

POSTDOCTORAL ACADEMIC CAREER DEVELOPMENT (PACD) PROGRAM

SC EPSCoR/IDeA Solicitation Number: 10-101

Effective January 20, 2010

Program Information

The Postdoctoral Academic Career Development (PACD) Program offers an opportunity for postdoctoral researchers to participate in enhancing the research culture at predominately undergraduate institutions (PUIs) in the state of South Carolina. Postdoctoral scholars in the PACD Program seek out collaborations with PUI faculty based primarily on either common teaching or research interests, serving as a professional conduit between the two types of institutions. For the postdoctoral scholar interested in pedagogy, this is an opportunity to acquire a substantial mentored teaching experience in conjunction with their primary training in research. For the postdoctoral scholar seeking to explore the research environment at a PUI, this is an opportunity to develop skills for incorporating students in a research project with the potential for increasing interest in pursuing graduate education. Both PACD options give scholars the valuable experience of transitioning into a new phase of their professional development. Appointment to the PACD Program is a two-stage process. Those candidates whose pre-applications are selected will be invited to submit a Collaborative Teaching/Research Plan.

The underlying hypothesis for the PACD Program is that the fundamentals of effective teaching/training students are directly applicable to the conduct of research. The goals of the PACD Program are to (1) provide teaching experience, increase research competitiveness, and expand career opportunities for the postdoctoral scholar as they serve as role models for students, (2) promote the infusion of contemporary research activities into undergraduate science and mathematics curricula, and (3) enhance research collaborations between faculty at PUI and research-intensive institutions. Postdoctoral scholars are the ideal emissaries for achieving these goals.

While the majority of postdoctoral researchers desire faculty positions, their training is often exclusively laboratory-based. Pursuit of instructional opportunities is generally discouraged due to a combination of funding constraints (i.e. research grants support research activities) and pressures to publish. Moreover, most opportunities for developing instructional skills are limited in duration and scope of involvement, yielding only marginal impact on the scholar's capacity to transition from bench scientist to junior faculty with both teaching and research responsibilities.

The converse situation often exists at PUIs, i.e. the heavy instructional demands of PUI faculty make it difficult for them to direct cutting-edge research projects. In addition, exposing students to progressive technologies and research-oriented courses at a PUI is a significant challenge due to limited research infrastructure and lack of a critical mass of researcher-oriented faculty. Consequently, many undergraduates are unaware of the broad availability of graduate programs and career opportunities in the basic sciences. The PACD Program is designed to fill the gap in training of aspiring academic scientists while enhancing the learning experience of undergraduate students.

Research productivity is the primary metric for evaluating the success of any postdoctoral training experience. While long hours are common for bench scientists, many trainees align length of the work week with an assumption of productivity. Those that pursue their research efficiently, and that are guided by an individual development plan, are much more likely to realize success according to the [Sigma Xi Postdoc Survey](#). Participation in the PACD program will necessitate the scholar developing effective time management skills and being more focused in the experimental design of their research project. It is anticipated that the scholar's training in pedagogical methods will enhance their communication skills, which should result in more effective seminars and grant proposals on their research pursuits. Expected outcomes for the postdoctoral scholar will be quantified based on the number of proposals submitted, peer-reviewed publications, interviews, and job offers. Impact to the host institution will include greater emphasis on research methodology in existing courses and/or creation of new courses emphasizing research.

The PACD Curricular Experience Track

Although the majority of a scholar's effort in the PACD Curricular Experience Track will be in pursuing their individual research objectives, the scholar will devote one semester to teaching science or mathematics courses at one of the participating institutions (see Appendix I) under the guidance of a teaching mentor. The desired result of the program is to train a well-rounded academic researcher who has multiple career options.

The PACD Curricular Experience Track scholar must commit either one semester or two 7-week long periods to teaching related activities at the host PUI on an essentially full time basis. The two 7-week long option may be satisfied by teaching either different portions of the same course in alternate semesters or by teaching in two different courses with the same or

secondary teaching mentor. The instructional responsibility of the scholar should increase over the duration of the course to allow them time to acclimate and acquire feedback from the teaching mentor. PACD scholars and their teaching mentors are encouraged to explore new avenues of lecture content and laboratory exercises in their courses. Overall, the PACD scholar is generally responsible for 30-40% of the formal course activities. Instructional activities will include preparation and presentation of lectures, grading quizzes and exams, conducting laboratory exercises, holding office hours, facilitating review sessions, and working outside formal class time with the teaching mentor. This intensive involvement of the PACD scholar should afford significant opportunities for the scholar to evolve and expand their teaching skills while simultaneously infusing cutting-edge research concepts and critical thinking into the curriculum at the PUI. Postdoctoral scholars appointed to the Curricular Experience Track will receive full salary support for one year and may request additional funds for supplies and travel (dependent on availability of funding).

The PACD Research-Focused Collaboration Track

PACD scholars may alternatively choose to engage primarily in a research project with a faculty member (see Appendix II). The Research-Focused Collaboration Track also involves teaching but primarily in the laboratory setting, mentoring and training undergraduates in a research experience. The PACD scholar will devote 50% annual effort (i.e. 6 months) towards the collaborative research project, with an equivalent of one semester being conducted in either a science or mathematics department at the host institution. The involvement at the host institution can occur either over a contiguous block of time or can be spread out over an entire year. Projects should involve undergraduates at the host institution, allowing them extensive interaction with the PACD scholar. Technical aspects of the project can be conducted at both the host and home institution as necessary to achieve the experimental objectives and give optimal exposure of undergraduates to all aspects of the project. In addition, the PACD scholar might become involved as a co-mentor for undergraduate senior research projects. Research-focused PACD scholars should also give 2-3 formal presentations to undergraduates either in a seminar series, journal or science club, or as a guest lecturer in various courses. Postdoctoral scholars appointed to the Research-Focused Collaboration Track will receive 6 months salary support and may request additional funds for supplies and travel (dependent on availability of funding).

Eligibility and Application Process

Eligibility for the PACD Program is limited to postdoctoral researchers from Clemson, MUSC, and USC who are either US citizens or permanent residents. Postdoctoral scholars from other South Carolina institutions who are interested in applying to the PACD program should contact Dr. Ed Krug, the Program Director, at krugel@musc.edu. Senior graduate students are also eligible to apply, but they must have completed all doctoral degree requirements by time of appointment.

Appointment to the PACD Program is a two-stage process. Applicants will be subjected to a first round review based on the strength of research accomplishments, teaching philosophy, personal statement, and letters of recommendation. The scholar's research mentor must also have suitable grant support and exhibit a commitment to the scholar's career development. All required pre-application materials must be received no later than 5:00 PM on Tuesday, February 23, 2010. Selected applicants will be notified no later than Thursday March 4, 2010 that they should proceed to develop a Collaborative Teaching/Research Plan with the intended host faculty. The Collaborative Teaching/Research Plan is due by 5 PM Monday April 12, 2010.

Previously supported PACD scholars may re-apply for appointment on a competitive basis; however, the length of support cannot exceed two years total. Applicants are encouraged to check the SC EPSCoR/IDeA website for updates to the list of participating host institutions. The following colleges and universities are currently open to PACD scholars:

Institutions Offering Curricular Experience Opportunities:

- Benedict College, Columbia, SC - Biology and Chemistry
- Charleston Southern University, Charleston, SC - Biology and Chemistry
- The Citadel, Charleston, SC - Biology
- Columbia College, Columbia, SC - Biology, Chemistry and Mathematics
- Coker College, Hartsville, SC - Biology and Chemistry
- Francis Marion University, Florence, SC - Biology
- Limestone College, Gaffney, SC - Biology
- Newberry College, Newberry, SC - Chemistry
- Southern Wesleyan University, Central, SC - Biology and Chemistry
- USC-Beaufort, Beaufort, SC - Biology
- USC-Upstate, Spartanburg, SC - Biology

Institutions Offering Research-Focused Collaborations:

- Claflin University, Orangeburg, SC - Faculty in the Departments of Biology, Mathematics and Computer Science
- College of Charleston, Charleston, SC - Faculty in the Department of Chemistry and Biochemistry
- Furman University, Greenville, SC - Faculty in the Departments of Biology and Chemistry

Pre-Application Instructions

I. The PACD Curricular Experience Track. Applicants must have some documented teaching experience or pedagogical training, or a well-defined plan to acquire such training prior to their mentored teaching experience. Scholars will be selected based on the combined strength of their research and teaching potential. Appointees will be supported at 100% effort for one year.

All Curricular Experience Pre-Applications must be assembled in the following sequence:

- A. Cover Sheet (must use program form)
 1. List desired teaching institutions and courses (no more than four) in rank order. See Appendix I for course descriptions as provided by instructors. Applicants are strongly encouraged to contact potential faculty mentors at the host institutions in making course selections.
- B. Letter of Interest (**3 page limit**) that includes:
 1. Career Goals and Teaching Philosophy
 2. Current Research Project
 3. Prior Teaching Activities (including training received, and/or plans to acquire instruction in teaching prior to their mentored teaching activities)
 4. Effort Statement (commitment to essentially full-time mentored teaching activities for either one semester or two 7 week-long periods)
- C. Applicant's Current Biographical Sketch (in either NIH or NSF format)
- D. Detailed Budget Justification (these funds will not be awarded unless specifically requested and fully justified - see Budgetary Request)
 1. Research supplies - up to \$5,000 may be requested for research activities at the home institution
 2. Program participation costs - up to \$5,000 may be requested for travel to and from the host institution
- E. Progress Report (competitive renewal; current or prior PACD scholars only)
 1. Current or Past Activities at Host Institution (1 page limit)
 2. Justification for Re-Appointment (1 page limit; a description of how you will apply your prior year's experience to better serve the outreach institution and its students)
 3. Letter of Recommendation from Prior Outreach Mentor (in addition to the 2 letters of recommendation in Sect. G)
- F. Materials from the applicant's research mentor
 1. Letter of Support addressing:
 - a. The applicant's potential for an academic career
 - b. The applicant's suitability for the PACD Program
 - c. Approval of 25% release time for the applicant's teaching activities (14 weeks of essentially full-time effort)
 2. Current biographical sketch (in either NIH or NSF format)
 3. Current and pending support (in either NIH or NSF format)
- G. Two letters of recommendation from individuals, other than the research mentor, who are familiar with the applicant's accomplishments and career potential

Senior graduate student applicants must include a copy of their official notification of dissertation defense form with their pre-application. The information requested in Section F above should be obtained from the applicant's future postdoctoral research mentor.

II. The PACD Research-Focused Collaboration Track. Applicants should have a well-developed research project with their current mentor and some prior evidence of teaching or working with undergraduates or graduate students in some fashion. Appointees to the Research-Focused Collaboration Track will be supported at 50% effort for one year.

All Research-Focused Collaboration Pre-Applications must be assembled in the following sequence:

- A. Cover Sheet (must use program form)
 1. Indicate desired host institution, faculty and research project (may list up to three potential collaborations) in rank order. See Appendix II for descriptions of faculty research interests. Applicants are strongly encouraged to contact potential faculty mentors at the host institutions when considering potential research projects.
- B. Letter of Interest (**3 page limit**) that includes:
 1. Career Goals
 2. Current Research Project
 3. Prior Involvement with Trainees (e.g. undergraduate or graduate students, teaching-related activities or training)
 4. Effort Statement (commitment to 50% effort at the host institution, equivalent to one semester, but not necessarily over a contiguous period of time – i.e. may be spread out over the entire year)
- C. Current Biographical Sketch (in either NIH or NSF format)

- D. Detailed Budget Justification (these funds will not be awarded unless specifically requested and fully justified - see Budgetary Request)
 1. Research supplies - up to \$8,000 may be requested for research materials or fees directly related to the collaborative project
 2. Program participation costs - up to \$5,000 may be requested for travel to and from the host institution or secondary living accommodation while teaching. This amount will be adjusted accordingly at the time of award if there is any change from the intended host institution.
- E. Progress Report (competitive renewal; current or prior PACD scholars only)
 1. Current or Past Activities at Host Institution (1 page limit)
 2. Justification for Re-Appointment (1 page limit; a description of how you will apply your prior year's experience to better serve the outreach institution and its students)
 3. Letter of Recommendation from Prior Outreach Mentor (in addition to the 2 letters of recommendation in Sect. G)
- F. Materials from the applicant's research mentor
 1. Letter of Support addressing:
 - a. The applicant's potential for an academic career
 - b. The applicant's suitability for the PACD Program
 - c. Approval of 25% release time for the applicant's collaborative activities (equivalent to one semester total at the host institution over a one-year period)
 2. Current biographical sketch (in either NIH or NSF format)
 3. Current and pending support (in either NIH or NSF format)
- G. Two letters of recommendation from individuals, other than the research mentor, who are familiar with the applicant's accomplishments and career potential

Senior graduate student applicants must include a copy of their official notification of dissertation defense form with their pre-application. The information requested in Section E above should be obtained from the applicant's future postdoctoral research mentor.

Electronic or signed hard copies of all required pre-application materials must be received via e-mail or U.S. mail to Ms. Isabel Sanchez (sanchez@scra.org) no later than 5:00 PM on Tuesday, February 23, 2010:

SC EPSCoR/IDeA PACD Program
1330 Lady Street, Suite 504
Columbia, SC 29201

Instructions for Submission of the Collaborative Teaching/Research Plan

Applicants whose pre-applications are selected will work in collaboration with their selected host mentor to prepare a more detailed plan of involvement with undergraduates. The Collaborative Teaching/Research Plan describing how the scholar will be involved in the chosen course or research project is **due no later than 5PM on Monday, April 12, 2010**. This plan must address the following:

- Specifics of the planned teaching/research collaboration,
- Any activities to be completed prior to hosting the PACD scholar,
- Responsibilities of each party involved,
- Mechanisms for the host mentor to provide feedback to the PACD scholar,
- Mechanisms for maintaining open communication with the home research mentor,
- Mechanisms for staying informed of research progress in the home laboratory, and
- Plans for any research-related activities to be conducted while involved at the host institution (e.g. working on manuscripts)

PACD scholars will be appointed by the PACD Selection Committee based on their potential for enhancing the research content of courses and the research activities at the host institutions. Curricular Enhancement and Research-Focused Collaboration scholars will receive 100% or 50% salary support, respectively, from May 1, 2010 through April 30, 2011, contingent upon continued satisfactory participation in the PACD program.

