Dr. Phillip A. Sharp from Massachusetts Institute of Technology at Van Andel Institute, Grand Rapids, Michigan, May 23 – 24, 2012.

- Poster presentation titled "Activin Signaling Mediated Aging Process in *Drosophila melanogaster"* at the 50th Annual Midwest Developmental Biology Meeting at Cincinnati Children's Hospital Medical Center, Ohio, May 11 – 12, 2012.
- 70th Annual Meeting of Society for Developmental Biology, Chicago, IL, July 21 – 25, 2011.
- Origins of Cancer Conference at Van Andel Institute, Grand Rapids, MI, May 19 – 20, 2011. Keynote speaker: Nobel Laureate Dr. James D. Watson.
- Funding Opportunities for Predominantly Undergraduate Institutions organized by the Council on Undergraduate Research (CUR), Washington D.C., February 24 – 26, 2011.
- Poster presentation titled "Activin signaling is required for Drosophila follicle cell development and normal female fertility" at West Michigan Regional Undergraduate Science Research Conference, Van Andel Institute, Grand Rapids, MI, October 3, 2010.
- Poster presentation titled "Activin signaling is required for Drosophila follicle cell development and normal female fertility" at the Society for Developmental Biology 69th Annual Meeting in Albuquerque, New Mexico, August 5 – 9, 2010.

- Poster presentation titled "The role of Activin signaling in adult *Drosophila* mushroom body neurons" at the 50th annual *Drosophila* conference, Chicago, IL, March 4 – 8, 2009.
- Attended the Conference of Neurobiology of *Drosophila*, Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, October 3 – October 7, 2007.
- Platform talk titled "Non-Canonical signaling of BMP ligands through an Activin-type pathway regulates brain lobe development and photoreceptor axon targeting in Drosophila" at the 47th annual *Drosophila* conference, Houston, TX, 28 March – 2 April 2006.
- Poster presentation titled "Activin type I receptor Babo regulates *Drosophila* photoreceptor axon targeting and optic lobe developemtn" at the Conference of Neurobiology of *Drosophila*, Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, October 5 – October 9, 2005.
- Attended the 46th Annual *Drosophila* Research Conference, San Diego, CA, March 30 – April 3, 2005.
- Attended the 44th Annual *Drosophila* Research Conference, Chicago, IL, March 5 – 9, 2003.
- Poster presentation titled "Mouse Six3 interacts with the Groucho-like Grg protein and functions as a transcriptional repressor" at the 60th Annual Meeting of the Society for Developmental Biology, Seattle, WA, July 18-22, 2001.

MARY ELIZABETH ZIMMER (née Schroeder)

University:	Department of Biological Sciences Ferris State University 820 Campus Drive, 2120 ASC Big Rapids, MI 49307 Tel. (231) 591-5022 Email: MaryZimmer@ferris.edu	**Home:**	19200 Seneca Ave Big Rapids, MI 49307 Tel. (231) 480-4731

EDUCATION

1997-2002	Ph.D. - The Modulation and Regulation of Episodic Breathing in Mammals Department of Zoology – Comparative Physiology Section University of British Columbia, Vancouver, BC
1994-1996	M.S. - Pulmonary Annexin 1 Expression and Synthesis: Effects of Hyperoxia Department of Animal Health and Biomedical Sciences University of Wisconsin-Madison, Madison, WI
1985-1989	B.S. - Zoology Department of Zoology University of Wisconsin-Madison, Madison, WI

PROFESSIONAL EXPERIENCE

2015-present	Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI
2010-2015	Associate Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI
2007-2010	Assistant Professor, Department of Biological Sciences, Ferris State University, Big Rapids, MI
2003-2007	Post-doctoral Fellow, Department of Anatomy and Cell Biology, Wayne State University, School of Medicine, Detroit, MI
1996	Assistant Faculty Associate, UW-Madison, Teacher Enhancement Program in Biology, Madison, WI
1989-1994	Research Specialist, UW-Madison, School of Veterinary Medicine, Department of Comparative Biosciences
1989	Project Assistant, UW-Madison, Veterans Administration Hospital
1986-1989	Laboratory Assistant, UW-Madison, Wisconsin Regional Primate Center

TEACHING EXPERIENCE

Courses Taught

2012-present	BIOL 423 Neurobiology, Ferris State University
2011-present	BIOL 460 Current Topics in Biology, Ferris State University
2009-2011	OPTM 635 Neuroanatomy and Neurophysiology, Michigan College of Optometry, Lecture, Ferris State University

2007-present	BIOL 321, Human Anatomy and Physiology-1 Lecture and Laboratory, Department of Biological Sciences, Ferris State University
2007–present	BIOL 322 Human Anatomy and Physiology-2, Lecture and Laboratory, Department of Biological Sciences, Ferris State University
2004-2006	Lecture: Advanced Respiratory Physiology, Department of Physiology, School of Medicine, Wayne State University
1999-2002	Teaching Assistant: Nursing Anatomy and Physiology Laboratory, University of British Columbia
1999-2001	Teaching Assistant: Comparative Neuroscience, University of British Columbia
1997-1999	Teaching Assistant, Animal Physiology Laboratory, University of British Columbia
1995	Teaching Assistant, Veterinary Histology, School of Veterinary Medicine, UW-Madison
1995	Volunteer Tutor, Cherokee Middle School, Madison, WI

Invited Guest Lecturer

FSU, SCWK 220, Theories- Methods of Practice 1 - basic neurophysiology - 2009
UBC, Biol 354, Environmental Physiology, hibernation – 2002
UBC, Biol 454, Comparative Animal Physiology, hibernation - 2001
UBC, Biol 353, Animal Physiology, hibernation – 1998, 1999
UBC, Biol 450, Molecular Adaptation of Animals to the Environment, hibernation, 1997, 1998, 1999

Student Research Projects

2015	Summer Undergraduate Research Fellowship (Ferris State): Rachel Kempisty
2014-2015	Student Research Projects (Ferris State): Jacqueline Tieu, Katherine Hart, Rachel Kempisty, Robert Pacella, Enefe Adaji, Zac Kramer
2014	Summer Undergraduate Research Fellowship (Ferris State): Jacqueline Tieu
2013-2014	Student Research Projects (Ferris State): Illyas Fana (Student Research Assistantship), Aaron Jackowski (Student Research Assistantship), Brendan Doyle, Catherine Plischke, Sarah Harp, Jacqueline Tieu
2013	Summer Undergraduate Research Fellowship (Ferris State): Catherine Plischke
2012-2013	Student Research Projects (Ferris State): Aaron Jackowski, Brendan Doyle, Illyas Fana, Catherine Plischke,
2011-2012	Independent Study (Ferris State): Danielle Clear, Liala Al-Shatel
2011	Summer Undergraduate Research Fellowship (Ferris State): Liala Al-Shatel
2010-2011	Biotechnology Internship (Ferris State): Rachel Scheib
2009-2010	Independent Study 497 (Ferris State): Marziah Hashimi, Joseph Dalton, Ruben Vaughn
2008-2009	Independent Study 497 (Ferris State): Tim Hotchkiss, Ruben Vaughn
2000	Senior Honors thesis (UBC): Jerome Lee, The Influence of the Pontine Respiratory Group and Vagal Feedback on Inspiratory Termination in the Golden-Mantled Ground Squirrel,.
1999	Senior Honors thesis (UBC): Krista Shaw, The Effect of Body Temperature on Metabolic Rate, Respiratory Pattern and Ventilation in Hibernating Golden-

	Mantled Ground Squirrels (*Spermophilus lateralis*),.
1999	High school honors thesis (UBC): Karolina Dziedzic and Linda Tay; The Effects of Humidity on Apneic Oxygen Uptake in Hibernating Squirrels,
1998	Senior Honors thesis (UBC): Danielle Brochu, Distribution of NMDA-type Glutamate Receptors in Respiratory Nuclei of Euthermic vs. Hibernating Golden-mantled Ground Squirrels, *Spermophilus lateralis*,.

Course development

Digestion Laboratory, Ferris State. I established a new lab to be used to introduce students to the physiology of digestion; fats, proteins and carbohydrates.

Biology Metabolism Laboratory, UBC. I assisted in establishing a first year biology laboratory to teach students about basic cellular metabolism using hibernating ground squirrels.

Teacher Enhancement Program in Biology, UW-Madison. I developed a University course to teach high school teachers basic physiology, as well as easy, practical lessons to be used in the high school classroom. I wrote and received a grant (Eisenhower grant 1996-1997) to purchase equipment for use in 1) the course and 2) for these teachers to use in their high school classrooms in the state of Wisconsin. This allowed them to provide their students with the opportunity to see physiology experiments firsthand using exercise and human based problems as the motivational tool.

PROFESSIONAL SERVICE

2015 – present	Member – Academic Senate
2015 – present	Member – Academic Program Review Council
2014 – 2015	Member – Biology Awards Committee, Ferris State University
2013 - present	Member – College Graduate Education Committee, Ferris State University
2011 - present	Biology Research Seminar Coordinator
2011 – 2014	Member – College Curriculum Committee, Ferris State University
2009 - 2012	Member/Secretary – Institutional Strategic Planning Committee, Ferris State University
2008 - 2010	Member – Biology Faculty Development Committee, Ferris State University
2008 - present	Member – Biology Curriculum Committee, Ferris State University
2008 - present	Advisor to pre-optometry students
2007- present	Advisor to the Registered Student Organization, the Circle K International Group

GRANTS AND AWARDS

Ferris Foundation Exceptional Merit Award, 2014-2015	$3500
Ferris Faculty Research Award, 2013-2014	$7500
Ferris Foundation Exceptional Merit Award, 2011-2012	$5500
Ferris Faculty Research Award, 2009- 2010	$7250
Dean's Initiative Grant, 2009	$1500
Ferris Foundation Exceptional Merit Award, 2008 - 2009	$7500

Travel Award, International Symposium on Neural Regeneration, 2003
McLean Fraser Summer Research Fellowship, 2001
Wisconsin Alumni Scholarship, 1985

PROFESSIONAL SOCIETIES

American Physiological Society, 2002-present
Society for Neuroscience, 2002

AD HOC EDITORIAL REVIEWS

Respiration physiology and neurobiology - 2003

INVITED PRESENTATIONS

The effect of spinal cord injury on learning and memory. August 2014. Michigan AALAS meeting. Ferris State University

Getting inside your student's heads – literally! Feb, 13, 2014. New Faculty Transition Program, Faculty Center for Teaching and Learning, Ferris State University

The biological and psychological aspects of learning. Spring 2013. New Faculty Transition Program, Faculty Center for Teaching and Learning, Ferris State University

Control mechanisms of episodic breathing in mammals. August 2012. Michigan AALAS meeting. Ferris State University

Latent motor pathways after spinal cord injury: "latent" or just inhibited? January 30, 2006, Department of Biological Sciences, University of Idaho

Latent motor pathways after spinal cord injury: "latent" or just inhibited? January 27, 2005, Department of Physiology, Wayne State University

The effect of the pons and neonatal age on respiratory rhythm in the hypothermic rat brainstem-spinal cord preparation, July 2001, Department of Anatomy and Cell Biology Wayne State University

PUBLICATIONS

1. Zimmer MB, Fong AY, Milsom WK. ***(In preparation)***. The effect of age and the pons on respiratory rhythm during hypothermia in neonatal rats. *Respiration Physiology and Neurobiology*
2. Zimmer MB, Grant J, Ayar A, Goshgarian HG. 2014. Ipsilateral inspiratory intercostal muscle activity after C2 spinal cord hemisection. *Journal of Spinal Cord Medicine,* 26: Epub ahead of print PMID: 2499369.
3. Fong AY, Zimmer MB, Milsom WK. 2009. The conditional nature of the "Central Rhythm Generator" and the production of episodic breathing. *Respiration Physiology and Neurobiology,* 168: 179-187.
4. Fong AY, Corcoran AE, Zimmer MB, Andrade DV, Milsom WK. 2008. Respiratory rhythm of brainstem-spinal cord preparations: effects of maturation, age, mass, and oxygenation. *Respiration Physiology and Neurobiology,* 164: 429-440.
5. Zimmer MB, Nantwi KD, Goshgarian HG. 2008. Effect of spinal cord injury on the neural regulation of respiratory function. *Experimental Neurology.* 209: 399-406.
6. Zimmer MB, Goshgarian HG. 2007. Spinal cord injury in neonates alters respiratory

motor output via supraspinal mechanisms. *Experimental Neurology.* 206(1): 137-145.
7. Zimmer MB, Nantwi KD, Goshgarian HG. 2007. Effect of spinal cord injury on the respiratory system: basic research and current clinical treatment options. *Journal of Spinal Cord Medicine.* 30(4): 319-30.
8. Zimmer MB, Goshgarian HG. 2007. GABA, not glycine, mediates inhibition of latent respiratory motor pathways after spinal cord injury. *Experimental Neurology.* 203(2): 493-501.
9. Zimmer MB, Goshgarian HG. 2006. Spinal activation of serotonin 1A receptors enhances latent respiratory activity after spinal cord injury. *Journal of Spinal Cord Medicine.* 29(2): 147-155.
10. Zimmer MB, Goshgarian HG. 2005. Spontaneous crossed phrenic activity in the neonatal respiratory network. *Experimental Neurology.* 194: 530-540.
11. Milsom WK, Chatburn J, Zimmer MB. 2004. Pontine influences on respiratory control in ectothermic and heterothermic vertebrates. *Respiration Physiology and Neurobiology.* 143: 263-280.
12. Zimmer MB, Milsom WK. 2004. Effect of hypothermia on respiratory rhythm generation in hamster brainstem-spinal cord preparations. *Respiration Physiology and Neurobiology.* 142: 237-249.
13. Zimmer MB, Milsom WK. 2002. Ventilatory pattern and chemosensitivity in unanesthetized, hypothermic ground squirrels (*Spermophilus lateralis*). *Respiration Physiology.* 133:49-63.
14. Milsom WK, Zimmer MB, Harris MB. 2001. Vagal control of cardiorespiratory function in hibernation. *Experimental Physiology.* 86(6):791-79
15. Zimmer MB, Milsom WK. 2001. Effects of changing ambient temperature on metabolic, heart and ventilation rates during steady state hibernation in golden-mantled ground squirrels (*Spermophilus lateralis*). *Physiological and Biochemical Zoology* 74(5):714-723.
16. Barros RC, Zimmer ME, Branco LGS, Milsom WK. 2001. Hypoxic metabolic response of the golden-mantled ground squirrel. *Journal of Applied Physiology* 91:603-612.
17. Milsom WK, Zimmer MB, Harris MB. 1999. Regulation of cardiac rhythm in hibernating mammals. *Comparative Biochemistry and Physiology.* 124A:383-391.
18. Christou M, Keith IM, Shen X, Schroeder ME, Jefcoate R. 1993. Reversal of cytochrome P450-1A1 and P450-EF expression in MCA-C3H/10T cell derived tumors as compared to cultured cells. *Cancer Research.* 53(5):968-976.
19. Uno H, Schroeder ME, Fors T, Mori O. 1990. Macaque and rodent models for the screening of drugs on stimulating hair growth. *Journal of Cutaneous Aging and Cosmetic Dermatology.* 1(3):193-204.

Books

Zimmer, MB. 2015. Fundamentals of Human Physiology; A Comparative Examination. Cognella, San Diego, CA.

Conference Proceedings

Zimmer MB, Harris MB, Milsom WK. 2000. Control of cardiac and ventilation frequencies during hibernation in ground squirrels. In: *Life in the Cold*, edited by G.Heldmaier, M

Klingenspor. Springer-Verlag, Berlin, Heidelberg, Germany. Pp 159-167.

Conference Abstracts

1. Tieu J, Zimmer MB, 2014. The effect of spinal cord injury on learning and memory in rats. *Experimental Biology*. Boston, MA.
2. Tieu J, Zimmer MB, 2014. The effect of spinal cord injury on learning and memory. West Michigan Regional Undergraduate Science Research Conference. Grand Rapids, MI.
3. Doyle B, Zimmer MB, 2014. The effect of exercising intensity on learning and memory in humans. *Experimental Biology*. San Diego, CA.
4. Jackowski A, Harp S, Zimmer MB 2014. Effect of upper body resistance training on memory. *Experimental Biology*. San Diego, CA
5. Plischke C, Fana I, Zimmer MB, 2014. The effect of C2 spinal cord injury on learning and memory. *15th International Symposium on Neural Regeneration.* Pacific Grove, CA
6. Fong AY, Zimmer MB, Milsom WK, 2012. Effects of postnatal development, temperature and the pons on respiratory rhythm and pattern generation in rat pups. *Experimental Biology*.
7. Zimmer MB, Grant J, Ayar A, Goshgarian, HG, 2011. Ipsilateral inspiratory intercostal muscle activity after C2 spinal cord hemisection. *14th International Symposium on Neural Regeneration.* Pacific Grove, CA.
8. Scheid R, Fong AY, Milsom WK, Zimmer MB, 2011. GABAergic mechanisms underlying breathing pattern in rat brainstem-spinal cord preparations. *Experimental Biology.*
9. Zimmer MB, Grant J, Ayar A, Goshgarian, HG, 2007. Ipsilateral inspiratory intercostal activity persists after C2 hemisection. *Experimental Biology*.
10. Zimmer MB, Goshgarian HG, 2006. Spinal cord injury in neonate rats alters respiratory neural output via supraspinal mechanisms. *Experimental Biology*.
11. Zimmer MB, Alilain W, Goshgarian HG, 2005. GABA-mediated inhibition of crossed phrenic pathways. *International Symposium on Neural Regeneration.*
12. Huang Y, Zimmer MB, Goshgarian HG, 2005. The neural pathway underlying the expression of crossed phrenic activity following spinal cord hemisection in the neonate rat. *International Symposium on Neural Regeneration.*
13. Zimmer ME, Goshgarian HG, 2005. Spinal activation of serotonin 1A receptors turns on latent respiratory pathways after spinal cord injury. *Faseb Journal* 19(5): A1282, Part 2, Suppl. S.
14. Zimmer MB, Goshgarian HG. 2004. Crossed phrenic pathways in the neonatal rat respiratory network: an *in vitro* assessment. *Faseb Journal* 18(4): A333 Suppl. S.
15. Zimmer MB, Goshgarian HG. 2003. Serotonin 1A receptor activation of a latent motor pathway after spinal hemisection. *Journal of Rehabilitation Research and Development* 40(6):56 Suppl 3.
16. Zimmer ME, Taylor BE, Milsom WK. 2002. Developmental and species differences in pontine influences on respiratory motor output in the mammalian brainstem spinal cord. Program No 171.4 Abstract Viewer/Itinerary Planner. Washington DC: *Society for Neuroscience, Online.*
17. Zimmer MB, Milsom WK. 2002. Species and developmental differences in respiratory

cold tolerance: hibernator versus non-hibernator. The power of comparative physiology: evolution, integration, and application. the-aps.org/publications/ p9.
18. Zimmer MB, Milsom WK. 2002. Recovery from respiratory arrest in the hypothermic rat pup brainstem en bloc. *Faseb Journal* 16(4): A45, Part 1.
19. Zimmer ME, Barros RCH, Milsom WK. 1999. Separate and combined influences of body temperature and metabolic rate on ventilatory pattern and chemosensitivity in golden-mantled ground squirrels. *Comparative Biochemistry and Physiology* 124A:S112.
20. Zimmer ME, Milsom WK. 1999. Episodic breathing in ground squirrels (Spermophilus lateralis): a consequence of "state," temperature or metabolic rate? *Canadian Society of Zoologists Bulletin.* 29:121.
21. Zimmer ME, Milsom WK. 1998. Ventilatory chemoresponses during hypothermia (5 and 10C) in golden-mantled ground squirrels (Spermophilus lateralis). *Faseb Journal* 12(4):A335.
22. Zimmer ME, Milsom WK. 1998. Uncoupling of ventilation and metabolic rate in hibernating ground squirrels. *Canadian Society of Zoologists Bulletin.* 28(2):100.
23. Zimmer M, Ling L, Olson E, Janssen P, Mitchell G, Keith I. 1994. Chronic neonatal hyperoxia causes persistent lung damage, pulmonary hypertension, and neuropeptide changes in rats. *Faseb Journal.* 8(4): A418.
24. Ryan ML, Keith IM, Zimmer ME, Hedrick MS, Bisgard GE. 1994. Carotid body peptide and catecholamine content in intact and sympathetically denervated goats. *Faseb Journal.* 8(5):A912.
25. Keith IM, Schroeder ME, Tsao FHC. 1992. Localization of phospholipid binding protein in rabbit lung. *Faseb Journal.* 6(4):A1162.

CINDY FITZWILLIAMS-HECK
22929 15 Mile Road
Big Rapids, Michigan 49307
Email: fitzwilc@ferris.edu Home: (231) 592-4067 Cell: (231) 349-7495

EDUCATION

PhD (candidate), EDUCATION (Learning, Instruction, and Innovation in Environmental Education)
Walden University, Minneapolis, MN
Current Focus: ***Using experiential learning techniques and a social-ecological approach in an environmental adult education curriculum to improve environmental literacy, and natural resource management***
(Golden Key International Honour Society)

MS, BIOLOGY (Emphasis: Aquatic Ecology; Endorsement: Conservation Biology)
Central Michigan University, Mt. Pleasant, MI
Thesis: ***The effects of filamentous cyanobacteria on the growth, survivorship, and fecundity of* Daphnia pulicaria**. Emphasis on intricacies of food web dynamics within a lake ecosystem.
(Honors Graduate)

BS, BIOLOGY EDUCATION (General Science Minor)
Ferris State University, Big Rapids, MI
Michigan Secondary Teaching Certificate
(Honors Graduate)

WORK HISTORY

Biology Instructor, Ferris State University (2001-present)
Classes Taught:

1. Nature Study 116 (lecture and lab – since 2005)
2. Ecology 442 (lecture and lab – 2009, 2002)
3. Biological Concepts 103 (lecture and lab – 2006, 2005)
4. Environmental Biology 111 (lecture and lab – 2005, 2003, 2002)
5. Laboratory Instructor [as needed] for General Biology 121, 122, Ecology 442, Environmental Biology 111, Biological Concepts 103

- Place-based education: 1) Sub-watershed studies before and after two rain gardens planted (partnerships with the Muskegon River Watershed Assembly - MRWA, Big Rapids High School, and Mecosta-Osceola Career Center); 2) 'My Nature Spot: Developing a connection with one place in nature'. A semester-long project using journaling to connect students with the outdoors and the concepts learned in class; emphasis on a watershed perspective.
- Community service project [each semester]: Litter clean-up along local waterways to help students become more aware of human impact on the environment (a written reflection of the experience assigned); associated with Alliance for the Great Lakes, The Ocean Conservancy research, and the MRWA.
- Active-learning: Implemented environmental education activities, macro-models, and inquiry-based learning in the classroom and laboratory settings.
- Technology: Classroom performance system ("clickers") used in lectures to stimulate discussion, assess student learning, and as a formative assessment tool (2009-2013).

Instructor of Education, Ferris State University (Summer 2013)
Classes Taught: EDUC 494; EDUC 694 – Special Topics in Conservation and Experiential Education

- Courses revolved around the Michigan Department of Natural Resources' (DNR) week-long workshop, *Academy of Natural Resources* (ANR).
- Students consisted of certified teachers, pre-service teachers, non-formal educators.
- Focused on innovative application and assessment of workshop material.

Environmental Educator, Independent Contractor (2005-2013)

- Assisted in developing structure of teacher training workshops for the 'Aquatic Academy for Teachers', and presented programs (MRWA Education Committee – 2008, 2009, 2010, 2013)
- Planned and presented at the 'Natural Shorescaping Workshops' within the Muskegon River Watershed (with the MRWA Education Committee) (2011, 2012).
- Led training seminars for volunteers interested in collecting benthic macroinvertebrates for stream quality assessments within the Muskegon River Watershed (an ongoing project affiliated with the MRWA, MiCorps and Michigan Department of Environmental Quality) (2005-present).
- Facilitator for third and fourth grade water festivals (MRWA – 2009, 2010, 2011, 2013)

Faculty Advisor, Outdoor Club of Ferris State University (2004-2005, 2011-present)

- Offered guidance and mentored club members interested in outdoor recreation, environmental education, and volunteerism in the outdoors.

Field Trip Co-Leader, Ferris State University - Geology of Michigan (2004) and Geology of Martinique (2003)

- Assisted in planning trip destinations, educational material covered, and directing students.
- Provided information about the natural history of the areas visited.

Environmental Educator, Naturalist, Asst. Program Coordinator, Hiking Club President, and **Assistant Summer Camp Director**, Woldumar Nature Center - Lansing, MI (1999-2001)

- Developed, coordinated, and taught a broad range of environmental biology and ecological programs for schools (following their science curriculum for pre-K through 12th grades), families, adults, and senior citizens.
- Led numerous interpretive nature walks year-round that emphasized food web dynamics, succession, other ecological concepts, and taxonomy.
- Founded and coordinated the Hiking Club that promoted environmental education, stewardship, and maintaining overall health and well being by monthly newsletters and weekly local hikes.
- Created, organized, and executed educational backpacking trips for adults that focused on the natural history, and watershed ecology in the area that was visited in MI. Areas visited and studied were Isle Royale National Park, North and South Manitou Islands/Sleeping Bear Dunes National Lakeshore, Nordhouse Dunes Wilderness Area, and the Manistee River/North Country Trail Loop.
- Assisted in development and implementation of a new environmental education summer day camp structure.
- Mentored high school students in Project GREEN, a cooperative school program that focused on water quality testing and interpretation of the Grand River Watershed.
- Assisted in organization and leadership of the Teachers Programming Committee for Environmental Education in the Classroom.

Biology Laboratory Instructor, Central Michigan University (1998-1999)

- Taught introductory college biology laboratories for biology majors, non-majors, and teacher education students.
- Created new laboratory exercises.
- Assisted in the updating of the Introductory Biology Laboratory Manual.

Research Assistant, Central Michigan University (1997-1998) – *Predatory zooplankton as the potential cause for the decline of yellow perch larva in Lake Michigan.*

- Collected, identified, and enumerated zooplankton and larval fish in Lake Michigan and Crystal Lake.
- Responsible for the organization and maintenance of the aquatics laboratory.

Substitute Teacher, Mecosta/Osceola, MI ISD (1996-1997); Lansing Area Schools, MI (1999-2001)

- Long-term subbing position for tenth grade biology at Pine River H.S. (1997).

Student Teacher (High School Physical Science & Biology) (1996) – Pine River High School, Leroy, MI.

- Immediately took initiative in teaching four, ninth-grade physical science classes, and one tenth-grade biology class.
- Effectively incorporated organized cooperative learning groups in the classroom.

PROFESSIONAL COMMITMENTS

- MRWA Executive Board – Vice Chair (2013-2015)
- Michigan Alliance of Environmental and Outdoor Education (MAEOE) Board of Directors (2013)
- DNR-ANR Advisory Committee (2013-present)
- MRWA Education Committee (2002-present)
- MRWA Action Committee (2013-present)
- MRWA Voyage of Discovery Committee (2012-present)
- Mecosta County Northern Lights Environmental Award Committee (2013)
- Ferris Non-tenure Track Faculty Organization Leadership Committee – Contract Review Chair (2009-present)

PROFESSIONAL DEVELOPMENT ACTIVITES

- Great Lakes Stewardship Initiative's *Place-Based Education Conference* (2012, 2013)
- MAEOE Annual Conference (2000, 2012, 2013)
- *Great Lakes Conference on Teaching and Learning* – CMU (2013)
- *Transforming Education Towards a More Sustainable Future* – Green Teacher (2013)
- Michigan Science Teacher's Association Annual Conference (2013)
- *Assessment in Action: The Use of Electronic Media for Classroom Assessment* (FSU Faculty Center for Teaching and Learning – FCTL , 2012)
- *Game-Based Learning* (FSU – FCTL, 2012)
- Pearson's *Innovations in Teaching Science* (Washtenaw Community College 2012)
- Preparing Students for a Changing Climate: Campus Sustainability Day 2012 – webcast and interactive panel
- Academy of Natural Resources (DNR): *Forests, Field, & Fins Field Camp* (Roscommon, MI 2012)
- National Wildlife Federation's webinar, *Sustainability in the Classroom* (2011)
- Environmental Protection Agency's webinar, *State of the Lakes Ecosystem Conference* (2011)
- Great Lakes Conference 2010 in E. Lansing, MI - *Learning from the Past, Looking Towards the Future* (2010)
- National Wildlife Federation Webinar – *Evaluating Campus Sustainability* (2010)
- Great Lakes Beach Conference 2010 – *Rapid Analytical Methods Wet Lab*
- The Watershed Academy's *Healthy Lakeshores Through Better Shoreline Stewardship* (2010)
- Interactive webinar on *Creating a Native Plant Specification* – JFNew Full-Service Ecological Solutions (2010)
- Science Fair Judge for Mecosta-Osceola Intermediate School District's, Math, Science, Technology Center (2010)
- Benthic Macroinvertebrate Symposium – MiCorps (Bay City, MI 2005)
- Lilly Conference Series on College and University Teaching and Learning (Traverse City, MI 2002, 2003)
- Pre-Cambrian Geology of the Marquette area (MTU – Ted Bornhorst, Field Geology, May 2002)
- Karst Geology of Michigan field trip (Association of Professional Geologists, Gaylord, MI 2002)
- National Association of Interpreters Annual Meetings (1999-2001)

CERTIFICATIONS

- Wilderness Awareness School - Kamana Naturalist Training Program (2011-2012)
- Environmental Protection Agency's Watershed Management Training Certificate (2010)
- Wildlife Management – Queens College, NY (2010)
- Wilderness First Responder (2001)
- Project Learning Tree (2001)
- Project WILD (2000)

PRESENTATIONS

- *Healthy Lake Ecosystems* (Michigan Chapter, North American Lake Management Society - MCNALMS 2012)
- *Understanding the Shoreline* (MCNALMS 2012)
- *Planning a Natural Shoreline Landscape* (MCNALMS 2012)
- *Basics of Natural Shoreline Ecosystems* (Natural Shoreline Workshop – MRWA 2011, 2012)
- *Native Plant Selection and Design* (Natural Shoreline Workshop – MRWA 2011, 2012)
- *Maintaining a Natural Shoreline* (Natural Shoreline Workshop – MRWA 2011, 2012)
- *Volunteer Stream Monitoring Program* (MRWA & MiCorps) Seminars consisted of educating the public on the physical and ecological dynamics of streams, the biology of benthic macroinvertebrates, and proper sampling and identification techniques (2005-present).
- *Lake & River Monitoring* (MRWA's Aquatic Academy for Teachers 2009, 2010)
- *What's in the Water and Why Should We Care? An Introduction to Simple and Fun Ways to Water Monitoring* (MRWA's Aquatic Academy for Teachers 2008)
- *Earth Day Enlightenment Hike: The History and Significance of Earth Day* (FSU Wellness Week 2007, 2008)
- *This is my True Home: Using Experiential & Place-based Education to Enhance Learning* (FSU Recreation Leadership seminar series 2008)
- Poster presentation at CMU of thesis research *The effects of filamentous cyanobacteria on the growth, survivorship, and fecundity of* Daphnia pulicaria (1999)
- Poster presentation at CMU of research on (co-author) *Daily vertical migrations of* Chaoborus sp. *in response to presence or absence of potential food sources* (1998)
- Poster presentation at CMU on *Sedimentation characteristics & zooplankton assemblages used to determine lake-level fluctuations in Lake Michigan* (1997)

FUNDING

- *Helping Hands to Reforest the Muskegon River Watershed*. Consumers Energy grant for purchasing trees (2012).
- Co-founder/coordinator for the grassroots venture, *Project Stormwater: A collaborative effort between Ferris State University faculty, staff, and students, and the Muskegon River Watershed Assembly, to reduce stormwater runoff into the Muskegon River.* Funding awarded through Ferris Foundation Grant, and Consumers Energy to construct a rain garden on campus (2011, 2010).
- FSU Academic Service Learning funds used to complete projects on campus to reduce stormwater runoff (2009, 2008), and clean up litter along local waterways (2007).
- Received funding from FSU's Political Engagement Project for students to conduct an ecological assessment of the property at Camp Newaygo, MI, *A comparison between the windward and leeward communities of a ridge - biotic and abiotic similarities and differences* (2009).