Questions or concerns in establishing the Collaborative Teaching/Research Plan should be brought to the attention of the Program Director as soon as possible to address any mitigating circumstances. Senior graduate student applicants only: Evidence that all PhD degree requirements have been satisfied must be submitted with the Collaborative Teaching/Research Plan. It is anticipated that two to four PACD scholar appointments will be made depending upon the nature of applications approved and the availability of funds. Successful applicants will be notified no later than April 20, 2010.

Award and Reporting Requirements

The Program Director will perform a scheduled visit to the host institution to observe each scholar's activities, as well as conduct interviews with the teaching and research mentors to assess the interim progress of the scholar. Evaluations will be collected from the students, research and teaching mentors, departmental chair at the host institution, and the PACD scholar. Annual follow-up surveys will be conducted to assess the impact of the PACD experience on the career progression of the scholars as well as persistent impact on the academic environment at the PUI.

PACD program outcomes will be measured based on evaluative data including performance assessment of the scholar prepared by teaching and research mentors, chair of the host department, and students. PACD scholars will complete evaluations at the end of their teaching apprenticeships. The overall success of the program for the PACD scholar will be determined based on research achievements and career advancement. The evaluation metrics for the outreach institution include curricula development (including evolution of course content and instructional methodologies) and the continuation of PACD-related course modifications. Evaluations of the program overall will be requested from the scholar and research mentor along with a progress report, due no later than May 31, 2011. The PACD Director will conduct follow-up interviews with the teaching and research mentors within one year post-award to collect evaluative data on those outcomes which occur post-award.

PACD scholars should acknowledge support from NIH grant number P20 RR-016461 from the National Center for Research Resources in any relevant publications or presentations occurring during the period of appointment.

Budgetary Requests

Successful individuals will receive one year of support at current NRSA stipend levels, plus the applicable fringe benefits rate at the scholar's home institution. Applicants are eligible to request additional funds (up to \$10,000 or \$13,000 depending on the program option); however, all funds must be detailed and fully justified (one page maximum). The budget request is limited to the categories below, and will be evaluated separately from the body of the application.

- **Research supplies:** The PACD scholar may request funds (up to \$5,000 for Curricular Enhancement or \$8,000 for Research-Focused Collaboration Scholars) to facilitate the scholar's research activities. These funds do not relieve the home institution research mentor's obligation for providing the necessary supplies for the scholar's primary investigative studies, i.e., they are for enhancing the career development of the scholar or for the host institution research collaboration.
- **Program participation expenses:** PACD scholars in either program may request up to \$5,000 for expenses related to their physical presence at the host institution. Travel or lodging costs should be estimated based on the location of the anticipated host institution relative to the scholar's home institution and according to the Federal Travel Regulations (estimate \$0.55 per mile for personal vehicle use). Any anticipated needs for miscellaneous items to participate in the instructional activities should be justified.

Post-Appointment Supplement Opportunities

Depending on the availability of funds, the SC EPSCoR/IDeA office may offer four types of supplements to enhance the PACD scholar's training experience and its impact at the host institution. Requests must describe the proposed activity and include a detailed budget justification. Supplement applications can be submitted at any time during the year but it is suggested to allow at least one month for review and processing. PACD scholars are limited to one supplement award in each category. Application forms and instructions can be obtained from the Program Director.

Curricular Enhancement Supplement: These funds are available to encourage curricular modifications to enhance undergraduate exposure to research topics, methodologies, or career opportunities. Such activities may include, but are not limited to, new lab exercises, field trips, etc. that require modest start-up funds to test their utility. Curricular enhancement requests of up to \$2,000 may be submitted prior to or during the teaching apprenticeship. Personnel or salary costs are not allowed. The host department chair must endorse the application in writing, stating that if the proposed curricular enhancement is successful, they will sustain the activity in subsequent years.

Host Institution Collaborating Faculty Travel Award: The faculty member hosting a PACD Research-Focused Collaboration scholar may request up to \$2,000 for travel related to the joint research project. These funds can cover a variety of activities, such as travel for faculty and/or students to the scholar's home institution, presentation of the research outcomes at societal meetings, etc.

Invited Teaching Supplement: These funds are available to encourage scholar participation in invited lectures or short-term teaching at other domestic or international institutions. Supplementary funds up to \$2,000 may be requested for the scholar to participate in a short-term teaching opportunity at a location other than the teaching mentor's institution. Applications may be submitted at any time during the scholar's appointment, but at least two months prior to the desired travel dates. Travel must

be completed by April 30, 2011. The application must include a detailed budget justification, a letter of invitation from the target institution, and a letter from the research mentor supporting the supplement request. Both the PACD scholar and the host instructor must submit an assessment of benefit from their perspective.

NIH NIGMS Academic Career Development Conference Award: The MORE Division of the National Institute of General Medical Sciences holds an annual meeting for participants in their Institutional Research and Academic Career Development Award (IRACDA) Program. The IRACDA Program is similar to the PACD Program in that it is focused on providing opportunities for postdoctoral scholars to combine their research training with a mentored teaching experience at undergraduate institutions. Both programs also seek to encourage increased representation of minorities in the sciences. The annual meeting provides a forum for postdoctoral scholars to share their experiences, participate in career development workshops, and learn more about life as an academician. Current and prior PACD scholars may request up to \$1,500 to cover registration, lodging and travel costs to attend the IRACDA Conference, which this year will be held June 6-8 in Boston, MA. Applications must be received no later than 5PM on Monday April 12, 2010. Awardees will be selected based on productivity at the host institution, innovation strategies for curricular enhancement, and career objectives.

Contact Information

General inquiries regarding this program should be made to:

Edward L. Krug, PhD
PACD Program Director
Assistant Dean for Postdoctoral Affairs
College of Graduate Studies
Medical University of South Carolina
173 Ashley Avenue, BSB 601
Charleston, SC 29425
krugel@musc.edu
Phone: 843-792-1543
Fax: 843-792-0664

Appendix I - PACD Curricular Experience Opportunities

Benedict College Columbia, SC

<http://www.benedict.edu>

Benedict College is a private, co-educational liberal arts institution located in Columbia, SC. It is the 4th largest private HBCU (Historically Black College or University) in the United States and has produced over 14,000 graduates. Of the 20 independent colleges in South Carolina, Benedict has the largest undergraduate student body and is the second largest overall with an undergraduate population of over 2,500 students. Benedict College is committed to being the best college it can be and is committed to establishing and maintaining high quality programs of teaching, research and public service. Benedict is distinguished by its continued commitment to facilitate the empowerment, enhancement, and full participation of African-Americans in American society. It is one of the top producers of African-American Physics majors in the country, as reported by the Education and Employment statistic Division of the American Institute of Physics and was ranked #2 in the nation for producing African-Americans with an undergraduate degree in Physics. In the past 10 years, one out of three Benedict College students has enrolled in graduate school.

Biology and Chemistry Courses at Benedict College

BIO 140 General Biology - Non-majors (7 sections): General Biology is an integrated service course in the biological sciences, including botany and zoology. Topics include taxonomy, anatomy, physiology, genetics, and ecology. Three 1-hour lecture periods and one 2-hour laboratory period.

Instructor: Various faculty (contact Larry Lowe, lowel@benedict.edu, (803) 705-4573).

BIO 147 Principles of Biology I: An introduction to the study of the biology of plants and animals is presented, emphasizing basic principles common to all living things. Topics covered include detailed examples from plants and animals, including: the cell and cell division, genes and gene function, energy transformation (photosynthesis and cellular respiration), nutrient procurement and processing, and gas exchange. Three 1-hour lecture periods and one 2-hour laboratory period.

Instructor: George McCoy, mccoyg@benedict.edu, (803) 705-4586

BIO 233 Human Anatomy and Physiology - Non-majors: The structural and functional characteristics of man's ten organ system are covered. Basic concepts of the human body are presented to non-science majors. Principal topics covered include levels of organization, support, movement, and integration. Three 1-hour lecture periods.

Instructor: Yavuz Cakir, cakiry@benedict.edu, (803) 705-4974.

BIO 341 Comparative Anatomy: The structural, functional, and phylogenetic relationships among chordates are presented, including detailed study of prochordate and detailed dissection of the lamprey, shark, salamander, and cat. Two 1-hour lecture periods and two 2-hour laboratory periods.

Instructor: Rush Oliver, rusho@benedict.edu, (803) 705-4621.

BIO 342 Invertebrate Zoology: A comparison of representatives of the major invertebrate animal phyla with emphasis on anatomy, physiology, life style, and life histories. Three 1-hour lecture periods and one 2-hour laboratory period.

Instructor: Rush Oliver, rusho@benedict.edu, (803) 705-4621.

BIO 349 Microbiology: Structural, cultural, and physiological characteristics of microorganisms and their role in health and nature are treated. The principles of immunology and virology are also discussed. Three 1-hour lecture periods and one 3-hour laboratory period.

Instructor: Bassam Fraij, fraijb@benedict.edu, (803) 705-4449.

BIO 445 Vertebrate Physiology: Basic functions of the vertebrate body are studied in terms of physical and chemical principles. The important functions of the circulatory, digestive, respiratory, glandular, muscular, nervous, and reproductive systems are discussed. Three 1-hour lecture periods and one 3-hour laboratory period.

Instructor: Yavuz Cakir, cakiry@benedict.edu, (803) 705-4974.

BIO 448 Cell and Molecular Biology: A comprehensive study of the structure and function of cells, including biochemistry and molecular approaches. Topics to be covered include cellular organization, metabolism, nucleic acid structure and function, protein synthesis, gene expression, and regulation. Three 1-hour lecture periods and one 3-hour laboratory period. An honors section is offered.

Instructor: Larry Lowe, lowel@benedict.edu, (803) 705-4573.

Appendix I - PACD Curricular Experience Opportunities

Benedict College
Columbia, SC

<http://www.benedict.edu>

CHEM 147 General Principles of Chemistry I: This course is a study of the fundamental principles of general chemistry, including atomic structure, chemical bonding, chemical equations, periodic properties of elements, and some descriptive chemistry as it relates to industrial processes. Practice in basic laboratory techniques and experimental studies of various types of chemical changes are emphasized. Three 1 -hour lecture periods and one 3-hour laboratory period.

Instructor: Silvia Atim, atims@benedict.edu, (803) 705-4644 **and/or** Changyong Qin, qinc@benedict.edu, (803) 705-4582.

CHEM 148 General Principles of Chemistry II: A continuation of Chem147, the course includes introduction to the study of solution chemistry, colloidal systems, oxidation-reduction reactions, chemical equilibrium, and thermochemistry. Basic concepts of organic chemistry and qualitative analysis are also stressed. Three 1 -hour lecture periods and one 3-hour laboratory period.

Instructor: Changyong Qin, qinc@benedict.edu, (803) 705-4582 **and/or** Silvia Atim, atims@benedict.edu, (803) 705-4644.

CHEM 247 Organic Chemistry I: This course is a study of the fundamental laws and theories of organic chemistry, emphasizing the preparation of typical organic compounds; qualitative and quantitative organic analysis; hydrocarbons and their halogen, oxygen, and nitrogen derivatives; and an introduction to amino acids and carbohydrates. Three 1-hour lecture periods and one 3-hour laboratory period.

Instructor: Silvia Atim, atims@benedict.edu, (803) 705-4644.

CHEM 343 Analytical Chemistry: This course is an introduction to the principles of quantitative analytical techniques with laboratory work designed to develop manipulative skills and dexterity for the handling of chemical apparatus. Much emphasis is placed on the measurement and treatment of analytical data. Three 1-hour lecture periods and one 3-hour laboratory period.

Instructor: Helene Tamboue Tamboueh@benedict.edu, (803) 705-4740

CHEM 441 Physical Chemistry: This course is a study of atomic and molecular structure; properties and thermodynamics of gases, liquids, and solids; and the relationships of various physical properties to structure and reactivity. Three 1-hour lecture periods and one 3-hour laboratory period. A research paper is required.

Instructor: Changyong Qin, qinc@benedict.edu, (803) 705-4582

CHEM 447 Biochemistry: This course covers the chemistry of lipids, carbohydrates, proteins, nucleic acids, and enzymes and briefly considers vitamins, steroids, hormones, and clinical procedures. Three 1-hour lecture periods and one 3-hour laboratory period.

Instructor: Bassam Fraij, fraijb@benedict.edu, (803) 705-4449.

Appendix I - PACD Curricular Experience Opportunities

Charleston Southern University Charleston, SC

<http://www.csuniv.edu>

Charleston Southern University enrolls approximately 3300 students in undergraduate and selected graduate programs. The Chemistry and Biology departments are housed in the university's new science building. The facility was constructed specifically to foster faculty/student interaction and active learning. The science building houses a significant level of scientific instrumentation, equipment, and small research spaces for faculty and student research. We have PACD scholar opportunities in both our Chemistry and Biology departments. In either case, while gaining significant experience in direct classroom and laboratory teaching, the PACD scholar would be expected to assist with supervision of undergraduate research and the further development of research activity at Charleston Southern.

Biology and Chemistry Courses at Charleston Southern University

BIO 216 - Human Physiology. A study of the relationship between structure and function in humans, correlation of normal homeostatic mechanisms of tissues, organs, and organ systems, and determination of the effect of certain pathological conditions on normal function. Prerequisite: Biology 210 or 215; a course in Chemistry is recommended. Lecture 3 hours. Laboratory 2 hours.

Instructor: Dr. Amy Nolan, 843-863-7541, anolan@csuniv.edu. The candidate will be expected to work with the students in both the lecture and laboratory settings, aiding the institution in improving the quality of instruction in both settings. This will involve integrating recent discoveries and applications into a traditional lecture course and developing interactive lectures to provide an active learning environment for the students. The candidate will be expected to design/develop/revise laboratory experiments that will be used as replacements for current experiments. The new experiments will provide hands-on activities to reinforce classroom instruction and foster development of the students' laboratory skills.

CHEM 121/123 - College Chemistry I (lecture and laboratory). This is the first course in a two-semester sequence intended for students majoring in a science. This course contains traditional topics. The topics include the theory and practice related to stoichiometry, solution chemistry, thermochemistry, gas laws, atomic structure and the periodic table, chemical bonding and molecular structure and colligative properties.

Instructor: Dr. Rebecca Hanckel, 843-863-8078, rhanckel@scuniv.edu. The candidate will be expected to work with the students in both the lecture and laboratory settings. The candidate will be expected to aid the institution in improving the quality of instruction in both settings. The candidate will be involved with integrating practical examples and applications into a traditional lecture course. The candidate will also work to make the lecture a more interactive experience for the students. The goal is to make chemistry come to life, to make it more exciting and engaging. This goal is to be achieved without sacrificing academic rigor. The candidate will be expected to design/develop a sequence of 3 or 4 laboratory experiments that will be used as replacements for current experiments. The sequence of experiments is to be designed so that they form a multi-week sequence related through a central topic.

Appendix I - PACD Curricular Experience Opportunities

The Citadel
Charleston, SC
<http://www.citadel.edu>

The Citadel has enjoyed a long history of hosting post-doctoral fellows in various teaching capacities. The atmosphere at The Citadel is strongly focused on teaching, and we are eager to help developing teachers gain experience in a supervised atmosphere. Our close relationship with the Medical University of South Carolina enables us to provide post-doctoral fellows a plethora of opportunities for hands-on teaching opportunities.

Biology Courses at the Citadel

BIOL 205 - Cell Biology: offered every Fall – This sophomore-level course covers Cell activity and structure at the molecular level. Lecture emphasis is on membrane structure and function, protein targeting, adhesion, cytoskeleton, cell division and cell signaling. Since the lab portion of the course is the first real lab experience for many students, it begins with basic introduction to lab equipment and techniques and works up to studying enzyme kinetics, performing cell fractionation, and western blotting. The semester culminates with student PowerPoint Presentations about their last 4-week lab projects.

Instructor: Dr. Kathy Zanin, zaninm1@citadel.edu, 843-953-7077.

Biol 207 - Bioterrorism: This course is designed as a general elective for students of any major. This 3-hour lecture course will focus on specific organisms that could be used as bio-weapons, discussing their normal existence, common methods of weaponization, potential effects on a human population, and strategies for protecting populations from such agents. The PACD scholar will work with Dr. Kristy Johnson for the entire 14-week semester and will participate in designing and delivering lectures, and generating and grading exams. Because this is a lecture-only course, the PACD scholar would also work in the laboratory portion of another course offered by Dr. Johnson in the same semester.

Instructor: Dr. Kristy Johnson, johnsonk1@citadel.edu, 843-953-7879.

BIOL 401- Developmental Biology: offered every-other Spring – This junior/senior-level course focuses on animal embryology and its molecular control. Topics discussed in lecture include the processes of fertilization, cleavage, gastrulation, neurulation; the formation of tissues and organs from the three primordial germ layers and from neural crest cells; the role of induction and of hormones in development; the role of the environment in development; and some of the techniques used in the study of development. The laboratory portion of the course uses model systems to investigate the principles discussed in lecture.

Instructor: Dr. Kathy Zanin, zaninm1@citadel.edu, 843-953-7077.

Biol 402/512 - Descriptive Histology: This course is designed for biology majors and includes a detailed study of the chief types of mammalian tissues and a description of the histology of organs. Laboratory work includes a microscopic study of cells, tissues, and organs of animals. The PACD scholar will work with Dr. Kristy Johnson for the entire 14-week semester and will participate in designing and delivering lectures, generating and grading exams, and instructing lab sessions. When offered to cadets, the class meets 2-3 mornings and one afternoon for lab each week. When offered in the graduate program, the class meets 2 nights each week from 6:45-9:45PM.

Instructor: Dr. Kristy Johnson, johnsonk1@citadel.edu, 843-953-7879.

BIOL 427 - Immunology: offered every-other Spring – This junior/senior-level lecture course is a study of the complex interactions between the molecules, cells and organs involved in immunity. It covers antigen-antibody interactions; immunoglobulin structure; organization and expression of genes for immunoglobulins, T Cell Receptors and the major histocompatibility complex; immune regulation and tolerance. The course also includes an introduction to vaccinations, infectious disease, organ transplantation, autoimmune diseases; immunodeficiency diseases, AIDS, and cancer. There is currently no laboratory component to this course.

Instructor: Dr. Kathy Zanin, zaninm1@citadel.edu, 843-953-7077.

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Coastal Carolina University Conway, SC

<http://www.coastal.edu>

The Department of Biology at Coastal Carolina University is home to over 500 undergraduate biology majors, 20 graduate students, 15 full time faculty, and a number adjunct or teaching faculty. Undergraduate students in our department earn a B.S. Degree in Biology, completing a core curriculum (Introduction to Biological Science I/II, Cell Biology, Genetics, and Ecology), and selecting the remainder of their upper level electives from one of three program foci: Cell, Molecular Biology and Genetics (CMG), Integrative Biology (IB) or Evolution, Ecology, and Conservation (EEC). The Biology and Marine Science departments at Coastal Carolina University also host an interdisciplinary program leading to the MS in Coastal Marine and Wetland Studies (CMWS). Our student demographic is diverse. About half of our students come from South Carolina, and half from primarily the Northeast and mid-Atlantic states. Many students are the first in their families to attend college. In addition to our eager majors, the department welcomes many students as biology minors, especially from the departments of Marine Science and Chemistry

Coastal Biology professors have a broad range of expertise, from the molecular scale to the ecosystem. At Coastal, biology laboratories in upper level courses are taught by the same faculty member who teaches the lecture. Professors typically incorporate aspects of their research interests and expertise into the laboratory class, allowing undergraduate students to learn modern techniques but also to catch a little bit of the excitement of making new knowledge as the professor takes them beyond "cookbook"- type laboratory experiences. Faculty also welcome undergraduate and masters student participation into their research programs. In 2008/2009, CCU biology faculty members held six externally-funded research grants (NIH, NSF, SCDNR, and the American Philosophical Society Franklin Research Grant), and several internal CCU awards. Faculty published 9 papers in peer-reviewed journals, with numerous others submitted or in preparation. Of the published or "in press" papers, three had students as first authors. Many students and faculty presented their research at regional and national meetings.

The Biology Department offers a lively, collegial welcome to PACD EPSCoR scholars.

Partial List of Biology Department Faculty, with Capsulized Research Interest and Teaching Responsibilities:

Aguirre, Karen. Associate Professor and Chair 843-349-4159 kmaquirr@coastal.edu

My students and I are interested in immune response within the Central Nervous System, especially in immune response to non-viral intracellular pathogens like the fungus *Cryptococcus neoformans*, and the parasite *Toxoplasma gondii*. We ask, "how do CD8+ T cells interact with infected neuroglia?" We are also interested in fungal diversity and abundance in sands of South Carolina beaches, and how microbial populations are affected by man and by non-anthropogenic influences. Lately, we have become intrigued by interactions of "bad" bacteria and probiotic bacteria in the oral cavity. We have a small tissue culture lab equipped with a class II biosafety cabinet, a water-jacketed CO₂ incubator, and a research-grade Olympus inverted microscope. Departmental resources include fluorescence microscopy and DIF. We routinely co-culture mouse glial cells and attenuated pathogens, along with T-cell derived immunochemicals, and run ELISA, cytotoxicity assays, and western blots to assess outcomes.

Currently I teach Introductory Biology (121) and Immunology (405 and 405L). A PACD scholar could be involved in either. With an eye towards enhancing the analytical skills of our freshman biologists, we would like to give them more experience with extracting meaning from tables, graphs, micrographs, etc., perhaps by developing a set of teaching tools that could be shared across the half-dozen or so lecture sections. We would like to assess the impact of the program. In Immunology, I would like to make better use of technology, and have been thinking about ways to have students create their own CG animations of immunological processes, or to imagine and model pathogens with truly formidable virulence factors. I am also interested in host-pathogen interactions between chytrid fungi and anurans and would like to work with my immunology students to develop a manipulable tissue culture model for investigation of the frog plague.

Cevasco, Megan. Assistant Professor 843-234-3456 mcevasco@coastal.edu

My research program investigates the evolution and biodiversity of symbiotic foraminifera, an ecologically important, yet understudied, group of marine protists. Currently I am in the process of developing molecular markers using a 454-sequencing approach that can be applied both to phylogenetic investigations of the foraminiferal host taxa and their dinoflagellate symbionts and to identify candidate genes associated with the establishment and maintenance of the endosymbiotic condition. This is an NSF funded project that potentially will generate a large amount of sequence

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data that can be applied to a number of additional research questions pertaining to this specific symbiotic association as well as to protist genomics generally. Additionally, the local availability of specimens creates opportunities for a PACD scholar to develop a related research project. This summer (2011) a CCU undergraduate will assist in the field collection and processing (DNA extraction and gene amplification) of specimens from Waites Island and in molecular data analysis using the available bioinformatic tools (e.g. sequence editors and parsers).

I teach both Introductory Biology (121) for science majors and Microbiology (330 and 330L). I am interested in enhancing both of these courses with more active learning content and exploring ways to further develop critical thinking skills among the students. Of particular interest is developing materials for the first-year students enrolled in 121 to address the variability in their academic backgrounds and skill sets. I am also interested in designing undergraduate courses that address topics in genomics, bioinformatics, and symbiosis. I would welcome involvement of a PACD scholar in either the enhancement of existing courses or in the design of new courses.

Gulis, Vlad. Assistant Professor 843-349-2576 vgulis@coastal.edu

My research interests revolve largely around issues of microbial ecology. Together with my undergraduate and graduate students, we study the role of microorganisms (especially fungi) in carbon and nutrient cycling in aquatic ecosystems. Current projects include studying (1) the effects of inorganic nutrient concentrations and ratios on fungal and bacterial biomass, production, respiration, community structure and microbially driven organic matter decomposition; (2) fungal stoichiometry; (3) effects of grazers on plant-associated fungi in coastal and marine ecosystems; (4) biodiversity and phylogenetic relationships of aquatic hyphomycetes. We use a variety of techniques to address these questions, e.g. lipid extraction and quantification with HPLC, DNA-based techniques (PCR, DGGE), radioactive tracers to estimate microbial production rates, epifluorescence microscopy, etc.

At CCU, I teach Microbiology (lectures and labs), Microbial Ecology and Introductory Biology.

Hutchens, John. Associate Professor 843-349-2169 jjhutch@coastal.edu

I am an aquatic ecologist interested in the structure and function of stream and wetland ecosystems. I am especially interested in how human activity influences aquatic ecosystems, and typically focus on benthic macroinvertebrates and ecosystem processes in freshwater streams and wetlands, and salt marshes. In freshwater systems, my students recently have examined whether stream ecosystem function (leaf breakdown) corresponds to ecosystem structure (macroinvertebrate functional feeding groups), whether riverine predators influence riparian wetland ecosystem function during floodplain inundation, and whether riverine fishes are influenced by differing dominant plant assemblages in tidal freshwater wetlands. In salt marshes, my students have examined the effects of shoreline alteration on the high marsh community and interactions between halophytes and invertebrates. One other line of research has examined controls on the diet of Venus' flytraps. PACD scholars interested in related research projects would be welcome.

In the spring I teach Principles of Ecology (BIOL 370; summer, too) and Conservation Ecology (BIOL 484/484L) while in the fall I teach Introductory Biology (BIOL 122) and Freshwater Ecology (BIOL 481/481L; even years). PACD scholars could participate in lecture by teaching traditional topics or by developing assignments that synthesize or incorporate several topics (e.g., disease ecology). In labs, scholars could develop exercises that use either computer applications or field exercises to engage students in topics related to basic or applied research within the discipline.

Hutchinson, Deborah. Assistant Professor 843-349-6462 dhutchin@coastal.edu

My research covers the broad areas of chemical ecology, morphology, physiology, and herpetology. My primary research project involves the sequestration of defensive steroids by a species of Asian snake. After making the initial discovery that the defensive chemicals used by this snake are derived from dietary toads, my colleagues and I began to investigate other aspects of this system. So far, we have determined that mothers can provision these sequestered toxins to their unborn offspring; the snakes chemically modify the sequestered compounds in at least three ways; and snakes from a toad-free island lack defensive steroids. We have just begun to study the physiology of the snakes to determine how they are able to withstand the cardiotoxic effects of the steroids they ingest every time they consume a toad. This tolerance may be due to a modification in sodium-potassium ATPase that makes it resistant to the effects of the steroids. Future studies into this system will be conducted to determine the mechanism(s) of resistance to the

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toxic steroids, the modes of steroid transport from the snake's digestive tract to other organs, and any additional types of chemical modifications performed by the snakes. In order to address these questions, we use histology, electron microscopy, NMR-spectroscopy, HPLC, and mass spectroscopy, among other methods. I work closely with collaborators at Kyoto University, Cornell University, NIH, and Old Dominion University on this project.

The courses I teach at Coastal are Comparative Vertebrate Anatomy (315/L), Herpetology (417/L), and General Biology (122/L). A PACD scholar could contribute to the lecture sections of any of these courses. The comparative anatomy and herpetology labs would benefit by having a postdoctoral scholar on board as well. The comparative anatomy lab in particular is very demanding and the students would benefit greatly by having a second instructor available to prepare labor-intensive dissections as demonstrations while I answered the students' questions as they completed their own dissections. Furthermore, I have been interested in developing a course in chemical ecology, which is still in the planning stages. A PACD scholar could take on that project with me to create a new course for Coastal's curriculum. That course would mesh well with my research interests so the students in that class could potentially perform research projects in my lab during the course of the semester.