AWARDS

- Mecosta County Northern Lights Environmental Award (2013)

PROFESSIONAL MEMBERSHIPS

- National Science Teachers Association
- Michigan Science Teachers Association
- American Institute of Biological Sciences
- North American Association of Environmental Education
- Michigan Alliance of Environmental and Outdoor Educators
- Association of Watershed and Stormwater Professionals
- Ecological Society of America
- Big Rapids Rock, Mineral, and Gem Club
- National Wildlife Federation – Campus Ecology
- Muskegon River Watershed Assembly
- The Michigan Nature Association
- Woldumar Nature Center
- The Nature Conservancy
- The Sierra Club

STEWARDSHIP & CONSERVATION EXPERIENCE

- Lake Sturgeon release in the Black River of Michigan (2013)
- Stream quality monitor of Mitchell Creek & Ives Ave Creek (using macroinvertebrates as indicators) (2007-present)
- Great Backyard Bird Count (2010-present)
- Salmon egg harvesting and fertilization for Salmon-in-the-Classroom program (2012 MAEOE conference)
- Assisted in the design & planting of five native rain gardens for the MRWA (2007-2012)
- Organized & participated in 'Litter Cleanup Day' along the Muskegon River, Big Rapids, MI (2002-present) – Alliance for the Great Lakes, The Ocean Conservancy, and MRWA.
- Geology field assistant for the investigation & interpretation of the Muskegon River Valley glacial geology (FSU -2001-present)
- Evaluated Woldumar Nature Center's (WNC) conservation efforts then proposed & implemented plans for composting, removal of exotic species & promoting native/indigenous plant species (1999-2001).
- Researched and planted native prairie plants and wildflowers at WNC (1999-2001).
- Participated in the removal of the exotic plant, purple loosestrife, along the Grand River in Lansing, MI (2000).
- Trained in and participated with The Nature Conservancy's (TNC) for prescribed prairie burns at WNC (2000).
- Participated in bird banding during 1998-1999 Fall and Spring migration through Mt. Pleasant, MI.
- Assisted in fish shocking and inventory of trout populations in the west Pere Marquette River, MI (1998).
- Volunteered for TNC's removal of exotic plant species in the Sleeping Bear Dunes National Lakeshore (1998).
- Assisted with the riverbank preservation along Chippewa River (1997) near Mt. Pleasant, MI.

REFERENCES

Dr. Joe Lipar - Department Head of Biological Sciences (2011-present), FSU (231) 591-2550
Ms. Terry Stilson – Program Coordinator, MRWA (231) 591-2324
Mr. Kevin Frailey – Education Services Manager, DNR (517) 373-7306
Dr. Karen Strasser – former Department Head of Biological Sciences, FSU (2006-2011), FSU (231) 591-3856
Dr. Gary Rodabaugh - Professor of Biology, FSU (231) 591-2308
Ms. Bridget Booth - WNC, Program/ Environmental Education Director (formerly) (517) 853-9863
Dr. Scott McNaught - Professor of Biology, Graduate Advisor, CMU (517) 774-1335
Mr. Dan Benjamin - Biology Instructor, Teaching Assistant Coordinator, CMU (517) 774-2491

JOHN W. JOHNSON

17042 Sierra Drive
Big Rapids, MI 49307
(231) 527-1268
johnjohnson@ferris.edu

EDUCATION

Central Michigan University — **Mt. Pleasant, Michigan**
Master of Arts in Physical Education and Sport — May 2000
Major: Exercise Science

Carthage College — **Kenosha, Wisconsin**
Bachelor of Arts — August 1996
Major: Biology

Alpena Community College — **Alpena, Michigan**
Associate of Science — May 1994
Graduated Magna Cum Laude

EXPERIENCE

Ferris State University — **Big Rapids, Michigan**
Lab Instructor for BIOL 205 — 08/07 to present

- Teach Anatomy/Physiology students pursuing degrees in Nuclear Medicine, Pre-pharmacy, Forensic science, and other allied health professions to apply what they have learned in lecture to experimentation
- Instruct students on proper use of lab equipment
- Assist students in developing skills necessary to approach and solve problems in a scientific manner

Advanced Cardiac Specialists — **Gilbert, Arizona**
Director of Cardiac Rehabilitation (8/01 to 7/06) — 02/99 to 07/06

- Managed five rehab sites
- Served as source of information on exercise, anatomy, physiology, cardiac medications, procedures, and nutrition to patients and staff
- Lectured at community outreach programs
- Acted as liaison between patient and doctor to aid in patient care
- Provided medical surveillance of rehab patients, including BP, HR, SaO2, and ECG analysis
- Performed VO_2 Max stress testing with MedGraphics metabolic cart
- Administered EECP treatments with Vasomedical equipment

Chandler/Gilbert Community College — **Chandler, Arizona**
ACSM Exercise Specialist Workshop Instructor — Summer '00 & '01

- Taught several subjects including ECG Interpretation, Medications, Training Special Populations, New Concepts in Cardiovascular Interventions, and Human Behavior
- Aided in explaining metabolic calculations

Q The Sports Club **Tempe, Arizona**
Personal Trainer 02/99 - 03/99
- Educated clients in proper technique and physiological adaptations to exercise
- Developed exercise programs for clients
- Instructed clients on health risks and nutrition

Central Michigan University **Mt. Pleasant, Michigan**
ECG Assessment Lab Assistant 07/98 – 05/98
- Assisted in ECG interpretation and answered physiological questions
- Instructed students on proper lead placement technique

Central Michigan University **Mt. Pleasant, Michigan**
Human Performance Lab Assistant 09/97 – 12/97
- Assisted students in use of laboratory technical equipment (underwater weighing, spirometry, Quinton stress testing, ECG machines)
- Instructed students on blood pressure techniques
- Body fat composition, strength testing, flexibility testing

Lincoln Haven Health Care Centre **Lincoln, Michigan**
Nurse Assistant 11/96 – 08/97
- Measured vital signs and provided daily care of residents with Multiple Sclerosis, stroke victims, and cognitively impaired

INTERNSHIP

Arizona Heart Institute-East / Cardiac Conditioning **Mesa, Arizona**
Graduate Intern 09/98 – 12/98
- Monitored telemetry unit and hemodynamic responses to exercise
- Calculated exercise prescriptions and assisted in progression of workloads
- Provided source of information for patients and assisted in instruction of undergraduate intern
- Assisted in the administration of stress tests and interpretation of results
- Experience in venipuncture and glucometer
- Performed nutritional summaries and provided patients with dietary information
- Observed CABG, angiogram, and echocardiograms

COMPUTER SKILLS

- Windows XP, some Access
- Nutribase Pro, Dine Healthy
- Internet

ACTIVITIES

- Second-degree black belt in Shorei-Ryu Karate (07/03)
- Volunteered in Physical Therapy department (170 hours) at Alpena General Hospital (1996)
- Studied language and culture at Kitakyushu University in Japan (Summer 1995)
- Co-captain of Carthage College Swim Team (1995-1996)
- US Army Mechanic/Recovery Specialist stationed in Germany (09/88 – 09/91)

HONORS

- CCIW All Academic (12/95)
- Dean's List (01/92 – 12/94)
- Carthage College Presidential Scholarship (09/94)
- Carthage College Robert Todd Scholarship (09/94)
- Army Commendation Medal (07/91)

REFERENCES

Dr. Tariq Khalil
6641 E Baywood Ave # A2
Mesa, AZ
(480) 396-2022 (clinic)
(480) 283-7943 (cell)

Dr. Ambika Bhaskaran
201 W. Guadalupe Rd.
Gilbert, AZ 85233
(480) 545-1847

Mary Haggberg, (RN, BSN)
2087 Leisure World
Mesa, AZ 85206
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CURRICULUM VITAE

Gary Miller

Address: Ferris State University
820 Campus Drive, ASC 2004
Big Rapids, MI 49307
Phone: 231-591-5844 FAX: 231-591-2540
Email: millerg6@ferris.edu

EDUCATION: Grand Valley State University, B.S., Biology, 1991
Bowling Green State University, Ph.D., Biology, 1997

Dissertation Title: The Evolution of Senescence in *Drosophila melanogaster*
(advisor: Dr. Mark H. Gromko)

POSITIONS HELD

Institution	Title	Year
Ferris State University Biological Sciences	Visiting Assistant Professor	Present
University of Kansas Ecology/Evolutionary Biology	Post-Doctoral Researcher	2004-2006
Cuyahoga Community College	Lecturer	2003-2004
Syracuse University Department of Biology	Assistant Research Professor	2002-2003
Syracuse University Department of Biology	Research Associate	1997-1999; 2000-2002
Syracuse University Department of Biology	Teaching Associate	1999-2000
Bowling Green State University Biological Sciences	Teaching Assistant	1991-1994; 1996-1997
Bowling Green State University Biological Sciences	Non-Service Fellowship	1995-1996
Bowling Green State University Biological Sciences	Research Assistant	1994-1995

TEACHING EXPERIENCE

Ferris State University-Assistant Professor		Semester
BIOL 121	General Biology I	Fall 2006
		Summer 2007
		Fall 2007
BIOL 122	General Biology II	Spring 2007

Cuyahoga Community College- Instructor

BIO 1500	Principles of Biology I Intro to molecular, cell, genetics, and evolution for majors	Fall 2003 Spring 2004
BIO 1100	Intro to Biological Chemistry	Fall 2003 Spring 2004

Syracuse University - Instructor		Semester
BIO 345	Population Biology Population and evolutionary genetics	Spring 2000
BIO 799	Seminar in Evolutionary Biology Darwin and The Origin of Species	Fall 1997

Bowling Green State University - Laboratory Instructor

BIO 204	Concepts in Biology I Introduction to ecological and evolutionary biology for majors	Fall 1991 Spring 1992 Fall 1992 Spring 1993
BIO 104	Introduction to Biology The cell, metabolism, genetics,reproduction, development, evolution, ecology for non-majors	Fall 1993 Spring 1994
BIO 205	Concepts in Biology II Introduction to molecular and cellular biology for majors	Fall 1996 Spring 1997

PUBLICATIONS:

Miller, G. T., Starmer, W. T. and S. Pitnick. 2003. Quantitative genetic analysis of among-population variation in sperm and female sperm-storage organ length in *Drosophila mojavensis*. Genetical Research 81: 213-220.

Miller, G. T. and S. Pitnick. 2003. Functional significance of seminal receptacle length in *Drosophila melanogaster*. Journal of Evolutionary Biology 16: 114-126.

Pitnick, S., Miller, G. T., Schneider, K., and T. A. Markow. 2003. Ejaculate-female coevolution in *Drosophila mojavensis*. Proceedings of the Royal Society of London B 270: 1507-1512.

Miller, G. T. and S. Pitnick. 2002. Sperm-female coevolution in *Drosophila*. Science 298: 1230-1233.

Miller, G. T., Starmer, W. T. and S. Pitnick. 2001. Quantitative genetics of seminal receptacle length in *Drosophila melanogaster*. Heredity 87: 25-32.

Pitnick, S., Brown, W. D. and G. T. Miller. 2001. Evolution of female remating behaviour following experimental removal of sexual selection. Proceedings of the Royal Society of London B 268: 557-563.

Pitnick, S., Miller, G. T., Reagan, J., and B. Holland. 2001. Males' evolutionary responses to experimental removal of sexual selection. Proceedings of the Royal Society of London B 268: 1071-1080.

Pitnick, S. and G. T. Miller. 2000. Correlated response in reproductive and life history traits to selection on testis length in *Drosophila hydei*. Heredity 84: 416-426.

INVITED DEPARTMENTAL SEMINARS

Bowling Green State University, Department of Biological Sciences, Fall 1993.
Syracuse University, Department of Biology, Fall 1997.
University of Kansas, Ecology and Evolutionary Biology, Fall 2004

CONFERENCE PRESENTATIONS

Miller, G. T. and M. H. Gromko. 1994. Joint Meeting of the SSE, ASN, SMBE, and SSB, Atlanta, Georgia.

Miller, G. T. and M. H. Gromko. 1995. Joint Meeting of the ASN, SSB, NT and SSE, Montreal, Canada.

Pitnick, S., Miller, G. T., and T. L. Karr. 1998. 7th International Behavioral Ecology Congress, Pacific Grove, California.

Pitnick, S., Miller, G. T., Reagan, J., and B. Holland. 2000. Joint Meeting of the SSE, ASN, ATB, and SSB, Bloomington, Indiana.

Gleason, J. M., Cropp, K. A., Dewoody, R. S., Drury, D., and G. T. Miller. 2004. Kansas NSF Epscor Symposium, Genes in Ecology, Ecology in Genes, Overland Park, Kansas.

Miller, G. T. and J. M. Gleason. 2005. Ecological Genomics Spring Workshop, Manhattan, Kansas.

Miller, G. T., Dewoody, R. S., Cropp, K. A., and J. M. Gleason. 2005. Kansas NSF Epscor Symposium, Genes in Ecology, Ecology in Genes, Overland Park, Kansas.

Curriculum Vitae

Schuyler T. Pike

1933 Desert Sun Dr.
El Paso, Texas 79938

Mobile Phone: 517-455-8202
Email: sky.pike@hotmail.com

EDUCATION

Postdoctoral Fellow/Trainee:

Teaching: 2014 to Present, The University of Texas at El Paso, Department of Biosciences and Women's Studies Program, El Paso, Texas 79968

- *Development and Instruction of Interdisciplinary Courses*
- *Additional education in Medical Sociology*

Research: 2008 to 2013, Michigan State University, Center for Integrative Toxicology, East Lansing, Michigan 48824

- *Additional education in Toxicology, Pharmacology and Immunology*

Ph.D., Molecular Biology, December 2008
The University of Texas at Austin, Austin, Texas 78712
Dissertation: *Characterization of Mitochondrial C_1-Tetrahydrofolate Synthase Transcript and Protein Expression in Adult and Embryonic Mammalian Tissues and the Role of the Mitochondrial One-Carbon Pathway in the Cytoplasmic Methyl Cycle*

B.A., Biology, May 1992
Cornerstone University, Grand Rapids, Michigan 49525

Post-baccalaureate studies in Physics, Fall 1992 and Spring 1997
Aquinas College, Grand Rapids, Michigan 49506

TEACHING EXPERIENCE

Pre-Medical Course Development and Instruction, Fall 2014 to Present
The University of Texas at El Paso, Department of Biological Sciences, El Paso, Texas 79938,
Supervisors: Kristen Gosselink, Ph.D. and Gina Nunez, Ph.D.

✓ Sociopolitical Toxicology/Corporations, Power and Pollution
- Interdisciplinary course between the biological and sociological sciences and Women's Studies examining the effects of different classes of toxicants on human and environmental health
- Examines the power and control exercised by corporate producers of toxicants on economics, society, governments and science
- Cross-listed in Biological Sciences (graduate and undergraduate level), Anthropology (undergraduate level), Sociology (undergraduate level) and Women's Studies (undergraduate level)
- Undergraduate and Graduate Students

✓ Epigenetics and Environment/Societal Determinants of Health and Disease
- Interdisciplinary course between the biological and sociological sciences and Women's

Studies examining the new science of epigenetics
- Epigenetics is environmentally induced changes in gene expression that can be transgenerational
- Promotes student understanding of the role that societal factors (i.e., access to good nutrition, exposure to toxicants and stress) play in the processes of disease and health
- Cross-listed in Biological Sciences, Anthropology, Sociology and Women's Studies (each at the undergraduate level)
- Current class (summer 2016) with only biology students is being reformatted and taught to develop a new Epigenetic course that is biological, rather than interdisciplinary, in nature.

✓ Medicinal Sciences Laboratory
- 2 week laboratory course (Offered Wintermesters and Maymesters)
- Goal is to acquaint students with laboratory skills and techniques used in medical clinical assays and give them hands-on experience in cutting-edge biomedical science

✓ National Science Foundation (NSF) Educational Grant Submission (November 2015)
- Title: *E3: Engagement, Exploration, Experimentation to Enhance Stem Recruitment and Retention*
- Collaboration between the Departments of Biology, Geology, and Mathematics, and the College of Education
- Seeks to bring minority students into STEM fields through scientific understanding of a local environmental concern in the El Paso area (arsenic contamination) and the effects on health that exposures bring
- The Environmental emphasis, as well as much of the structure of the study and the experimental plan, are based on my suggestions and experience
- Currently being prepared for resubmission

✓ Instructor of General Biology class of over 100 students

✓ Distance Learning Training/Certification
- Blackboard
- Moodle

Guest Lecturer, February 2012
The University of Texas at El Paso, Department of Biological Sciences, El Paso, Texas 79938
Delivered lectures in Anatomy and Physiology for Dr. Kristin Gosselink

Michigan State University, Department of Biochemistry and Molecular Biology, East Lansing, Michigan 48824
Delivered lectures to a 500 student biochemistry class for Dr. Thomas Sharkey

Reading Course Development, Fall 2011
Michigan State University, Department of Pharmacology and Toxicology, East Lansing, Michigan 48824
Organized class outline, structure, and syllabus for a "Topics in Toxicology" reading course with Dr. John LePres (The Role of the Mitochondria in Toxicology and Pharmacology) offered spring 2013

Graduate Teaching Assistant
The University of Texas at Austin, Department of Chemistry and Biochemistry, Austin, Texas 78712

- Biochemistry for Non-Majors (Spring 2008), under Prof. Barrie Kitto, Ph.D.
- Biochemistry II (Fall 2006), under Anne Tibbetts, Ph.D and Gisela Kramer, Ph.D.
- Biochemistry I (Spring 2006), under Anne Tibbetts, Ph.D and Gisela Kramer, Ph.D.
- Biochemistry I (Fall 2005), under Prof. Jon Robertus, Ph.D.
- Biochemical and Molecular Biology Laboratory Techniques (Spring 2002), under Gisela Kramer, Ph.D.
- Advanced Inorganic Chemistry Laboratory (Fall 2001), under Prof. Joseph Lagowski, Ph.D.

Promoted student comprehension of class subject matter during regular office hours, review sessions, and class-time interactions

R.I.S.E. (Rehabilitation, Information, Support, and Empowerment) Seminar Lecturer, Facilitator, Marketer, and Coordinator, May 1999 to May 2001
The National Kidney Foundation of Michigan (NKFM), Ann Arbor, Michigan 48108

- Community-based education effort to educate and instruct dialysis and kidney transplant patients, dieticians, and social workers on the physiology, pathology and treatment of end-stage renal disease
- Enabled patients to retain or restore better health outcomes allowing reintegration into paid or volunteer employment
- Marketed seminars in dialysis and transplantation clinics
- *Before being modified from its original format, as developed by Wayne Nix and Ray Blackstock at NKFM, this program was highly successful in it outcomes with the great majority of participants able to return to some form of an enhanced quality of life including employment*

Scholastic Aptitude Test Scorer, June to July 1998 and June 2001
Measurement Incorporated, Durham, North Carolina 27701
Test scoring location: Grand Rapids, Michigan

Substitute Teacher, November 1998 to May 1999
Ionia Intermediate School District, Ionia, Michigan 48846

Undergraduate Teaching Assistant (Biology, Chemistry and Biochemistry), September 1991 to December 1992
Cornerstone University, Grand Rapids, Michigan 49525

RESEARCH EXPERIENCE
Postdoctoral Fellow/Research Associate, October 2008 to July 2013
Michigan State University, Center for Integrative Toxicology, East Lansing, Michigan 48824
Carcinogenesis Laboratory, March 2013 to July 2013
Supervisor: J. Justin McCormick, Ph.D.
Discovered three potential carcinogenic gene/protein candidates

Postdoctoral Fellow/Research Associate.
Molecular and Cellular Immunotoxicology Laboratory, October 2008 to February 2013
Supervisor: Norbert Kaminski, Ph.D.

- Expertise in immunotoxicology, especially related to cannabinoid-induced cell signaling
- Successfully wrote and was funded by an individual Ruth L Kirchstein National Research Service Award (NRSA)
- Completed Computational Modeling of Dose Response course given by the Hamner Institute
- Attended graduate level pharmacology/toxicology and immunology courses and seminars
- Characterized how the endogenous cannabinoid, anandamide, modulates T cell function through interactions with elucidated cannabinoid receptors
- Presented results at international scientific meetings and peer-reviewed journals

Graduate Research Assistant, September 2001 to August 2008
The University of Texas at Austin, Department of Chemistry and Biochemistry; Austin, Texas 78712,
Supervisor: Dean Appling, Ph.D.

- Expertise in metabolic biochemistry, molecular biology and developmental genetics
- Characterized the novel mammalian enzyme, mitochondrial C1-tetrahydrofolate synthase, during embryonic development and in adult tissues
- Presented and participated in one-carbon metabolism, mitochondrial and developmental biology journal clubs
- Presented results at international scientific meetings and peer-reviewed journals

BUSINESS & ENTREPENEURIAL EXPERIENCE
Independent Consultant, October 2013 to July 2014
Monterrey, Nuevo Leon, Mexico

- Provided scientific expertise to a health education and therapy-based business educating people on the effects of toxins and the importance of a clean environment on the earth (Pura Vida, Monterrey, Nuevo Leon, Mexico)
- Facilitated an effort towards international collaborations between a College of Education (Escuela Normal Miguel F. Martinez, Monterrey, Nuevo Leon, Mexico) and colleges of education in the United States
- Acquired basic proficiency in Spanish

Agriculture (Family Farm/Business), June 1992 to July 2000
Clark-Bell Farms, Belding, Michigan 48809

- Medium-sized (1000 acres) vegetable and grain crop production operation
- Performed normal crop production activities (planting, tilling and harvesting) as well as grading and packing of vegetable crops
- Co-managed business affairs (payroll, accounting and legal)

Office Staff, March 1996 to March 1998
Dan Croel Insurance Agency, Ionia, Michigan 48846

PUBLICATIONS

Pike ST, Chen W, Kaplan BLF, Crawford R and Kaminski NE. "T Cell Activation Magnitude Dictates Endocannabinoid Receptor Usage". *Manuscript in Preparation.*

Chen W*, Kaplan, BLF*, **Pike, ST,** Topper, LA, Lichorobiec NR, Simmons SO, Ramabhadran R, and Kaminski, NE. (2012) "Magnitude of Stimulation Dictates the Cannabinoid-Mediated Differential T Cell Response to HIV_{gp120}." *J. Leuk. Biol.* 92, 1093-1102, (**Authors contributed equally to work)*

Pike ST, Rajendra R, Artzt KA, Appling DR. (2010) "Mitochondrial C1-THF Synthase (MTHFD1L) Supports Flow of Mitochondrial One-Carbon Units into the Methyl Cycle in Embryos". *J. Biol. Chem.* 285, 4612-4620.

Prasannan P*, **Pike ST***, Peng P, Shane B, and Appling DR. (2003) "Human Mitochondrial C_1-Tetrahydrofolate Synthase: Gene Structure, Tissue Distribution of the mRNA, and Immunolocalization in Chinese Hamster Ovary Cells". *J. Biol. Chem.* 278, 43178-43187. (**Authors contributed equally to work)*

CONFERENCE PRESENTATIONS

Pike, ST, Crawford R, Kaplan. BLF, and Kaminski, NE. Cannabinoid Receptors and PPAR-gamma Interactions in Endocannabinoid-Modulated Differential $CD8^+$ T Cell Responses, March 2013, Society of Toxicology Annual Meeting, San Antonio, Texas.

Pike, ST, Chen, W, Kaplan, BLF and Kaminski, NE. "An In Vitro Immune Response Model Mimicking Early-Stage HIV Infection for Elucidating Mechanisms of Cannabinoid-Induced Immune Modulation", July 2011, 21st Annual Symposium of the International Cannabinoid Research Society, St. Charles, Illinois.

Fakhouri, W, Figueira, H, Kariagina, A, Manzan, A, Pattanaik, B, **Pike, ST**, Steiner, A, Zeng, W. "Michigan State University Postdoc Survey 2009: What We Learned and What We Need to Know", March 2010, *National Postdoctoral Association Annual Meeting*, Philadelphia, Pennsylvania.

Pike, ST and Appling, DR. "The Role of Mitochondrial C_1-Tetrahydrofolate Synthase in Embryonic Development", August 2006, *Folic Acid, B12 and One-Carbon Metabolism: FASEB Summer Research Conference*, Indian Wells, California.

Pike, ST and Appling, DR. "The Role of Mitochondrial C_1-Tetrahydrofolate Synthase in Vertebrate Development", July 2005, *Gene and Nutrient Interactions: FASEB Summer Research Conference*, Tucson, Arizona.

Pike, ST and Appling, DR. "The Role of Mitochondrial C_1-Tetrahydrofolate Synthase in Vertebrate Development", July/August 2004, *Folic Acid, B12 and One-Carbon Metabolism: FASEB Summer Research Conference*, Snows Mass Village, Colorado.

Prasannan, P, **Pike, ST** and Appling, DR. "Characterization of Mitochondrial C_1-Tetrahydrofolate Synthase", July 2002, *Folic Acid, B12 and One-Carbon Metabolism: FASEB Summer Research Conference*, Snows Mass Village, Colorado.

PROFESSIONAL MEMBERSHIPS

- Society of Toxicology (Since January 2010)
- American Association for the Advancement of Science (January 2010 – January 2015)
- International Cannabinoid Research Society (July 2011-July 2012)

HONORS AND AWARDS

- February 2011 to January 2012, Ruth L. Kirschstein National Research Service Award (NRSA) Individual fellowship recipient from the National Institutes on Drug Abuse, grant number: F32 DA031067 (*Endocannabinoid Suppression of T Cell Mediated Host-Resistance to HIV*), Michigan State University
- October 2008 to October 2010, NRSA Institutional (MSU) Training Grant fellowship recipient from the National Institutes of Environmental Health and Safety, grant number: T32 ES007255, Michigan State University, East Lansing, MI
- 2004 FASEB Summer Research Conference Research Poster Award, Snowsmass Village, CO
- 1992 *summa cum laude* graduate, Cornerstone University, Grand Rapids, MI
- 1992 Science and Social Science Departmental Award, Cornerstone University
- 1991 Au Sable Institute of Environmental Studies Summer Scholarship, Au Institute of Environmental Studies, Mancelona, MI
- 1991 and 1992, Who's Who In American Colleges and Universities
- 1991, All American Scholar

PROFESSIONAL SERVICE & LEADERSHIP

Postdoctoral Representative, Michigan Society of Toxicology, May 2011 to May 2013

- Interacted with academics and industry scientists in the field of toxicology from a variety of disciplines from environmental science, public health and pharmaceutical and chemical manufacturers
- Planned and prepared bi-annual meetings
- Judged poster sessions to award cash prizes at bi-annual meetings and Michigan State University undergraduate science expositions

Co-chair/Acting Chair/Member, Michigan State University (MSU) Postdoctoral Association (PDA) Steering Committee, December 2009 to May 2013

- Lead efforts to prepare and enact MSU PDA by-laws as the acting chair and then co-chair
- Designed, analyzed and presented two surveys examining changing demographics, working conditions and satisfaction among MSU postdoctoral scholars to MSU administrators and at National PDA conferences
- Oversaw organizational funds, events and committees

Postdoctoral representative, MSU Vice President for Research and Graduate Studies Search Committee, June to October 2012

- Interviewed candidates for the MSU Vice President of Research and Graduate Studies
- Member of a committee composed of upper level MSU administrators, professors and outside consultants

Postdoctoral Representative, MSU Research Integrity Council, June 2010 to June 2011

Collaborated with administrative, faculty and graduate student representatives preparing updated MSU authorship and plagiarism guideline recommendations

Postdoctoral Representative, MSU CAFFE (Center for Academic Future Faculty Excellence) Advisory Committee, June 2010 to June 2011

Provided guidance to MSU administrators implementing a National Science Foundation funded program to better prepare graduate student and postdoctoral academics for faculty careers

Co-Initiator/Charter Member, Paul D. Gottlieb (Nobel Laureate) Lecture Series Committee, The University of Texas at Austin, June 2004 to July 2006

Brought three Nobel Laureates in Physiology and Medicine (Sydney Brenner, Richard Roberts and Phillip Sharp) to present lectures on campus

Host for Prospective Students to the Cell and Molecular Biology Program and Department of Chemistry and Biochemistry, The University of Texas at Austin, 2002 to 2008

National Kidney Foundation of Michigan (NKFM) Legislative Canvasser, Summers 2000 and 2001

- Educated State of Michigan legislators and staff about the effectiveness of NKFM health education programs
- Resulted in State of Michigan continuing to fund NKFM programs and services

National Kidney Foundation, Patient and Family Council, Michigan Chapter, May 2000 to July 2001

Advised on directives and decisions being considered by The National Kidney Foundation

Anna M. Rizzo, B.S.

21701 Forest Lake Dr., Big Rapids, MI 49307

Cell: (231) 679-6803 ✦ Office: (231) 591 -5841

rizzoa@ferris.edu

Education

Bachelor of Science ,Applied Biology with emphasis in Pharmacy, Ferris State University, Big Rapids, MI, 1990.

Masters of Education, Vocational Education, Ferris State University, Big Rapids, MI, Currently Pending.

Professional Profile

- Strong team player who performs equally well independently.
- Knowledgeable in many areas of Biology, i.e. botany, anatomy, genetics, zoology, environmental
- Strong background in course design.
- Teaching approach covers all facets of learning: visual, auditory, kinesthetic

Academic / Teaching Experience

Instructor at Ferris State University, Big Rapids, MI August 1995 – Present

- Biology 101 Lab Basic Human Genetics
- Biology 111 Lab Environmental Biology
- Biology 121 and 122 General Biology (majors)
- Biology 205 Lab Human Anatomy (Allied Health majors)
- Biology 109 Human Anatomy and Physiology
- Biology 114 Turf Grass Management (8 years)

Structured Learning Assistant/CLS Facilitator at Ferris State University, Big Rapids, MI, 1995 – 1999

- Worked cooperatively with appointed staff in order to align curriculum for higher student achievement.
- Applied appropriated study skills for maximum achievement in course work in biology.
- Courses Facilitated: Biology 101, Biology 375 Genetics (majors), Biology 205 and Biology 122

Para-Professional, Academic Support Center, Ferris State University, Big Rapids, MI August 1996 - 1999

- Develop Seminars for Test-anxiety, study skills, test-taking, time management and reading comprehension.