Parker, Scott, Assistant Professor 843-349-2491 sparker@coastal.edu

I am an environmental animal physiologist broadly interested in the evolution of complex physiological processes and in how organisms respond and adapt to the environment. A major focus of my research is directed toward understanding what fundamental molecular and regulatory changes are responsible for the capacity to support intrauterine embryonic development during the evolutionary transition from oviparity (egg-laying) to viviparity (live-bearing) in reptiles. Examples of current projects include studies of the regulation of placental angiogenesis and its role in the evolution of viviparity, understanding regulatory pathways controlling complex placentation, and the interaction of environment, glucocorticoids, and reproduction in reptiles. I welcome enquiries from PACD scholars with backgrounds in physiology, evolution, pathology, or related fields working in a variety of animal systems. Our physiology research lab is equipped with a new Sable Systems dual-channel oxygen analyzer for respirometry research, microtome and all necessary equipment for basic histology and immunohistochemistry. We have also recently acquired radio telemetry gear appropriate for tracking small vertebrates in the field. The department has a Leica microscope capable of both fluorescence, brightfield, and differential-interference-contrast microscopy.

My teaching responsibilities include Comparative Physiology (BIOL 343/343L), Physiological Ecology (BIOL 322/322L), and Introductory Biology II (BIOL 122). I welcome participation of a PACD scholar in any of these courses, but particularly in the upper division physiology courses with laboratory component. A major learning objective of all of my courses is to help develop student analytical skills with special emphasis on application of biological knowledge to real-world scenarios. To achieve this objective, I provide my students with training in equipment and experimental methodologies widely used in the discipline of physiology. I am especially interested in increasing the experimental component of the animal physiology labs to give students the opportunity to develop and execute their own independent research projects. Collaborating with a PACD scholar on this effort is of particular interest to me.

Pierce, Michael M., Assistant Professor 843-349-6483 mpierce@coastal.edu

Research in my lab is directed towards an understanding of the molecular requirements for the formation of infectious proteins (prions). Prions are typically recognized as the causative agents of the fatal transmissible spongiform encephalopathies which include Mad Cow disease in cattle and Creutzfeldt-Jakob disease in humans. Infectious proteins with similar structural properties and nearly identical modes of transmission have also been identified in two species of fungi. We utilize *Saccharomyces cerevisiae* (baker's yeast) as a model system to study infectious proteins, taking advantage of the relatively large number of prions that have been identified in laboratory strains of this organism. For each of these infectious prions, a single polypeptide constitutes the insoluble infectious form that is transmitted vertically (by mitosis or meiosis) or horizontally by cytoduction (cytoplasmic mixing). Students in my lab have constructed and integrated variants of the URE2 gene at the URE2 locus and characterized these proteins for (1) the ability to generate prions, (2) the stability of the prion form through multiple generations and (3) the transmission of these variant infectious proteins to donor yeast strains. Additionally, we have sought to identify accessory proteins that play a role in the generation or maintenance of yeast prions. We are currently characterizing several candidate proteins that affect the frequency of prion formation in yeast cells.

In a typical academic year, I teach one semester courses (lecture and laboratory) in Genetics and Molecular Biology. Both laboratory courses utilize a number of molecular techniques to illustrate the manipulation, expression

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and cloning of DNA. We have used inquiry based experiments to determine the potential DNA damaging capacity of substances using the Comet Assay. Students in Molecular Biology complete semester long projects in which they select a yeast gene to clone and subsequently delete from the genome. PACD scholars with expertise in molecular biology methods and biological information databases could develop new lab exercises and lecture based components that will introduce students to the modern methods of sequence analysis, DNA manipulation and the control of gene expression.

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Columbia College Columbia, SC

<http://www.columbiasc.edu>

Columbia College, a women's college related to the United Methodist Church, educates students in the liberal arts tradition. The College provides educational opportunities that develop students' capacity for critical thought and expression, life-long learning, acceptance of personal responsibility, and commitment to service and social justice. In furtherance of its mission, the College is responsive to the needs of students, the communities to which it belongs, and the greater global society.

Biology, Chemistry and Mathematics Courses at Columbia College

BIOL350 - Molecular Cell Biology: (Prerequisite: Chemistry 122, Biology 252 or 253. Chemistry 261 is highly recommended as a prior or concurrent course.) This course considers the chemistry of life, the thermodynamic principles that govern cellular chemistry, the role of enzymes, nucleic acid function, protein synthesis, and the cellular organelles' roles in the integration of the basic unit of life. Both prokaryotic and eukaryotic cell function are considered. (Previously offered as Biology 210 and 290J; not open to students with credit in Biology 490A.) 4 s.h.

Instructor: Dr. Meg Brinley, 803-786-3822, mbrinley@colacoll.edu. For molecular cell biology, I need assistance in making labs that will augment what is being covered in class. Most of the cell biology lab manuals for purchase are specific to the laboratory equipment for the lab book author's college and research interest. Most of the lab manuals do not give adequate instruction for setting up the experiments in our labs. I would like to develop some laboratories that are applicable to our equipment and budget.

BIOL381 - Genetics: (Prerequisite: Biology 252 or 253.) (Three hours lecture and two hours laboratory weekly.) Principles of Mendelian heredity, linkage, mutation, sex determination, and eugenics. The working of problems will be stressed. 4 s.h.

Instructor: Dr. Kirt Moody, 803-786-3750, kmoody@colacoll.edu. The PACD scholar will be responsible for organizing and delivering selected lectures, designing and implementing stand-alone laboratory exercises, and measuring and reporting learning outcomes in an upper-level genetics course.

BIOL441/CHEM441 - Biochemistry I: (Prerequisite: Chemistry 261, Biology 112.) (Three hours lecture and one three-hour laboratory weekly.) An introduction to biochemistry. A study of the major classes of biomolecules including amino acids, proteins, enzymes, carbohydrates, lipids, and nucleic acids. The chemical features and biochemical functions of these biomolecules are examined along with the general principles of intermediary metabolism. (Also listed as Chemistry 441) 4 s.h.

Instructor: Dr. Meg Brinley, 803-786-3822, mbrinley@colacoll.edu. For biochemistry 441, I would like to be able to develop some labs using the spectrophotometer that uses UV light as a source in order to look at denaturing DNA. Also, I would like to make use of our PCR. I have had difficulty getting results and I believe this is due to my lack of expertise with this piece of equipment.

BIOL442/CHEM442 - Biochemistry II: (Prerequisite: Chemistry 441.) (Three hours lecture and one three-hour laboratory weekly.) A study of the biosynthesis and metabolism of proteins, carbohydrates, lipids, and nucleic acids. Most of the major metabolic pathways used by cells will be examined. DNA replication and transcription as well as the synthesis of RNA and proteins will also be discussed. (Also listed as Chemistry 442.) 4 s.h.

Instructor: Dr. Meg Brinley, 803-786-3822, mbrinley@colacoll.edu. For biochemistry 442, I need help with ordering the correct equipment and developing protocols that work for DNA separation and restriction analysis. As I have had only some lab exposure to these protocols, I feel that I need someone who is an expert to help set labs up to work with our equipment at Columbia College.

BIOL450 - Immunology: (Prerequisite: Biology 253, Biology 265.) (Three hours lecture and one two-hour laboratory weekly.) A study of the basic concepts of the immune response, the properties of antigens and antibodies, immunologic specificity, and cellular and human immunity. 4 s.h.

Instructor: Dr. Roger Schmidt, 803-786-3855, rschmidt@colacoll.edu. Participation by a postdoctoral fellow from the PACD Program in Bio 450 (Immunology) will significantly upgrade and result in needed revision of the laboratory portion of the course. The input of the PACD individual will be highly valuable in revising some of the lab classes and in their instruction of some of the lab classes. I would also anticipate that any lectures on cytokines, autoimmunity, and the most recent diagnostic techniques in immunology provided by the postdoctoral fellow would be greatly advantageous. I am excited about the possibility of collaborating with a recent doctoral recipient in the field of immunology.

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CHEM261 - Organic Chemistry I: (Prerequisite: Chemistry 122.) (Three hours lecture and one three-hour laboratory weekly.) Theoretical and descriptive organic chemistry. A study of organic nomenclature, the chemistry of aliphatic and aromatic compounds including reaction mechanisms, spectral techniques and identification procedures. 4 s.h.

Instructor: Dr. Julia Baker, 803-786-3025, jbaker@colacoll.edu. For the organic chemistry courses, I would like help developing unique lecture presentations that would demonstrate the application of reactions being studied in the synthesis of compounds students would recognize or appreciate. I would also like to develop more research like experiences for the lab such as a 4-6 week synthetic project for the second semester.

CHEM262 - Organic Chemistry II: (Prerequisite: Chemistry 122.) (Three hours lecture and one three-hour laboratory weekly.) Theoretical and descriptive organic chemistry. A study of organic nomenclature, the chemistry of aliphatic and aromatic compounds including reaction mechanisms, spectral techniques and identification procedures. 4 s.h.

Instructor: Dr. Julia Baker, 803-786-3025, jbaker@colacoll.edu. For the organic chemistry courses, I would like help developing unique lecture presentations that would demonstrate the application of reactions being studied in the synthesis of compounds students would recognize or appreciate. I would also like to develop more research like experiences for the lab such as a 4-6 week synthetic project for the second

MATH 150 - Discrete Mathematics: (Prerequisite: A grade of C or better in Mathematics 104 or placement by the department.) An introduction to discrete structures, algorithms and proof with an emphasis on problem-solving. Topics include logic, sets, functions and relations, elementary number theory, counting, and elementary graph theory. 3 s.h. Fall.

Instructor: Dr. Madeleine Schep (mathematics and Computer and Information Science), (803) 786-3714, mschep@columbiasc.edu. Teaching this course is challenging for several reasons: the variety of topics covered in the course, the transition from concrete to abstract for students, the great disparity in students' ability level, the distinct audiences, mathematics and CIS majors mainly, with different backgrounds, interests and needs. The PACD scholar will help develop material (class activities, presentations, projects, etc.) aimed at integrating applications that will be meaningful to all students, enhance their problem solving skills, and help students transition to more abstract thinking. The PACD will be responsible for teaching at least two of the main topics covered in the class, selected in accord with the instructor.

MATH 390 - Special Problems - Mathematical Models in Biology: This course is being offered on an experimental basis. If successful, this would be the foundation for a regular course that will be open to both mathematics and biology majors at Columbia College. The PACD scholar will help create the course by developing class modules from topics such as epidemiology, genomics, bioinformatics, and dynamic models involving continuous or discrete systems, and even results of current research. A class module will include the identification of the requisite knowledge and skills, the basic and intermediate concepts to be studied, and class activities that will enhance student's understanding. Prerequisites: An introductory course in biology and Calculus I. (3 semester hours)

Instructor: Dr. Nieves McNulty, (803) 786-3844, nmcnulty@columbiasc.edu. This course is intended to be interdisciplinary in nature and to be team-taught by a mathematician and a biologist. It is also hoped that the PACD scholar will be able to serve as mentor to some undergraduate research project. The instructor has attended several workshops on mathematical biology but has not had the time or the resources to develop such a course.

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Coker College
Hartsville, SC
www.coker.edu

Coker College is a private, unaffiliated, liberal-arts college located in Hartsville, South Carolina. It was established in 1908 as a school for women and became coeducational in 1969. Coker has been recognized by US News and World Report as one of the top fifteen baccalaureate colleges in the South, by the Princeton Review as one of the *best Southeastern colleges*, by Barron's as one of the *300 Best Buys in College Education*, and is fully accredited by the Southern Association of Colleges and Schools (SACS). Coker is distinguished as having one of the smallest average class sizes in the country (10 students). Of over 1,000 students enrolled, 70% are female and 30% African-American. Approximately 50% of the student body consists of first-generation college students. The student body of Coker is remarkably diverse; students from 12 countries outside of the US were enrolled in 2007.

Coker College has a fully operational molecular biology laboratory (600 sq. ft. of space dedicated to undergraduate research, an additional 800 sq. ft. of lab space will be annexed in 2010) and houses a BIO-RAD Opticon2 real-time PCR instrument, a conventional PCR thermocycler, Leica MZ9 stereoscope with CCD camera, environmental growth chambers, -80°C and -20°C freezers, a level 2 biosafety cabinet, and a fume hood. Additional equipment include: HPLC (Dionex), LC (Waters), FTIR spectrometer (Perkin Elmer), fluorescence spectrometer (PE), GC-MS (Agilent), 300 MHz nuclear magnetic resonance (NMR) spectrometer (Bruker), three Spectronic 20s, and four UV-VIS spectrometers.

In the last 5 years, five new faculty members have joined the Department of Science and Mathematics at Coker College. Of these new hires, all engage students in independent research projects. Coker College is committed to providing students the opportunity to participate in scientific research. In 2009, biology professor and chair, Dr. Joe Flaherty, received an NSF-CAREER award to integrate the study of fungal genomics into the undergraduate curriculum, providing students high-impact learning experiences.

Biology and Chemistry Courses at Coker College

110 Core Principles of Cell and Molecular Biology Three semester hours. An in-depth introduction to the principles of cell and molecular biology with emphasis in physiology of the cell, biochemistry, molecular biology and molecular genetics. This course will also discuss methods in science, advances in science, and how those advances have affected our western culture. Intended for biology majors or other majors whose intent is to attend professional school.

Instructors: Dr. Paula Bailey, 843-383-8093, pbailey@coker.edu and Dr. Joseph E. Flaherty, 843-383-8079, jflaherty@coker.edu

110L Core Principles of Cell and Molecular Biology Lab One semester hour. A laboratory-based study of cell and molecular biology. This course is intended for biology majors or other majors whose intent is to attend professional school.

Instructors: Dr. Paula Bailey, 843-383-8093, pbailey@coker.edu and Dr. Joseph E. Flaherty, 843-383-8079, jflaherty@coker.edu

111 Core Principles of Organismal Biology Three semester hours. A study of the diversity of organisms, their phylogeny, characteristic architectural features, physiological processes, and human importance. The nature of scientific inquiry will be explored through examples of how biologists acquire and continuously modify the understanding of organismal biology. Intended for biology majors or other majors whose intent is to attend professional school.

Instructor: Dr. Jennifer Borgo, 843-383-8396, jborgo@coker.edu

111L Principles of Organismal Biology Laboratory One semester hour. A laboratory-based study of organismal biology. This course is intended for biology majors or other majors whose intent is to attend professional school.

Instructor: Dr. Jennifer Borgo, 843-383-8396, jborgo@coker.edu

210 Core Principles of Ecology and Evolution Four semester hours. A study of the fundamentals of ecology and evolution and their interrelationships. Other topics included are ecosystem and community structure and function, the nature and evolution of life history traits, human ecology, the historical development of the theory of evolution, speciation, and the major events of macroevolution. Biology education majors enrolling in the course will be required to complete 10 hours of clinical internships in public school classrooms.

Instructor: Dr. Jennifer Borgo, 843-383-8396, jborgo@coker.edu

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211 Core Principles of Genetics Four semester hours. A study of the principles of inheritance, Mendelian laws of transmission, molecular aspects of gene action, and the role of genes in development.

Instructor: Dr. Joseph E. Flaherty, 843-383-8079, jflaherty@coker.edu

227 Human Anatomy and Physiology I Four semester hours. A general introductory course in the principles of human anatomy and physiology. Part one of a two-semester series. Topics covered will include histology, the skeletal system, the muscular system, the nervous system, the cardiovascular system and the respiratory system. Laboratory will emphasize anatomy. Intended for dance majors and physical education majors.

Instructor: Dr. Paula Bailey, 843-383-8093, pbailey@coker.edu

228 Human Anatomy and Physiology II Four semester hours. A general introductory course in the principles of human anatomy and physiology. Part two of a two-semester series. Topics covered will include the integumentary system, the lymphatic system, the digestive system, the urinary system, metabolism, nutrition, and reproduction and development. Laboratory will emphasize anatomy and techniques used to measure bodily processes.

Instructor: Dr. Paula Bailey, 843-383-8093, pbailey@coker.edu

325 Invertebrate Zoology Four semester hours. An introduction survey of invertebrate zoology, including the taxonomy, morphology, development and ecology of freshwater, marine, terrestrial, and parasitic invertebrates. The laboratory component of the course emphasizes observations of living material, including some observations in the field.

Instructor: Dr. Jennifer Borgo, 843-383-8396, jborgo@coker.edu

330 Microbiology Four semester hours. An introduction to the study of microorganisms including training in methods of cultivation, isolation, staining and recognition.

Instructor: Dr. Paula Bailey, 843-383-8093, pbailey@coker.edu

350 Plant Science Four semester hours. A study of the general structure, life cycles, and evolutionary history of all the major plant groups, and of the most significant features of the physiology, anatomy, growth and development, classification, ecology, and human importance of the angiosperms. The laboratory component of the course will emphasize the systematics of the major angiosperm families.

Instructor: Dr. Joseph E. Flaherty, 843-383-8079, jflaherty@coker.edu

360 Applied Ecology: The Human Predicament Four semester hours. A study of the ecological bases for the human environmental predicament. Topics will include: the structure and function of ecosystems and services they provide to human populations; the principles of population dynamics and their application to human populations; the distribution and characteristics of biomes in relation to human land use; the current and projected production of human food; the current and projected human use of land, water, forests, and energy; pollution and other disruptions to ecological services; the social and political context of some environmental problems and their potential solutions. Laboratory studies will include the study of techniques to quantify anthropomorphic modifications of ecological communities, and the technologies used to reduce or ameliorate human environmental impacts.

Instructor: Dr. Jennifer Borgo, 843-383-8396, jborgo@coker.edu

410 Advanced Cellular and Molecular Biology Four semester hours. An in-depth and advanced investigation into the principles of cell and molecular biology with emphasis in molecular biology and molecular genetics. Topics include: the history and discovery of DNA and the processes of DNA replication, DNA repair, transcription and translation in both eukaryotes and prokaryotes. Class presentations based on articles from primary research journals are required. Laboratory emphasizes techniques used in molecular biology research.

Instructor: Dr. Joseph E. Flaherty, 843-383-8079, jflaherty@coker.edu

411 Advanced Molecular Genetics Three semester hours. An in-depth and advanced investigation into the molecular dynamics of gene regulation with emphasis on signal transduction, genome structure, gene families, mobile genetic elements, genetic variation, mutant screens, developmental genetics, and comparative genome analysis. The course will focus on the genetic events at the molecular level of the gene across a wide spectrum of prokaryotic and eukaryotic organisms. Various model systems will be studied to illustrate the impact of genetic and molecular experimental approaches on the current understanding of conserved biological processes in the context of

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functional genomics. Classroom discussions and student presentations of recent journal articles will provide an opportunity for students to continue their development of critical thinking, experimental design, and communication skills.

Instructor: Dr. Joseph E. Flaherty, 843-383-8079, jflaherty@coker.edu

461 Introduction to Biochemistry Three semester hours (Cross Reference: CHE461). A one-semester, non-laboratory study of carbohydrates, lipids, proteins, nucleic acids, vitamins and enzymes.

Instructor: Dr. Joseph E. Flaherty, 843-383-8079, jflaherty@coker.edu

462 Comparative Vertebrate Physiology Four semester hours. A comparative study and broad overview of physiological systems and adaptations among vertebrates from morphological, biochemical, and mechanical perspectives. Laboratory emphasizes an experimental approach to the measurement of physiological processes.

Instructor: Dr. Paula Bailey, 843-383-8093, pbailey@coker.edu

490 Research in Biology Three semester hours. Directed independent laboratory research in biology. Students will be strongly encourage to present their research in the form of a poster or oral presentation at a scientific conference such as the South Carolina Academy of Sciences. This course may be repeated for additional credit.

Instructor: Dr. Joseph E. Flaherty, 843-383-8079, jflaherty@coker.edu

101 General Chemistry I Three semester hours. A course in basic chemical principles. Topics include: periodicity, stoichiometry, chemical and nuclear reaction types, coordination chemistry, atomic and molecular nomenclature, structure, and properties.

Instructor: Dr. Gordon Brown, 843-383-8089, gbrown@coker.edu

101L General Chemistry I Laboratory One semester hour. Development of laboratory and mathematical skills through experiments designed to illustrate chemical concepts.

Instructor: Dr. Gordon Brown, 843-383-8089, gbrown@coker.edu

102 General Chemistry II Three semester hours. An introduction to the principles of chemical kinetics and thermodynamics and their application to chemical reactions, with an emphasis on solution chemistry.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

102L General Chemistry II Laboratory One semester hour. A continuation of CHE101L, focused on the development of quantitative and analytical laboratory skills.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

351 Organic Chemistry I Three semester hours. A survey of the structure, nomenclature, properties, and reactions of carbon compounds. Fundamental reaction types are studied in detail.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

351L Organic Chemistry I Laboratory One semester hour. A study of the techniques for synthesis, purification, and characterization of carbon compounds.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

352 Organic Chemistry II Three semester hours. A continuation of CHE351 emphasizing the chemistry of aromatic and carbonyl compounds.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

352L Organic Chemistry II Laboratory One semester hour. A continuation of CHE351L including more challenging syntheses as well as qualitative analysis of carbon compounds.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

381 Physical Chemistry I Three semester hours. The laws of thermodynamics, chemical kinetics, electrochemistry, and their application to physical and chemical changes of state.

Instructor: Dr. Gordon Brown, 843-383-8089, gbrown@coker.edu

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Coker College
Hartsville, SC
www.coker.edu

381L Physical Chemistry I Laboratory One semester hour. Calorimetry, spectroscopy, conductimetry as well as other techniques used to illustrate the extent to which physical chemistry theory applies to real systems. Critical analysis and interpretation of results of the experiments are formalized by the writing of detailed laboratory reports. *Pre- or corequisite: CHE381.*

Instructor: Dr. Gordon Brown, 843-383-8089, gbrown@coker.edu

382 Physical Chemistry II Three semester hours. Quantum mechanics of model systems and molecular spectroscopy with discussion of practical applications of spectroscopy.

Instructor: Dr. Gordon Brown, 843-383-8089, gbrown@coker.edu

382L Physical Chemistry II Laboratory One semester hour. A continuation of CHE381L. *Prerequisite: CHE381L.*

Instructor: Dr. Gordon Brown, 843-383-8089, gbrown@coker.edu

401 Analytical Chemistry Three semester hours. An integrated view of the theories and methods for solving various problems in chemical analysis, including traditional methods of quantitative analysis and contemporary methods in analytical instrumentation. Emphasis on clear definition of analytical problems, selection of appropriate methodologies to solve them, selection of acceptable limits of accuracy and precision, and proper evaluation, interpretation and optimization of data.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

401L Analytical Chemistry Laboratory One semester hour. Development of skills in traditional and contemporary analytical techniques, including acid-base titration, precipitation, complex formation, and oxidation-reduction reactions. Instrumental techniques include spectroscopy (infrared, visible, ultraviolet, and fluorescence), chromatography, mass spectrometry, and electrochemical methods.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

402 Advanced Inorganic Chemistry Three semester hours. Atomic structure, bonding theory, symmetry and group theory, molecular orbitals, chemistry of the main-group elements, coordination chemistry, and organometallic chemistry.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

410 Advanced Chemistry Techniques One semester hour. Advanced laboratory techniques in inorganic chemistry, biochemistry, and other areas. In this class the student will design and execute experiments to answer contemporary questions in chemistry.

Instructor: Dr. Pramod Chopade, 843-383-8090, pchopade@coker.edu

Appendix I - PACD Curricular Experience Opportunities

Francis Marion University Florence, SC

<http://www.fmarion.edu>

The University

Francis Marion University was founded in Florence in 1970, and is one of South Carolina's 13 predominantly undergraduate universities, providing a strong liberal arts education. The university offers a broad range of undergraduate degrees and a select number of graduate programs in serving the needs of communities, businesses and industries of the Pee Dee region.

The Students

While 94 percent of the undergraduate students at FMU come from South Carolina, the university enrolls students from 26 states and 16 countries, allowing the FMU community to experience the diversity of people from other cultures. Of the 2,997 undergraduates in spring 2008, 51% come from the Pee Dee region. Francis Marion University has a large minority enrollment with African Americans making up 43% of the undergraduates. The student-faculty ratio is 17 to 1, and the overall class size is 20. The average age of undergraduates is 22.

Genetics BIOL 401 - Fall 2010. Genetics introduces students to the basics principles of heredity. The lecture includes the fundamentals of Mendelian genetics, cytogenetics, molecular genetics and population genetics. The laboratory component includes Mendelian genetics of corn and fruit flies, quantitative genetics, PCR, restriction enzyme mapping and the Hardy-Weinberg Theorem. Nucleic acid structure, DNA replication, transcription, translation and gene regulation are emphasized in the lecture portion of the course during the molecular section.

Instructor: Dr. Jeff Camper, jcamper@fmarion.edu or 843 661 1418.

Appendix I - PACD Curricular Experience Opportunities

Limestone College
Gaffney, SC
<http://www.limestone.edu>

The mission of Limestone College is to educate students from diverse backgrounds in the liberal arts and selected professional disciplines. By providing degree programs throughout South Carolina and by way of the Internet, Limestone College offers opportunities for personal and professional growth to individuals who may find access to higher education difficult. Limestone College enrolls 700 traditional day students and 2800 Extended Campus students at 10 sites in South Carolina and on the Internet. Limestone's total enrollment is approximately 3,500.

Biology Courses at Limestone College

BI 101 - Introduction to Biology I (lecture and lab): An introduction to the basic concepts in Biology, covering the chemical basis of life, the cell, cellular respiration, photosynthesis, mitosis, meiosis, basic concepts of genetics, evolutionary concepts and biological diversity. Three hours of lecture and two hours of laboratory per week. Offered fall and spring semesters.

Instructor: Dr. Tamara McGovern, 800-795-7151, tmcgovern@limestone.edu. The goal for PACD scholar involvement in this course would be to help bridge this introductory course with the higher level courses, especially in the area of molecular genetics. The scholar would also be involved in mentoring undergraduate research projects.

BI 102 - Introduction to Biology II (lecture and lab): A continuation of BI 101, covering the evolution of man, animal form and function, plant form and function, and ecological concepts. Three hours of lecture and two hours of laboratory per week. Offered fall and spring semesters.

Instructor: Dr. M.C. Wicht, (864) 488-4517, mwicht@limestone.edu. There would be a heavy emphasis on the development of new laboratory activities.

BI 205 - Human Anatomy (lecture and lab): A study of the structure of the systems of the human body: skeletal, muscular, nervous, circulatory, digestive, excretory, endocrine, and reproductive. Three hours of lecture and two hours of laboratory per week. Fall semester.

Instructor: Dr. M.C. Wicht, (864) 488-4517, mwicht@limestone.edu. There would be a heavy emphasis on the development of new laboratory activities.

BI 206 - Human Physiology (lecture and lab): A study of the functions of the human body: skeletal, muscular, nervous, circulatory, digestive, excretory, endocrine, and reproductive. Three hours of lecture and two hours of laboratory per week. Spring semester.

Instructor: Dr. M.C. Wicht, (864) 488-4517, mwicht@limestone.edu.

BI 308 - Cell Biology: This course is an in-depth study of the molecular processes and mechanisms of the eukaryotic cells. Topics will include cell morphology, histology and ultrastructure; bioenergetics; expression or genetic information in cells; cell cycle regulation; modification and transport of cellular products; cell communication and signal transduction; and molecular and cellular laboratory techniques. Fall semester.

Instructor: Dr. Suzanne Lindley, 800-795-7151 ext. 4437, slindley@limestone.edu. The PACD scholar would have the opportunity to teach some integrated lecture/laboratory unit or units in their area of interest. The scholar would also participate in the development of new laboratory activities, and be involved in mentoring undergraduate research projects.

BI 310 - Genetics: This course explores mechanisms of genetic inheritance including molecular, Mendelian, and population genetics. Topics include DNA and RNA structure and replication; transcription; translation; mutations and mutagenesis; recombinant DNA technology; genomes; inheritance patterns; gene regulation; and methods of genetic analysis. One three hour lab per week utilizes techniques including molecular biology for the study of inheritance patterns and genetic material. Spring semester.

Instructor: Dr. Suzanne Lindley, 800-795-7151 ext. 4437, slindley@limestone.edu. The PACD scholar would have the opportunity to teach some integrated lecture/laboratory unit or units in their area of interest. The scholar would also participate in the development of new laboratory activities, and be involved in mentoring undergraduate research projects.