- Tutoring: Biology and Chemistry

Substitute Teacher, Big Rapids Public School and Reed City Public School 1997 -1999

- Fourth Grade, Kindergarten, Music, and high school biology and chemistry

Committees and University Affiliations

Ferris Non-Tenure Faculty Organization, Ferris State University, Big Rapids 2012 – Present

- President July 2013 – Present
- Vice- President May 2012 – July 2013
- Originating member 2012
- Member of the bargaining team 2013

Presidents Leadership Committee, Ferris State University, Big Rapids 2012 – Present

- Discuss and vote on University wide proposals/policies.

Health Care Committee, Ferris State University, Big Rapids, MI 2012 – Present

- Evaluate medical insurance coverage
- Determine which policies benefit employees
- Provide feedback and university recommendations.

AAUW, Ferris State University Big Rapids, MI 2012 – Present

- Women in the workplace discussions
- Community service projects
- Raise Scholarship money for female students.

Community

Big Rapids Garden Club 2000 – 2003

Brookside Elementary, Big Rapids, MI 2008 – 2012

- PTO e-board member
- Secretary, Vice-President, and President

Big Rapids Co-Op Preschool, Big Rapids MI 1994 -1996

- Executive Board Member

References

Dr. David M. Griffith
Professor of Biology
Ferris State University
820 Campus Dr.
SCI 141
Big Rapids, MI 49307
davidgriffith@ferris.edu

Dr. Mary Murnik
Professor of Genetics
Ferris State University
820 Campus Dr.
ASC 2117
Big Rapids, MI 49307
marymurnik@ferris.edu

Mr. John Johnson
Instructor
Biology
Ferris State University
SCI 141
Big Rapids, MI 49307
JohnJohnson@ferris.edu

R. Douglas Workman, Ph.D – Curriculum Vitae

Education:

- **Ph. D. in Fisheries, March 2002.** Department of Fisheries and Wildlife, Michigan State University, East Lansing, Michigan.
- **M. S., Biology, 1994.** Emphasis in Fisheries and Aquatic Sciences. Murray State University. Murray, Kentucky.
- **B. S. Department of Fisheries and Wildlife, June 1991.** Michigan State University. East Lansing, Michigan.

Professional Experience:

Advanced Ecological Management, Inc. Reed City, MI
Fisheries/Aquatic Biologist 05/06 to present. Conducting comprehensive fisheries community and aquatic habitat assessments for numerous private firms, including hydro-facilities, as part of environmental assessments. Perform weekly hydrologic monitoring, including stream flow and water level measurement. Conduct threatened and endangered species surveys. Conduct and implement aquatic habitat improvement as part of habitat restoration projects. Coordinate and conduct environmental assessments, and Phase I Environmental Site Assessments. Conduct wetland assessments using a combination of field investigations and GIS analyses.

Ferris State University, Big Rapids, MI
Adjunct Faculty, Biology Department 08/06 to present. Instructor for biology courses.

King & MacGregor Environmental, Inc., Grand Rapids, MI
Fisheries/Aquatic Biologist 01/01 to 05/06. Conducted aquatic habitat sampling and fisheries community assessments for hydro-facility licensing, roadway improvement projects, and other environmental assessment projects. Conducted threatened and endangered species fish surveys. Used GIS to assess land use features that influence invasive plant distributions within mitigation wetlands. Conducted large-scale wetland assessments using a combination of field investigations and GIS analyses. Developed and implementing quantitative study designs for analyses of sensitive headwater systems and other aquatic systems.

Michigan State University, East Lansing, MI
Research Assistant 01/96 to 01/01. Conducted a movement and spawning study of steelhead and longnose suckers in the Pere Marquette River, Michigan using radio telemetry. Investigated fish movement using GIS and developed a model to predict steelhead migratory behavior in response to changes in water temperature and stream flow. Evaluated the influence of an electric sea lamprey barrier on the movements of steelhead and longnose suckers, and described steelhead spawning habitat selection.

Snell Environmental Group Inc., Lansing, MI
Environmental Scientist 05/94 to 01/96. Conducted aquatic habitat sampling. Prepared Environmental Impact Statements, Environmental Assessments, and Phase I Environmental Assessments. Conducted public meetings, wetland delineations, monitored wetland mitigation sites, and conducted corridor land-use analyses using GIS. Project manager for several airport Environmental Assessments.

Murray State University-Hancock Biological Station, Murray, Kentucky
Laboratory Technician/Student Worker 06/93 to 02/94. Water sample collection and analysis for the Kentucky Lake Monitoring Program. Analysis of benthic community distribution in relation to groundwater flow in a Kentucky Lake embayment. Provided seminar presentations for visiting high-school students.

Murray State University. Murray, Kentucky
Research Assistant 08/91 to 06/93. Studied movement and spawning of largemouth bass in Reelfoot Lake, Tennessee to identify problems with recruitment. Evaluated movement patterns and identified home range size using GIS. Identified spawning habitat and movements in relation to water quality.

Michigan State University East Lansing, Michigan
Field Technician/Summer Internship 06/90 to 09/90. Stream ecosystem and habitat study of smallmouth bass and rockbass in relation to water flow on the Huron River, Michigan. Gained familiarity with IFIM by conducting stream flow measurements, habitat identification, and other data collection.

Activities and Achievements:

Chair of the Membership Committee, North Central Division of the American Fisheries Society, 2006-present

Past-President of the Michigan Chapter of the American Fisheries Society 2006

President of the Michigan Chapter of the American Fisheries Society, 2005-2006

President-elect of the Michigan Chapter of the American Fisheries Society, 2004

Chair of Continuing Education Committee, Michigan Chapter of the American Fisheries Society, 2003-8

Web-page Development Committee, Michigan Chapter of the American Fisheries Society, 2002-3

Recipient of best poster award at the Midwest Fisheries Conference in Bettendorf, IA, 2002.

Newsletter Editor of the Education Section of the American Fisheries Society, 1998 to 2001

Administrator and Developmental Assistant of the Non-Game Fish Identification Class of the Michigan Chapter of the American Fisheries Society's Committee for Continuing Education, 1997 to 1998

Activities and Achievements continued:

Moderator of the Fisheries Publications Bulletin Board, Department of Fisheries and Wildlife Graduate Student Organization, 1996 to 1997

Volunteer Conservation Officer for the Michigan Department of Natural Resources, 1989 to 1997

Member: American Fisheries Society
1989 to Present

Trout Unlimited
1996 to 2004

Recipient of the Sigma Xi, scientific fraternity award for public speaking and scientific paper presentation, 1993

Recipient of the Sisk Scholarship Award for academic excellence in aquatic sciences, 1992

Courses and Lectures Taught:

- BIO 103 Biology for non majors, Fall 2006, Spring 2008, Ferris State University
- Computer/network training workshop 1999-2000, conducted workshop to provide training to College of Business graduate students to connect personal computers to MSU network, Michigan State University
- Chaos and Fractals, one lecture during Spring 2000 Teaching Seminar Series, Michigan State University
- FW 471 Ichthyology Teaching Assistant Fall 1997, and frequent guest lecturer Fall 1998 and 1999
- Ecology, guest lecture, Summer 1998, Michigan State University
- Zebra Mussel Workshop-Hancock Biological Station, Murray State University

Certifications and Professional Training:

- Aquatic Plant Identification Workshop, American Fisheries Society, 2009
- Mine Safety and Health Administration 24-hour Part 46 New Miner Training, October 2008
- Smith-Root Electro-Fishing Techniques Workshop, American Fisheries Society, 2008
- Mussel Identification/Life History Workshop, American Fisheries Society, 2007
- Introductory Fluvial Geomorphology Workshop, American Fisheries Society, 2005
- Fisheries Popluation Estimation Workshop, American Fisheries Society, 2005
- Statistical Aspects of Sampling Freshwater Fish Populations and Habitats, American Fisheries Society, 2003

Certifications and Professional Training continued:

- Basic/Intermediate GIS for Fisheries Biologists/Managers, American Fisheries Society, 2003
- Wetland delineation training course, Wetland Training Institute of Frederick Maryland. 1995
- PADI Open-Water Diver Certification, 1991

Presentations:

Workman, R.D. 2010. Invasive species: Asian carp and the Great Lakes Region. Benzie County Chamber of Commerce Public Forum. March 2010.

Workman, R.D. 2010. Invasive species: Asian carp and the Great Lakes Region. Branch County Exposition. March 2010.

Workman, R.D., M.P. Owens, C.L. Wolverton, G.J. Goodman. 2006. Creating wetlands for compensatory mitigation by reclamation of iron mine tailings basins at the Republic Mine in Marquette, Michigan. The 7th Annual Interational Conference of Acid Rock Drainage. St. Louis, MO. March 2006.

Workman, R. D. 2005. An investigation of landscape features that influence the invasiveness of reed canarygrass in compensatory mitigation wetlands. Midwest Fish and Wildlife Conference. Grand Rapids, MI. December 2005.

Workman, R. D. 2005. Career opportunities in Michigan's environmental consulting industry. Lake Superior State University Fisheries and Wildlife Club. Sault Ste. Marie, MI. April 2005.

Workman, R. D., and M. Selzer. 2004. Reed canarygrass (*Phalaris arundinacea*) landscape evaluation and experimental control study. Multi-resource agency meeting in Lansing, MI. November 2004.

Workman, R. D., D. Hayes, and T. G. Coon. 2002. Steelhead spawning habitat selection in the Pere Marquette River, Michigan. Poster presentation at the North Central Division of the American Fisheries Society Midwest Fisheries Conference, Bettendorf, IA. December 2002.

Workman, R. D. 2002. Steelhead spawning habitat selection in the Pere Marquette River, Michigan. Michigan Chapter of the American Fisheries Society Spring Meeting, Muskegon, MI. March 2002.

Workman, R. D., D. Hayes, and T. G. Coon. 2000. A temperature and flow-based model for predicting upstream movement of migratory steelhead in Lake Michigan. American Fisheries Society Annual Meeting, St. Louis, MO. August 2000.

Presentations continued:

Workman, R. D., D. Hayes, and T. G. Coon. 2000. A temperature and flow-based model for predicting upstream movement of migratory steelhead in Lake Michigan. Michigan Chapter of the American Fisheries Society Spring Meeting, East Lansing, MI. March 2000.

Workman, R. D., D. Hayes, and T. G. Coon. 1999. A temperature-based model for predicting upstream movement of migratory steelhead in Lake Michigan. 61st Annual Midwest Fish and Wildlife Conference, Chicago, IL. December 1999.

Workman, R. D., and T. G. Coon 1999. Spawning and movement of steelhead and longnose suckers in the Pere Marquette River. Annual Report to the Michigan Department of Natural Resources, Ann Arbor, MI. April 1999.

Workman, R. D., and T. G. Coon 1998. Spawning and movement of steelhead and longnose suckers in the Pere Marquette River. Lansing, MI Chapter of Trout Unlimited. Lansing, MI. October 1998.

Workman, R. D., and J. M. Jones. 1994. Spawning and movement of largemouth bass (*Micropterus salmoides*) in Reelfoot Lake, Tennessee. Environmental Systems Research Institute, Inc. 1994 User Conference. Palm Springs, CA. May 1994.

Workman, R. D., and Tom Timmons. 1994. Spawning and movement of largemouth bass (*Micropterus salmoides*) in Reelfoot Lake, Tennessee. Southeastern Conference of the American Fisheries Society Annual Meeting, Chattanooga, Tennessee. March 1994.

Workman, R. D., and Tom Timmons. 1993. Movement behavior of largemouth bass (*Micropterus salmoides*) in Reelfoot Lake, Tennessee. Kentucky Chapter of the American Fisheries Society Annual Meeting, Frankfort, Kentucky. March 1993.

Publications:

Workman, R.D., M.P. Owens, C.L. Wolverton, G.J. Goodman. 2006. Creating wetlands for compensatory mitigation by reclamation of iron mine tailings basins at the Republic Mine in Marquette, Michigan. Proceedings of the 7th Annual Interational Conference of Acid Rock Drainage.

Workman, R. D., M. Selzer, and M. Pennington. 2006. Assessing the invasiveness of reed canarygrass using landscape features. Michigan Department of Transportation. Lansing, Michigan

Workman, R. D., D. B. Hayes, and T. G. Coon. 2004. Rainbow trout spawning habitat selection in the Pere Marquette River, Michigan. Journal of Great Lakes Research 30(3):397-406.

Workman, R. D., D. B. Hayes, and T. G. Coon. 2002. A temperature and flow-based model for predicting upstream movement of migratory steelhead in Lake Michigan. Transactions of the American Fisheries Society 131:463-475.

Publications continued:

Workman, R. D., D. B. Hayes, and T. G. Coon. 2000. A description of the migratory behavior of steelhead (*Oncorhynchus mykiss*) and longnose suckers (*Catostomus catostomus*) in the Pere Marquette River, Michigan. Research Report to the Michigan Department of Natural Resources, Ann Arbor, Michigan.

Workman, R. D., and J. M. Jones. 1994. Spawning and movement of largemouth bass (*Micropterus salmoides*) in Reelfoot Lake, Tennessee. Environmental Systems Research Institute, Inc. 1994 User Conference Proceedings.

White, D. S., K. Johnston, G. Rice, and R. D. Workman. 1994. Ecology of the Hyporheic Interface of a Third Order Kentucky Stream. Abstract. Proceedings of the Second International Conference on Ground Water Ecology.

DANIEL A. ADSMOND – Curriculum Vitae

Education

B.S. Chemistry, Northern Michigan University, Cum Laude, 4/82

Ph.D., Chemistry, University of Minnesota, 4/91 Advisor: Margaret C. Etter, Thesis title: "Designing and Synthesizing Organic Crystals with Aminopyrimidine Building Blocks"

Employment History

Aldrich Chemical Company, Synthetic Organic Chemist 1983-1985
University of Minnesota, Graduate Teaching Assistant, Department of Chemistry 1985-1987
University of Minnesota, Graduate Research Assistant, Department of Chemistry 1987-1991
University of Minnesota, Postdoctoral Research Associate, Department of Pharmaceutics 1991-1992
Morehead State University, Assistant Professor of Chemistry 1992-97
Morehead State University, Associate Professor of Chemistry 1997-98
Ferris State University, Assistant Professor of Chemistry 1998- 2001
Ferris State University, Associate Professor of Chemistry 2001 - 2006
Ben Gurion University of the Negev, Beer Sheva, Israel, Visiting Research Scientist, 2006-2007
Ferris State University, Professor of Chemistry 2006 – present
University College Cork, Cork, Ireland, Visiting Research Scientist, September-December 2014

Scholarly and Professional Activities

Sabbatical
2014 Fall semester, research in ternary cocrystallization, University College Cork, Cork, Ireland

2006-2007 academic year spent carrying out research in solid-state organic chemistry at Ben Gurion University of the Negev, Beer Sheva, Israel.

Refereed Publications
"Polymorphic Co-crystals from Polymorphic Co-crystal Formers: Competition between Carboxylic Acid-Pyridine and Phenol-Pyridine Hydrogen Bonds," A. Lemmerer, D. Adsmond, C. Esterhuysen, J. Bernstein, *Crystal Growth & Design*, **2013**, *13* (9), 3935–3952.

"Maximizing Scientific Thought through the Design of a Collaborative Research-Based Organic Chemistry 2 Laboratory Course, D. Adsmond, *Chemica nella Scuola, Rivista CnS: Speciale n. 3* -**2012**.

"An Investigation of the Hydrogen-Bond Peferences and Co-crystallization Behavior of Three Didonor Compounds," A. Lemmerer, D. Adsmond, J. Bernstein, *Crystal Growth & Design*, **2011**, *11* (5), 2011–2019.

"Hydrogen Bonding in Sulfonamides," D. Adsmond, D. Grant, *J. Pharm. Sci.*, **2001**, 90, 2058-2077.

"Relationships Between Solution Thermodynamics and Hydrogen-Bond Patterns of Crystalline Dialkylhydroxypyridone Iron Chelators and their Formic Acid Solvates," S. Ghosh, D. Adsmond, D. Grant, *J. Pharm. Sci.*, **1995**, 84, 568-574.

"Hydrogen-Bond Patterns of Dialkylpyridone Iron Chelators and their Formic Acid Solvates: Description, Prediction, and Role in Crystal Packing," S. Ghosh, D. Adsmond, J. Huotari, D. Grant, *J. Pharm. Sci.*, **1993**, 82, 901-911.

"The Use of Cocrystallization as a Method of Studying Hydrogen-Bond Preferences of 2-Aminopyrimidine," M. Etter, D. Adsmond, *J. Chem Soc., Chemical Communications*, **1990**, 8, 589-591.

"Using Hydrogen Bonds to Design Acentric Organic Materials for Nonlinear Optical Users," M. Etter, G. Frankenbach, D. Adsmond, *Mol Cryst. Liq. Cryst.*, **1990**, 187, 25-39.

"2-Aminopyrimidine-Succinic Acid (1/1) Cocrystal," M. Etter, D. Adsmond, D. Britton, *Acta Cryst.*, **1990**, C46, 933-934.

Submitted Manuscript
"Design and Synthesis of Ternary Cocrystals Using Carboxyphenols and Two Complementary Acceptor Compounds," D. Adsmond, A. Sinha, U. Khandaville, A.Maguire, S. Lawrence, submitted to Crystal Growth and Design, July 2015.

Invited Plenary Presentations
"Design and Goals of the FSU Chemistry BA Program," European Chemistry Thematic NetworkAssociation, International Scientific School, Association Kazan National Research Technological University, Kazan, Russia, Oct 27-31, 2014.

"Chemistry Lecture and Laboratory Goals and Course Design," European Chemistry Thematic Network Association, International Scientific School, Kazan National Research Technological University, Kazan, Russia, Oct 27-31, 2014.

"A Collaborative Research-based Organic Chemistry 2 Laboratory Course," European Chemistry Thematic Network Association, International Scientific School, Kazan National Research Technological University, Kazan, Russia, Oct 27-31, 2014.

"Techniques for Increasing Student Involvement in the Chemistry Lecture," European Chemistry Thematic Network Association, International Scientific School, Kazan National Research Technological University, Kazan, Russia, Oct 27-31, 2014.

Conference Sessions Organized and Chaired
Organized and chaired session entitled "Molecular Modeling in the Classroom," at the American Chemical Society National Meeting, Anaheim, California, , March 21-25, 1999.

Conference Presentations
"An Investigation of the Ability of Sulfisomidine to form Cocrystals with with Carboxylic Acids," S. Douglas, D. Adsmond, American Chemical Society National Meeting, Denver, CO, March 2015.

"An Investigation of the Ability of Dibenzylsulfoxide and Triphenylphosphine oxide to form Cocrystals with Carboxyphenols," C. Kemppainen, D. Adsmond, American Chemical Society National Meeting, Denver, CO, March 2015.

"Saccharin Cocrystallization," D. Birdsall, D. Adsmond, American Chemical Society National Meeting, New Orleans, LA, April 2013.

"Maximizing Scientific Thought through the Design of a Collaborative Research-Based Organic Chemistry 2 Laboratory Course, D. Adsmond, 22nd International Conference on Chemistry Education, Rome, Italy, July 2012.

"Cocrystallization of Sulfamethazine with 20 Carboxylic Acids," B. Q. Wierckz, D. Adsmond, American Chemical Society National Meeting, San Diego, CA, March 2012.

"Maximizing Engagement in the Laboratory: A Retrospective on 7 Years of a Collaborative Research-based Organic Chemistry 2 Laboratory Course, D. Adsmond, Lilly Conference on College and University Teaching, Traverse City, MI, Sept 2010.

"Predicted and Unpredicted Cocrystals of m-Hydroxybenzoic Acid and Acridine," D. Adsmond, J. Bernstein, and R. Vainer, American Crystallographic Association Meeting, Toronto, Ontario, July 2009.

"Evaluation of a 2-year Pilot of a Collaborative Research-based Organic Chemistry 2 Laboratory Course at Ferris State University," D. Adsmond, P. Balanda, and D. Frank, Gordon Research Conference on Chemical Education: Research and Practice, New London, Connecticut, June 2005.

"Outcomes and Analysis of a 2-Year Pilot of a Collaborative Research-Based Organic Chemistry 2 Laboratory Course at Ferris State University," D. Adsmond, P. Balanda, and D. Frank, 228th ACS National Meeting, NSF Symposium, Philadelphia, Pennsylvania, Aug 2004.

"Implementation of a Collaborative Research-Based Organic Chemistry 2 Laboratory Course at Ferris State University," D. Adsmond, P. Balanda, and D. Frank, 18th Biennial Conference on Chemical Education, Ames, Iowa, July 2004.

"A Student Investigation of Sulfa Drug/Carboxylic Acid Molecular Recognition by Cocrystallization," D. Adsmond; M. Whitener, and P. Squattrito, XIXth General Assembly and Conference of the International Union of Crystallography, Geneva, Switzerland, Aug 2002.

"An Investigation of the Effects of Molecular Changes on the Binding Preferences of Amidines," D. Adsmond and D. Grabill, American Chemical Society Great Lakes/Central Regional Meeting, Grand Rapids, Michigan, June 2001.

"A Research Experience for Students in the Second Semester of Organic Chemistry at Ferris State University," D. Adsmond, Biennial Conference on Chemical Education, Ann Arbor, Michigan, Aug 2000.

"A Student Investigation of the Molecular Recognition between Sulfa Drugs and Carboxylic Acids by Cocrystallization," D. Adsmond and M. Whitener, American Crystallographic Association Annual Meeting, St. Paul, Minnesota, July 2000.

"Comparison of the Hydrogen-Bond Patterns of Sulfapyridine/Acetic Acid 1:1 Solvate with Related Structures," S. Gorrell, D. Adsmond, and M. Whitener, American Crystallographic Association Annual Meeting, Arlington, VA; July. 1998.

"A Four-week Research and Development Team Project for the Organic Chemistry Laboratory," D. Adsmond, Kentucky Academy of Science 83rd Annual Meeting, Morehead State University, Morehead, Kentucky, Nov 1997.

"An Analysis of the Hydrogen-bond Patterns Observed in Acetic Acid Solvates," S. Gorrell and D. Adsmond, Kentucky Academy of Science 83rd Annual Meeting, Morehead State University, Morehead, Kentucky, Nov 1997.

"An Analysis of the Hydrogen-bond Prefereences of Acetic Acid in Solvates of Neutral Organic Hosts," J. Underwood and D. Adsmond, 8th Midwest Organic Solid-State Chemistry Conference, University of Nebraska, Lincoln, Nebraska, June 1996.

"What kind of a Molecule Would Let Acetic Acid be Included in its Crystal?" J. Underwood and D. Adsmond, Kentucky Academy of Science 83rd Annual Meeting, Kentucky State University, Frankfort, Kentucky, Nov 1996.

"An Investigation of Hydrogen Bond Preferences of Amidine Functionalities and Carboxylic Acid Groups by Cocrystallization," K. Thomas and D. Adsmond, 7th Midwest Organic Solid-State Chemistry Conference, Bloomington, Indiana, June 1995.

"Student Design of Projects for Freshman Chemistry," D. Adsmond and Z. Barnes, 13th Biennial Conference on Chemical Education, Lewisburg, Pennsylvania, July1994.

"Graph-set Analysis of Hydrogen-bond Patterns in Polymorphs of Two Sulfa Drugs," D. Adsmond and D. Grant, 6th Midwest Organic Solid-State Chemistry Conference, Minneapolis, Minnesota, June 1994.

Graph-set Analysis of Hydrogen-bond Patterns in Polymorphs of Two Sulfa Drugs," D. Adsmond, American Crystallographic Association Annual Meeting, Atlanta, Georgia, June 1994.

"Scientific Method and Classification Skills for Middle School," Z. Barnes and D. Adsmond, workshop at National Science Teachers Association 1993 Area Convention, Louisville, Kentucky, Nov 1993.

"Investigation and Modification of Complexation Behavior of Aminopyrimidines in the Solid State," D. Adsmond, invited lecture at University of Kentucky, Lexington, Kentucky, April 1993.

"Hydrogen Bond Directed Molecular Recognition in Organic Crystals," D. Adsmond and M. Etter, Kentucky Academy of Science, 78th Annual Meeting, Ashland, Kentucky, Oct 1992.

"Hydrogen-bond Selectivity in Asymmetrically Substituted Aminopyrimidines," D. Adsmond, 32nd National Organic Chemistry Symposium, University of Minnesota, Minneapolis, MN, June 1991.

"Predicting, Synthesizing, and Analyzing Organic Cocrystals Formed by Solid-State Methods," D. Adsmond, 2nd Midwest Organic Solid-State Chemistry Conference, Minneapolis, Minnesota, June 1989.

"Predicting and Analyzing Hydrogen-bond Patterns of 2-Aminopyrimidines," D. Adsmond and M. Etter, American Crystallographic Association Annual Meeting, Seattle, Washington, July 1989. (winner of Linus Pauling Prize for best student poster).

Local Student Research Presentation Events

"Chemistry on the Bridge," planned and executed a public poster presentation session where 60-90 students of Organic Chemistry presented the results of their laboratory research. (2006, 2008- 2012)

College of Arts and Sciences Student Recognition Event, 11 student research posters in 2011, 8 student research poster presentations in 2012.

Grants & Fellowships

"Finding the Sweet Spot for Ternary Cocrystal Formation," D. Adsmond, J. Reardon, Ferris State University, Academic Affairs, Student Research Fellowship, funded, Summer 2015.

"An Investigation of the Ability of Dibenzylsulfoxide to form Cocrystals with Carboxylic Acids and Phenols," D. Adsmond, C. Kemppainen, Ferris State University, Academic Affairs, Student Research Fellowship, funded, Summer 2015.

"An Investigation of the Ability of Sulfisomidine to form Cocrystals with Carboxylic Acids," D. Adsmond, S. Douglas, Ferris State University, Academic Affairs, Student Research Fellowship, funded, Summer 2015.

"Determination and Analysis of Crystal Packing in Cocrystals Incorporating the Antibacterial Drug, Sulfamethazine, and a Carboxylic Acid," D. Adsmond, Ferris State University, Academic Affairs, Faculty Research Fellowship, funded 25% release time Spring 2013-Fall 2013.

"Growth of X-ray Quality Sulfamethazine Cocrystals and Analysis of the Crystal Packing," D. Adsmond, B. Wierckz, Ferris State University, Academic Affairs, Student Research Assistantship, funded $1500, Spring 2013.

"An Investigation of the Cocrystallization Behavior of Saccharin," D. Adsmond, D. Birdsall, Ferris State University, Academic Affairs, Student Research Fellowship, funded $5500, Summer 2012.

"Assessing the Influence of Carboxylic Acid Structure and Crystallization Conditions on Acid:Amidine Cocrystal Formation" D. Adsmond, B. Wierckz, Ferris State University, Academic Affairs, Student Research Fellowship, funded $4500, Summer 2011.

"The Rational Design, Synthesis, and Analysis of Ternary Cocrystals," D. Adsmond, Ferris State University Research Grant, funded $10,984, 2006 – 2007.

"FT-NMR Upgrade for a Collaborative Research-Based Organic Chemistry 2 Laboratory Course: Development and Implementation" D. Adsmond, P. Balanda, D. Frank, National Science Foundation, funded $46,676, March 13, 2002.

"Funding for the Instrument Support for a Collaborative Research-Based Organic Chemistry Laboratory" D. Adsmond, Exceptional Merit Faculty/Staff Award funded by the Ferris Foundation, funded $5,000 April 29, 2002.

"FT-NMR Upgrade for a Collaborative Research-Based Organic Chemistry 2 Laboratory" D. Adsmond, Dean's Initiative Grant, funded $1000 February 2002.

"Release Time for Grant Proposal Writing, Application to the National Science Foundation for Funds to Upgrade Ferris State University's Chemistry Laboratory Instrumentation," D. Adsmond, Faculty Grant Development Fund grant, funded $2500 release time for January 2001-May 2001.

"An Investigation of the Effect of Molecular Change on Binding Preferences of Amidines" D. Adsmond, Ferris research grant, funded $2950 May 2000.

"An Investigation of the Effect of Molecular Change on Binding Preferences of Amidines" D. Adsmond, Ferris State University research grant, funded $2950, 2000.

"Development and Implementation of a Research Experience for Students in the Organic Chemistry Laboratory," D. Adsmond, P. Balanda, Ferris State University professional development grant, funded $3066, 1999.

"Characterization of New Acetic Acid Solvates and Studies of Acetic Acid Binding Interactions," D. Adsmond, Morehead State University research grant, funded $4406, 1997.

"An Investigation of the Preferences and Binding Modes of Acetic Acid in Solvate Formation," D. Adsmond, Morehead State University research grant, funded $3213, 1995.

Editor

Guest Editor for special issue of Crystal Growth and Design honoring Margaret C. Etter, 2014-2015.

Manuscript Review

Reviewer for the Journal of Pharmaceutical Sciences, Crystal Growth and Design, & CrystEngComm: 3 manuscripts in 2002, 1 manuscript in 2003, 1 manuscript in 2005, 3 manuscripts in 2006, 1 manuscript in 2008, 1 manuscript in 2009, 2 manuscripts in 2010, 1 manuscript in 2011, 2 manuscripts in 2012, 2 manuscripts in 2013, 2 manuscripts in 2015.

Memberships

American Chemical Society, American Crystallographic Association

Teaching Awards

Ferris State University Distinguished Teacher Award 2009

Ferris State University Outstanding Professor Award by Honors Students 2005

Research Interests

hydrogen-bonding, molecular recognition, graph sets, solvate formation, cocrystalization, polymorphism, pharmaceutical solids, and organic materials.

Teaching Interests

organic chemistry, cooperative and problem-based learning, collaborative laboratory research projects.

Charles R. Bacon, Ph.D.
Professor of Physics and Chemistry

Education:

- 1990 Doctor of Philosophy, Polymer Physics and Chemistry, Michigan Technological University.
- 1980-1983, ABD, Physics, Michigan State University.
- 1977 Master of Science, Physics of Condensed Matter, Montana State University.
- 1975 Bachelor of Science, Physics, Michigan State University.

Publications:

1. A. G. Baker, C. R. Bacon and V. H. Schmidt, "Dielectric Behavior of KH_2PO_4 Near the Tricritical Point", Proceedings of the San Diego Meeting of the American Physical Society, March 1977.
2. A. B. Western, A. G. Baker, C. R. Bacon, V. H. Schmidt, "Pressure Induced Tricritical Point in the Ferroelectric Phase Transition of KH_2PO_4", Physical Review B, 17(11), 1 June, 1978.
3. V. H. Schmidt, A. B. Western, C. R. Bacon and W. P. Crummett, "Dielectric Studies of Critical and Tricritical Phenomena in KDP and RDP", Proceedings of the 4th European Meeting on Ferroelectricity, Portosoj, Yugoslavia, 3-7 Sept. 1979.
4. V. H. Schmidt, A. B. Western, A. G. Baker and C. R. Bacon, "Tricritical Point and Tricritical Exponent d in KH_2PO_4", Ferroelectrics, 1979.
5. C. R. Bacon, J. G. Williams and B. C. Cornilsen, "Interphase Chemistry Via Micro-Raman Spectroscopy", Composite Materials in Transition, Proceedings of the American Society for Composites 5th Technical Conference, L. Drzal, ed., 11-14 June 1990.
6. B. C. Cornilsen, C. R. Bacon, X. Wang, R. E. Riman and D. A. Warner, "The Nature of Carbonate Incorporation in $Ba_4Y_2O_7CO_2$", Proceedings of the American Ceramic Society Meeting, Cinncinati, OH 25-30 April 1991.
7. C. R. Bacon and Y. H. Huang, "Compressive Failure of Kevlar Fiber Reinforced Composites", Developments in Mechanics Volume 15, Proceedings of the Twenty-First Midwestern Mechanics Conference, J. B. Ligon, H. W. Lord, M. Vable, V. W. Snyder and G. Trevino, ed., 13-16 August 1989.
8. C. R. Bacon, "Physics 12th Grade Communication and Arts", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates- Duffield and L. Schaftenaar, 1994.
9. C. R. Bacon, "Physics 12th Grade Health and Wellness", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T.

Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.

10. C. R. Bacon, "Physics 12th Grade Management and Commerce", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates- Duffield and L. Schaftenaar, 1994.
11. C. R. Bacon, "Physics 12th Grade Ecology and Natural Resources", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
12. C. R. Bacon, "Physics 12th Grade Technical and Engineering", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates- Duffield and L. Schaftenaar, 1994.
13. C. R. Bacon, "Physics 12th Grade Education and Societal Services", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
14. C. R. Bacon, "Trigonometry 11th Grade Ecology and Natural Resources", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
15. C. R. Bacon, "Trigonometry 11th Grade Education and Societal Services", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P.Gates-Duffield and L. Schaftenaar, 1994.
16. C. R. Bacon, "Trigonometry 11th Grade Communication and Arts", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
17. C. R. Bacon, "Trigonometry 11th Grade Health and Wellness", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
18. C. R. Bacon, "Trigonometry 11th Grade Management and Commerce", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
19. C. R. Bacon, "Trigonometry 11th Grade Technical and Engineering", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
20. C. R. Bacon, "Applied Math 12th Grade Ecology and Natural Resources", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
21. C. R. Bacon, "Applied Math 12th Grade Education and Societal Services", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
22. C. R. Bacon, "Applied Math 12th Grade Communication and Arts", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.

23. C. R. Bacon, "Applied Math 12th Grade Health and Wellness", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
24. C. R. Bacon, "Applied Math 12th Grade Management and Commerce", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
25. C. R. Bacon, "Applied Math 12th Grade Technical and Engineering", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
26. M. K. Bacon and C. R. Bacon, "General Science 7th Grade Technical and Engineering", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
27. M. K. Bacon and C. R. Bacon, "General Science 7th Grade Education and Societal Services", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
28. M. K. Bacon and C. R. Bacon, "General Science 7th Grade Communication and Arts", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
29. M. K. Bacon and C. R. Bacon, "General Science 7th Grade Health and Wellness", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C.R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
30. M. K. Bacon and C. R. Bacon, "General Science 7th Grade Management and Commerce", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
31. M. K. Bacon and C. R. Bacon, "General Science 7th Grade Ecology and Natural Resources", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
32. M. K. Bacon and C. R. Bacon, "General Science 8th Grade Technical and Engineering", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
33. M. K. Bacon and C. R. Bacon, "General Science 8th Grade Education and Societal Services", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
34. M. K. Bacon and C. R. Bacon, "General Science 8th Grade Communication and Arts", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
35. M. K. Bacon and C. R. Bacon, "General Science 8th Grade Health and Wellness", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
36. M. K. Bacon and C. R. Bacon, "General Science 8th Grade Management and Commerce", *Analyze* and Apply: A Guide to Connect

Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.

37. M. K. Bacon and C. R. Bacon, "General Science 8th Grade Ecology and Natural Resources", *Analyze* and Apply: A Guide to Connect Learning to Performance, ed. S. Stanley, T. Sears, J. A. Palm, C. R. Bacon, P. Gates-Duffield and L. Schaftenaar, 1994.
38. Charles R. Bacon, **Physics: An Active Learning Inquiry**, Michigan Center for Learning and Educational Systems, 2005.
39. Charles R. Bacon and Mary K. Bacon, **Science and Crime: Active Learning in Forensic Science**, Michigan Center for Learning and Education Systems, 2014.
40. Todd Welch, Charles R. Bacon, Mary K. Bacon, Sarah Hamilton, "Fracture Match: A Validation Study of Paper Tears, Part 1", Journal of the American Society of Questioned Document Examiners, Vol. 13, No. 1, June 2010.
41. Charles R. Bacon, **Physics 1: Introduction to Mechanics and Heat**, ISBN 13: 978-1490957746, Amazon, 2013.
42. Charles R. Bacon, **Do Something: The Art and Practice of Project-Based Learning**, ISBN-10: 1491082038, Amazon, 2013.
43. Mary K. Bacon and Charles R. Bacon, **Forensic Chemistry: An Active Learning Approach**, 7th ed., Michigan Center for Learning, 2013.

Conference Presentations:

- C. R. Bacon, "Raman Spectroscopy of Kevlar Fibers: Elastic Modulus via Quantum Mechanical Modeling", First Annual Spring Scientific Conference, Michigan Polymer Consortium, Central Michigan University, 28-29 April, 1989.
- C. R. Bacon, "Interphase Chemistry of Model Fiber/Epoxy Composites", International Conference on Composite Interfaces, Case Western Reserve University, Cleveland, OH, 12-15 June 1992.
- H. Auman, T. Browne, M. K. Bacon and C. R. Bacon, "Thermal Degradation Studies on Polyethylene/Cornstarch Blended Composites", Great Lakes Chemistry Conference, Michigan State University, E. Lansing, MI, 13 March, 1993.
- C. R. Bacon, "Chemical and Mechanical Limitations in Polymer Composites", Sigma Xi, GVSU Club, 14 October 1991.
- American Society of Electrical Engineers, Midwest Regional Meeting presentation, "Connecting School to the World of Work in University Physics", April 1996.
- Michigan Association of Physics Teachers presentation, "Integrating the Classroom and the Workplace", March 1997.
- National Conference of Steel Construction, Invited Speaker, "Are you hiring the right people?" April 1998, New Orleans, LA.

- Charles R. Bacon, "The Classroom as the Workplace in Science Education", 1999 Tech Prep Education Conference, Feb. 16 and 17, 1999, Grand Rapids, MI.
- Charles R. Bacon, "Project-Based Active Learning", Trends in Occupational Studies Conference, Oct. 26 and 27, 2000, E. Lansing, MI.
- M. K. Bacon and C.R. Bacon, "What is Scientific Research?" Midwestern Association of Forensic Scientists, Milwaukee, WI, Sept. 2002.
- M. K. Bacon and C. R. Bacon, "What is Scientific Research?" American Academy of Forensic Scientists, Chicago, IL, Feb. 2003.
- Mary K. Bacon, Todd Welch, Charles Bacon, "Fracture Matches: A Preliminary Look at Validating Whether Paper Tears are Unique: Part I", The Joint Meeting of The Southern Association of Forensic Scientists, The Midwestern Association of Forensic Scientists, The Mid-Atlantic Association of Forensic Scientists, and The Canadian Society of Forensic Science, Orlando, FL, September 19-24, 2004.
- Todd Welch, Mary K. Bacon, Charles R. Bacon, "Fracture Match: A Preliminary Look at Validating Whether Paper Tears Are Unique: Part II", Sixty-Third Annual Conference of the American Society of Questioned Document Examiners, Montreal, Canada, August 11-16, 2005.
- Todd Welch, Mary K. Bacon, Charles R. Bacon, Sarah Bohn, "Fracture Match: A Preliminary Look at Validating Whether Paper Tears Are Unique", Sixty-Fourth Annual Conference of the American Society of Questioned Document Examiners, Portland, OR, August 11-16, 2006.
- Charles Bacon, Molding Minds with a Green Curriculum, Michigan Education Report, Winter 2007.
- Todd Welch, Mary K. Bacon, Charles R. Bacon, "Fracture Match: A Validation Study of Paper Tears, Part 2", 67th Annual Conference of the American Society of Questioned Document Examiners, Dearborn, MI, August 8-13, 2009.
- Charles R. Bacon, Ph.D., Mary K. Bacon, M.S., Todd W. Welch, D/Sgt., Joey L. Biagini, "Fracture Match: Validation Studies of Double Paper Tears", 2010 Midwest Association of Forensic Scientists, Kansas City, October 2010.

Awards and Honors:

- Ferris Foundation Grant 2009-2010.
- Professional Development Grants, 2009-2010.
- NSF Grant, Co-Investigator, TC: Small: RUI: Digital Laser Microscopy Analysis of Active, Altered, and Damaged Storage Media for Security and Digital Forensic Recovery, 2012-2014.

Committee Work:

University

- Academic Senate Vice President, 2014-2015.

- Academic Senate-1991-1995, 2013-present.
- Academic Senate Executive Board, 2014-present.
- Ferris Faculty Association, Executive Board, 2010-present.
- Ferris Faculty Association Membership Coordinator, 2014-present.
- Ferris Faculty Association Grievance Committee, 2012-present.
- Michigan Association of Higher Education, Executive Board, 2013-present.
- ESP Caucus Executive Board, Michigan Education Association, 2013-present.
- Student Life Committee of the Senate

College of Arts and Sciences

- Promotions & Merit Committee
- Sabbatical Leave
- Curriculum Committee
- Ad hoc Planning

Departmental

- Tenure Review
- Curriculum
- Faculty Development
- Travel
- Search Committees, numerous.

Ferris State University Service

University

- Academic Senate Vice President, 2014-2015.
- Academic Senate-1991-1995, 2013-present.
- Academic Senate Executive Board, 2014-present.
- Ferris Faculty Association, Executive Board, 2010-present.
- Ferris Faculty Association Membership Coordinator, 2014-present.
- Ferris Faculty Association Grievance Committee, 2012-present.
- Michigan Association of Higher Education, Executive Board, 2013-present.
- ESP Caucus Executive Board, Michigan Education Association, 2013-present.
- Academic Program Review, Architectural Technology, 1998.
- Academic Program Review, Optician Program, 1999-2000
- International Education
- Radiation and Safety
- Recording Technology Task Force
- Ad-Hoc Online Learning Task Force
- Ad-Hoc E-Learning Liaison Committee
- Mathematics, College of Engineering Technology Project

College of Arts and Sciences

- Promotions & Merit Committee
- Sabbatical Leave
- Curriculum Committee
- Ad hoc Planning

Departmental

- Bachelor of Arts Development Committee
- Tenure Review
- Curriculum
- Faculty Development
- Travel
- Search Committees, numerous.

Post Mortem on 2009-2014 Goals:

Goal Stated: Continue research collaboration with Michigan State Crime Lab on Paper Tear Analysis. Expand research to include Electrostatic Deposition Analysis. Obtain instrument.

Actual Accomplishments:

- Collaboration continued and resulting research presented at:
- Charles R. Bacon, Ph.D., Mary K. Bacon, M.S., Todd W. Welch, D/Sgt., Joey L. Biagini, "Fracture Match: Validation Studies of Double Paper Tears", 2010 Midwest Association of Forensic Scientists, Kansas City, October 2010.
- We acquired a Visual Spectral Comparator, instead of an ESDA, from the crime lab. Student research project was done in the Spring of 2014 utilizing the VSC.

Goal Stated: Improve online courses in PHYS 211 and PHYS 212.

Actual Accomplishments:

- Implemented mastery learning strategy for both courses.
- Development assessment matrix correlating identified skills with location and type of assessment.
- Development 'second chance' assessments based upon assessment matrix and exam results to identify unmet skills and remediate those skills.

Goal Stated: Develop and implement virtual 3D interactive game for improvement of STEM skills.

Actual Accomplishments:

- Obtained Faculty Research grant to do project through Digital Animation and Game Design.
- Created Project Timeline.
- Created 1.0 version of simple numeracy game.

Goal Stated: Continue to write grants.

- Obtained two faculty research grants.
- Submitted NSF REESE grant.

- Submitted NSF TUES grant.
- NSF Award No. CNS-1116268, October 2013. TC: Small: RUI: Digital Laser Microscopy Analysis of Active, Altered, and Damaged Storage Media for Security and Digital Forensic Recovery. Project is under the direction of Greg E. Gogolin, Charles R. Bacon, James H. Jones, Tracey Boncher.

Peter B. Balanda
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Ferris State University, Big Rapids, MI 49307-2225
H (231) 250-6203, W (231) 591-5870, Fax (231) 591-2545, balandap@ferris.edu

ACADEMIC EXPERIENCE:

Professor of Chemistry (2008-present) Associate Professor (2003-2008) Assistant Professor (1998-2003)	Physical Sciences Department, Ferris State University, Big Rapids, MI. Teach/taught: Fund of Organic Chemistry. Organic Chemistry 1, Organic Chemistry 2, Fund Organic-Polymer Chemistry, Intro Organic-Biochemistry, and Fund of Biochemistry.
Postdoctoral Associate (1997-1998)	Department of Chemistry, Virginia Polytechnic Institute and State University, Blacksburg, VA. Studied thermodynamics of host-guest complexations with Professor Harry Gibson.
Research assistant (1992-1997)	Department of Chemistry, University of Florida, Gainesville, FL. Carried on independent research. Established and maintained a thirteen lab and office computer network.
Teaching Assistant (1991-1992, 1996-1997)	Department of Chemistry, University of Florida.
Teaching Assistant (1988-1991)	Department of Chemistry, Central Michigan University; Outstanding Teaching Assistant Award, 1989-1990.
Secondary Science Teacher (1987-1988)	Murray-Wright High School, Detroit, MI. Taught high school chemistry and biology. Acquired an interest in polymer chemistry.
Substitute Teacher (1986-1987)	L'Anse Creuse Public Schools, Harrison Twp., MI

EDUCATION:

University of Florida (1991-1997)	Ph.D. in organic polymer chemistry. Research advisor: Professor John R. Reynolds. Thesis title: "Synthesis of Functionalized Poly(*p*-Phenylene)s *via* Palladium Acetate Catalyzed Suzuki Cross-Coupling Polymerization"
Central Michigan University (1988-1991)	Undergraduate and graduate course work in chemistry with independent research involving monomer and polymer synthesis with Professor Dillip Mohanty. Outstanding Teaching Assistant, 1990

Wayne State University (1986-1988)	Secondary high school teaching certification
Macomb Community College (1985)	Emergency medical technology certification
Albion College (1980-1983)	Liberal arts curriculum. B.A. in biology; member Beta-Beta-Beta Biological Honor Society; recipient Albion Presidential Award; graduated *cum laude*
L'Anse Creuse High School (1976-1980)	Salutatorian; National Honor Society; varsity tennis

PROFESSIONAL AFFILIATIONS:

American Chemical Society: Member (1989-present): Division of Organic Chemistry; Division of Chemical Education

International Alliance of Teacher Scholars: Member (2000-2002)

PUBLICATIONS & PRESENTATIONS:

Hull, B.; Balanda, P. "Towards the Synthesis of Bisbenzoxazoles from Resorcinol," Midwestern Symposium on Undergraduate Research in Chemistry, Michigan State University, October 11, 2014 & Hull, B.; Balanda, P. "Towards the Synthesis and Polymerization of Benzoxazole from Resorcinol," Research Fellowship, Ferris State University, August 21, 2014

Taylor, D.; Balanda, P. "Towards the Synthesis of Bisbenzoxazoles from Hydroquinone," 2014 Student Research Fellowship, Ferris State University, August 21, 2014

Hull, B.; Balanda, P.B. "One Pot Amidation of Anisole with Isobutyric Acid and Hydroxylamine in Polyphosphoric Acid," CAS Student Poster Session, Ferris State University, May 2, 2014

Balanda, P.B. "A Semi-quantitative Analysis of the Effect of Relative Monomer Concentrations on Rate of Copolymerization and Copolymer Composition in Styrene and Methyl Methacrylate Bulk Polymerization/Copolymerization for the Undergraduate Laboratory," 21st Biennial Conference on Chemical Education, August 1, 2010–August 5, 2010, University of North Texas, Denton, Texas

Adsmond, D.; Balanda, P.B.; Frank, D. "Evaluation of a 2-year pilot of a collaborative research-based Organic Chemistry 2 laboratory course at FSU," Gordon Research Conference on Chemistry Education Research and Practice, June 2005

Adsmond, D.; Balanda, P.B.; Frank, D. "Outcomes and Analysis of a 2-Year Pilot of a Collaborative Research-Based Organic Chemistry 2 Laboratory Course at FSU," 228th ACS National Meeting, NSF Symposium, Aug 2004

Balanda, P.B.; Adsmond, D.; Frank, D. "Research Projects in an Organic Chemistry 2 Laboratory," 18th Biennial Conference on Chemical Education, Ames, Iowa, July 21, 2004

Adsmond, D.; Balanda, P.B.; Frank, D. "Implementation of a Collaborative Research-Based Organic Chemistry 2 Laboratory Course at Ferris State University" 18th Biennial Conference on Chemical Education, Ames, Iowa, July 21, 2004

Balanda, P.B. "A Project-Driven One-Semester Introduction to Organic and Polymer Chemistry" 16th Biennial Conference of Chemical Education, Ann Arbor, MI, August 2, 2000

Balanda, P.B.; Ramey, M.B.; Reynolds, J.R. "Water Soluble and Blue Luminescent Cationic Polyelectrolytes Based on Poly(*p*-Phenylene)," *Macromolecules*, **1999**, *32*, 3970

Gong, C.; Balanda, P.B.; Gibson, H.W. "Supramolecular Chemistry with Macromolecules: New Self-Assembly based Main Chain Polypseudorotaxanes and Their Properties," *Macromolecules*, **1998**, *31*, 5278

Baur, J.W.; Kim, S.; Balanda, P.B.; Reynolds, J.R.; Rubner, M.F. "Thin-Film Light Emitting Devices Based on Sequentially Adsorbed Multilayers of Water-Soluble Poly(*p*-Phenylene)s." *Adv. Mater.* **1998**, *10*, 1452

Balanda, P.B.; Reynolds, J.R. "Functionalized Poly(*p*-Phenylene)s via Suzuki Cross-coupling" *Am. Chem. Soc., Proc. Div. Polym. Mats. Sci. Eng.* **1997**, *76*, 252

Balanda, P.B.; Reynolds, J.R. "Methoxyethoxy- and Triethoxy- Substituted Poly(*p*-Phenylene)s via Suzuki Cross-coupling" *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)* **1996**, *37*(1), 528-529

Spangler, C.W.; Zhu, L.; Lu, Z.; He, M.; Balanda, P.B.; Reynolds, J.R. "Synthesis, Characterization and Oxidative Doping Behavior of Copolymers Incorporating BEDT-TTF Repeat Units" *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)* **1995**, *36*(2), 292-293

Spangler, C.W.; Zhu, L.; Hall, T.J.; Balanda, P.B.; Reynolds, J.R. "Studies toward the Design and Synthesis of Superconducting Organic Polymers: Mainchain Incorporation of ET Subunits" *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)* **1995**, *36*(1), 605-606

Reynolds, J.R.; Katritzky, A.R.; Balanda, P.B.; Musgrave, R.; Soloducho, J.; Sotzing, G.A.; Sankaran, B.; Spangler, G.W.; Zhu, L. "Electrically Conductive and Redox Electroactive Organic Polymers" *Am. Chem. Soc., Proc. Div. Polym. Mats. Sci. Eng.* **1995**, *72*, .393-394

Balanda, P.B.; Child, A.D.; Reynolds, J.R. "Towards the Synthesis of Highly Functionalized Poly(*p*-phenylenes)" *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)* **1994**, *35*(1), 257-258

Cummings, D.C.; Mani, P.S.; Balanda, P.B.; Howell, B.A.; Mohanty, D.K. "Synthesis and Characterization of Poly(aryl ether-bissulfone)s *J. Macromol. Sci., Chem.* **1991**, *A28*(8), 793-810

Balanda, P.B.; Cummings, D.; Mohanty, D.K. "Synthesis and Characterization of Bisphenol-A, Hydroquinone and Biphenol Functional Poly(aryl ether) Bissulfones" *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)* **1990**, *31*(2), 671-672

OTHER PROFESSIONAL PARTICIPATION:

Attended American Chemical Society "44th National Organic Chemistry Symposium;" University of Maryland, College Park, Maryland; June 28-July 2, 2015.

Attended American Chemical Society "2014 Biennial Conference on Chemical Education;" Grand Valley State University; August 3&5, 2014, to attend *Symposia:*

"Engaging Students in Organic Chemistry: Lecture Methods Emphasis"
"Undergraduate Research in Chemistry: Expanding Opportunities and Broadening Participation"

Participated in the Ferris State University "Student Research Fellowship (SRF) Program," supervising the summer chemistry research efforts (10 weeks, full time) of two FSU Student Research Fellows, May-July, 2014

Attended "Integrating Contemplative Practices into the Teaching and Learning Experience," a retreat for FSU and GVSU faculty; Pierce Cedar Creek Institute; Hastings, Michigan; June 4-6, 2014

Attended "Liability & Safety Training for Academic Laboratories," session by The Office of Safety, Health, Environmental, & Risk Management in conjunction with the Academic Affairs Director of Laboratory Safety, Ferris State University, 1/29/2015.

Attended "Academic Laboratory Safety" sessions by Academic Affairs Director of Laboratory Safety, Anne Hawkins-Badge, Ferris State University, 8/21/2014 & 8/23/2013.

Participated in Workshops sponsored by Faculty Center for Teaching & Learning Workshops, Ferris State University:

"Tips for Flipping," 3/6/2014

"Whoever Does the Work Does the Learning: Facilitation Active Learning," 3/5/2014

"The Naked Presenter," FCTL Workshop, Ferris State University, May 22,23,30, June 4,6, & 19, 2013

"Presentation Zen," FCTL Workshop, Ferris State University, May 29,31, & June 5, 2013

"An Introduction to Learner-Centered Teaching," November 11, 2005

"Problem Based Learning," July 16-18, 2001

Attended "Essential Face-to-Face Blackboard Training Workshop," Ferris State University, 11/29/2011

Provided Consultation and Copolymerization Studies for Beholtztech Inc., 132 West First Street, Flint, MI 48502. Synthesized a latex substrate for use as membrane in the manufacture of a bioanalytical device. Student research opportunity provided for Harry Roy (currently pursuing a Ph.D.) at Wayne State University; work was supported by Beholtztech Inc. ($4000). May 2010-December 2011

Completed American Chemical Society short course: "Organic Synthesis: Methods and Strategies for the 21st Century Chemist", Boston, MA, May 20-22, 2009

Attended a two day NSF Multi-Initiative Dissemination Project Workshop, Central Michigan University, January 2003

Attended Ferris State University Spring Learning Institute – Teaching that Promotes Learning, 3/28/2003

Attended two symposia: "Self-assembled Photonic Band-gap Materials"; "Chromogenic Phenomena in Polymers: Tunable Optical Properties," 223rd ACS National Meeting, *Orlando, Florida,* April 7-11, 2002; Dean's Initiative Grant

Adsmond, D.; Balanda, P.B.; Frank, D. "FT-NMR Upgrade for a Collaborative Research-Based Organic Chemistry 2 Laboratory Course: Development and Implementation," NSF Proposal Number 0126961, *Awarded 2002*, Final Report, May, 2005

Attended "The 1st Annual Lilly Conference on College & University Teaching—North," September 21-22, 2001, Big Rapids, Michigan

Attended the NSCI Conference: "Instruction and Assessment: Infusing Brain Research, Learning Styles, and Multiple Intelligences," Phoenix, AZ; February 8-11, 2001

Attended Equity within the Classroom XI: Teaching and Learning in a Diverse Classroom; Big Rapids, MI; March 22-23, 2001

Attended Center for Teaching, Learning & Faculty Development's Facilitating Student Learning Program (2000-2001):

"Methods and Learners" (4 days)
"Repurposing Course Material" (4 days)
"Integrating Material into WebCT" (4 days)
"Student Assessment Techniques" (2 days)

Awarded Ferris State University Faculty Research Grant: "A New Route to Polyphenylenes: Self-Coupling of Arylboronates." 2000-2001

Attended "The 6th Annual Lilly Conference on College & University Teaching-South," Athens, Georgia; February 11-13, 2000

Awarded Ferris State University Professional Development Grant: "Development and Implementation of a Research Experience for Students in the Organic Chemistry Laboratory." Co-author: Daniel Adsmond.; 1999-2000

Awarded Ferris State University Professional Development Grant: "Project Oriented Curriculum for CHEM 211: Fundamentals of Organic and Polymer Chemistry,"1999-2000.

Attended Ferris State University Center for Teaching, Learning & Faculty Development workshops (1999-2000):

Case Studies Workshop
Get on the Web

Attended "1999 NSF Case Studies in Science Workshop," SUNY Buffalo (5 days)

Attended "Legal Issues for Educators Panel Discussion," Ferris State University, 1999

Attended "Grant Writing for New Faculty" workshop; Ferris State University, 1999

ACADEMIC SERVICE

Academic Senate, Ferris State University (2014-2015)

DAWG Days, Ferris State University (11/9/2013, 10/18/2014)

ACS Division of Chemical Education Examinations Institute, Committee Member for the 2012 Organic Chemistry Examination. Convening at the 241st (Anaheim, California, 3/26/2011-3/29/2011) and 242nd (Denver, Colorado, 8/27/2011-8/30/2012) American Chemical Society (ACS) National Meeting & Exposition

A Chemical Safety Committee (on behalf of the Hazardous Substance Awareness and Compliance Committee) to review a chemical hygiene plan for undergraduate research in the College of Pharmacy (2012-2013)

Interviewer for "Syria – US Ambassadorship Summer 2010," Ferris State University, June29-30, 2010

Academic Program Review Committee, Bachelor of Science in Nursing (2008-2009)

Academic Program Review Committee, Clinical Laboratory Sciences (1999-2000, 2004-2005)

Academic Senate Health Promotions and Substance Abuse Committee (2004-2007, secretary 2005-2006, 2006-2007)

Academic Senate Student Life Committee (2008-2010, chair 2009-2010)

Academic Senate Academic Standards and Policies Committee (2013-2015)

CAS Academic Policies and Standards Committee (2000-2003, 2006-2009, chair 2000-2003, 2007-2009)

CAS Curriculum Committee (2013-2015)

CAS Dean's Search Committee (2011-2012)

CAS Promotion and Merit (2009-2011)

CAS Sabbatical Review Committee (1999-2000)

CAS Graduate Education Committee (2013-2015)

Physical Sciences Department Chemistry Minor Committee (2009-2010)

Physical Sciences Department Tenure Review Committee (2003-2014, chair 2006-2014)

Physical Sciences Department Tenure Policy Revision (2012-2013, chair 2012-2013)

Physical Sciences Department Candidate Tenure Committee (2006-2007, 2010-2011)

Physical Sciences Department Planning Committee (2007-2008, 2010-2012)

Physical Sciences Department Equipment Committee (2006-2013)

Physical Science Department Faculty Development and Travel Committee (1999-2001, 2004-2005, chair 1999-2000)

Physical Sciences Department Curriculum Committee (2000-2002, 2005-2007, 2008-2009, 2012-2015)

Physical Sciences Department Head Evaluation Committee (2000-2001)

Physical Sciences Department Safety Committee (1998-2002, chair 1999-2002)

Physical Science Department Faculty Search Committee (2004-2005)

Faculty advisor to the Sigma Pi men's fraternity (1999-2002)

Reitz Reading Room Committee (1998-1999)

COMMUNITY SERVICE & AWARDS

Service to Mecosta-Osceola Intermediate School District (MOISD)

Math, Science and Technology Center (MSTC) Science & Engineering Fair
Project Involvement: Mentor for Chloe Balanda (2007-2008), mentor for Alina Lou (2004-2005), assistance to: Phil Videtich (2004-2005)
Science Fair Judge (2006-2007, 2009-2012)

"Atoms, the Periodic Table, and Reactivity" Presentation to the 5th grade at Crossroads Charter Academy, November, 2007

Polymer chemistry laboratory/workshop provided for MSTC students, spring 2000

"The Structure and Functional Roles of Fats" Presentation to the Lions Club, January, 2003

Mecosta County Medical Center Foundation, Outdoor Activities and Sports Committee, Northern Lights Award Show 2008

Youth Soccer Volunteer (1999-2012)
American Youth Soccer Organization, Coach (1999-2002)
United States Youth Soccer Association (2002-2012):
Founding member: Northland United Soccer Club: Coach (2002-2011); Director of Youth Development (2003–2009); President (2005-2011); Recreation Program Referee Assigner (2007-2012)
Nominee: Michigan State Youth Soccer Association 2003 Volunteer of the Year
Recipient: Mecosta County Medical Center Foundation, 2007 Northern Lights Award for Outdoor Activities and Sports

Finalist: Pioneer Group's 2009 Mecosta County Citizen of the Year
Recognition: Bench dedication at Industrial Park Soccer Field, 2012
Earned: United States Soccer Federation National Youth License, 2010

Knights of Columbus: Member (2000-present), Recorder (2003-2010), Trustee (2010-13, 2014-present), Chancellor (2013-2014); Charity Golf Tournament Chair (2007-2013); Breakfast Crew Leader (2009-present); Lifetime Achievement Award (2014)

Dr. Thomas Edward Brennan

962 Prairie Ave.
Glen Ellyn, IL

Phone: 630.790.2143
thomasedwardbrennan@gmail.com

Education

Ph.D. Physics, Illinois Institute of Technology, December 2009

M.S. Physics, UCLA, 2002

B.A. Physics, *with Honors*, *Phi Beta Kappa*, University of Chicago, 1999

Current Position

Adjunct Professor of Astronomy — August 2013 – Present
University of St. Francis — Joliet, Illinois

Previous Position

Research Assistant Professor — August 2010 – September 2012
West Virginia Wesleyan College — Buckhannon, West Virginia

Teaching Experience

West Virginia Wesleyan College – Instructor, General Physics I & II, lectures and labs.

Moraine Valley Community College – Instructed General Chemistry and General Physics.

Illinois Institute of Technology – While a graduate student, gained several years experience assisting in an analog and digital electronics lab course. Also instructed calculus-based general physics lectures and labs.

UCLA – While a graduate student assisted in general physics labs and discussions.

Research Experience

Sonoluminescence, and the discharge of rapidly condensed gasses. (At IIT and NASA/Glenn.)

Topics in mathematical physics related to solutions of the Dirac Equation.

Completed a visiting faculty fellowship at the NASA Glenn Research Center, Summer 2011.

Completed a visiting faculty fellowship at the NASA IV&V facility in Fairmont, WV, Summer 2012.

Industry Experience

Electrical Engineer, Boeing Electron Dynamic Devices (currently ETI). Worked as a *Responsible Engineering Authority* at EDD from June 2001 until July 2002. Oversaw the design and construction of helix TWT's for satellite communications. I volunteered for a layoff, and returned to graduate school to complete my Ph.D in Physics.

Papers

Variations in Sonoluminescence Flash Timing. http://arxiv.org/abs/1012.5009

On the Variation of Sonoluminescence Flash Timing, Ph.D. thesis, December 2009.

The Timing of Sonoluminescence. A paper describing the results of my collaboration with NASA Glenn. http://arxiv.org/abs/1111.5229

Alternative Solutions to the Free Particle Dirac Equation. A mathematical paper describing a new method of solving the free particle Dirac Equation. http://arxiv.org/abs/1110.6141

Programming Experience

Java, C, C++ , Mathematica, Matlab.

Experience with *digital signal processing.*

Experience with mathematical modeling of physical systems.

References

Daniel Kaplan. Professor, Illinois Institute of Technology.
kaplan@iit.edu
312.567.3389

Porter Johnson. Professor, Illinois Institute of Technology.
johnsonpo@iit.edu
312.567.3480

Carlo Segre. Professor, Illinois Institute of Technology.
segre@iit.edu
312.567.3498

Albert Popson. Professor, West Virginia Wesleyan College.
popson@wvwc.edu
304.473.8070

Gustave C. Fralick. Research Engineer, NASA Glenn Research Center.
gustave.c.fralick@nasa.gov
216.433.3645

CURRICULUM VITA

Kim K. Colvert
Department of Physical Sciences
Ferris State University
Big Rapids, Michigan 49307
(231) 591-5851 colvertk@ferris.edu

CURRENT TEACHING RESPONSIBILITIES

Survey, introductory and advanced courses in biochemistry and biochemistry labs, proteins laboratory.

Courses Taught at Ferris:

Quantitative Analysis (CHM 231)
Introductory Biochemistry (CHM 324)
Biochemistry (CHM 364)
Instrumental Analysis (CHM 231)
Chemical Calculations (ICT 221)
Biochemistry Lab I (CHM 332)
Biochemistry Lab II (CHM 333)
Organic/Biochemistry (CHM 124)
Inorganic Chemistry (CHM 114)
Introductory Chemistry (CHM 100)
Proteins Laboratory (BIOL 473)
Advanced Topics in Biochemistry (CHEM 474)
Chemistry and Food (CHEM 104)
Intro to Physical Chemistry (CHEM 451)

CURRENT RESEARCH INTERESTS

Binding site interactions and mechanisms of ATP synthases;, ATP synthesis assay development, neurotransmitter detection by enzyme-coated microprobes.

POST DOCTORAL RESEARCH

In vitro metabolism and macromolecular binding of suspected carcinogens using HPLC, radioisotope, and protein and DNA isolation techniques. Suicide inactivation of cytochromes P450, affinity chromatography.

GRADUATE RESEARCH

Interaction between proteins in the electron transport chain of photosynthesis using protein purification and analysis techniques, enzyme assays, covalent crosslinking and absorbance spectroscopy.

EDUCATION

PhD August, 1984, University of Arkansas, Fayetteville, Arkansas 72701. Major: Biochemistry. Dissertation Title: "Interaction of Ferredoxin with Ferredoxin:NADP Reductase in Chloroplast Membranes." Advisor: Dr. Danny J. Davis

B.A. June, 1977, Hendrix College, Conway, Arkansas 72032. Major: Chemistry.

PROFESSIONAL EXPERIENCE

September, 1988 to present
Asst./Assoc./Full Professor of Chemistry, Physical Sciences Department
Ferris State University. Big Rapids, MI

August, 1986 to August, 1988
Assistant Professor of Chemistry
Chemistry Department
Southwest Missouri State University , Springfield, MO

August, 1984 to August, 1986
Postdoctoral position with Peter P. Fu,
Division of Biochemical Toxicology, National Center for Toxicological Research, Jefferson, AR. (Exchange Program with Veteran's Administration, Little Rock, AR)

ACTIVITIES AND AWARDS

Academic Scholar Award, Academic Affairs, 2012
Sabbatical Leave, University of Kansas-Lawrence, August 2009-August 2010
Sabbatical Leave, University of Kansas-Lawrence, August 2001-August 2002
(American Heart Association Grant)
Sabbatical Leave, University of Kansas-Lawrence, August 1994-June 1995
Ferris Faculty Research Grant, June 1993-May 1994
NSF Research Opportunity Award, University of Kansas-Lawrence. June-August 1990 and June-August 1991
Chair, Western Michigan Section, American Chemical Society. 1991
Faculty Research Grant, Southwest Missouri State University. June 1987-June 1988.

COMMITTEES (current)

Departmental: Tenure Review, Candidate Tenure Committees, Equipment, Scholarship, Search, Departmental Faculty Development

University: Biotechnology Advisory

Additional Service:

B.A. Biochemisty Program Coordinator
RSO advisor for Biotechnology Student organization
Independent Study Mentor (16 students since 2011)
Math /Science Student Project mentor (2 since 2005)
Science Fair
Dawg Days Volunteer
Alumni Outreach, Homecoming 2014

PUBLICATIONS

Stephanie C. Bishop, Shyam Mehta, Kim K. Colvert, Daxin Zheng, Mark L. Richter, Cindy L. Berrie and Fei Gao. "Insertion of a Rigid Structural Element into the Regulatory Domain of the Chloroplast F1- ATPase Gamma Subunit for Rotational Studies." *(to be published in the proceedings of 15th International Congress on Photosynthesis which was held on 22-27 August 2010, in Beijing, China)*

Kim K. Colvert, Fei Gao, Daxin Zheng, Shyam Mehta, Mark L. Richter, The Mutation E242K in the chloroplast ATP synthase Gamma Subunit Increases the Inhibitory Binding of the Epsilon Subunit Without Changing the Apparent Redox Potential of the Regulatory Dithiol." *(to be published in the proceedings of 15th International Congress on Photosynthesis which was held on 22-27 August 2010, in Beijing, China)*

Quillen, E.E., Haslam, G.C., Samra, H. S., Amani-Taleshi, D., Knight,J.A., Wyatt, D.E., . Bishop, S.C., Colvert, K.K, Richter M.L., Kitos, P.A. "Ectoadenylate kinase and plasma membrane ATP synthase activities of human vascular endothelial cells." J. Biol. Chem., vol. 281, 20728-20737, 2006

Kirch, R.D., Colvert, K.K., Richter, M. L., Graber, P., "Intrinsic Fluoresence of the Chloroplast H^+-ATPase.", Archives of Biochemistry and Biophysics, vol. 316, 1995.

K.K. Colvert, D.A. Mills, and M. L. Richter, "Structural Mapping of Cysteine 63 of the Chloroplast ATP Synthase Beta Subunit", Biochemistry, vol.31, pp. 3930-3935, 1992

L.Z.Morand, M.K. Frame, K.K. Colvert, D.A. Johnson, D.W. Krogmann, and D.J. Davis, "Plastocyanin Cytochrome $_f$ Interaction," Biochemistry, vol. 28, pp. 8039-8047, 1989.

K. K. Colvert and D. J. Davis, "Characterization of a covalently crosslinked complex involving ferredoxin and ferredoxin:NADP reductase," Photosynthesis Research, vol. 17, pp. 231-245, 1988.

K. K. Colvert, M. W. Chou, and P.P. Fu, "*In Vitro* Binding of Nitro-Polycyclic Aromatic Hydrocarbons and Their Oxidative Metabolites to Macromolecules," presented at the International Symposium on Polynuclear Aromatic Hydrocarbons, National Bureau of Standards, Gaithersburg, Maryland, September, 1987 (published in the proceedings of this meeting).

Kim K. Colvert and Peter P. Fu, "Xanthine Oxidase-Catalyzed DNA Binding of Dihydrodiol Derivatives of Nitro-Polycyclic Aromatic Hydrocarbons," Biochemical and Biophysical Research Communications, vol. 141, pp. 245-250, 1986.

Barbara J. Vieira, Kim K. Colvert, and Danny J. Davis, "Chemical Modification and Cross-linking as Probes of Regions on Ferredoxin Involved in its Interaction with Ferredoxin:NADP Reductase, "Biochemica et Biophysica Acta, vol. 852, pp. 109-122, 1986.

Kim K. Colvert and Danny J. Davis, "Effect of pH, Salt and Coupling State on the Interaction of Ferredoxin with the Chloroplast Membrane," Archives of Biochemistry and Biophysics, vol. 225, pp. 936-943, 1983.

PRESENTATIONS

Effects of Putrescine Oxidase Active Site Mutations on Activity. Lukas Woodcock , Dr. Kim Colvert, American Chemical Society National Meeting, Student poster session, March 2015; Ferris State University CAS Student Awards Ceremony and Poster Session, April 2015.

Chemical Rescue of a Mutant Beta-Glycosidase from *Sulfolobus Solfataricus* by Indole and Indole Derivatives. Doug Hulbert, Elizabeth Utke,Matthew Mousseau, Dr. Kim Colvert, Ferris State University
CAS Student Awards Ceremony and Poster Session, April 2015

The Role of His 432 Putrescine Oxidase in Substrate Interaction. Lukas Woodcock , Dr. Kim Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April 2014; Midwestern Symposium on Undergraduate Research in Chemistry, Michigan State University, Oct. 2014

Kinetic Characterization of Mutant Beta-Glycosidase from *Sulfolobus Solfataricus Chemically Rescued by Indole*. Jacob Hare, Matthew Mousseau, Dr. Kim Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April 2014

His Tag Removal and Heme Incorporation of Recombinant CCP1. Lukas Woodcock, Matthew Manninen, Dr. Kim Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April 2013; Midwestern Symposium on Undergraduate Research in Chemistry, Michigan State University, Oct. 2013

Temperature Effects on Activity and Flavin Content of Recombinant L-6-hydroxynicotine Oxidase and Mutants. Thomas Dingman, Kimberly Johnson, Dr.Kim Colvert Ferris State University CAS Student Awards Ceremony and Poster Session, April 2013;

Midwestern Symposium on Undergraduate Research in Chemistry, Michigan State University, Oct. 2013

"Kinetic characterization of recombinant nicotine oxidase (6-L-hydroxy nicotine oxidase) from *Arthrobacter oxidans*. Nga Ton nu, Dr. Kim K. Colvert , Ferris State University CAS Student Awards Ceremony and Poster Session, April, 2012

The kinetics of recombinant 6-L-hydroxy nicotine oxidase are altered in the chimera of 6-L-hydroxy nicotine oxidase and maltose binding protein. David Kallio, Nga Tan nu, Dr. Kim Colvert Ferris State University CAS Student Awards Ceremony and Poster Session, April, 2012

Isolation and Characterization of Recombinant *Saccharomyces cerevisiae Cytochrome C Peroxidase.*
Matthew Manninen , Dr. Kim K. Colvert, Ferris State University CAS Student Awards Ceremony and Poster Session, April, 2012

Colvert, K. K. (Dec. 2011) "What I Do On My Summer Vacations: Current Research", Ferris Student Affiliate Chapter of the American Chemical Society.

Knight, J., Colvert, K.K., Amani, D., Haslam, G., Samra, H., Kitos, P.A. and Richter, M.L. (2003) "A novel plasma membrane ATP synthesis activity in human umbilical vein endothelial cells" KU undergraduate research symposium

Kim K. Colvert, "Structural Mapping of Cysteine 63 of the Chloroplast ATP Synthase Beta Subunit" Physical Sciences Department, Ferris State University, Big Rapids, Michigan, March, 1993

Gao, F., Colvert, K.K. & Richter, M.L. (1992) *Permanent asymmetry in the chloroplast ATP synthase: evidence against a rotational mechanism,* Midwest Biochemistry Conference, Manhatten Kansas

Mills, D.A., Colvert, K.K., & Richter, M.L. (1990) *Identification and distance mapping of the ATP binding site on the b subunit of the chloroplast ATP synthase,* Midwest Biochemistry Conference, University of Oklahoma

Mills, D.A., Colvert, K.K., & Richter, M.L. (1990) *Structural mapping of the b subunit of the chloroplast ATP synthase,* Gordon Research Conference, Bioenergetics, Vermont

Kim K. Colvert, "Metabolism of Benzo(a)pyrene by Plant Microsomal Enzymes," Midwest Regional Meeting, American Chemical Society, Wichita, Kansas, November, 1987.

K.K. Colvert, N.W. Chou, and P.P. Fu, "*In Vitro* Binding of Nitro-Polycyclic Aromatic Hydrocarbons and Their Oxidative Metabolites to Macromolecules,"

International Symposium on Polynuclear Aromatic Hydrocarbons, National Bureau of Standards, Gaithersburg, Maryland, September, 1987

Kim K. Colvert and Peter P. Fu, "Reductive Metabolism of Nitrated Polycyclic Aromatic Hydrocarbons to DNA Binding Derivatives," 190th National Meeting of the American Chemical Society, Division of Biological Chemistry, Chicago, Illinois, September 1985.

Kim Colvert and Danny J. Davis, "Preparation and Characterization of a Covalently Linked Adduct Between Ferredoxin and Ferredoxin:NADP Reductase," Ann. Plant Biochemistry-Physiology Symposium, University of Missouri-Columbia, Missouri, April, 1984.

Kim Colvert, Keith Hough, and Danny J. Davis, "Covalent Linkage of Interacting Proteins of the Photosynthetic Electron Transport Chain by a Water-Soluble Carbodiimide," Southwest Regional Meeting, American Chemical Society, Tulsa, Oklahoma, December, 1983.

K. Colvert and D. J. Davis, "Effects of pH and Salt on Km for Ferredoxin in NADP Photoreduction by Chloroplast Membranes," Ann. Plant Biochemistry-Physiology Symposium, University of Missouri-Columbia, Missouri, April, 1982.

D.J. Davis and K. Colvert, "Effects of pH, Salt and Coupling State on the Interaction of Ferredoxin with the Chloroplast Membrane," Midwest Photosynthesis Conference, Argonne National Laboratory, Argonne, Illinois, October, 1982.

K. Colvert and D.J. Davis, "Effects of pH, Salt and Coupling State on the Interaction of Ferredoxin with the Chloroplast Membrane," West Central States Biochemistry Conference, Stillwater, Oklahoma, November, 1982.

VITA

Jeffrey A. Christafferson

Personal Data:

Office Address
Department of Physical Sciences
Ferris State University
Big Rapids, MI 49307
(616) 592 – 2585

Home Address
260 Harper Dr.
Sparta, MI 49345
(616) 887 - 2631

Educational History:

Western Michigan University
Kalamazoo, MI
Major: Science Education (A.B.D.)
Progress: 27 Grad. Hrs. Completed (4.0 G.P.A)
Passed Comprehensive Exam (2004)

The University of Akron
Akron, Ohio
Major: Physics
Degree: M.S.
Date Earned: 1987

The University of Akron
Akron, Ohio
Major: Physics
Degree: B.S., Magna Cum Laude
Date Earned: 1985

Professional Positions:

2010-Present	**Professor of Physics** The Department of Physical Sciences Ferris State University
2004-2010	**Associate Professor of Physics** The Department of Physical Sciences Ferris State University
1988-2004	**Assistant Professor of Physics** The Department of Physical Sciences Ferris State University
1987 - 1988	**Instructor of Physics** (1-year temporary position) The Department of Physical Sciences Ferris State University

Courses Taught (in past 5 years):

Inquiry into Physical Science (PHSC 115), Conceptual Physics (PHYS 130), Introductory Physics 1 (PHYS 211), General Physics 1 (PHYS 241), General Physics 2 (PHYS 242), Introductory Modern Physics (PHYS 311), Integrated Physical Science (INPS 320) Science Laboratory (PHYS 450), Physics Seminar (PHYS 460)

Awards/Recognitions

2001-2002 Distinguished Teacher Finalist (Ferris State University)

Ferris State University Service

- **Department Of Physical Sciences:** Curriculum Committee, Faculty Search (Physics), Faculty Development and Travel, Safety Committee, Planning Committee, Tenure Review
- **College of Arts & Sciences:** Curriculum Committee, Planning Committee, Graduate Education Committee, CAS Promotions/Merit Committee, CAS Dean's Advisory Committee
- **University:** College of Arts & Sciences Dean Search Committee (co-chair, 2011-2012)
- **Academic Senate:** Professional Development Committee, Arts & Lectures Committee

Professional Memberships:

American Association of Physics Teachers
Michigan Association of Physics Teachers
National Science Teachers Association

Professional Activities:

Professional Development:

Great Teachers Seminar, June, 2012
Offered through the Center for Teaching Excellence at Grand Rapids Community College, seminar focused on professional development through collaborative learning, rational analysis of teaching methodologies and pedagogies, and exchange of ideas.

American Association of Physics Teachers 2009 Summer Conference Workshops

- NTIPERS: Research-Based Conceptual Reasoning Tasks
- A New Methodology for Using Clickers in Physics
- Using the Reformed Teaching Observation Protocol (RTOP) to Improve Physics & Physical Science Instruction

Faculty Center for Teaching & Learning (Ferris State University)

- Rubrics, Readability, and Retention
  (September, 2010; awarded $400 Professional Development Incentive grant)
- Online Instructor Certification Program, Languages and Literature Online Learning Committee (Oct. 2009 – March 2010)
- Transforming a Course Toward More Learner Centered Teaching (Spring 2009, awarded $400 Professional Development Incentive grant)
- Learner Centered Teaching (Fall 2008, awarded $400 Professional Development Incentive grant)
- The Scholarship of Teaching (Spring 2007, awarded $750 Professional Development Incentive grant)
- Faculty Writing Workshop (Spring 2006, awarded $400 Professional Development Incentive grant)

Conference Attendance

American Association of Physics Teachers 2009 Summer Meeting, 2009.
Participated in several workshops/discussions centered on improving classroom instruction through the use of structured sequences of "clicker" questions and conceptual reasoning tasks.

5th annual Leadership Initiative in Science Education Conference, April, 2005.
Sponsored by the Dow Chemical Company and the Chemical Heritage Foundation, conference showcased methods for improving students' understanding of science, highlighting inquiry-based techniques and techniques for teaching the nature of science.

Michigan Test for Teacher Certification Item Review Conference, October, 2004
Participated in the evaluation of test items for the Integrated Science certification exam for secondary education in the state of Michigan.

American Association of Physics Teachers Summer Meeting, 2003. Participated in several workshops/discussions centered on teaching and learning with regard to inquiry based environments.

Special Courses/Workshops Taught

Mecosta-Osceola ISD Math, Science, and Technology Center
Provide physics instruction to high school juniors and serve as mentor/research advisor for student science fair projects.

CURRICULUM VITA

Pasquale Di Raddo, PhD.
Professor, Organic/Biochemistry
Ferris State University ASC 3011
Big Rapids, MI 49307
(231) 591-2584

Education: BSc. McGill University (1976)
PhD. McGill University (1983)
Postdoctoral Fellow, Montreal Neurological Institute (1984)
Research Associate/Instructor, University of Chicago (1984-88)

Teaching: University of Wisconsin (1988-89)
Carthage College (1989-94)
Ferris State University Associate Professor (1994-98)
Professor (1998-2009)

Courses Taught: Organic Chemistry 321, 322
Biochemistry 324
General Chemistry 114 (on/off campus)

Conference /Presentations: Midland Section of ACS ('11) *Selected Student Poems in Chemistry Poster with Andrew Laseck*
Alma College, MI
Western Michigan Section of ACS ('12) *Poetry for Chemists: An Unusual Academic Hybridization*
Hope College, MI
22nd International Conference on Chemical Education (ICCE '12) *Poetry for Chemists: An Unusual Academic Hybridization*
Rome, Italy
Michigan Academy of Letters, Arts & Sciences ('12)
Alma College, MI
Michigan Academy of Letters, Arts & Sciences ('13) *Cartoon Imagery as a Tool for Wartime Propaganda*
Hope College, MI
FSU Arts & Sciences Student Recognition Event ('13) *Two Posters: Benzoic Acid Crystals and Dyeing Properties of DBA*
National (ACS) Meeting ('11/'13?) *Vitamin K*
National (ACS) Meeting ('11/'13?) *Vitamin H (Biotin)*
Biennial Chemistry Education Conference ('14) Grand Valley State, MI

University: FSU Student ACS group ('10) *Laboratory Safety*

Presentations FSU Dept. of Lang & Lit Faculty Colloquium ('10) *Chemistry and Poetry*
SVSU Department of Chemistry ('11) *Poetry in Chemistry*
Aquinas College Department of Chemistry ('11) *Poetry in Chemistry*
WMU Department of Chemistry ('12) *Poetry in Chemistry*
FSU Faculty Rankin Art Show ('12) *Shape Poetry in Chemistry*
FSU Humanities Colloquium Series ('12) *Cartoon Imagery as a tool for Wartime Propaganda*
FSU Honors/Science/Fiction/Culture LITH 233 ('12) *Poetry & Science*
FSU April's *Take a Poem to Lunch* Series (2013-14) Coordinator and Contributor
University of Detroit Department of Chemistry ('13) *Laboratory Safety*
FSU Honors Students Lunch & Learn ('13) *20th Century Cartoon Imagery of African Americans*
CMU Arts and Sciences ('14) *Comics and Cartoons as Propaganda*
Ferris State University Black History Month ('14) *20th Century Cartoon Imagery of African Americans*
FSU Department of Lang & Lit, Dr. Charles Vannette, The Holocaust ('14) *The Holocaust as Seen Through Cartoon Imagery*
FSU Honors Students Lunch & Learn ('14) *The Holocaust as Seen Through Cartoon Imagery*

Committees: Ferris ICT Advisory Board (09 - 14)
ICT Program Review report ('12)
Medical Technology Faculty Search ('12)
Tenure Review Committee (09 - 14) (Departmental)
CTC Committee (Departmental):
Dr. Hiel (two years)
Dr. Brennan, Chair one year)
Professional Development/Travel, Safety, Equipment (09-14) (Departmental)
Arts & Sciences Diversity Committee ('14)
Wellness Committee ('14)
Distinguished Teacher Committee (2012-14, chair '14)

Professional Development: Soap Making Workshop (BCCE conference GVSU '14)

Professional Membership: America Chemical Society (04-14)
Kappa Psi Pharmaceutical Fraternity (04-14)
Golden Key Honor Society (04-14)

Advising: Pre-pharmacy
Four RSO student science groups:

Pre-optometry club (2009-present)
Pre-medicine club (2009 – 12)
American Chemical Society (2009-present)
Kappa Psi Pharmaceutical Fraternity (2009-14)

ACS RSO Select Speakers:
David Stickles ('10) Dow Corning Corporation
Gary Homan ('10) Hemlock Semiconductor Corporation
Dr. Gary Heil ('10, '12) FSU
Dr. Ed Muccio ('10) FSU
Dr. Ned Heindel ('11) Lehigh University
Dr. Kim Colvert ('11) FSU
Dr. John Engelman ('12) S.C. Johnson & Son
Sandra Lorenz ('12) Honeywell
Dr. Mark Thompson ('12, '14) FSU
Professor William Killian ('12) FSU
Chris Beier & Dr. Lafontaine ('13) FSU
Dr. Wallace Fu ('13) Hope College
Dr. Mark Benvenuto ('14) University of Detroit, Chair

Articles/ Publications
Chemical Café ('10) Selection of poems for teaching science-related writings
The Big Rapids Pioneer ('12) *Poet in the Chemistry Lab (2 weeks)*
The Midland Chemist (Dow) ('12/'13) Two Chemistry Poems Published
The Smithsonian/NASA Astrophysics Data System ('13) *Teaching Chemistry Lab Safety through Comics*
BioChemical Café ('12) Selection of poems for teaching science related writings

Community Service:
Big Rapids Festival of the Arts ('14) *Wartime Propaganda in Cartoons*
Magic of Chemistry Show at FSU (Dr. Slime/Garlick of Delta College, 100 attendees from MOISD & Home Schooled students '12)
Relay for Life (three year participant)
Artworks member

3/2014

FREDERICK R. HECK

CURRICULUM VITAE

January, 2007 - November, 2013

ADDRESS:

Office:
Department of Physical Sciences
Ferris State University
Big Rapids, MI 49307
(231) 591-2588

Home:
22929 15 Mile Rd.
Big Rapids, MI 49307
(231) 592-4067

PERSONAL:

Born on November 18, 1953
Married to Cynthia Fitzwilliams-Heck
Four children, Daniel (age 26 years); Katie (age 23 years); Trey (age 7 years); Jace (age 7 years)

EDUCATION:

Ph.D., (1987) Structural Geology, Northwestern University, Evanston, IL
M.S., (1984) Geology, Northwestern University, Evanston, IL
Geology Field Camp (1982) Indiana University, Cardwell, Montana
B.S., (1982) Geology, Western Michigan University, Kalamazoo, MI

EMPLOYMENT:

1997 - present: Professor of Geology, Department of Physical Sciences, Ferris State University, Big Rapids, MI
1992 - 1997: Associate Professor of Geology, Department of Physical Sciences, Ferris State University, Big Rapids, MI
1988 - 1992: Assistant Professor of Geology, Department of Physical Sciences, Ferris State University, Big Rapids, MI
1987 - 1988: Post-doctoral research, "Synthesis of Finite Displacements and Displacement Rates in Continental Margins Over 700ma", Northwestern University, Evanston, IL
1982 - 1987: Research Assistant, Department of Geology, Northwestern University, Evanston, IL
1979 - 1982: Operating Room Technician, Bronson Methodist Hospital, Kalamazoo, MI
1978 - 1979: Operating Room Technician, Mecosta County General Hospital, Big Rapids, MI
1971 - 1976: Hospital Corpsman 2nd Class, Operating Room Technician, United States Navy

COURSES TAUGHT AT FERRIS STATE UNIVERSITY SINCE 2007:

GEOL 121 Physical Geology
GEOL 131 Geology and Land-Use Management
GEOL 221 History of the Earth
PHSC 110 Inquiry into the Earth System

COMMITTEE SERVICE AT FERRIS STATE UNIVERSITY:

Department-level committees:

Departmental Planning Committee, 1990 to present
Tenure Review Committee, 1993 to present
Candidate Tenure Review Committee for Yamuna Kollalpitiya, Fall 2013

College-level committees:

College Planning Committee, 2008 to 2009

University-level committees:

Associate Provost for Academic Operations Search Committee, Chair, Fall 2011
General Education Task Force, defacto Chair, 2009 to present

University General Education Committee, Chair, 2008 to present
Higher Learning Commission Criterion 3c Subcommittee, Co-chair, 2008 to 2010

OTHER SERVICE AT FERRIS STATE UNIVERSITY:

Bachelor of Integrated Science Advisory Board, Fall, 2009 – present
Countless (seemingly) meetings with individuals, departments, programs, and colleges as defacto chair of the General Education Task Force, 2009 – present
Coordinator for University General Education Program, 2008 to present
Advisor and Coordinator for the Elementary Education, Integrated Science Minor, 2007 to 2011
Solicitor in Physical Sciences Department for United Way: 1994 to present

HONORS / RECOGNITION:

Recognized at Faculty Appreciation Night by student athletes as a faculty member who had a positive impact on their academic careers, February, 2007; April, 2008
Merit Award, 2007
Nominated for Michigan Distinguished Professor of the Year, 2007

PROFESSIONAL ACTIVITIES:

Publications:

Heck, F.R. (2009) General Education: We all have something to learn, *Ferris Torch* AND *Big Rapids Pioneer*, November, 2009

Presentations:

Numerous presentations on the status of General Education review to a wide variety of groups on the Ferris campus, 2009-present

"Geology of Michigan at Hall's Lake", a presentation for the Chippewa Watershed Conservancy, July, 25, 2013

"The Nature of Science: Implications for the Debate About Teaching Creationism in the Science Classroom", a presentation for the public sponsored by the Secular Student Alliance, a Ferris State University RSO, February, 2013

"Assessing Student Affairs Contributions to General Education", Michael Cairns, Fred Heck, Kristen Salomonson; a presentation at the AACU Annual Conference on General Education and Assessment, February, 2011

"Student Affairs: A Place Where Learning Happens!", Michael Cairns, Kristen Salomonson, Fred Heck; a presentation at the Annual Conference of the NCA / The Higher Learning Commission, April, 2010

"My Year in General Education: Lessons Learned and Suggestions for Colleagues", a presentation for the Academic Senate and also for the campus community during Faculty Development Week, August, 2009

"The Nature of Science: Implications for the Debate About Teaching Creationism in the Science Classroom", a presentation to students in CHEM 121, October, 2007.

"Cooperative Group Learning As An Alternative to Lecture in the Classroom", a workshop given for FSU faculty at the Spring Learning Institute, March, 2007

"The Nature of Science: Implications for the Debate About Teaching Creationism in the Science Classroom", a presentation to students in the Honors Program, February, 2007

Workshops / Meetings / Field Trips Attended:

Geological Society of America North-Central Section Meeting, to learn about current research strategies for understanding the glacial geologic history of Michigan and to attend a day field trip to examine glacial geologic features of southwest Michigan, Kalamazoo, MI, May, 2013

"General Education and Assessment: New Contexts, New Cultures", AACU annual conference on general education, New Orleans, LA, February, 2012

"General Education and Assessment 3.0: Next-Level Practices Now", AACU annual conference on general education, Chicago, IL, March, 2011

"General Education and Assessment: Maintaining Momentum, Achieving New Priorities", AACU annual conference on general education, Seattle, WA, February, 2010

"General Education, Assessement, and the Learning Students Need", AACU annual conference on general education, Baltimore, MD, February, 2009

"Improving the Validity and Reliability of Your Tests or Quizzes", Ferris Faculty Center for Teaching and Learning, June, 2008

FerrisConnect Training, January, 2008

Other Activities:

Weekly reading mentor for 2nd graders in Mrs. Kirinovic's classroom, Riverview Elementary, Fall, 2013

Rocks and minerals presentation to 1st graders at Riverview Elementary School, Spring 2013

Interviewed for FCTL video, Spring, 2011

Rocks and minerals presentation to Preschool students at MOISD Career Center, Spring 2010

Various presentations to the Big Rapids Rock, Gem, and Mineral Club; founding member, October, 2009 – present

Research mentor for Brady Hasse, a Math, Science, Technology Center student working on a project titled: *The Geologic History of Ferris Flats: Implications for a Readvance of the Saginaw Ice Lobe*, October, 2009. I think it's worth noting that Brady won the local science fair with this effort and earned a trip to California to present his research at the national level.

Cub Scout field trip to local gravel pit for Geology Merit Badge, October, 2008

Rocks and minerals presentation to 4th graders at Brookside Elementary School, Jan. 2008

MOISD Science Fair Judge, March, 2008

PROFESSIONAL MEMBERSHIPS:

Geological Society of America
American Geological Institute
National Association of Geoscience Teachers

PROFESSIONAL SUBSCRIPTIONS

Journal of Geoscience Education, GSA Today, Scientific American, Geology, Earth

Curriculum Vitae

William Killian
Department of Physical Sciences
Ferris State University
231-349-1578
WilliamKillian@ferris.edu

Education:

North Park Colleges, B.A. Biology, 1973. Magna Cum Lauda Graduate.

Ohio State University, M.S. Chemistry, 1976.
Area of Research: Synthesis and Characterization of Substituted. Dihydropyridines in Relation to NAD/ NADH models.

Representative Summer Experience

Summer 1998&1999: Taught at Parke-Davis and coordinated pharmaceutical chemical tech certificate program

Summer 1994: Visiting Scientist, Dow Chemical Company, Surfactant Research

Summer 1992&1993: Research Associate, The Upjohn Company, HPLC method development.

Full Time:

1987-Present: Associate Professor, Industrial Chemical Coordinator, Ferris State University

Courses Taught:

- General Chemistry
- Laboratory Safety
- Applied Analytical Chemistry
- Instrumental Analysis

1985-1986: Instructor, George Williams college.
Closed in March '86 due to financial exigency.

1984-1985: Instructor, Loop Junior College, part-time position.
Courses Taught:

- General Chemistry
- Environmental Science

1981-1985: Chemistry/Manager, Inland Steel.
2 years as an EPA compliance water/waste water chemist.
2 years as a quality control manager for chemical operations at rolling mill.