Appendix I - PACD Curricular Experience Opportunities

Newberry College Newberry, SC

<http://www.newberry.edu>

Newberry College, established in 1856, is a private, accredited, four-year higher education institution located in Newberry County forty-five miles northwest of Columbia, South Carolina. Newberry College has 980 students, a 14:1 student-teacher ratio, 21 majors, 25 areas of concentration, 29 minors, and more than 40 student organizations.

The Newberry Opera House is located in downtown Newberry. Part of the Palmetto Trail, Lynch's Woods offers a 290 acre nature area within Newberry City limits with trails throughout. Reasonable housing costs are found in the area. Boating, swimming, and recreation can be found near Newberry at scenic Lake Murray only 20 minutes away.

The chemistry department has chemistry major, chemistry minor, chemistry major with forensic science concentration, and chemistry major with secondary education concentration. The forensic science concentration is the only one of its kind in South Carolina, Georgia, or North Carolina. In the last six years, the chemistry department has grown from one full-time chemistry PhD faculty to three full-time and one part-time chemistry PhD faculty, while the number of chemistry majors has grown from 3 to 69. For the past few years the chemistry faculty's primary responsibility was teaching and outreach. They are now also working toward establishing a strong research program.

The chemistry students at Newberry College gain a basic knowledge of analytical, inorganic, organic, and physical chemistry with additional courses in environmental chemistry and 3 new courses in biochemistry. With the addition of \$250,000 of instrumentation in 2007-2008, students have the ability to gain hands-on experience with NMR, GC/MS, HPLC, IR, AA, GC, and UV-VIS. Additionally; many opportunities exist for students outside the normal classroom or laboratory setting. Students may elect to work on lab development, investigative chemistry, undergraduate research, or an internship off campus. Established in 2004, the American Chemical Society Student Affiliate Chapter is an award winning "Outstanding" chapter with over 35 members.

Graduates of our program have a strong background in inquiry-based science and critical thinking skills, providing them with skills to be competitive in the job market, professional programs, and graduate school. We encourage interested postdoctoral applicants to come visit the department, to meet the faculty and students. We look forward to adding new energetic members to our team.

Chemistry Courses at Newberry College

CHE 113 General Chemistry I: An introductory course in chemistry designed for science majors. Emphasizes stoichiometry, thermochemistry, atomic and molecular structure, bonding, states of matter, solutions, and gas behavior. Three two-hour combined lecture/lab classes per week.

Instructor: Dr. Evelyn Swain, 803-321-5109, evelyn.swain@newberry.edu. The PACD scholar will gain experience in preparation and presentation of lectures, grading, leading laboratory sessions, holding office hours and review sessions for a portion of the course with the supervision of Dr. Swain. The scholar would have the opportunity to develop guided inquiry and inquiry based labs for use in CHE 113 in conjunction with Newberry College undergraduate students enrolled in CHE 290, 391, and/or 491. During the laboratory component of the course, safety, accuracy/precision, the laboratory notebook, the mole concept, dilution, titration and spectroscopy will be introduced.

CHE 114 General Chemistry II: A continuation of Chemistry 113. Emphasizes thermodynamics, kinetics, chemical equilibria, acid-base and precipitation reactions, and descriptive aspects of atmospheric, organic and nuclear chemistry. Three two-hour combined lecture/lab classes per week.

Instructor: Dr. Evelyn Swain, 803-321-5109, evelyn.swain@newberry.edu

The PACD scholar will gain experience in preparation and presentation of lectures, grading, leading laboratory sessions, holding office hours and review sessions for a portion of the course with the supervision of Dr. Swain. The scholar would have the opportunity to develop guided inquiry and inquiry based labs for use in CHE 114 in conjunction with Newberry College undergraduate students enrolled in CHE 290, 391, and/or 491. The scholar would also have the opportunity to find new avenues to incorporate the introduction of Newberry College instrumentation into these laboratories.

CHE 231 Organic Chemistry I: A study of atomic and molecular orbitals, stereochemistry, basic building block reactions, kinetics, thermodynamics, and the chemistry of alkanes, alkenes, and alkynes. The laboratory will include hands-on experimentation with basic microscale and macroscale techniques. Three lecture and four laboratory hours per week.

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Newberry College

Newberry, SC

<http://www.newberry.edu>

Instructor: Dr. Christina McCartha, 803-321-5260, Christina.mccartha@newberry.edu. The PACD scholar will gain experience in preparation and presentation of lectures, grading, leading laboratory sessions, holding office hours and review sessions for a portion of the course with the supervision of Dr. McCartha. The scholar would have the opportunity to develop guided inquiry and inquiry based labs for use in CHE 231 in conjunction with Newberry College undergraduate students enrolled in CHE 290, 391, and/or 491. During the laboratory component of the course, IR spectroscopy, chromatography, UV-VIS, and GC/MS are introduced. The scholar would also have the opportunity to find new avenues to incorporate the introduction of Newberry College instrumentation into CHE 231 through these first semester organic laboratories.

CHE 232 Organic Chemistry II: A study of spectroscopy and the chemistry of carbonyls, alcohols, nitrogen containing compounds and aromatics. Laboratory will emphasize critical thinking through extensive practice in problem solving and chemical analysis. Three lecture and four laboratory hours per week.

Instructor: Dr. Christina McCartha, 803-321-5260, Christina.mccartha@newberry.edu. The PACD scholar will gain experience in preparation and presentation of lectures, grading, leading laboratory sessions, holding office hours and review sessions for a portion of the course with the supervision of Dr. McCartha. The scholar would have the opportunity to develop guided inquiry, inquiry based, and project based labs for use in CHE 232 in conjunction with Newberry College undergraduate students enrolled in CHE 290, 391, and/or 491. During the laboratory component of the course, NMR spectroscopy and HPLC are introduced with further instruction in IR, UV-VIS, and GC/MS.

CHE 301 Biochemistry I: The course will provide a foundation for understanding biochemistry, building on the fundamental concepts from general and organic chemistry. The structure and function of proteins, carbohydrates, nucleic acids and lipids will be covered. Enzyme kinetics, catabolic and anabolic pathways will be introduced. Three lecture hours and three laboratory hours per week.

Instructor: Dr. Evelyn Swain, 803-321-5109, evelyn.swain@newberry.edu

The PACD scholar will gain experience in preparation and presentation of lectures, grading, leading laboratory sessions, holding office hours and review sessions for a portion of the course with the supervision of Dr. Swain. The scholar would have the opportunity to develop guided inquiry and inquiry based labs for use in CHE 301 in conjunction with Newberry College undergraduate students enrolled in CHE 290, 391, and/or 491. During the laboratory component of the course safety, documentation of experimental results, buffer preparation, pipetting, protein analysis, DNA analysis, electrophoresis and molecular biology will be introduced. The scholar would also have the opportunity to find new avenues to incorporate the bioinformatics into the lecture and laboratory components of this course.

CHE 302 Biochemistry II: This course will build on the concepts learned in CHE301.

Quantitative aspects of biochemistry, kinetics, thermodynamics and spectroscopy will be covered, as well as biochemical aspects of cell biology, molecular genetics. The integration of metabolism will be covered in detail.

Three lecture hours and four laboratory hours per week.

Instructor: Dr. Evelyn Swain, 803-321-5109, evelyn.swain@newberry.edu

The PACD scholar will gain experience in preparation and presentation of lectures, grading, leading laboratory sessions, holding office hours and review sessions for a portion of the course with the supervision of Dr. Swain. The scholar would have the opportunity to develop guided inquiry and inquiry based labs for use in CHE 113 in conjunction with Newberry College undergraduate students enrolled in CHE 290, 391, and/or 491. In the laboratory component of this course purification of proteins, lipids, DNA and RNA will be introduced. Other topics covered will be protein crystallography, biomolecular interactions and enzymology. The scholar would also have the opportunity to find new avenues to incorporate spectroscopy components into the laboratory component of this course.

CHE 375 Advanced Inorganic Chemistry: An intermediate study of atomic and molecular structures, bonding, crystalline structures, and preparations and reactions of inorganic compounds with an emphasis on transition metal coordination compounds. Three lecture and three laboratory hours a week.

Instructor: Dr. Christina McCartha, 803-321-5260, Christina.mccartha@newberry.edu. The PACD scholar will gain experience in preparation and presentation of lectures, grading, leading laboratory sessions, holding office hours and problem sessions for a portion of the course with the supervision of Dr. McCartha. The scholar would have the opportunity to develop inquiry and project based labs for use in CHE 375 in conjunction with Newberry College undergraduate students enrolled in CHE 391, and/or 491. During the laboratory component of the course, IR, UV-VIS, GC/MS, and NMR spectroscopy will be used.

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Newberry College

Newberry, SC

<http://www.newberry.edu>

CHE 376 Structural Organic Analysis: Data interpretation and identification by classical and instrumental methods. Three lecture and three laboratory hours per week.

Instructor: Dr. Christina McCartha, 803-321-5260, Christina.mccartha@newberry.edu. The PACD scholar will gain experience in preparation and presentation of lectures, grading, leading laboratory sessions, holding office hours and problem sessions for a portion of the course with the supervision of Dr. McCartha. The scholar would have the opportunity to develop inquiry and project based labs for use in CHE 376 in conjunction with Newberry College undergraduate students enrolled in CHE 391, and/or 491. During the laboratory component of the course, IR, UV-VIS, GC/MS, and NMR spectroscopy will be used extensively.

CHE 290 Lab Development: An opportunity for science majors to gain experience in the scientific method. Students will research, develop and test, and implement new chemistry laboratory experiments under the supervision of departmental faculty. Three laboratory hours per week.

Instructor: Dr. Christina McCartha, 803-321-5260, Christina.mccartha@newberry.edu. Dr. Evelyn Swain, 803-321-5109, evelyn.swain@newberry.edu

The PACD scholar will gain experience in working with sophomores and second semester freshmen to refine labs prior to incorporation into the general or organic chemistry curriculum with the supervision of Dr. McCartha (organic) or Dr. Swain (general) depending on the course content areas.

CHE 391 Investigative Chemistry: Students will conduct several inquiry-based experiments. Students will design and conduct a scientific investigation. The results of the investigation will be reported in both oral and written report. Six hours of laboratory per week.

Instructor: Dr. Christina McCartha, 803-321-5260, Christina.mccartha@newberry.edu. Dr. Evelyn Swain, 803-321-5109, evelyn.swain@newberry.edu

The PACD scholar will gain experience in working with sophomores and juniors to develop guided inquiry and inquiry based labs or conduct mini-research projects with the supervision of Dr. McCartha (organic, inorganic) or Dr. Swain (general, biochemistry) depending on the course content areas.

CHE 491 Research in Chemistry: A scientific research project completed under the supervision of a Chemistry faculty member.

Instructor: Dr. Christina McCartha, 803-321-5260, Christina.mccartha@newberry.edu. Dr. Evelyn Swain, 803-321-5109, evelyn.swain@newberry.edu

The PACD scholar will gain experience in working with juniors and seniors on undergraduate research projects with the supervision of Dr. McCartha (organic, inorganic) or Dr. Swain (general, biochemistry) depending on the course content areas.

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**Southern Wesleyan University
Central, SC**

<http://www.swu.edu>

Biology, Chemistry and Computer Science Courses at Southern Wesleyan University

(Contact Dr. Walter Sinnamon, 864-644-5265 or wsinnamon@swu.edu for current information regarding instructor of record or other questions about a course.)

BIOL 1004, BIOL 1014. General Biology I, II General Biology I would encompass scientific philosophy and methodology, chemistry and biochemistry, cell biology and genetics. General Biology II would encompass evolution, taxonomy and diversity, basic plant anatomy and physiology, basic animal anatomy and physiology, and ecology. Both semesters include laboratory.

BIOL 1054. Survey of Anatomy and Physiology A one-semester survey emphasizing the interrelationships between the various human organ systems. Does not give credit toward a biology, medical technology, pre-medical/pre-dental majors, or nursing. Prerequisite: BIOL 1103, 1004, 2033 or 2034 or PSYC 2003 or permission of instructor. Includes laboratory.

BIOL 1104. Biology for Non-Majors An introduction for non-majors emphasizing philosophy of science, cell biology, genetics, diversity of organisms, ecology, and evolution. Includes laboratory.

BIOL 2001. Biology Cornerstone Seminar An introductory seminar for biology majors dealing with the use of library, methods and goals of research, and vocational options for the biologist. Prerequisite: Instructor's permission. P/NC. May be taught concurrently with CHEM 2001.

BIOL 2024. Botany The phylogenetic relationships within the plant kingdom, and the comparative structure, function, development, and ecology of representative plants. Prerequisites: BIOL 1004 or BIOL 1103, or permission of the instructor. Includes laboratory.

BIOL 2034. Zoology The phylogenetic relationships within the animal kingdom, and the comparative anatomy, physiology, development, and ecology of representative animals. Prerequisite: BIOL 1014 or 1103, or permission of instructor. Includes laboratory.

SEMR 2051. Scientific Literacy. Course required the second semester of the freshman year in which students learn to write for scientific "publications" and labs, and learn to critique scientific literature appropriately.

BIOL 2074. Environmental Biology Energetics, pollution, and resource management; the distribution of organisms; the ethics of man's influence on the environment. Prerequisite: BIOL 1004, 1103, or permission of instructor. Includes laboratory.

BIOL 2103. Medical Terminology A study of medical terminology that will aid in the understanding of medical-related courses and assist in preparation for professions related to medicine.

BIOL 2203. Nutrition Principles of Nutrition, including functions, digestion, and requirements of nutrients; factors affecting food choices and dietary adequacy; role of nutrition in physical fitness and health maintenance. Does not meet lab science general education requirement. Prerequisites: BIOL 1004 or BIOL 1103, CHEM 1004.

BIOL 2254. Ecology Study of the relationships organisms have with each other and with their environments. Themes include populations, communities, ecosystems, biodiversity, and conservation biology. Prerequisites: BIOL 1004 or 1103, or permission of instructor. An overnight trip is required. Includes laboratory.

BIOL 2351. Ornithology Seminar A basic introduction to the study of birds including diversity, field identification, and song recognition for species common to South Carolina. Students will learn to identify resident birds using field marking, calls and behaviors. Class work will be supplemented by field trips to local birding hotspots which might require minimal cost. Students will spend considerable time in the field and maintain a log of observed species.