Publications/Presentations:

"N-ACYL-1, 4-Dihydroprydines by Acid Catalyzed Condensations," Tetrahedron Letters, 16, 1407-1410, 1978

"Development of a Process for Treating Red Water by Organic/ Inorganic Separation and Biodegradation," 14th Annual Army Environmental R&D Symposium, Williamsburg, VA, November 14-16, 1989.

"Detection of Chemical Plumes Utilizing Passive-Remote Fourice Transform FTIR Spectroscopy," 44th Annual Pittsburgh Conference and Exposition on Analytical Chemistry, Atlanta, GA, March 8-12, 1993.

"The Role of an Industrial Advisory Board in Chemical Technology Program,"
15th Biennial Conference on Chemical Education, Waterloo, Ontario, August 1998.

"How to Obtain Accreditation for a Two-Year Industrial Technology Program," ACS Region Meeting, Midland, MI, October, 1997.

"A Mechanistic Representation For the Synthesis of Benzanthrone and Violanthrone,"Journal of Polycyclic Aromatic Compounds, Vol 19, pp 179-197, 2000.

"Roundtable Discussion of Curricular Issue in Chemical Technology Programs,"
BCCE in Lafayette, IN, 2006.

ICT Chemistry poster and presented at National ACS Meeting, 2013.

Affiliations:

American Chemical Society
Instrumental Society of America

YAMUNA KOLLALPITIYA

830 Woodward Ave · Big Rapids, MI 49307
(316) 734-0348 · yamunakollalpitiya@yahoo.com

EDUCATION

Wichita State University, Wichita, KS
Ph.D. in Chemistry/Biochemistry *July 2011*
Dissertation
Part I: Investigation of Mechanisms of Copper and Zinc Neurotoxicity
Part II: Pre-steady State Kinetics of the Reduction of Cytochrome b_{561} with Ascorbate

M.Sc. in Chemistry/Biochemistry *May 2008*
Relevant coursework
Electroanalytical Chemistry, Photochemistry, Spectroscopy, Physical Biochemistry, Analytical Spectroscopy, Bioorganic Chemistry, Advanced Biochemistry, Neurochemistry

University of Colombo, Sri Lanka
M.Sc. in Analytical Chemistry *August 2004*
(Completed theory and practical components only)

University of Peradeniya, Sri Lanka
B.Sc. in Chemistry, 2nd class upper division *March 2000*
Subsidiary Subject: Physics

TEACHING EXPERIENCE

Assistant Professor *August 2013 - Present*
Department of Physical Sciences, Ferris State University, Big Rapids, MI

- Taught biochemistry courses (CHEM 324 and OPTM 530)
- Instructed General Chemistry Labs (CHEM 114, 122 and 103)

Professor *July 2011 – May 2013*
Department of Chemistry, Warren Wilson College, Asheville, NC

- Created syllabi and taught Principles of Chemistry, General Chemistry and Biochemistry courses
- Instructed Biochemistry and Analytical Chemistry lab sessions
- Served as a student advisor and a research mentor

Teaching Assistant *August 2006 – May 2011*
Department of Chemistry, Wichita State University, Wichita, KS

- Instructed labs and recitation sessions for General Chemistry and Biochemistry
- Individually mentored three undergraduate students in independent research projects

Temporary Lecturer *May 2000 – September 2000*
Department of Chemistry, University of Peradeniya, Sri Lanka

- Conducted lab sessions and group discussions in undergraduate Organic Chemistry, Inorganic Chemistry, and Physical Chemistry lecture classes

TEACHING INTERESTS

Biochemistry, General Chemistry, Analytical Chemistry, Physical Chemistry

RESEARCH EXPERIENCE

Ph.D. Candidate *January 2005 - July 2011*
Department of Chemistry, Wichita State University, Wichita, KS

- Studied the factors affecting copper and zinc-induced apoptosis in neuronal cells
- Characterized SH-SY5Y neuronal cells as a serotonergic model
- Purified and characterized cytochrome b_{561} protein from natural sources for functional studies
- Studied the kinetics of cytochrome b_{561}

Research Officer *July 2001 -December 2004*
Industrial Technology Institute, Colombo, Sri Lanka

- Performed quantitative analysis on metals and minerals using ASTM, BS, SLS standards
- Provided test reports to industry
- Trained laboratory staff of two companies to perform testing

Research Assistant *October 2000- June 2001*
Environmental Technology Division, National Building Research Organization, Colombo, Sri Lanka

- Analyzed air pollutants by standard methods
- Provided test reports to industry

LABORATORY SKILLS

- Handling and maintenance of neuronal and nonneuronal cell lines (SH-SY5Y, MN9D, PC12)
- Basic methods in protein purification from natural sources
- Analytical and separation chromatography techniques including FPLC, HPLC-EC, HPLC-UV and GC/MS
- Spectroscopy (UV/VIS, CD, Fluorescence, Stopped flow, AAS)
- Electrophoresis
- Titration techniques

AWARDS AND AFFILIATIONS

- Member: Sigma Xi, 2012-2013
- Mellon funds to redesign general chemistry I course, 2011
- Lloyd Parker Graduate Fellowship in Chemistry, 2006-2008
- Member: American Association for the Advancement of Science, 2008-2011
- Student Affiliate Member: American Chemical Society, 2008-2011
- Outstanding Teaching Assistant, Spring-2009
- Junior Faculty Fellow, 2014-2015
- Professional Development Intensives, 2014

PUBLICATIONS/ PRESENTATIONS

- **Kollalpitiya, Yamuna** and Wimalasena, Kandatege, Neurotoxicity of Copper (II) and Zinc (II). 45th Midwest Regional Meeting of the American Chemical Society, Wichita, KS, October 27-30, 2010.

- **Kollalpitiya, Yamuna** and Wimalasena, Kandatege, Catecholaminergic Toxicity of Copper could not be due to its Redox Activity. Poster, 44th Midwest Regional Meeting of the American Chemical Society, Iowa City, IA, October 21-24, 2009.

- **Kollalpitiya, Yamuna** and Wimalasena, Kandatege. Membrane Permeable Chelators Increase Copper Uptake and Toxicity in Catecholaminergic Cells. Poster. 84th Southwestern and Rocky Mountain Division Regional Meeting of the American Association for the Advancement of Science, Tulsa, OK, March 28-31, 2009.

- **Kollalpitiya, Yamuna** and Wimalasena, Kandatege. Transport of Tryptophan into Neuronal cells. Poster. 4thAnnual Symposium on Graduate Research and Scholarly Projects, Wichita State University, April 25, 2008.

- **Kollalpitiya, K.M.Y.P.,** Kamaldeen, T. and Navarathne, A., Detection of Hydrogen Peroxide in Milk using a Biosensor. *Chemistry of Sri Lanka* (2000), 17, 41.

- **Kollalpitiya, K.M.Y.P.,** Kamaldeen, T. and Navarathne, A., Detection of Hydrogen Peroxide in Milk using a Biosensor. Poster. Annual Research Sessions, University of Perdeniya, Sri Lanka 2000.

Bo Lou

Physical Sciences Department, Ferris State University, Big Rapids, MI 49307
(616)592-5874, Bo Lou@ferris.edu

EDUCATION:

University	Year	major	degree
Zhejiang Univ., China	1978-1982	Optics/Laser Engineering	B.Sc
Zhejiang Univ., China	1983-1985	Optics/Laser Engineering	M.Sc
Emory Univ., USA	1985-1989	Physics	Ph.D

TEACHING AND RESEARCH EXPERIENCE:

September, 1993 -
Associate professor of physics at Ferris State University, Big Rapids, MI 49307. Teaching undergraduate physics courses and laboratories; serving department and college committees; advising students; developing World Wide Web based lesson modules, writing physics ancillary materials, and conducting research in optical properties of superlattices.

September, 1990 - August 1993
Assistant professor of physics at Ferris State University, Big Rapids, MI 49307. Teaching undergraduate physics courses and laboratories; serving department and college committees; advising students; developing innovative teaching methods, and conducting research in optical properties of superlattices.

August, 1989 - August 1990
Visiting assistant professor of physics at Berry College, Mt. Berry Station, GA 30149. Teaching undergraduate physics courses and laboratories and conducting research in optical properties of superlattices.

January 1989 - May 1989
Joint research program of Brookhaven National Laboratory and Emory University. Conducting infrared synchrotron radiation transmission studies of thin film high T_c superconductors.

September 1985 - December 1988
Ph.D. program in experimental condensed matter physics. Topic of Ph.D dissertation: Far-Infrared Studies on GaAs-AlGaAs Superlattices.

September 1982 - May 1985
Master of Science Program in Laser Technology. Topic of M.Sc thesis: Tunable–CO_2 Waveguide Laser.

September 1978 - July 1982
Bachelor of Science program in Optical Engineering. Topic of B.Sc. thesis: CO_2 Waveguide Laser.

AWARDS:

Outstanding graduate student of molecular spectroscopy by The Coblentz Society.
Applied Spectroscopy, 42*f*, 1137 (1988).
Applied Spectroscopy, 43*f*, 363 (1989).
University fellowships, Emory University, 1985 - 1989.

PUBLICATION LIST: (in reverse chronological order)

B. Lou, "Test Item File" to accompany Physics, Principles with Applications, 5th ed. by Douglas Giancoli, Prentice-Hall, INC., ISBN 0-13-628017-X, 537 pp (1998).

B. Lou, "Study Guide, Student Solutions Manual" to accompany College Physics 3rd ed. by Jerry Wilson and Anthony Buffa, Prentice-Hall, INC., ISBN 0-13-505116-9, 346 pp (1997).

B. Lou, "Instructor's Solutions Manual" to accompany College Physics 3rd ed. by Jerry Wilson and Anthony Buffa, Prentice-Hall, INC., ISBN 0-13-505090-1, 380 pp (1997).

D. Lee and B. Lou, "Instructor's Solutions Manual" to accompany Physics for Scientists and Engineers, 1st ed. by Lawrence Lerner, Jones and Bartlett Publishers, ISBN 0-7637-0206-4, Vol. 2, 566 pp (1997).

B. Lou, "Answer Booklet" to accompany University Physics, 1st ed. by Jeff Sanny & William Moebs, Wm. C. Brown Publishers, ISBN 0-697-26722-9, 58 pp (1996).

B. Lou, T. Kremser, and R. Cole, "Student Solutions Manual" to accompany University Physics, 1st ed. by Jeff Sanny & William Moebs, Wm. C. Brown Publishers, ISBN 0-697-23258-1, 87 pp (1996).

B. Lou, T. Kremser, and R. Cole, "Instructor's Solutions Manual" to accompany University Physics, 1st ed. by Jeff Sanny & William Moebs, Wm. C. Brown Publishers, ISBN 0-697-05887-5, 459 pp (1996).

B. Lou and A. Hilgendorf, "Instructor's Solutions and Resource Manual" to accompany Physics: Principles with Applications 4th ed. by Douglas Giancoli, Prentice-Hall, INC, ISBN 0-13-141285-X, 555 pp (1995).

B. Lou, and Z. C. Feng "Valence subbands and acceptor levels in p-type GaAs - $Al_xGa_{1-x}As$ superlattices", Semicond. Sci. Technol., Vol. 8, pp1741 - 1745 (1993).

A. Abbasabadi and B. Lou, "POST-USE REVIEW: College Physics, 3rd ed. Raymond A. Serway and Jerry F. Faughn. 1091 pp. Saunders College Publishing, Philadelphia, 1992. Price $61.25 ISBN 0-03-073331-6", Am. J. Phys., Vol. 61, No. 1 (1993).

B. Lou, "Plasma-phonon coupling in GaAs - AlAs superlattices", Solid State Commun., Vol. 84, No. 6, pp685 - 690 (1992).

B. Lou, "Physics 211 (#3489), 212 (#3999), 213 (#4936), 241 (#4251), 242 (#4535), 243 (#4935) Laboratory Materials", Ferris Copy Center 1991 - 1998.

B. Lou, "Far-infrared transmission spectra of GaAs - AlAs superlattices at oblique incidence'", Solid State Commun., Vol. 76, pp1395 - 1401 (1990).

G. P. Williams, R. C. Budhani, C. J. Hirschmugl, G. L. Carr, S. Perkowitz, B. Lou, and T. R. Yang, "Infrared synchrotron-radiation transmission measurements on $Yba_2Cu_3O_7$ in the gap and supercurrent regions", Phys. Rev., B41, pp4752 - 4755 (1990).

S. Perkowitz, B. Lou, L. S. Kim, O. K. Wu and J. N. Schulman, "Far-infrared determination of effective mass and valence-band offset in the HgTe/CdTe superlattice", Phys. Rev. B40, pp5613 - 5616 (1989).

B. Lou, R. Sudharsanan, and S. Perkowitz, "Anisotropy and infrared response of the GaAs-AlAs superlattice", Phys. Rev., B38, pp2212-2214 (1988).

R. Sudharsanan, S. Perkowitz, B. Lou, T. Drummond, and B. Doyle, "Far-infrared characterization of AlAs-GaAs superlattices", Superlattices Microstruct, Vol. 4, pp657-660 (1988).

R. Sudharsanan, S. Perkowitz, B. Lou, B. R. Caldwell, and G. L. Carr, "Infrared reflectance of rare earth-barium-copper oxide superconductors" in High-Temperature Superconducting Materials, edited by W. Hatfield and J. Miller, Jr., pp283-288 (1988).

I. Bozovic, D. Mitzi, M. Beasley, A. Kapitulnik, and T. Geballe, S. Perkowitz, G. L. Carr, B. Lou, R. Sudharsanan, and S. Yom, "Vibrational spectra and lattice instabilities in the high-Tc superconductors $Yba_2Cu_3O_7$ and $GdBa_2Cu_3O_7$", Phys. Rev., B36, pp4000-4002 (1987).

S. Perkowitz, G. L. Carr, B. Lou, S. S. Yom, and R. Sudharsanan, "Phonon, plasmon and gap behavior in superconducting high-T_c $Y_1Ba_2Cu_3O_7$ and $Gd_1Ba_2Cu_3O_7$", Solid State Commun., Vol. 64, pp721-725 (1987).

PROFESSIONAL PRESENTATIONS: (in reverse chronological order)

Round Table Discussion on "How to Use the Web in Physics Teaching". AAPT (American Association of Physics Teachers) National Winter Meeting, New Orleans, Louisiana, January 3 - 7, 1998.

Round Table Discussion on "The Importance of Accurate Physics Ancillary Materials". AAPT (American Association of Physics Teachers) National Winter Meeting, Phoenix, Arizona, January 4 - 8, 1997.

B. Lou, "Physics demonstration with Moire patterns" AAPT (American Association of Physics Teachers), Michigan Section meeting, Ferris State University on April 4, 1992.

G. L. Carr, R. Budhani, G. P. Williams, C. J. Hirschmugle, T. Yang, B. Lou and S. Perkowitz, "Infrared synchrotron radiation transmission studies of high Tc superconductors", NSLS Annual Report (1988), Brookhaven National Laboratory, Upton, NY 11973.

B. Lou, R. Sudharsanan, and S. Perkowitz "Far-infrared off-normal studies on AlAs-GaAs superlattices" March Meeting of The American Physical Society, New Orleans, 1988.

G. L. Carr, B. Lou, T. R. Yang, R. Sudharsanan, B. R. Caldwell, S. Perkowitz, P. Broussard, J. Claasen, and S. A. Wolf, "Far-infrared and DC transport studies of $Yba_2Cu_3O_y$ thin layers", March Meeting of The American Physical Society, New Orleans (1988), Bulletin of the American Physical Society, Vol. 33, pp451 (1988).

S. Perkowitz, B. Lou, R. Sudharsanan, B. R. Caldwell, T. R. Yang, G. L. Carr, and W. G. Moulton, "A comparison of the far-infrared properties of bulk Y-, Gd-, and Tm-$Ba_2Cu_3O_y$", March Meeting of The American Physical Society, New Orleans (1988), Bulletin of the American Physical Society, Vol. 33, pp450 (1988).

S. Perkowitz, R. Sudharsanan, G. L. Carr, B. Lou, and S. Yom, "Infrared spectra of high-Tc YBaCuO and GdBaCuO: comparison to conventional superconductors", Materials Science Of High Temperature Superconductors II, Cincinnati, 1987.

R. Sudharsanan, S. Perkowitz, and B. Lou, "Far-infrared reflectance and anisotropy of phonon modes in GaAs-AlAs superlattices", Third International Conference on Superlattices, Microstructures & Microdevices, Chicago, 1987.

R. Sudharsanan, S. Perkowitz, S. S. Yom, and B. Lou, ``Far-infrared reflectance and Raman studies of $Cd_{1-x}Mn_xTe$-CdTe microstructures", March Meeting of The American Physical Society, New York (1987), Bulletin of the American Physical Society, Vol. 32, pp657 (1987).

PROFESSIONAL ACTIVITIES: (in reverse chronological order, since Fall 1990)

AAPT (American Association of Physics Teachers) National Winter Meeting, New Orleans, Louisiana, January 3 - 7, 1998.

AAPT (American Association of Physics Teachers) National Winter Meeting, Phoenix, Arizona, January 4 - 8, 1997.

1996 Faculty Summer Institute, Holiday Inn, Big Rapids, MI, June 10 - 13, 1996.

AAPT (American Association of Physics Teachers) Michigan Section meeting, Central Michigan University, April 3, 1993.

"The Diversity Challenge: Implications for the Classroom", in Lansing on March 26, 1993 (by Sharom Thomas of Miami-Dade Community College).

"The Making of a Master Teacher", in Lansing on March 26, 1993 (by Sharom Thomas of Miami-Dade Community College).

"Equity within the Academy: Graduating Minority Students III", in Lansing on March 26, 1993.

AAPT (American Association of Physics Teachers) Michigan Section meeting, Lansing Community College, October 24, 1992.

"Using the Polaroid Camera in the Science Classroom", Lansing Community College, October 24, 1992 (Gloria Henry of the Polaroid Corporation).

"Changing science courses to improve critical thinking: Schemes and implementations", Ferris State University, September 12, 1992 (Craig E. Nelson of Indiana University).

AAPT Michigan Section meeting, Ferris State University, April 4, 1992.

"The success of graduating minority students", Lansing, MI, March 27, 1992 (Xavier University of Louisiana).

"Equity within the Academy": Graduating Minority Students II", Lansing, MI, March 27, 1992.

AAPT Michigan Section meeting, Lawrence Technological University, April 20, 1991.

"Equity within the Academy": Graduating Minority Students", Lansing, MI, January 23, 1991.

PUBLIC SERVICE AND COMMITTEE: (since Fall 1990)

University Wide

Senate Budget Planning Committee (since October 1997)

University Web Policies and Use Task Force (since April 1997)

Affirmative Action Council (since September 1996)

FFA Bargaining Team for the 1994 - 2002 contract

FFA Data Officer (since August 1997)

College of Arts and Sciences

The Arts and Sciences Planning Committee (April 1991 - May 1992),

The Arts and Sciences Minority Retention Task Force (since January 1991),

The Arts and Sciences Computer Committee (since September 1990),

The Art and Sciences Computer Guru (since September 1995)

Department of Physical Sciences

Search Committee for Tenure-Track Physics Position (Chair) (February 1996 - May 1996),

Department Tenure Review Committee (since September 1995)

Department Planning Committee (since September 1991),

Department Curriculum Committee (September 1992 - May 1993),

Department Faculty Development and Travel Committee (since September 1992),

Department Head Evaluation Committee (September 1990 - May 1991 and since September 1995)

Search Committee for the Chemistry position from Spring to Summer 1991,

Search Committees for the temporary Astronomy/Physics position in Summer 1992, 1993.

COLLEEN M. PARTIGIANONI
Curriculum Vitae
July, 2015

Education

Ph. D., (1991) Chemistry, Michigan State University, East Lansing MI.
B.S., (1986), Chemistry, *magna cum laude*, Ithaca College, Ithaca NY.

Professional Experience

Ferris State University:
Professor of Chemistry: 2009 – present.
Associate Professor of Chemistry: 2004 – 2009.
Assistant Professor of Chemistry: 1999 – 2004.

Pellissippi State Community College: Adjunct Instructor 5 / 98 – 5 / 99.

Cornell University: Tutor, Learning Skills Center 1 / 98 – 5 / 98.

University of North Carolina: Visiting Professor 1 / 97 – 1 /98; 8 / 94 – 8/ 95
(one year appointments funded by Career Advancement and Visiting Professorship Awards from the National Science Foundation)

Ithaca College: Assistant Professor of Chemistry 8 / 91 – 8 / 94; 8 / 95 – 8 / 96.

Ferris Teaching Assignments

Chem 121 General Chemistry 1 (lecture and lab)
Fall Semesters: 1999 through 2014;

Chem 122 General Chemistry 2 (lecture and lab)
Spring Semesters: 2001 through 2015

Chem 381: Inorganic Chemistry: Spring 2010, Spring 2012, Spring 2014

Chem 497 Independent Study in Coordination Chemistry: Fall 04, Spring 08

Chem 114 Introduction to General Chemistry
1 section: (lecture and lab): Winter 05 & Summer 00.
3 sections: (lab): Winter 03.

Chem 103 Preparatory Chemistry (lecture and lab): Summer 00

Service

FSU Committee Service

Departmental (Recent)

2014-2015
- Assessment Committee (Chair)
- CHEM 121 and CHEM 122 Assessment Coordinator
- General Chemistry Faculty Search Committee
- B. A. in Biochemistry and Chemistry Program Review Committee

2013–2014
- Assessment Committee (Chair)
- CHEM 121 and CHEM 122 Assessment Coordinator
- Curriculum Committee

2012–2013
- Assessment Committee (Chair)
- CHEM 121 and CHEM 122 Assessment Coordinator
- Equipment Committee
- Tenure Policy Revision
- Tenure Review Committee
- Summer Teaching Committee

2011–2012
- Assessment Committee (Chair)
- Chem 122 Assessment Coordinator
- Equipment Committee
- Tenure Review Committee
- CTC for Gary Hiel (Chair)

2010—2011:
- Assessment Committee
- Chem 122 Assessment Coordinator
- Equipment Committtte
- Tenure Review Committee
- CTC for Gary Hiel (Chair)

2009—2010:
- Assessment Committee
- Chem 122 Assessment Coordinator
- Equipment Committee
- Safety Committee
- Tenure Review Committee
- CTC for Gary Hiel (Chair)

2008—2009:
- Assessment Committee
- Equipment Committee
- Tenure Review Committee

College
CAS Assessment Committee (2011 – present)
CAS Sabbatical Leave Committee (2010—2011; 2006 – 2007)
CAS Diversity Committee (2008—2010)
CAS Academic Standards and Policies (2003 – 2006)
CAS Planning Committee (2001 – 2004)
CAS Faculty Support and Development (2000 – 2003), Recorder (2002 - 2003)

University
Scientific Understanding Assessment Committee (2002 – 2008)

Advising / Mentoring

Faculty Advisor for Kappa Psi Pharmaceutical Fraternity (Fall 2002 – present)

Mentor in Select Sixty (Fall 2005 – Winter 2006)

Research Advisor for an undergraduate student (Fall 2002 – Winter 2003)

Academic Advisor for approximately 20 pre-pharmacy students / year.

Honors/ Recognition

Excellence in Course Assessment Award (Spring 2011)

Semifinalist for Ferris' Distinguished Teacher Award, Spring 2007.

Recipient of the Outstanding Professor Award, FSU Honors Program, Fall 2004.

Scholarly and Professional Activities

Publications

A New Electron Transfer Donor for Photoinduced Electron Transfer in Polypyridyl Molecular Assemblies"; Colleen Partigianoni, Sandrine Chodorowski-Kimmes, Joseph A. Treadway, Durwin Striplin, and Thomas J Meyer, Inorg. Chem. **1999,** 38, 1193.

"Photoreduction of Diaryl Disulfides by Quadruply Bonded Dimolybdenum and Ditungsten Complexes"; Carolyn Hsu, Sarah A. Helvoigt, Colleen M. Partigianoni, Claudia Turro and Daniel Nocera, Inorg. Chem. **1995**, 34, 6186.

"Photoredox Chemistry of d^4 Bimetallic Systems"; Colleen M. Partigianoni, Claudia Turro, Carolyn Hsu, I-Jy Chang, and Daniel Nocera, Adv. Chem. Series (238), Kutal, ed, **1993,** 147.

"Photoredox Chemistry of Mixed Valency Systems"; Colleen Partigianoni, Claudia Turro, Yeung-gyo Shin, Douglas Motry, Janice Kadis, Joel I. Dulebohn, and Daniel G. Nocera, NATO ASI Series, Reidel Publishing Company: Amsterdam; **1991**, 91.

"Photoinduced Oxidative-Addition to a Quadruply Bonded Tungsten Complex $W_2Cl_4(dppm)_2$"; Colleen M.Partigianoni and Daniel Nocera, Inorg. Chem. **1990**, 29, 2033.

"Multielectron Photochemistry of Quadruply Bonded Metal-Metal Complexes"; Colleen M. Partigianoni, I-Jy Chang, and Daniel Nocera, Coord. Chem. Rev. **1990**, 97, 105.

Conference Presentations

"Overcoming Fear of Perceived Hurdles in Implementation of POGIL," Colleen Partigianoni, 20th Biennial Conference on Chemical Education, Bloomington, Indiana, July 27-31 2008.

"Overcoming Fear of Perceived Hurdles in Implementation of POGIL," Colleen Partigianoni, 234th American Chemical Society National Meeting, Boston, MA, August 19 – 23 2007.

"Ligand Effect on the Photoinduced Electron Transfer Reactions of Quadruply–Bonded Bimetallic Complexes," Colleen Partigianoni, 34th Great Lakes / Central Regional American Chemical Society Meeting, Ypsilanti, MI, June 26 – 29, 2002.

"Don't Slay Them – SLA Them," **Colleen Partigianoni**, David V. Frank, Lowell Jacobs, William Killian and Virginia Shepler, 33rd Great Lakes / Central Regional American Chemical Society Meeting Grand Rapids, Michigan, June 11 – 13, 2001.

"Increasing Student Success in General Chemistry Classes with Structure Learning Assistance (SLA) Workshops," **Colleen Partigianoni**, David Frank, Lowell Jacobs, Biennial Conference on Chemical Education, University of Michigan, Ann Arbor, Michigan, July 30 – August 3, 2000.

Conference Participation

2015 American Chemical Society Great Lakes Regional Meeting, Grand Rapids, MI, May 27 — 30, 2015

2014 Biennial Conference on Chemical Education, Grand Valley State University, Allendale, MI, August 3 – 7, 2014

2012 Biennial Conference on Chemical Education, Penn State University, University Park, PA, July 29 – August 2, 2012

12th Annual Texas A & M University Assessment Conference, College Station, Texas, Febuary 19 – 21, 2012

19th Biennial Conference on Chemical Education, Purdue University, West Lafayette, Indiana, July 29 – August 3, 2006.

American Association of Higher Education National Conference, "Learning in 3D: Democratic Transformations, Diversity Redefined, Digital Environments," San Diego, CA, April 1– 4, 2004.

Lilly Conference on College and University Teaching–West, California State Polytechnic University, Pomona, California, March 14 & 15, 2003.

Lilly Conference on College and University Teaching, The University of Georgia, Athens, Georgia, February 11 – 13, 2000.

External Workshop Participation

National Science Foundation Sponsored POGIL Workshop: ("Process Oriented Guided Inquiry Learning in the Laboratory), Berry College, Mount Berry, GA, July 15-17 2008.

National Science Foundation Sponsored POGIL Workshop: ("Process Oriented Guided Inquiry Learning in the Classroom and Laboratory), University of St. Thomas, St. Paul, Minnesota, June 23rd – June 25th, 2005.

National Science Foundation Sponsored POGIL Workshop, Grand Valley State University, Allendale, MI October 2, 2004.

Pearson Education / Benjamin Cummings General Chemistry Forum, Chicago, Illinois, November 13, 2004.

National Science Foundation: Multi-Initiative Dissemination Project, Innovations in Chemical Education, Central Michigan University, Mount Pleasant, Michigan, April 4 & 5, 2003.

National Science Foundation Sponsored Chautauqua Short Course: "Process Workshops: A New Model for the Science Classroom"; SUNY Stony Brook, Long Island NY, June 7 – 9, 2001.

Internal Workshop Participation (Center for Teaching, Learning and Faculty Development)

FerrisConnect Block Training, August 28 – 29, 2008.

Faculty Learning Community on Learner Centered Teaching, Fall 05 (45 hour course.)

"Getting Up to Speed with WEBCT," May 10–12, 2005.

Critical Thinking Workshop, Critical Thinking Institute at Ferris State University, Ferris State University, Big Rapids, Michigan, May 22 & 23, 2003.

"Test What You Teach, Teach What You Test," (3/ 04/ 02 — 4 / 29 / 02): 30 hour course.

New to Ferris Faculty Transition Program (Fall 2009)

Luis A. Rivera-Rivera, Ph.D.

Department of Chemistry
Texas A&M University
College Station, TX 77843-3255

Phone: (979) 845-8400
E-mail: rivera@chem.tamu.edu

EDUCATION

2011 **Ph.D. in Chemistry**: Texas A&M University, College Station, TX
Dissertation: *Morphed potential energy surfaces from the spectroscopy of weakly bound complexes*
Advisor: Dr. Robert R. Lucchese

2004 **M.S. in Chemistry**: University of Puerto Rico, Mayagüez, PR
Thesis: *Synthesis, characterization, reactions, and mechanisms of (dihapto-[C60]fullerene) (dihapto-bidentate ligand) tricarbonyl tungsten(0)*
Advisor: Dr. José E. Cortés-Figueroa

2002 **B.S. in Chemistry with High Honors**: University of Puerto Rico, Mayagüez, PR

EXPERIENCE

2014-Present **Postdoctoral Research Associate**: Department of Chemistry, Texas A&M University, College Station, TX
- Study of weakly bound complexes of water molecule.
- Canonical potential for pairwise interatomic interactions.
- Semiclassical formulation of chemical bonding.

Chemistry Instructor: STEM Division, Blinn College, Bryan, TX
- Instructor of General Chemistry lecture and laboratory course.

2011-2014 **Postdoctoral Fellow**: Department of Chemistry, University of Missouri, Columbia, MO
- Pressure effects on vibrational relaxation.
- Shock simulations of energetic materials.
- Molecular dynamics simulations of hydrocarbons and energetic materials.
- HPC cluster systems administrator.

2007-2008 **Teaching Assistant**: Department of Chemistry, Texas A&M University, College Station, TX
- Instructor of General Chemistry and Physical Chemistry laboratory courses.

2005-2011 **Research Assistant**: Department of Chemistry, Texas A&M University, College Station, TX
- Generating potential energy surfaces of weakly bound complexes.
- Quantum mechanics electronic structure calculations.
- Rovibrational dynamics of weakly bound complexes.
- Telluride School on Theoretical Chemistry, Telluride, CO; July 19-25, 2009.

2004 **Research Associate**: Department of Chemistry, University of Puerto Rico, Mayagüez, PR
- Synthesis of ligands and metallic complexes.
- Spectroscopic characterization by UV-Vis, IR, NMR, and electrochemistry.
- Interaction studies of metal-DNA and metal-protein, and kinetic studies.

2002-2003 **Teaching Assistant:** Department of Chemistry, University of Puerto Rico, Mayagüez, PR
- Instructor of General Chemistry laboratory course.

1999-2003 **Research Assistant**: Department of Chemistry, University of Puerto Rico, Mayagüez, PR
- Synthesis of ligand-transition metal carbonyl complexes.
- Spectroscopic characterization by UV-Vis, IR, and NMR.
- Study of the mechanisms of ligand exchange reactions of fullerene-transition metal complexes.

AWARDS

- 2008: Marie M. and Jim H. Galloway Endowed Graduate Scholarship in Chemistry
- 2002: 26th Senior Technical Meeting Poster Award
- 2000-2011: Gates Millennium Scholar Award
- 2000: Ángel Quintero Alfaro Grant for academic achievement

PUBLICATIONS

27. J. R. Walton, **L. A. Rivera-Rivera**, R. R. Lucchese, and J. W. Bevan, *From H_2^+ to the Multidimensional Potential of the Intermolecular Interaction Ar•HBr: A Canonical Approach*, Chem. Phys. Lett. 2015, vol. 639, pp. 63-66.

26. J. R. Walton, **L. A. Rivera-Rivera**, R. R. Lucchese, and J. W. Bevan, *Canonical potentials and spectra within the Born-Oppenheimer approximation*, J. Phys. Chem. A 2015, vol. 119, pp. 6753-6758.

25. J. R. Walton, **L. A. Rivera-Rivera**, R. R. Lucchese, and J. W. Bevan, *A general transformation to canonical form for potentials in pairwise interatomic interactions*, Phys. Chem. Chem. Phys. 2015, vol. 17, pp. 14805-14810.

24. M. Khanpour, **L. A. Rivera-Rivera**, and T. D. Sewell, *On statistical mechanics of small systems: Accurate analytical equation of state for confined fluids*, Phys. Chem. Liq. 2015, vol. 53, pp. 467-480.

23. **L. A. Rivera-Rivera**, A. F. Wagner, T. D. Sewell, and D. L. Thompson, *Pressure effects on the relaxation of an excited nitromethane molecule in an argon bath*, J. Chem. Phys. 2015, vol. 142, pp. 014303 (15 pages).

22. R. R. Lucchese, C. K. Rosales, **L. A. Rivera-Rivera**, B. A. McElmurry, J. W. Bevan, and J. R. Walton, *A unified perspective on the nature of bonding in pairwise interatomic interactions*, J. Phys. Chem. A 2014, vol. 118, pp. 6287-6298.

21. **L. A. Rivera-Rivera**, A. Siavosh-Haghighi, T. D. Sewell, and D. L. Thompson, *A molecular dynamics study of the relaxation of an excited molecule in crystalline nitromethane*, Chem. Phys. Lett. 2014, vol. 608, pp. 120-125.

20. A. F. Wagner, **L. A. Rivera-Rivera**, D. Bachellerie, J. W. Perrry, and D. L. Thompson, *A classical trajectory study of the dissociation and isomerization of C_2H_5*, J. Phys. Chem. A 2013, vol. 117, pp. 11624-11639.

19. **L. A. Rivera-Rivera**, K. W. Scott, B. A. McElmurry, R. R. Lucchese, and J. W. Bevan, *Compound model-morphed potentials contrasting OC–$^{79}Br^{35}Cl$ with the halogen bonded OC–$^{35}Cl_2$ and hydrogen-bonded OC–HX (X = ^{19}F, ^{35}Cl, ^{79}Br)*, Chem. Phys. 2013, vol. 425, pp. 162-169.

18. **L. A. Rivera-Rivera**, B. A. McElmurry, K. W. Scott, R. R. Lucchese, and J. W. Bevan, *The Badger–Bauer rule revisited: Correlation of proper blue frequency shifts in the OC hydrogen acceptor with morphed hydrogen bond dissociation energies in OC–HX (X = F, Cl, Br, I, CN, CCH)*, J. Phys. Chem. A 2013, vol. 117, pp. 8477-8483.

17. **L. A. Rivera-Rivera**, T. D. Sewell, and D. L. Thompson, *Post-shock relaxation in crystalline nitromethane*, J. Chem. Phys. 2013, vol. 138, pp. 084512 (8 pages).

16. B. A. McElmurry, **L. A. Rivera-Rivera**, K. W. Scott, Z. Wang, I. I. Leonov, R. R. Lucchese, and J. W. Bevan, *Studies of low-frequency intermolecular hydrogen-bonded vibrations using a continuous supersonic slit jet mid-infrared quantum cascade laser spectrometer*, Chem. Phys. 2012, vol. 409, pp. 1-10.

15. **L. A. Rivera-Rivera**, B. A. McElmurry, R. R. Lucchese, and J. W. Bevan, *Predicted properties of CO-HF isomer using a six-dimensional morphed potential*, J. Mol. Struct. 2012, vol. 1023, pp. 43-48.

14. S. D. Springer, **L. A. Rivera-Rivera**, B. A. McElmurry, Z. Wang, I. I. Leonov, R. R. Lucchese, A. C. Legon, and J. W. Bevan, *CMM-RS potential for characterization of the properties of the halogen-bonded OC-Cl_2 complex, and a comparison with hydrogen-bonded*

OC-HCl, J. Phys. Chem. A 2012, vol. 116, pp. 1213-1223.

13. **L. A. Rivera-Rivera**, B. A. McElmurry, Z. Wang, I. I. Leonov, R. R. Lucchese, and J. W. Bevan, *Morphed intermolecular potential of OC:HCCH complex based on infrared quantum cascade laser spectroscopy*, Chem. Phys. Lett. 2012, vol. 522, pp. 17-22.

12. **L. A. Rivera-Rivera**, Z. Wang, B. A. McElmurry, R. R. Lucchese, J. W. Bevan, and G. Kanschat, *Morphing a vibrationally-complete ground state potential for the hydrogen bond OC-HF*, Chem. Phys. 2011, vol. 390, pp. 42-50.

11. **L. A. Rivera-Rivera**, Z. Wang, B. A. McElmurry, F. F. Willaert, R. R. Lucchese, J. W. Bevan, R. D. Suenram, and F. J. Lovas, *A ground state morphed intermolecular potential for the hydrogen bonded and van der Waals isomers in OC:HI and a prediction of an anomalous deuterium isotope effect*, J. Chem. Phys. 2010, vol. 133, pp. 184305 (13 pages).

10. **L. A. Rivera-Rivera**, R. R. Lucchese, and J. W. Bevan, *A four-dimensional compound-model morphed potential for the OC:HBr complex*, Phys. Chem. Chem. Phys. 2010, vol. 12, pp. 7258-7265.

9. **L. A. Rivera-Rivera**, R. R. Lucchese, and J. W. Bevan, *A parameterized compound-model chemistry for morphing the intermolecular potential of OC-HCl,* Chem. Phys. Lett. 2008, vol. 460, pp. 352-358.

8. W. Jabs, F. F. Willaert, B. A. McElmurry, **L. A. Rivera-Rivera**, R. Montuoro, R. R. Lucchese, J. W. Bevan, and R. D. Suenram, *Microwave-base structure and four-dimensional morphed intermolecular potential for HI-CO_2*, J. Phys. Chem. A 2007, vol. 111, pp. 11976-11985.

7. **L. A. Rivera-Rivera**, B. A. McElmurry, S. P. Belov, R. R. Lucchese, and J. W. Bevan, *A three-dimensional morphed potential of Ne-HCl including the ground state deuterated Σ bending vibration*, Chem. Phys. Lett. 2007, vol. 444, pp. 9-16.

6. **L. A. Rivera-Rivera**, R. R. Lucchese, and J. W. Bevan, *A morphed intermolecular bending potential of OC-HCl*, Chem. Phys. Lett. 2006, vol. 429, pp. 68-76.

5. Y. Pérez, V. López, **L. Rivera-Rivera**, A. Cardona, and E. Meléndez, *Water-soluble titanocene complexes with sulfur-containing aminoacids: Synthesis, spectroscopic, electrochemical and Ti(IV)-transferrin interaction studies*, J. Biol. Inorg. Chem. 2005, vol. 10, pp. 94-104.

4. **L. A. Rivera-Rivera**, G. Crespo-Román, D. Acevedo-Acevedo, Y. Ocasio-Delgado, and J. E. Cortés-Figueroa, *[60]Fullerene displacement from fac-(dihapto-[60]fullerene) (dihapto-1,2-bis-(1,10-phenanthroline) tricarbonyl tungsten(0)*, Inorg. Chim. Acta 2004, vol. 357, pp. 881-887.

3. Y. Ocasio-Delgado, **L. A. Rivera-Rivera**, G. Crespo-Román, and J. E. Cortés-Figueroa, *Site of bond breaking in mer-(dihapto-[60]fullerene) (dihapto-1,2-bis-(diphenylphosphino)ethane tricarbonyl tungsten(0)*, Inorg. React. Mech. 2003, vol. 5, pp. 13-19.

2. **L. A. Rivera-Rivera**, F. D. Colón-Padilla, Y. Ocasio-Delgado, J. Martínez-Rivera, S. Mercado-Feliciano, C. M. Ramos, and J. E. Cortés-Figueroa, *Kinetics and mechanisms of ligand exchange reactions on (dihapto-buckminsterfullerene) pentacarbonyl tungsten(0)*, Inorg. React. Mech. 2002, vol. 4, pp. 49-56.

1. **L. Rivera-Rivera**, F. Colón-Padilla, A. del Toro-Novalés, and J. E. Cortés-Figueroa, *Photosynthesis of (dihapto-buckminsterfullerene) pentacarbonyl tungsten(0)*, J. Coord. Chem. 2001, vol. 54, pp. 143-151.

INVITED PRESENTATIONS

5. Department of Chemistry, Skidmore College, Saratoga Springs, NY; December 3, 2015. *Is There a Fundamental Difference Between Bonding in CO and Ar_2?*

4. Department of Chemistry, University of Texas-Pan America, Edinburg, TX; May 6, 2015. *Is There a Fundamental Difference Between Bonding in CO and Ar_2?*

3. School of Science, Engineering & Mathematics, Bethune-Cookman University, Daytona Beach, FL; March 18, 2015. *Is There a Fundamental Difference Between Bonding in CO and Ar_2?*

2. North Research Group, Department of Chemistry, Texas A&M University, College Station, TX; January 16, 2015. *Simulations of internally excited nitromethane molecule in argon bath*

1. Numerical Analysis Seminar, Department of Mathematics, Texas A&M University, College Station, TX; September 30, 2009. *Interpolation of a six-dimensional potential energy surface and calculation of rovibrational energy levels for the hydrogen bound complex OC-HF*

CONTRIBUTED PRESENTATIONS

19. 70th International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL; June 22-26, 2015. *A general transformation to canonical form for potentials in pairwise intermolecular interactions*

18. 70th International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL; June 22-26, 2015. *A rovibrational analysis of the water bending vibration in OC-H_2O and a morphed potential of the complex*

17. American Physical Society prairie section Fall 2013 meeting, Columbia, MO; November 7-9, 2013. *Single molecule relaxation in crystalline nitromethane*

16. 26th Southwest Theoretical Chemistry Conference, Denton, TX; October 22-24, 2010. *Implementation of an alternative method for fitting a vibrationally complete ab initio potential in non-covalent interactions*

15. 23rd Austin Symposium on Molecular Structure and Dynamics, Austin, TX; March 7-9, 2010. *A four-dimensional compound-model morphed potential for the OC:HBr complex*

14. 25th Southwest Theoretical Chemistry Conference, Houston, TX; October 16-17, 2009. *A four-dimensional compound-model morphed potential for the OC:HBr complex*

13. 24th Southwest Theoretical Chemistry Conference, El Paso, TX; October 10-12, 2008. *Ground state isotopic isomerization: Investigation of an anomalous deuterium isotope effect in OC-HI using 4-D intermolecular potential morphing*

12. 22nd Austin Symposium on Molecular Structure, Austin, TX; March 1-4, 2008. *A parameterized compound-model chemistry for morphing the intermolecular potential of OC-HCl*

11. 23rd Southwest Theoretical Chemistry Conference, College Station, TX; October 12-14, 2007. *Four-dimensional morphed intermolecular potential for HI-CO_2*

10. 22nd Southwest Theoretical Chemistry Conference, Austin, TX; October 27-29, 2006. *A morphed intermolecular potential of the hydrogen-bonded dimer OC-HCl*

9. 21st Austin Symposium on Molecular Structure, Austin, TX; March 5-7, 2006. *An initial morphed potential of OC-HCl*

8. 2nd Colloquium in Protein Structure, Function and Dynamics, San Juan, PR; February 15-19, 2005. *Complexation of titanocene antitumor agents to human transferrin: The effect of the ancillary ligand on Ti(IV)-transferrin binding*

7. 28th ACS-STM, Isabela, PR; November 18-19, 2004. *Studies of human apo-transferrin and Ti^{+4} complexes by NMR, UV-Vis, and ICP*

6. Spring Conference in Protein Research 2004, San Juan, PR; April 15-17, 2004. *Interaction studies of human transferrin and titanium complexes*

5. 227th ACS national meeting, Anaheim, CA; March 27 – April 1, 2004. *Mechanism of ligand exchange reactions on (dihapto-[60]fullerene) transition metal carbonyl complexes*

4. 27th ACS-STM, Quebradilla, PR; November 7, 2003. *Mechanism of ligand exchange reactions on (dihapto-[60]fullerene) transition-metal carbonyl complexes*

3. 225th ACS national meeting, New Orleans, LA; March 23-27, 2003. *Site of bond breaking on (dihapto-[60]fullerene) transition-metal complexes*

2. 224th ACS national meeting, Boston, MA; August 18-22, 2002. *Determination of W-fullerene bond energy*

1. 220th ACS national meeting, Washington DC; August 19-24, 2000. *Photosynthesis of (dihapto-buckminsterfullerene) pentacarbonyl tungsten (0)*

3/2014

PRABHAKARA H. SHETTY
14580 Tomahawk Lane
Big Rapids, MI 49307
231-591 2589 (work)
231-796 1362 (home)

Education

Wayne State University, Ph. D., Chemistry, 12/89
Eastern Michigan University, M.S., Chemistry, 12/86
University of Bombay, M.Sc., Physical Chemistry, 11/76
University of Bombay, B.Sc., Chemistry, 3/72

Employment

Ferris State University, Professor of Chemistry, 1999-todate
Ferris State University, Associate Professor of Chemistry, 1994-1999
Ferris State University, Assistant Professor of Chemistry, 1991-1995
Dickinson College, Assistant Professor of Chemistry, 1990-1991 (sabbatical replacement)
Lafayette College, Dreyfus Teaching & Research Fellow, 1989-1990

Primary Professional Responsibilities

Classes Taught

CHEM 103, Preparatory Chemistry, in summer
CHEM 114, Introduction to General Chemistry, in fall and summer
CHEM 121, General Chemistry I, winter 2002
CHEM 122, General Chemistry II, in winter
CHEM 231, Quantitative Analysis, in fall

Advising

Pre-Pharmacy

University Service

Committee Work

University

Student Life Committee (2005-2008)
Distinguished Teacher Award Committee (1999-2000)

College

Diversity Committee (2013-2014)

Academic Program Review Committee (Pre-Pharmacy, 2008-2009)
Sabbatical Leave Committee (2003-2004)
Promotion/Merit Committee (2001-2003)

Department
Course Outcome Discussion group (CHEM 114, CHEM 121/122, 2008, 2012-2013)
Safety Committee (2008)
Planning Committee (2008-2009)
Faculty Development Committee (2007-2008, 2010-2014)
Equipment Committee (2009-2014)
Curriculum Committee (2010-2011)
General Chemistry Discussion Group (2002-2003)

Scholarly Activities

Presentations in Scientific Conferences
Optimizing Parameters for the Separation and Detection of Cholesterol Esters by High Performance Liquid Chromatography, David C. Snyder (Ferris alumnus) and Prabhakara Shetty, Oral Presentation at the 36th American Chemical Society (ACS) Great Lakes Regional Meeting, Peoria, IL, October 18, 2004.

Separation and Identification of Sterol Esters by Gradient Elution HPLC Coupled with Multiple Wavelength UV/VIS Detector, D. Snyder (Ferris grad) and P. Shetty, Presented as a poster at the 35th ACS-Central Regional Meeting, Pittsburgh, PA, October 22, 2003.

A Relatively Fast Technique for the separation and identification of Cholesterol Esters by HPLC, D. Snyder (Ferris grad), P. Shetty and D. Haugh (Ferris alumnus), Presented as a poster at the 226th ACS-National Meeting, New York, NY, September 7, 2003.

Determining the Amount of Methyl Ethyl Ketone in an Industrial Liquid Effluent, A. Anderson (Ferris Grad), P. Wolf (Ferris Grad) and P. Shetty, Presented as a poster at Great Lakes College Chemistry conference, East Lansing, MI, April 8, 2000.

Analysis Of Methyl Ethyl Ketone in Industrial Effluents by GLC, P. Wolf (Ferris grad) and Prabhakara Shetty, Presented as a poster at Great Lakes College Chemistry Conference, East Lansing, April 17, 1999.

Participation in Scientific Conferences

19th Bienneal Conference for Chemical Education, West Lafayette, IN, 7/29/2006

36th ACS, Great Lakes Regional Meeting, Peoria, IL, 10/18/2004

35th ACS, Central Regional Meeting, Pittsburgh, PA, 10/22/2003

226th ACS, National Meeting, New York, NY, 10/07/2003

33rd ACS, Central/Great Lakes Regional Meeting, Grand Rapids, MI, 06/13/2002

Great Lakes College Chemistry Conference, East Lansing, MI, 04/08/2000

Great Lakes College Chemistry Conference, East Lansing, MI, 04/17/1999

Honors and Awards

Awarded one semester (fall 2002) of sabbatical leave to work on optimizing the separation and identification of sterol esters by HPLC.

Research with Ferris Students

1999-2000, Paul Wolf, worked separating and identifying methyl ethyl ketone in industrial waste by gas chromatography (GC).
2000, Andrea Anderson, worked on separating and identifying methyl ethyl ketone in industrial waste by GC.
2001 (fall) David Haugh, worked on separating Sterol esters
2003 (fall) Pawan N. Parasu, (from MST program) worked on separating sterol esters
2002-2005 David Snyder, developed a methodology to separate and identify sterol esters.

Other Contributions

1999- Setup and maintenance of a new Gas Chromatograph (HP 6890)
2000- Setup and maintenance of a new multi-wavelength UV/VIS detector.
2002- Setup and maintenance of a new High Performance Liquid Chromatographic pump (Beckman 127)
2007 - Developed methodology, and maintenance of a new UV/VIS detector (Beckman 166)
2012 – Helped Dr. Adnan (Pharmacy) to set-up his research project UV/VIS analysis.

Mark A. Thomson

Department of Physical Sciences
Ferris State University

EDUCATION:

Ph.D. Inorganic Chemistry. August 1995; Colorado State University, Fort Collins, Colorado.
Dissertation: Synthetic Models for the Resting Oxidized Form of the Dioxygen Binding Site in Cytochrome *c* Oxidase. Oren P. Anderson and C. Michael Elliott, Advisors.
Awards: Graduate Teaching Fellowship, Gustafson Graduate Teaching Award.

B.S. Chemistry. June 1987; University of Utah, Salt Lake City, Utah.

ACADEMIC EXPERIENCE:

Associate Professor, Chemistry. Department of Physical Science, Ferris State University, August 2011 to present.
Assistant Professor, Chemistry. Department of Physical Science, Ferris State University, August 2007 to August 2011.
Instructor, Chemistry. Department of Physical Science, Ferris State University, August 2006 to July 2007.
Instructor, Chemistry. Department of Chemistry and Physics, Southeastern Louisiana University, August 2003 to August 2006.
Instructor, Wet Science Gear Up. Southeastern Louisiana University, June and July 2005.
Instructor, Chemistry. Our Lady of Holy Cross College, August to December 2003.
Visiting Assistant Professor, Chemistry. Department of Chemistry and Physics, Arkansas State University, August 2002 to May 2003.
Assistant Professor, Chemistry. Department of Chemistry, Xavier University of Louisiana, August 1995 to August 2002.
Instructor, Chemistry. Division of Science, Louisiana State University at Alexandria, August 1994 to August 1995.
Instructor, Chemistry. Fort Polk Center, Northwestern State University of Louisiana, June to August 1995.

AREAS OF INTEREST AND EXPERTISE:

INSTRUCTION

- General Chemistry Lecture & Laboratory
- Applied Fermentation Chemistry
- Physical Chemistry
- Biochemistry
- Chemistry for Non-Science Majors
- K-12 Education in Science and Chemistry
- Environmental Chemistry

RESEARCH

- History and Application of Small-Scale Fermentation.
- Chemical Analysis Applications in the Fermentation Industry.
- Interdisciplinary Approaches to Pedagogy and Content.
- Preparation of K-12 Science Teachers including the use of Technology Resources

FERRIS STATE UNIVERSITY SERVICE:

Department of Physical Sciences

Program Coordinator, BS in Industrial Chemistry, 2015 to present
Assessment Committee, 2006-07, 2008-2012, 2013-2015
Curriculum Committee, 2008-09, 2012 to 2015
Faculty Development and Travel Committee, 2009-2012
Department Assessment Coordinator, 2008-2012
Planning Committee, 2007-08
General Chemistry Tenure-Track Search Committee, 2007-08

College of Arts and Sciences

New Student Orientation, 2012 to present
Pre-Pharmacy Advisor, 2007 to present
College Sabbatical Leave Committee, 2014 to 2015
College Promotion/Merit Committee, 2011 to 2015
Chair, 2011-2012, 2013-2015
College Curriculum Committee, 2012 to 2013
College Assessment Committee, 2008-2011
Chair, 2008-2011

University

Dean of the Library Search Committee, 2011-2012
Academic Program Review Council, 2011-2012
Pre-Pharmacy Task Force, 2011
Assessment Mentor 2009-2011

PROFESSIONAL ORGANIZATIONS:

American Chemical Society, Member since 1990
Joint Great Lakes Central Regional Meeting Executive Committee, 2013 to present
Program Co-Chair, 2013 - 2015
Committee on Technician Affairs, 2013 to present
Central Region Steering Committee, 2011 to present
Western Michigan Section, Councilor – 2007 to present
ACS Speaker Service, 2006 to the present.
Committee on Project SEED, 2008 - 2012
Louisiana Section, Chair Elect – 1999, Chair – 2000

Master Brewers Association of America, Member since 2012
American Society of Brewing Chemists, Member since 1999

PROFESSIONAL TRAINING:

ACS Leadership Development System
- "Leading Without Authority" May 27, 2015; Grand Rapids, MI.
- "Strategic Planning" March 18, 2014; Dallas, TX.
- "Developing Communication Strategies" September 9, 2013; Indianapolis, IN.
- "Engaging and Motivating Volunteers" September 9, 2013; Indianapolis, IN.

"Regional Meeting Planning Conference" November 1-3, 2013; Washington, DC, sponsored by the American Chemical Society.

"McGraw-Hill General Chemistry Symposium" March 1-3, 2013; San Diego, CA, sponsored by McGraw Hill Publishing.

"NCA-HLC Assessment Workshop" July 23-25, 2008; Lisle, IL.

"Summer Hands-On AP Chemistry Workshop" June 23-24, 2008; Baltimore, MD, sponsored by Vernier Software & Technology.

"Ferris Connect Training" June 5-6, 2007; Ferris State University, sponsored by the Faculty Center for Teaching and Learning.

"Scholarship of Teaching and Learning Faculty Learning Community" Spring 2007; Ferris State University, sponsored by the Faculty Center for Teaching and Learning.

"POGIL – Process Oriented Guided Inquiry Learning Workshop" March 24, 2007; Joliet Junior College, Joliet, IL.

"Computational and Theoretical Chemistry Workshop" May 15-20, 2005; Salt Lake City, Utah, sponsored by NSF and the Center for Workshops in the Chemical Sciences.

"Computer and Graphing Calculator Workshop" February 26, 2005; New Orleans, Louisiana, sponsored by Vernier Software & Technology.

"Medic-B Faculty Teaching Workshop" July 18-21, 2001; Boston, Massachusetts, sponsored by Indiana University.

"T.H.E. | QUEST Training Workshop" March 13-14, 29-30, April 14-15, 2000; University of Louisiana at Lafayette, sponsored by University of Louisiana at Lafayette and LaSIP.

CONFERENCE ATTENDANCE:

250th National Meeting, American Chemical Society, Boston, MA, August 16-20, 2015.

Joint Great Lakes Central Regional Meeting, American Chemical Society, Grand Rapids, MI, May 27-30, 2015.

249th National Meeting, American Chemical Society, Denver, CO, March 22-26, 2015.

248th National Meeting, American Chemical Society, San Francisco, CA, August 10-14, 2014.

247th National Meeting, American Chemical Society, Dallas, TX, March 16-20, 2014.

246th National Meeting, American Chemical Society, Indianapolis, IN, September 8-12, 2013.

American Society of Brewing Chemists Annual Meeting, Tucson, AZ, May 19-28, 2013.

44th Central Regional Meeting, American Chemical Society, Mt. Pleasant, MI, May 15-18, 2013.

245th National Meeting, American Chemical Society, New Orleans, LA, April 7-11, 2013.

Michigan Academy of Science, Arts, and Letters Annual Meeting, Holland, MI, March 22, 2013.

244th National Meeting, American Chemical Society, Philadelphia, PA, August 19-23, 2012.

WBC 2012, American Society of Brewing Chemists and Master Brewers Association of the Americas, Portland, OR, July 28-August 1, 2012.

43rd Central Regional Meeting, American Chemical Society, Dearborn, MI, June 6-9, 2012.

243rd National Meeting, American Chemical Society, San Diego, CA, March 25-29, 2012.

242nd National Meeting, American Chemical Society, Denver, CO, August 28-September 1, 2011.
42nd Central Regional Meeting, American Chemical Society, Indianapolis, IN, June 8-10, 2011.
241st National Meeting, American Chemical Society, Anaheim, CA, March 27-31, 2011.
240th National Meeting, American Chemical Society, Boston, MA, August 22-26, 2010.
239th National Meeting, American Chemical Society, San Francisco, CA, March 21-25, 2010.
9th Annual Lilly Conference, Traverse City, MI, September 24-27, 2009.
238th National Meeting, American Chemical Society, Washington, DC, August 16-20, 2009.
237th National Meeting, American Chemical Society, Salt Lake City, UT, March 22-26, 2009.
2008 Assessment Institute, IUPUI, Indianapolis, IN, October 25-28, 2008.
236th National Meeting, American Chemical Society, Philadelphia, PA, August 17-21, 2008.
235th National Meeting, American Chemical Society, New Orleans, LA, April 6-April 10, 2008.
234th National Meeting, American Chemical Society, Boston, MA, August 19-23, 2007.
38th Central Regional Meeting, American Chemical Society, Cincinnati, OH, May 20-23, 2007.
233rd National Meeting, American Chemical Society, Chicago, IL, March 25-29, 2007.

STUDENT RESEARCH SUPERVISION AND PRESENTATIONS:

Lucas Woodcock, Big Rapids, MI. February 2015 to April 2015.

"Effect of Putrescine Oxidase Active Site Mutations on Activity." As presented at the 249th National Meeting of the American Chemical Society, Denver, CO March 22-26, 2015 (Research conducted with Dr. Kim Colvert)

College of Arts and Sciences Student Research Grant, Ferris State University, Applied for January 18, 2015. $750 for travel to ACS National Meeting in Denver, CO March 22-26, 2015

Jacob Longnecker, Ferris State University, Big Rapids, MI. May 2014 to August 2014.

Student Research Fellowship, Ferris State University, May 2014 to August 2014.

"Determining typical pH ranges throughout the brewing process for brown ale and American pale ale style beers." As presented in the Student Research Fellowship Seminar, Ferris State University, August 20, 2014

Symon Cronk, Ferris State University, Big Rapids, MI. May 2014 to August 2014.

Student Research Fellowship, Ferris State University, May 2014 to August 2014.

"Addition of gypsum and its effect on pH and flavor perception in American amber ale." As presented in the Student Research Fellowship Seminar, Ferris State University, August 20, 2014

Spencer Crittendon, Ferris State University, Big Rapids, MI. January 2013 to August 2013.

Student Research Fellowship, Ferris State University, May 2013 to August 2013.

Student Research Assistantship, Ferris State University, January 2013 to May 2013.

"Analysis of Yeast Available Nitrogen and its Effect on Wine Fermentation." As presented in the Student Research Fellowship Seminar, Ferris State University, August 21, 2013

Kim Johnson and Joe Saviano, Ferris State University, Big Rapids, MI. September 2012 to April 2013.

"Acquire the practical laboratory skills and knowledge needed for the chemical industry with an associate's in Industrial Chemistry Technology alongside a bachelor's degree." As presented at the 245th National Meeting of the American Chemical Society, New Orleans, LA, April 7-11, 2013

College of Arts and Sciences Student Research Grant, Ferris State University, Applied for February 5, 2013. $1500 for travel to ACS National Meeting in New Orleans, LA April 7-11, 2013

Caleb Archambalt, Ferris State University, Big Rapids, MI. May 2011 to May 2013.

College of Arts and Sciences Student Research Grant, Ferris State University, Applied for February 5, 2013. $750 for travel to ACS National Meeting in New Orleans, LA April 7-11, 2013

I&EC Travel Grant, American Chemical Society, April, 2013. $1000 for travel to present at the 245th National Meeting of the American Chemical Society, New Orleans, LA, April 7-11, 2013

Student Research Assistantship, Ferris State University, October 2012 to May 2013.

"Development and Improvement of Protocols and Methodologies for Chemical Analysis in the Fermentation Industry." As presented in the Student Research Fellowship Seminar, Ferris State University, August 22, 2012

Student Research Fellowship, Ferris State University, May-to July, 2012. $6000 for stipend, travel, and supplies

"Factors effecting the carbonation rate of non-alcoholic sodas or carbonated beverages." As presented at the 243rd National Meeting of the American Chemical Society, San Diego, CA, March 25-29, 2012

I&EC Student Travel Grant, American Chemical Society, March, 2012. $500 for travel to present at the 243rd National Meeting of the ACS in San Diego, CA

College of Arts and Sciences Student Research Grant, Ferris State University, June 2011-to May, 2012. $750 for travel and supplies

Tyler Weatherwax, Ferris State University, Big Rapids, MI. August 2011 to April 2012.

"Fermentation in High School: I Hope it Doesn't Explode!" As presented at the 243rd National Meeting of the American Chemical Society, San Diego, CA, March 25-29, 2012

College of Arts and Sciences Student Research Grant, Ferris State University, June 2011-to May, 2012. $750 for travel and supplies

Steven Lingenfelter, Ferris State University, Big Rapids, MI. August 2010 to April 2011.

"The Promotion of Undergraduate Research at Teaching Institutions." As presented at the 241st National Meeting of the American Chemical Society, Anaheim, CA, March 27-31, 2011

I&EC Student Travel Grant, American Chemical Society, March, 2011. $1000 for travel to present at the 241st National Meeting of the ACS in Anaheim, CA

CONSULTATION/COLLABORATION EXPERIENCE:

Crankers Brewery, Big Rapids, MI. May 2012 to present. Collaboration has resulted in analytical chemistry research by FSU student Caleb Archambalt, both on-site and in research labs at FSU during the summer of 2012.

The Blue Cow Café, Big Rapids, MI. October 2008 to May 2010. Consultation resulted in discussions and presentations on the chemistry of fermentation, especially as it applies to the production of beer. The presentations have included discussion of beer evaluation, regional beer styles, and beer – food pairings at beer dinners and monthly beer style discussion groups.