BIOL 2371 Wildlife and Conservation Biology Seminar An exploration of basic principles of ecology and how they apply to the management and conservation of wildlife. Course lecture and student research material will be supplemented with lectures by representative from local natural resource agencies and through field trips, which might require minimal cost, to local wildlife management demonstration areas. Current trends in wildlife and

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Southern Wesleyan University Central, SC

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conservation biology will be addressed through reviews of current research literature.

BIOL 2393 Biology in the News A survey course in which students explore biology-related topics currently in the news. Emphasis will be placed on current events, issues, and developments and the fundamental biological principles behind them. Coursework will consist of readings, problem-based learning exercises, electronic discussions, topical study guides, and written tests.

BIOL 3033. Immunology Introduction to the structure, function, production, and reactions of antibodies, and a study of immunity in general. Prerequisites: BIOL 1004, CHEM 1004, 1054; or permission of instructor.

BIOL 3074. Field Biology An introduction to methods and techniques for studying populations and communities in their natural settings. Includes emphasis on the plants and animals of South Carolina. Prerequisites: BIOL 1004 or 1103 or permission of instructor. An overnight trip is required. (An extra fee may be required.) Includes laboratory.

BIOL 3104. Microbiology Study of common forms of bacteria, viruses, protozoa and fungi, and their relationship to plant and animal life and to public health. Bacteriological techniques are taught in the laboratory. Prerequisites: CHEM 1004, 1054; BIOL 1004; BIOL 1033 or 2034. Includes laboratory.

BIOL 3204, 3214. Human Anatomy and Physiology I, II A two-semester study of human structure and function as an integrated whole. Prerequisites: BIOL 1004, 2034. BIOL 3204, or instructor's permission, is a prerequisite for BIOL 3214. Includes laboratory.

BIOL 3254 (CHEM 3254). Biochemistry A study of physiologically significant organic molecules. Prerequisites: BIOL 1004, CHEM 2504, or Medical Laboratory Technician or equivalent certification. Includes laboratory.

BIOL 3303. Animal Behavior Designed to investigate the physiological bases of animal behavior and the behavior of animals in response to their environment. PSYC 3303 is identical. Prerequisites: PSYC 2003; BIOL 1004, 1054, 1103, 2033 or 2034; ENGL 1013.

BIOL 3313. Bioethics A study of the ethical dilemmas posed by human effect on the environment at large and those encountered in medical practice. Prerequisites: ENGL 1013, and permission of the instructor. Required philosophy course for biology, medical technology, pre-dentistry, and pre-medicine majors.

BIOL 3403. Physiology of Behavior. Designed to investigate the anatomical and physiological basis of human behavior, including the physiological bases of disses and disorders which affect human behavior. Prerequisites: PSYC 2003; BIOL 1004, 1054, 1103, 2033 or 2034. (May not be used to meet the physiology requirement in a biology major.)

BIOL 3454. Cellular and Molecular Biology An introduction to structure and function of cells and tissues, and the techniques for studying them, with emphasis on animal material. Prerequisites: BIOL 1004, 2034, CHEM 1004, and CHEM 1054, or permission of instructor. Includes laboratory.

BIOL 3504. Genetics Mendelism; population genetics; the genetic code; protein synthesis; differentiation and control of gene action. Prerequisites: BIOL 1103 or 1004; ENGL 1013; proficiency in mathematics. Includes laboratory.

BIOL 3653. The Ecology of South Carolina—Mountains to the Sea Despite its small size, South Carolina possesses a wide array of natural communities. This course will explore the natural history of South Carolina's four physiographic provinces: Blue Ridge, Piedmont, Sandhills, and Coastal Plain. Emphasis will be on basic principles of ecology, field study techniques, identification of local flora and fauna, and general nature interpretation. The course will incorporate various outdoor laboratory investigations and field trips to a number of natural areas. Some of the field trips will involve overnight stays at minimal cost. Prerequisites: BIOL 1004 or 1103 or permission of instructor. Includes laboratory.

BIOL 3753/5753. Natural History for Teachers – Bringing Nature to the Classroom An introduction to the study of natural history for in-service or pre-service teachers. Emphasis will be on identification of local flora and fauna, nature interpretation, and principles of ecology. Instruction will take place via classroom instruction and field trips to

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<http://www.swu.edu>

local natural areas. Grading will consist of quizzes, tests, and development of standards-based instructional materials involving content from the course.

BIOL 400-419. Biology Studies (1 to 4 semester hours) Any topic in biology meeting the approval of the division chair and the academic dean. Hours of credit and laboratory fee (if any) are to be determined. Courses numbered 400-409 are directed study by individuals; those numbered 410-419 are experimental courses not described above. Offered on sufficient demand. 400-409 graded P/NC. Prerequisite: consent of instructor.

BIOL 4253. Neurobiology An introduction to the cellular physiology of the mammalian brain with particular focus on the electrical properties of neurons, the process of neurotransmission and the general properties of the neuronal circuits. Areas of the brain and specific brain circuits involved in learning and memory, movement and emotion will be studied as a means of applying general principles of neurobiology. Prerequisite: BIOL 1004, 1054, 1103.

BIOL 4354/BIOL 4353. Comparative and Environmental Physiology. A comparative study of anatomical, physiological and biochemical adaptations of various animals. Prerequisites: ENGL 1013; competency in mathematics; BIOL 1004 and 2034; CHEM 1004 and 1054. Laboratory included.

BIOL 4501. Biology Capstone Seminar Study of philosophy of science, presenting scientific information in oral and written form, final science comprehensive oral examinations, administration of required final assessment instrument (Major Field Test, or equivalent). Prerequisites: Senior standing or permission of instructor. ENGL 1013 and BIOL 2001 or CHEM 2001.

BIOL 480. Biology Senior Practicum (Hours to be determined) An internship off-campus, to provide professional development for senior-level students. (See p. 25) Prerequisite: competency in computer, math, oral communication, reading, and writing. (P/NC) BIOL 490-498. Independent Study (1-3 hours per semester)

BIOL 4993. Major Honors

BIOL 5753/BIOL 3753. Natural History for Teachers An introduction to the study of natural history for in-service or pre-service teachers. Emphasis will be on identification of local flora and fauna, nature interpretation, and principles of ecology. Instruction will take place via classroom instruction and field trips to local natural areas. Grading will consist of quizzes, tests, and development of standards-based instructional materials involving content from the course. May be taken for graduate or undergraduate credit. Additional charge to cover field trips.

CHEM 1004, 1054. General Chemistry I, II I - Principles of inorganic chemistry as illustrated by important elements, compounds, and reactions. II - Introduction to physical chemistry and qualitative analysis. Includes laboratory. Prerequisite: Mathematics competency.

CHEM 2001. Chemistry Cornerstone Seminar An introductory seminar for chemistry majors dealing with the use of library, methods and goals of research, and vocational options for the chemist. P/NC. May be taught concurrently with BIOL 2001. Prerequisites: Mathematics competency and instructor's permission.

CHEM 2504. Organic Chemistry I Study of the preparations and reactions of the various organic functional groups with emphasis upon the mechanisms of the reactions. Prerequisites: CHEM 1004, 1054 or permission of instructor, and mathematics competency. Includes laboratory.

CHEM 2514. Organic Chemistry II Study of the preparations and reactions of the various organic functional groups with emphasis upon the mechanisms of the reactions. Prerequisites: CHEM 1004, 1054 or permission of instructor, and mathematics competency. Includes laboratory.

CHEM 3254 (BIOL 3254). Biochemistry A study of physiologically significant organic molecules. Prerequisites: BIOL 1003 or 1004, CHEM 2503; or Medical Laboratory Technician or equivalent certification, and mathematics competency. Includes laboratory.

CHEM 3404. Inorganic Analysis Analysis of inorganic compounds and inorganic elements in organometallic compounds. Laboratory included: Prerequisites: CHEM 1054 and mathematics competency.

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<http://www.swu.edu>

CHEM 3414. Organic Analysis Chemical and instrumental methods commonly used on organic compounds and mixtures. Laboratory included. Prerequisites: CHEM 1054 and mathematics competency.

CHEM 400-419. Chemistry Studies (1 to 4 semester hours) Any topic in chemistry meeting the approval of the division chair and the academic dean. Hours of credit and laboratory fee (if any) are to be determined. Courses numbered 400-409 are directed study by individuals; those numbered 410-419 are experimental courses not described above. Offered on sufficient demand. 400-409 graded P/NC. Prerequisite: consent of instructor.

CHEM 4501. Chemistry Capstone Seminar Study of philosophy of science literature, presenting scientific information in oral and written form, final science comprehensive oral examinations, administration of required final assessment instrument (Major Field Test, or equivalent). Prerequisites: Senior standing or permission of instructor, ENGL 1013, and BIOL 2001 or CHEM 2001, and mathematics competency.

CHEM 480. Chemistry Senior Practicum (Hours to be determined) An internship off-campus, to provide professional development for senior-level students. (See p. 25.) Prerequisite: competency in computer, math, oral communication, reading, and writing. (P/NC)

CHEM 4993. Major Honors

CPSC 1003. Fundamentals of Programming

Introduction to the application of program development concepts and tools. Use of such tools as pseudo-code and flowcharting to produce top-down structured solutions to business and scientific applications. Emphasis given to program documentation and debugging.

CPSC 1103. Introduction to Computers and Information Processing

Introduction to the history, vocabulary, and use of computer information systems. Includes word processing, spreadsheet, and presentation applications using the integrated package Microsoft Office.

CPSC 1113. Introduction to Computers and Music Software

Introduction to the history, vocabulary, and use of computer information systems. Includes word processing, spreadsheet, and presentation applications using the integrated package *Microsoft Office*. The music software program *Finale* will serve as a foundation for computer-assisted music notation. Musical Instrument Digital Interface (MIDI) and digital music formats will be discussed, explored, and used in unrelated music software programs such as *Windows Media*, *Band in a Box*, and *Smart Music*. Open only to music majors and minors.

CPSC 1203. Introduction to the Internet, Online Research, and Web Site Design

Topics include the history, evolution, structure, and management of the Internet; the influence of the Internet on society; locating and synthesizing information online; Hypertext Markup Language; and building web pages.

CPSC 1903. Introduction to Computer Science Programming

Introduction to programming and basic computer science principles and algorithms. Topics include fundamental computer science theory, number systems, thinking strategies, Tanenbaum's virtual machine, recursion, data structures, and addressing. Prerequisite: Satisfactory performance on computer science placement test or CPSC 1003.

CPSC 2103. Advanced Software

Advanced topics in word processing, spreadsheets, databases, electronic presentations, the Internet, and the integration of the above, using the Windows operating system and Microsoft Office. Prerequisite: CPSC 1103.

CPSC 2203. Desktop Design

Design, capture, and processing of digital graphic elements in published material (with emphasis on the Internet as the publishing medium). Introduction to design concepts. Prerequisite: CPSC 1103 and CPSC 1203 or permission of instructor.

Appendix I - PACD Curricular Experience Opportunities

**Southern Wesleyan University
Central, SC**

<http://www.swu.edu>

CPSC 2253. Object-Oriented Programming I

Introduction to object-oriented design and programming using a modern object programming language. Studying language syntax, program construction, and debugging techniques provides the foundation to design and implement new solutions for common business applications. Prerequisite: CPSC 1903 and CPSC 2203 or permission of instructor.

CPSC 2293. Web Page Design and Programming

Web page design and programming syntax and use of HTML and DHTML to implement those designs. Design elements include text, forms, tables, frames, graphics, sound, white space, images, animation, and intra-page, intra-site, and inter-site hyperlinks. Introduction to scripting and XML. Prerequisite: CPSC 1203 and CPSC 1003, or CPSC 1903.

CPSC 2303. Hardware and Software Configuration and Support

Concepts of PC hardware and software configuration and help desk technical support in a business environment. Troubleshooting and hardware peripheral maintenance and repair, basic application installations, printer maintenance, and end-user public relations. Prerequisite: CPSC 1903 or permission of instructor. Includes lab.

CPSC 2313. Elements of Graphic Design

Computer graphics and basic elements of graphic design and practice, with emphasis on design for the Internet. Students will evaluate existing web sites for their graphic design and implementation. Individual projects will be required. Prerequisites: CPSC 2203 or permission of instructor.

CPSC 2453. Special Topics I

Advanced programming techniques including possible topics of indirection, recursion, and conceptual development and implementation of data structures including arrays, records, linear lists, stacks, queues, trees, tables, and graphs. Other topics may include applications writing involving strings, sorting, searching, and file operations. Prerequisite: CPSC 1903 or permission from the instructor.

CPSC 2503. Networking I

A study of the protocols employed to implement business and organizational solutions on an intranet or the Internet. Analysis of available hardware and software used in the design of networks and the respective cost/benefit tradeoffs. Prerequisite: CPSC 2303 or permission of instructor.

CPSC 3003. Database Design and Implementation I

Methods of database planning, design, and development. Management topics include data integrity, privacy, and security. File systems, hierarchical and networked databases, and relational online databases. Prerequisite: CPSC 2253 and CPSC 2293.

CPSC 3013. Database Design and Implementation II

Advanced database design, creation, maintenance, and security using the SQL or SQL type language. The online databases will be implemented using current database engines and interfaces. Prerequisite: CPSC 2503 and CPSC 3003.

CPSC 3103. Systems Analysis and Design

Theory and practice of determining data flow in a small enterprise environment. The Systems Development Life Cycle methodology will be the process used to develop appropriate solutions. Local business case studies will serve as class projects. Prerequisite: CPSC 2503, 3003 and 3354.

CPSC 3303. Object-Oriented Programming II

Advanced study of the concepts and application of an Object-Oriented Event Driven (OOED) approach to developing solutions to business problems. Prerequisite: CPSC 2253.

CPSC 3313. Developing Distributed Applications

Advanced concepts and the associated technologies required to develop and implement distributed software solutions to business problems. Prerequisite: CPSC 3003 and 3303.

Appendix I - PACD Curricular Experience Opportunities

**Southern Wesleyan University
Central, SC**

<http://www.swu.edu>

CPSC 3354. Operating Systems and Servers

Design concepts of advanced PC operating systems. Focus on modern operating systems and server theory, as well as hands-on lab projects. Prerequisite: CPSC 2303 and CPSC 2503 or permission of instructor.