Dillard University, New Orleans, LA. October 2003 to June 2009. Environmental Chemistry Education collaboration with Dr. José Ramirez to develop a new Ecology Lab Manual incorporating experiments in environmental chemistry for use in the Biology curriculum at Dillard University. The collaboration has also included guest lectures on various occasions on Acid Rain and on Ecology from a Chemistry perspective.

Flint Community Schools, Genesee Area Skill Center, and Dillard University. October 2006 to April 2007. Environmental Studies collaboration with Dr. José Ramirez (DU) and Joyce Dudley (GASC) to enhance the environmental education studies of approximately 20 High School students through soil and water field testing in post-Katrina New Orleans, Louisiana.

GRANT EXPERIENCE:

Computerized Data Collection for CLAB 123 and CLAB 124, Inorganic Chemistry Lab I & II. Co-Investigator, Dr. Tino Ladogana, Student Technology Fee Program, Southeastern Louisiana University, December 2004, $30445.55. Proposal to enhance the pedagogy employed in CLAB 123 and CLAB 124 by the acquisition of new computer-based data collection probes and software.

PUBLISHED COURSE MATERIAL:

Thomson, M. A. *CHEM 121 Laboratory Manual*, V. 4.; Ferris Copy Center, Big rapids, MI, 2015.

Thomson, M. A. *CHEM 122 Laboratory Manual*, V. 2.; Ferris Copy Center, Big rapids, MI, 2015.

Adams, M. R.; Allen, L. R.; Bauer, J.; Carmichael, JW Jr.; Henry, S.; Sevenair, J. P.; Thomson, M. A. *General Chemistry Laboratory Manual*, 13th ed.; Stipes Publishing Company: Champaign, IL, 2009.

Adams, M. R.; Allen, L. R.; Bauer, J.; Carmichael, JW Jr.; Sevenair, J. P.; Thomson, M. A. *General Chemistry II Laboratory Manual*; 4th ed.;Stipes Publishing Company: Champaign, IL, 2004.

Adams, M. R.; Bauer, J.; Bean, K. S.; Carmichael, JW Jr.; Eduok, E.; Henry, S.; Howell, D.; Klassen, B.; Privett, J. A.; Sevenair, J. P.; Thomson, M. A. *Handbook for General Chemistry Volume I: Chemistry 1010*, 15th ed.; Stipes Publishing Company: Champaign, IL, 2003.

Adams, M. R.; Bauer, J.; Bean, K. S.; Carmichael, JW Jr.; Eduok, E.; Henry, S.; Howell, D.; Isovitsch, R.; Privett, J. A.; Sevenair, J. P.; Thomson, M. A. *Handbook for General Chemistry Volume II: Chemistry 1020*, 16th ed.; Stipes Publishing Company: Champaign, IL, 2003.

Allen, L. R.; Bauer, J.; Carmichael, JW Jr.; Sevenair, J. P.; Thomson, M. A. *Qualitative Inorganic Analysis Laboratory Manual*, 4th ed.; Stipes Publishing Company: Champaign, IL, 1997.

BOOK CHAPTERS:

Thomson, M. A; Killian, W. Transitioning Culture: Teaching and Modeling Workplace Behavior. In Moore, M.; Leesma, E (Eds.), "Academia and Industrial Pilot Plant Operations and Safety." ACS Symposium Series; American Chemical Society, Washington, DC; 2014.

Thomson, M. A. The 'Science' and 'Art' of Teaching and Learning at Xavier University of Louisiana. In Lenoar Foster, Janet A. Guyden, and Andrea L. Miller (Eds.), "Affirmed Action: Essays on the Academic and Social Lives of White Faculty Members at Historically Black Colleges and University." Lanham, MD: Rowman & Littlefield Publishers, Inc, 1999.

RESEARCH PUBLICATIONS:

Trautmann, N. M.; Carlsen, W. S.; Eick, C. J.; Gardner, F. E. Jr.; Kenyon, L.; Moscovici, H.; Moore, J. C.; Thomson, M. A.; West, S. S. "Online Peer Review: Learning Science As It's Practiced." *Journal of College Science Teaching*, **2003**, *32*, 443-447.

Thomson, M. A.; Kar, M.; Anderson, O. P.; Lenz, T.; Vaughan, J. D. "The Structure of phenyl maleic anhydride" *Acta Cryst., Cryst. Struct. Commun.* **1996**, *C52*, 168-169.

Mylrajan, M.; Andersson, L. A.; Sun, J.; Loehr, T. M.; Thomas, C. S.; Sullivan, E. P., Jr.; Thomson, M. A.; Long, K. M.; Anderson, O. P.; Strauss, S. H. "Resonance Raman Spectroscopic Core-Size Correlations for the Crystallographically Defined Complexes Fe^{II}(OEP), Fe^{II}(OEC), Fe^{III}(OEP)(NCS), and $[Fe^{III}(OEP)(N\text{-MeIm})_2]^+$, $[Fe^{III}(OEP)(DMSO)_2]^+$." *Inorg. Chem.* **1995**, *34*, 3953-3963.

Thomson, M. A.; Anderson, O. P. "Structure of Carba-bicyclomycin I." *Acta Cryst., Cryst. Struct. Commun.* **1991**, *C47*, 1984-1986.

Thomson, M. A.; Anderson, O. P. "Structure of Benzyl 3-Benzyl-3-methyl-2-oxo-5,6-diphenylmorpholin-4-ylcarboxylate." *Acta Cryst., Cryst. Struct. Commun.* **1991**, *C47*, 1996-1998.

Thomson, M. A.; Anderson, O. P. "The Structure of a Model for Aspirochlorine (Antibiotic A30641)." *Acta Cryst., Cryst. Struct. Commun.* **1991**, *C47*, 2003-2005.

Thomson, M. A.; Anderson, O. P. "The Structure of 1-(Methoxymethyl)-16,17-didehydro-19-oxoalloyohimbane" *Acta Cryst., Cryst. Struct. Commun.* **1991**, *C47*, 2494-2495.

Thomson, M. A.; Anderson, O. P. "The Structure of (4S,4'S,5'S) 3–(5'–Benzyloxy–5'–methyl– 2'–oxo–2',3',4',5'–tetrahydro–4'-furyl)–4–phenyl–1,3–oxazolidin–2–one" *Acta Cryst., Cryst. Struct. Commun.* **1991**, *C47*, 2496-2497.

PRESENTATIONS:

"The role of flavoring agents in carbonation rate for yeast carbonated non-alcoholic soda; a general chemistry experiment with interesting problems." With Caleb Archambault and Tyler Weatherwax, as presented at the 75th American Society of Brewing Chemists Annual Meeting, Tucson, AZ, May 19-22, 2013.

"Establishing a culture: Teaching and modeling safe workplace behavior." As presented at the 245th National Meeting, American Chemical Society, New Orleans, LA, April 7-11, 2013.

"Industrial Chemical Technology at Ferris State University: past, present and future." With Bill Killian, Pasquale Di Raddo, and Dave Frank, as presented at the Michigan Academy of Science, Arts, and Letters Annual Conference, Holland, MI, March 22, 2013.

"The Chemistry of Beer." As presented to the FSU Student Affiliates of the American Chemical Society, Big Rapids, MI, February 7, 2013.

"Is it Beer? Is it Wine? Investigations into Native American Fermentation Traditions." As presented at the November Meeting of the Western Michigan Section of the American Chemical Society, Spring Lake, MI, November 8, 2012.

"¿Qué Hay en mi Sopa? Dispersión de Contaminantes Químicos por Inundación." As presented in the Día Mas Verde Seminar Series at Universidad Interamericana, Recinto de Ponce, Ponce, PR, October 6, 2010.

"Is it Beer? Is it Wine? Investigations into Native American Fermentation Traditions." As presented at the 240th National Meeting of the American Chemical Society, Boston, MA, August 22-26, 2010.

"What Makes Beer Beer? An Introduction to Fermentation Chemistry." As presented to the FSU Student Affiliates of the American Chemical Society, Big Rapids, MI, April 21, 2010.

"Hurricane Katrina: A Natural or Man-Made Catastrophe. A Personal and Academic Perspective." As presented in the Science Today Seminar Series at SUNY-Oswego, Oswego, NY, April 1, 2009.

"The Role of Chemistry in the Development of Regional Styles of Beer and Ale." As presented to the STEM Scholarship Recipients at Ferris State University, Big Rapids, MI, March 19, 2009.

"The Role of Chemistry in Producing Different Styles of Beer and Ale." As presented at the 235th National Meeting of the American Chemical Society, New Orleans, LA, April 6-April 10, 2008.

"Chicha: Pre-Columbian Brewing Traditions of South America." As presented at the 235th National Meeting of the American Chemical Society, New Orleans, LA, April 6-April 10, 2008.

"The Fine Art of Brewing, or, What is Beer?" As presented at the September Meeting of the Western Michigan Section of the American Chemical Society, Holland, MI, September 25, 2007.

"Chicha: South American Brewing Traditions that Predate European Influences." As presented at the 39th Central Regional Meeting of the American Chemical Society, Cincinnati, OH, May 20-23, 2007.

"What Makes Beer Beer? An Introduction to Fermentation Chemistry." As presented to the FSU Student Affiliates of the American Chemical Society, Big Rapids, MI, February 22, 2007.

"The Role of Chemistry in the Development of Regional Styles of Beer and Ale." As presented at the March Meeting of the Sabine-Neches Section of the ACS, Beaumont, TX, March 31, 2005.

"The Role of Chemistry in Beer Stability and the Development of Regional Styles of Beer and Ale." As presented at the September Meeting of the Louisiana Section of the ACS, New Orleans, LA, September 28, 2004.

Hale, R. P.; Thomson, M. A.; Rodrigue, S.; Kocic, V.; Eschenazi. E. "A Collaborative Approach Between Education, Science and Mathematics Faculty to Provide Professional Development Activities for Pre-service and Veteran Teachers." As presented at the Ninth National HBCU Faculty Development Symposium, Nashville, TN, October 17-20, 2002.

Hale, R. P.; Bordelon, D. E.; Carmichael, M. C.; Thomson, M. A. "Curriculum Redesign - A Collaborative Approach Between Education and Arts and Sciences Faculty." As presented at the Ninth National HBCU Faculty Development Symposium, Nashville, TN, October 17-20, 2002.

Carlsen, W.; Trautmann, W.; Abrams, E.; Ahern, K.; Dekkers, P.; Eick, C.; Gardner, F.; Ghosh, N.; Kenyon, L.; Moore, J.; Moscovici, H.; Thomson, M.; West, S.; Yalvac, B. "Peer Review by

College Students in Science and Science Education: A Multi-Institutional R & D Project." As presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA, April 1-5, 2002.

Thomson, M.; Black, L. "Study Abroad at HBCU Institutions in the Sciences: Collaborating to Breakdown Barriers." As presented at the Eighth National HBCU Faculty Development Symposium, Norfolk, VA, October 18-21, 2001.

Thomson, M.; Fulwiler, J. "Working Together to Improve Middle School Science and Math Education." As presented at the Seventh National HBCU Faculty Development Symposium, Jackson, MS, October 19-22, 2000.

Anderson, T.; Bales, F.; Foster, L.; Frank, F.; Guyden, J.; Henzy, K.; Redinger, M.; Rozman, S.; Sides-Gonzales, K.; Silvergate, J.; Thomson, M.; Ziegler, W. "White Faculty at Historically Black Colleges and Universities: Academic and Social Lives." As presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA, April 24-28, 2000.

Humphrey, J. H.; Ramirez-Domenech, J.; Thomson, M. "The Across The Curriculum Thinking Program: Interdisciplinary Interactions at Xavier University." As presented at the Winter Conference, "How Learning Happens: Making Connections, Constructing Knowledge, Building Community," of The Collaboration for the Advancement of College Teaching and Learning, Bloomington, MN, November 19-20, 1999.

Thomson, M.; Bean, S.; Privett, A. "The First-Year Experience for Chemistry Students at Xavier University." As presented at the 215th National Meeting of the American Chemical Society, Dallas, TX, March 29-April 3, 1998.

Thomson, M.; Okon, S. "Letting the Cat Out of the Bag: Do Our Students Know What We Want Them to Know?" As presented at the Spring Conference, "Teaching Key Concepts Within and Across Disciplines," of The Collaboration for the Advancement of College Teaching and Learning, Bloomington, MN, February 19-20, 1998.

AMERICAN CHEMICAL SOCIETY SPEAKER SERVICE PRESENTATIONS:

"The Role of Chemistry in the Development of Regional Beer Styles, or "What is Beer (to a Chemist)?" As presented at the October Meeting of the St. Joseph Valley Section of the ACS, South Bend, IN, October 29, 2009.

"The Role of Chemistry in the Development of Regional Beer Styles, or "What is Beer (to a Chemist)?" As presented at the October Meeting of the Puget Sound Section of the ACS, Olympia, WA, October 21, 2009.

"The Role of Chemistry in the Development of Regional Beer Styles, or "What is Beer (to a Chemist)?" As presented at the October Meeting of the Portland Section of the ACS, Portland, OR, October 20, 2009.

"The Role of Chemistry in the Development of Regional Beer Styles, or "What is Beer (to a Chemist)?" As presented at the October Meeting of the Richland Section of the ACS, Richland, WA, October 19, 2009.

"What Kind of Beer Am I Drinking? Is it Good? And What Makes a Beer Good Anyway? An Introduction to the Beer Evaluation." As presented at the November Meeting of the Greater Houston Section of the ACS, Houston, TX, November 13, 2008.

"What Kind of Beer Am I Drinking? Is it Good? And What Makes a Beer Good Anyway? An Introduction to the Beer Evaluation." As presented at the November Meeting of the Brazosport Section of the ACS, Lake Jackson, TX, November 12, 2008.

"The Role of Chemistry in the Development of Regional Beer Styles, or "What is Beer (to a Chemist)?" As presented at the November Meeting of the South Texas Section of the ACS, Corpus Christi, TX, November 11, 2008.

"What Kind of Beer Am I Drinking? Is it Good? And What Makes a Beer Good Anyway? An Introduction to the Beer Evaluation." As presented at the November Meeting of the San Antonio Section of the ACS, San Antonio, TX, November 10, 2008.

"The Role of Chemistry in the Development of Regional Beer Styles, or "What is Beer (to a Chemist)?" As presented at the March Meeting of the Lake Superior Section of the ACS, Duluth, MN, March 7, 2008.

"What Kind of Beer Am I Drinking? Is it Good? And What Makes a Beer Good Anyway? An Introduction to the Beer Evaluation." As presented at the March Meeting of the La Crosse-Winona Section of the ACS, La Crosse, WI, March 6, 2008.

"The Role of Chemistry in the Development of Regional Beer Styles, or "What is Beer (to a Chemist)?" As presented at the March Meeting of the Central Wisconsin Section of the ACS, Marshfield, WI, March 5, 2008.

"The Role of Chemistry in the Development of Regional Beer Styles, or "What is Beer (to a Chemist)?" As presented at the March Meeting of the Milwaukee Section of the ACS, Milwaukee, WI, March 4, 2008.

"The Role of Chemistry in the Development of Regional Beer Styles, or "What is Beer (to a Chemist)?" As presented at the March Meeting of the Northeast Wisconsin Section of the ACS, Oshkosh, WI, March 3, 2008.

Keith G. Calkins

Objective:

To facilitate the application of technology to research via my knowledge quest in mathematics and physics.

Contact Information:

Home telephone: 269 473-2572
e-mail: calkins@andrews.edu
610 N. Main St.
Berrien Springs, Michigan 49103-1013

Education:

Ph.D.	2005	University of Notre Dame (Physics)
		Absolute Optical Frequencies Measurements of the Cesium D_1
		Transitions and Their Effect on Alpha, the Fine-Structure Constant
	2003	Andrews University (Educational Administration)
MAT	2002	Andrews University (Secondary Education)
		Certified in Math, Physics, Chemistry, and Computer Science
M.S.	1996	University of Notre Dame (Physics)
M.S.	1991	Andrews University (Interdisciplinary Studies, Math and Physics)
M.S.	1982	Andrews University (Computer Information Science)
B.S.	1981	Andrews University (Math (and in 1988 Physics, with honors))

Certification:

State of Michigan Professional Education Certificate for secondary Chemistry, Computer Science, Mathematics, and Physics. Expiration date: 06/30/2015.

Postscript: Last updated March 23, 2011.

More details regarding experience, awards, publications, and service are available in my *vitae* at: http://www.andrews.edu/~calkins/profess/cvitae.pdf

Experience:

2008–2010	**Associate Prof. of Math & Science** Coordinate and teach mathematics in the Berrien Co. Math & Science Center (public high school program for accelerated students). Supervise students, other math teachers, and workers; track budgets, supplies, calculators, and textbooks; advise students; coordinate competitions; develop curriculum.	Andrews University Berrien Springs, MI 49104-0140
1978–2008	**Unranked Faculty** Berrien Co. Math & Science Center (High School since 1993): mathematics, computer science, statistics. (University): computer programming, language short courses, maintenance, computer applications in architecture, math ed, statistics, and guest lectures.	Andrews University, Berrien Springs, MI 49104-0140
1980–present	**Consultant; Research, Contract** Artware (early 1980's), Telefile Computer Products (July 1984–Oct. 1987+), NASA (Lockheed, June 1987), Warner (April 1989), Interlink (1993–98), BCISD/Berrien RESA (1993–2010); University of Notre Dame (1991–93, 2003–05), University of Rochester (Summer 2006), Lake Michigan College (2006–present), Argonne National Labs (Fall 1988), Educational Testing Service (2002–present), PESG (Feb.–March 2011), Marion Public Schools (March–July 2011), Berrien Springs Virtual Academy (March 2011–), and Sawyering.	$\overline{\text{X}}\underline{\text{D}}\overline{\text{X}}$ (July 1984–present) 610 N. Main St. Berrien Springs, MI 49103-1013
1983–1993	**Assistant Director for Technical Support** pre-1987–title was Manager, Computer Systems Programming, Hardware Maintenance and Development). Other management areas included: data communications network, microcomputers, academic computing, resource management, security, and disaster recovery.	Andrews University
1978–1983	**Systems Programmer & Hardware Engineer** responsibilities included: systems programming (CP-V), security, hardware installation, development, and maintenance for Xerox Sigma 6, 7, and 9 computers and related peripherals.	Andrews University

Refereed Journal Articles:

"On mesh-based Ewald methods: Optimal parameters for two differential schemes." Harry A. Stern and Keith G. Calkins, *Journal of Chemical Physics*, **128**, June 6, 2008, 214106-1–8. PDF: `http://www.andrews.edu/~calkins/uofr/jcp_128.pdf`.

"Optical frequency measurements of $6s\ ^2S_{1/2} \rightarrow 6p\ ^2P_{1/2}$ transitions in ^{133}Cs and their impact on the fine-structure constant," V. Gerginov, K. Calkins, C. E. Tanner, S. Diddams, A. Bartels, J. McFerran, L. Hollberg, Physical Review A, March 2006.

"Structure of Acidic Haloaluminate Melts: Neutron Diffraction and Quantum Calculations," M. Blander, E. Bierwagen, K. Calkins, L. A. Curtiss, D. L. Price, M.-L. Saboungi, Journal of Chemical Physics, **97** (4), Aug. 15, 1992, 2733–41.

"Computer Assisted Analysis of Nuclear Magnetic Resonance Spectra," K. Calkins, R. Daley, Journal of Chemical Education, May 1978, 322.

References:

Tonya Snyder, 269 471-7725, Coordinator, Math & Science Center, Berrien RESA, 49103

Lorena Bidwell, 269 471-6124, CIO, Andrews University, 49104-0880

Don Rhoads, 812 876-1042, former Chair Andrews Univ. Math Dept., `drhoads@bluemarble.net`

Harry Stern, 585 275-8804, asst. prof., computational chemistry, Univ. of Rochester

Other references and more details available upon request.

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Toronto, ON M6J 3X5

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Education

University of Toronto, Toronto, ON
Postdoctoral Fellow, Department of Chemistry, September 2006-August 2009
Research Advisor: Aaron R. Wheeler

Purdue University, West Lafayette, IN
Ph.D. Analytical Chemistry, GPA: 3.90/4.0, May 2006
Research Advisor: Dr. Fred E. Regnier

University of Virginia, Charlottesville, VA
B.Sc. Chemistry, GPA: 3.052/4.0, May 1999

Research Experience

Postdoctoral Fellow, University of Toronto: Protein Assays in Digital Microfluidic Devices

Developed surface-based immunoassays for the detection of lung cancer markers in digital microfluidic devices

Developed enzymatic assays for the detection and quantitation of substrate in a digital microfluidic system

Developed assays for the characterization of enzyme kinetics in digital microfluidic devices

Students supervised: Alphonsus Ng, Ph.D. candidate; Uvaraj Uddayasankar, Ph.D. candidate; Vivienne Luk, M.Sc. candidate; Yu Miao, second-year undergraduate; Charley Wang, second-year undergraduate

Thesis, Purdue University: A Hydrodynamic Microfluidic System for the Analysis of Glycoproteins

Developed immunoassays using lectins for the study of glycoprotein markers in rheumatoid arthritis

Investigated strategies for the modification of surface properties of hydrophobic polymers to prevent protein fouling

Developed a hydrodynamic fluidic system for enzymatic assays and fluid delivery

Undergraduate Research Associate, University of Virginia

Organic synthesis of oligosaccharides for application as inhibitors of cancer cell adhesion, September 1998-May 1999.
Research advisor: Dr. Glenn J. McGarvey

Organic synthesis of protein kinase C inhibitors as potential antitumor agents, January-May 1998.
Research advisor: Dr. Richard J. Sundberg

Teaching Experience

Sessional Lecturer, University of Toronto, Toronto, ON. January-May 2007, September-December 2009.

CHM 217 Lecturer – Introduction to Analytical Chemistry. Prepared and delivered two lectures/week and supervised three laboratory and tutorial sections. Topics included statistics, titrations, potentiometry, atomic and molecular spectroscopy, and chromatography. Aims of the course included analytical problem-solving skills and basic concepts of instrumental design and use. Reponsible for writing all quizzes, homework assignments, and exams.

CHM 139 Lecturer – prepared and delivered three lectures a week for two sections (approximately 250 students/section) of a first-year general chemistry course. Responsible for writing quizzes, exams, and online homework assignments on quantum mechanics, states of matter, chemical bonding, and properties of solutions. First general chemistry course at the University of Toronto to employ the iClicker classroom participation system.

Adjunct Instructor, Germanna Community College, Fredericksburg, VA. May-August 2006.

CHM 112 Instructor – sole instructor for lecture and laboratory sections of a second-semester general chemistry course. Developed lectures and some laboratory activities, supervised laboratory portion of course, wrote quizzes and exams, and performed all grading duties. Topics included chemical bonding and molecular shapes, phases of matter, properties of solutions, kinetics, equilibria, and thermodynamics.

Teaching Assistant, Purdue University, West Lafayette, IN. August 1999-December 2000, August 2002-December 2004.

Chromatographic Methods of Analysis – assisted in the instruction of a graduate level course in separations, which included development and grading of exams as well as substitute lectures.

Analytical Chemistry II – supervised laboratory sections of a senior-level course in electronics and instrumentation.

Instructed a variety of general chemistry laboratory and recitation sections, responsible for supervising exams.

Affiliations

American Chemical Society

Iota Sigma Pi, National Honor Society for Women in Chemistry, Plutonium Chapter

Outreach Coordinator, June 2002-May 2003. Coordinated community outreach activities in conjunction with the local chapter of the American Chemical Society, Women in Science Programs, and the Department of Chemistry.

National Chemistry Week, October 2002. Organized a week-long program in local elementary schools; assembled committees, recruited volunteers, and developed two hands-on experiments for children in grades K-3 and 4-6 in approximately 100 classrooms. Theme: Chemistry Keeps Us Clean.

Exciting Science @ Purdue, April 2003. Participated in the development, planning, and execution of a new one-day recruiting event for high school girls interested in the sciences and their parents. Served on a discussion panel and organized and taught a hands-on experiment workshop. Experiment: DNA extraction from wheat germ.

Workshop at Faith Christian School, Lafayette, IN, April 2003. Developed an after-school workshop for a middle school-aged gifted program. Experiment: the chemistry of polymers.

Vice President, June 2001-May 2002. Assisted in administrative duties of the organization and responsible for recruitment and initiation.

Civic Theater of Greater Lafayette, Lafayette, IN, March 2003-May 2005. On-stage performer in *Annie, A Chorus Line, Carousel, Crimes of the Heart,* and *HONK!*; occasional voice-over work.

Vanity Theater, Crawfordsville, IN, May-August 2003. Choreographer, actor, and pit orchestra member in a production of *Oliver!.*

Publications

Miller, Elizabeth M.; Ng, Alphonsus; Uddayasankar, Uvaraj; Wheeler, Aaron R. **A Digital Microfluidic Approach to Heterogeneous Immunossays**. (In preparation)

Miller, Elizabeth M.; Wheeler, Aaron R. **Digital Bioanalysis**. *Analytical and Bioanalytical Chemistry* **2009**, *393*, 419-426.

Miller, Elizabeth M.; Wheeler, Aaron R. **A Digital Microfluidic Approach to Homogeneous Enzyme Assays**. *Analytical Chemistry* **2008**, *80*, 1614-1619.

Miller, Elizabeth M.; Freire, Sergio L. S.; Wheeler, Aaron R. **Proteomics in Microfluidic Devices**. *Encyclopedia of Micro- and Nanofluidics*, Li, D. Q., Ed.; Springer-Verlag: Heidelberg, Germany, 2007.

Miller, Elizabeth M.; Regnier, Fred E. **An Enzyme-Linked Lectin Immunoassay for the Study of Altered Glycosylation in Rheumatoid Arthritis**. (In preparation)

Miller, Elizabeth M.; Regnier, Fred E. **An Enzyme-Linked Lectin Immunoassay for the Study of Glycoproteins.** (In preparation for Analytical Chemistry)

Miller, Elizabeth M.; Regnier, Fred E. **A Hydrodynamic Microchip for Fluid Delivery and Enzymatic Assays.** (In preparation)

Professional Presentations

"A Digital Microfluidic Approach to Heterogeneous Immunoassays." Elizabeth M. Miller, Aaron R. Wheeler; Pittcon 2009 (March 8-13, 2009 Chicago, IL).

"A Digital Microfluidic Approach to Homogeneous Enzyme Assays." Elizabeth M. Miller, Aaron R. Wheeler; Pittcon 2008 (March 2-6, 2008 New Orleans, LA).

Additional Skills

Microfabricated Devices, Laser-Induced Fluorescence, Fluorescence Microscopy, Chip Electrophoresis, High-Voltage Systems, Enzymatic Assays, Microcontact Printing, Immunoassays, Photolithography/Cleanroom.

Basic Liquid Chromatography (HPLC) and Mass Spectrometry, Nuclear Magnetic Resonance Spectroscopy (NMR), Infrared Spectroscopy (IR), Ultraviolet-Visible Spectroscopy (UV-Vis).

James Weaver
652 North Park Street
Reed City, Michigan 49677-9375
(616) 832-4087

OBJECTIVE

To gain one year of either part time or full time teaching experience in the field of chemistry at a major university or college before attempting to obtain a Doctorate of Philosophy.

SKILLS

Experienced with part time teaching of martial arts for two years. Stockroom clerk for a period of approximately two years. Extensive research experience in the area of medicinal compounds. Graduate teaching assistant for three years.

ACADEMIC BACKGROUND

Ferris State University
Big Rapids , Michigan Sept. 1986 - May 1989
Associate's in Science, Chemistry

Central Michigan University
Mt. Pleasant, Michigan Sept. 1989 - Aug. 1991
Bachelor's in Science, Chemistry

Central Michigan University
Mt. Pleasant, Michigan Jan. 1991 - Aug. 1994
Master's in Science, Chemistry

PROFESSIONAL BACKGROUND

Ferris State University Karate Club
Department of Criminal Justice
Big Rapids , Michigan 49307
(616) 796-0466

Organization dedicated to the teaching and education of the general public and law enforcement personnel with regard to the Korean martial arts.

Instructor Sept. 1987 - Sept. 1989

Responsibilities included general supervision of students, in addition to the primary role of instructor.

Ferris State University
Department of Chemistry
Big Rapids , Michigan 49307
(616) 592-2580

Major university located in the state of Michigan.

Stockroom clerk Sept. 1987 - Sept. 1989

Various general responsibilities with regard to the organization, distribution, and preparations of equipment and chemicals for general chemistry laboratories.

Central Michigan University
Department of Chemistry
Mt. Pleasant, Michigan 48858
(517) 774-4098

Major university located in the state of Michigan.

Graduate Teaching Assistant Jan. 1991 - Aug. 1994

Assisted professors with teaching responsibilities by correcting exams, laboratories, and by substituting as a lecturer when needed. Also supervised laboratory sections and lectured, as well as provided tutoring to numerous students.

AFFILIATIONS

Member of the American Chemical Society, Division of Medicinal Chemistry.
Ferris State University Karate Club.

References available upon request.

FERRIS STATE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES

TO: Gary Todd, Chair, Academic Program Review Council (APRC)

CC: Beth Zimmer, Department Chair, Social & Behavioral Sciences

Joe Lipar, Chair, Program Review Panel

FROM: Kristi L. Haik, Dean, College of Arts & Sciences

RE: Pre-Science A.S.

DATE: 09/12/2017

The Associates of Science in Pre-Science program serves the following groups of students:

1. those interested in a natural science-based program but are not ready to choose a specific field of study;
2. those interested in a natural science-based program but do not meet the entrance requirements to begin the typical first year combination of mathematics, biology, and chemistry classes; and/or
3. those who are seeking one of the natural-science related Bachelor's level programs (BIPM, BIPO, CHEM, etc.) but also qualify for the Tuition Incentive Program (TIP).

The program goals align with the college and university and is a vital part of our college. The report produced examines the strengths and challenges of the program and proposes some improvements. One of the strengths of the program are that the program involves faculty from two very strong and active departments: Biological Sciences and Physical Sciences. These faculty are active with these students in service and experiential learning opportunities (both in and out of the classroom). The summative data presented in this report are from a small number of respondents (n=11 and 12). Of interest, is that 90% of these students intended on pursuing a B.S. degree in a variety of science and health-related fields. A common theme in the suggestions for the program is that the students did not feel they received adequate advising.

Over the next year, the college will make the following improvements:

- Implementation of Greater Oversight and Advising for the Program - This may take the form of an "Oversight Committee", composed of members of the Biological Sciences Department and the Physical Sciences Department, that will be responsible for overseeing all actions related to the program, including assessment, future program reviews, and curriculum modification/development. Alternatively, a single program coordinator may also be appointed to ensure that the program receives appropriate oversight. Training of advisors on the requirements of this program and the requirements of the TIP program will be addressed.

- Continue Program-level Assessment – Assessment of student outcomes began in earnest during the Fall 2016 semester as part of a college-wide plan to carry out program assessment for all programs in the college. Course-level assessment related to program outcomes will commence in the Fall of 2017 and will continue thereafter. Other forms of assessment that have been occurring within this program. The program will upload all appropriate assessment artifacts and findings into TracDat.

The dean's office believes that the Pre-Science Program is a vital program for many of the students that Ferris serves. We look forward to its continued growth and improvement.