CPSC 3403. Digital Photography and Image Rendering

Analysis of image formats, rendering, layering, and composition for electronic multimedia. Techniques and software packages for animating existing graphic images and the creation of new animated images. Topics include realistic representation, illumination, and bandwidth management. Prerequisite: CPSC 2203 and 2293 or permission of instructor.

CPSC 3413. Designing Electronic Multimedia

Design, development, and publishing multimedia for business applications. Includes the creation of graphical, photographic, video, sound, animation, multimedia authoring, virtual reality applications suitable for publication on the Internet or other electronic media. Prerequisites: CPSC 2203 and CPSC 2293, or permission of instructor.

CPSC 3623. Networking II

The techniques employed to implement business/organizational networking solutions. Includes transmission media, client-server strategies, throughput and response time, systems architecture, and cost/benefit tradeoffs. Prerequisite: CPSC 2503.

CPSC 3633. Networking III

An advanced study of protocols employed to implement business/organizational networking solutions. An in-depth analysis of available hardware and software used in the design of networks and the respective cost/benefit tradeoffs. Prerequisite: CPSC 3354 and CPSC 3623.

CPSC 4201. Ethics and Professional Issues in Computing

Ethical and professional issues relating to the use of computer software, hardware, and information systems. Prerequisite: Senior standing and permission of instructor.

CPSC 4303. Advanced Scripting and Common Language Interfaces

A study of the advanced programming techniques of powerful scripting languages. Students will analyze scripts and design new applets. Strong focus on design, documentation, and debugging. Prerequisite: CPSC 3013, 3303, and CPSC 3354.

CPSC 4423. Advanced Networking Applications

An advanced study of network applications and protocols to implement networking solutions. Analysis of available hardware and software used in the design of network support. Prerequisite: CPSC 3633. Lab fee required

CPSC 4453. Special Topics II

Advanced programming techniques and theories currently implemented in a variety of computer programming languages.

CPSC 4523. Advanced Web Site Design

Advanced concepts and elements of web site design. Advanced web page editors are used to build the web pages. On-line research and analysis provide the foundation for building a small enterprise environment group project. Prerequisites: CPSC 3103.

CPSC 400-419. Studies in Computer Science (1 to 4 semester hours)

Any topic in computer science meeting the approval of the division chair and the academic dean. Courses numbered 400-409 are directed study by individuals; those numbered 410-419 are experimental courses not described above. Offered on sufficient demand. 400-409 graded P/NC. Prerequisite: Permission of instructor.

CPSC 4603. Advanced Business Solutions (Project)

Prerequisite: Junior/senior status and permission of coordinator of studies in computer science.

Appendix I - PACD Curricular Experience Opportunities

**Southern Wesleyan University
Central, SC**

<http://www.swu.edu>

CPSC 4613. Advanced Application Development

Prerequisite: Junior/senior status and permission of coordinator of studies in computer science.

CPSC 4623. Special Topics in Internet Computing

Prerequisite: Junior/senior status and permission of coordinator of studies in computer science.

Appendix I - PACD Curricular Experience Opportunities

University of South Carolina – Beaufort Beaufort, SC

<http://www.uscb.edu>

University of South Carolina at Beaufort is the newest 4-year baccalaureate institution in the University of South Carolina System. We offer a small, collegial environment for the ~1500 undergraduate students of the institution. The students of the institution are largely drawn from the region, and consist largely of students who, for any of various reasons, wish to attend college in the South Carolina Lowcountry. The students are therefore enthusiastic about learning, and contribute to an excellent cooperative classroom experience.

The Biology Department at USCB consists of two tenure-track faculty – Joe Staton, who works on the population genetics of fiddler crabs, and Charles Keith, who works on cellular neurobiology, as well as two full-time instructors, and a number of adjuncts. The department is equipped for basic cell biological and molecular genetic research.

The University of South Carolina at Beaufort is eager to participate in the Postdoctoral Teaching Internship Program both as a benefit to our students, who will benefit from exposure to a wider variety of academic scientists, as well as the PACD scholar, who will benefit from exposure to students in a very closely interactive environment, as well as to exposure to Drs. Staton and Keith, both of whom are experienced teacher/scholars.

The mentor for the PACD program will be Dr. Charles Keith, Professor and Chair of Science and Mathematics. Dr. Keith came to USCB in Fall 2007, after 23 years as a faculty member in the Department of Cellular Biology at the University of Georgia. While at the University of Georgia, Dr. Keith helped initiate, and mentored a number of students in a similar program at the graduate student level, C BIO 7360 - "Teaching Internship in Cellular Biology." In that program, students who served as teaching assistants in departmental courses (Cell Biology or Neurobiology) were mentored by Keith in teaching a limited number of lectures in that course, in addition to the normal duties of their TA (running review sessions, holding office hours, and participating in grading essay questions and extra credit review papers).

Biology Courses at University of South Carolina - Beaufort

(For additional information regarding any of these courses contact Dr. Charles Keith, Professor of Biology and Chair, Science and Mathematics, 843-208-8108 or KEITHCH@uscb.edu.)

BBIO 243 - Human Anatomy and Physiology I. (3) (Prereq: BCHM 102) Functional anatomy and physiology of the human body, including the integumentary, skeletal, muscular, and nervous systems. Not available for biology major credit. Three lecture hours per week. **BBIO 243L - Human Anatomy and Physiology Laboratory.** (1) (Coreq: BBIO 243) The principles of anatomy and physiology as demonstrated by microscopic studies, animal dissection, and physiological experiments. One three-hour laboratory per week.

BBIO 302 - Cell and Molecular Biology. (3) (Prereq: BBIO 102; prereq or coreq: BCHM 333) Principles of eukaryotic cell structure, molecular organization, and physiology. Genome organization and expression. Cell growth, division, and cell-cell interactions. Three lecture hours per week.

BBIO 302L - Cell and Molecular Biology Laboratory. (1) (Prereq or coreq: BBIO 302) Experiments, exercises, and demonstrations. Three hours per week.

BBIO 435 - Neurobiology. (3) (Prereq: BBIO 302 and permission of instructor) Descriptive and experimental aspects of the neural basis of behavior, emphasizing cellular and molecular mechanisms. Three lecture hours per week.

BBIO 435L – Neurobiology Laboratory (1) (Prereq: BBIO 302 and permission of instructor) Descriptive and experimental aspects of the neural basis of behavior, emphasizing cellular and molecular mechanisms. One 3-hour laboratory per week.

BBIO 441 - Principles of Biochemistry. {=BCHM 450} (3) (Prereq: CHEM 334) A survey of fundamentals of biochemistry.

BBIO 460 - General Physiology. (3) (Prereq: BBIO 302) Functional mechanisms of vertebrate organ systems. Three lecture hours per week.

BBIO 460L - General Physiology Laboratory. (1) (Prereq or coreq: BBIO 460) Experiments on vertebrate organ system functions using different animal models. One four-hour laboratory per week.

Appendix I - PACD Curricular Experience Opportunities

University of South Carolina - Upstate Spartanburg, SC

<http://www.uscupstate.edu/>

The University of South Carolina Upstate (formerly USC Spartanburg) is a coeducational, public, comprehensive metropolitan institution that is located in Spartanburg along the thriving economic I-85 corridor between Atlanta and Charlotte. As a senior comprehensive public institution of the University of South Carolina, we offer bachelor's degree programs in the liberal arts and sciences, business administration, nursing and teacher education, as well as master's degrees in education. Among the fastest growing universities in South Carolina, USC Upstate boasts two thriving campuses – the 280-acre largely residential campus in Spartanburg and the campus in Greenville for commuting junior and senior-level students.

USC Upstate is home to 4,600 students from 38 states and 71 nations. It offers challenging, first-rate academic courses, small class sizes, personal experiences, remarkable diversity, an expansive international community, and a dynamic campus life. Our acclaimed and accredited academic programs create real opportunities for our students to build bridges to their future through internships, field service, study abroad, and more. USC Upstate inspires its students to grow intellectually, culturally, socially and emotionally. Students are also challenged to think critically and to prepare themselves for the professional challenges that lie ahead.

The Division of Natural Sciences and Engineering, in the College of Arts and Sciences, offers the Bachelor of Science degree in biology and chemistry and engineering technology management. Minors are also offered in biology and chemistry. Courses are offered in the areas of engineering, geology, physical science, physics and astronomy. Students interested in the following professional programs typically pursue coursework under this division: chiropractic, dental, engineering, medical, optometry, occupational therapy, pharmacy, physician assisting, physical therapy, speech pathology, and veterinary medicine.

SBIO 202 - Introduction to Cell and Molecular Biology (4 credits). Basic principles of the origin, evolution, function, and diversity of cells. Emphasis is placed on molecular level approaches to the scientific study of eukaryotic cell functions, physiology, metabolism, ultrastructure, and evolution, as well as the use of cells relevant to medical, biosocial, and environmental issues. Three class and three laboratory hours per week. All lab sections are limited to 24 students.

Instructor: Dr. Jeannie Chapman, 864-503-5768, JCHAPMAN@USCUPSTATE.EDU. This is the last course in a 4-part series (BIO 101, 102, 201, and 202) that all Upstate biology majors take. During Spring 2010, I will be making modifications to the 202 lecture and lab courses because of recent changes to the BIO 101/102 curriculum. This will be an ideal time for a post-doc to gain experience in all aspects of course development (i.e. developing syllabi, preparing lectures, and designing assessments to include exams, quizzes, homework and writing assignments, etc.) Because we do a good deal of our own laboratory prep, I would also like to streamline the laboratory procedures. I would welcome ideas on how to make the lab course more hypothesis-driven and problem-based as well. This can be particularly challenging and expensive in a reagent-intensive lab course. In addition to my teaching duties, I also run a small research program that addresses the molecular biology of a tumor suppressor in colon cancer. Specifically, I am investigating the mechanism of down-regulation of this gene, DRA, in colon cancer. We are currently assessing the role of promoter methylation and histone modification in the down-regulation of the gene in a tissue culture model. We also have future plans to map the promoter of the gene.

Appendix II - PACD Research-Focused Collaboration Opportunities

Furman University
Greenville, SC
www.furman.edu

Department of Biology Research Collaboration Opportunities

Eli Hestermann, Associate Professor of Biology, Furman University, eli.hestermann@furman.edu, 864-294-3527.

The Hestermann lab investigates regulation of gene expression by soluble receptors, including steroid hormone receptors and the aryl hydrocarbon receptor. We examine the interactions of ligands for these receptors at the levels of DNA binding, chromatin modification and transcriptional activation. Our work is conducted primarily in breast and endometrial cancer cell models, although we also work with human tissue and rodent models through collaborators. An exciting potential project for a post-doc this year is examining genome-wide interactions of transcription factors with DNA through chromatin immunoprecipitation coupled to high-throughput sequencing (i.e. ChIP-seq) approaches.

Travis Perry, Assistant Professor of Biology, Furman University, Travis.Perry@furman.edu, 864-294-3009.

Travis Perry's lab currently has one graduate student and two undergraduates. We are addressing basic evolutionary/ecological questions and developing management tools for puma (*Puma concolor*) in southcentral New Mexico. Specific areas of interest include drivers of prey selection, predator-prey interactions, habitat selection, and the development of cost effective census techniques. Currently, detailed behavioral data from GPS collared puma, field data, including prey selection and habitat structure, photographic data from remote camera arrays, and geospatial data are being used to meet these objectives. Population modeling, standard multivariate statistical tests, and GIS modeling constitute our primary means of data analysis. We are interested in developing probability models and more flexible multivariate tests using R programming.

Department of Chemistry Research Collaboration Opportunities

Brian Goess, Assistant Professor of Chemistry, Furman University, brian.goess@furman.edu, 864-294-2318.

The Goess group focuses on new organic reaction development and small molecule total synthesis. Ongoing projects include the development of sigmatropic rearrangements involving cyclopropanes and the synthesis of cyclopropyl homologs of the anti-cancer drug hibiscone C. We are currently publishing the first general strategy for the regioselective semihydrogenation of dienes and have published the first use of this strategy in the total synthesis of the natural product gradisol.

Tim Hanks, Professor of Chemistry, Furman University, tim.hanks@furman.edu, 864-294-3373.

The Hanks group is interested in the mechanisms of self-assembly and the construction of functional supramolecular systems. Work in our laboratory includes computational studies, synthesis, and structural determination using a host of microscopic, spectroscopic, and physical methods. We currently have major efforts in the areas of halogen bonding, surface-passivated metallic nanoparticles, self-assembled monolayers, and the synthesis and assembly of polymeric nanostructures.

Jeff Petty, Professor of Chemistry, Furman University, jeff.petty@furman.edu, 864-294-2689.

The Petty group focuses on novel DNA structures as the basis of diseases and as templates for nanomaterials. Repeated DNA sequences are empirically linked with neurological diseases such as Huntington's disease, and the secondary structures of these sequences are thought to interfere with normal biochemical processes. We utilize the fluorescence properties of modified nucleobases to assess structures, and our goal is to understand how the length of the sequence is related to the secondary

Appendix II - PACD Research-Focused Collaboration Opportunities

Furman University
Greenville, SC
www.furman.edu

structure. We are also using DNA as a general template for synthesizing fluorescent silver clusters. These small (<10 atoms) clusters are being used as unique chromophores for fluorescence imaging. The advantage of this approach is the ability to form different types of chromophores by varying the DNA sequence, and current efforts are focusing on near infrared emission.

Greg Springsteen, Assistant Professor of Chemistry, Furman University, greg.springsteen@furman.edu, 864-294-2763.

The Springsteen lab currently consists of two full-time masters and four part-time undergraduate researchers. During the summer months we have as many as eight full-time undergraduate researchers. Our two main projects are: 1) the enhancement of techniques used for the in vitro evolution of DNA-based protein aptamers, and 2) the development of boronic-acid glucose sensors. The long-term goal of our automated in vitro evolution project is to develop a therapeutically effective nucleic acid-based aptamer against HIV gp120. We propose to accomplish this by expanding the chemical alphabet of in vitro selected nucleic acids while maintaining the effectiveness of polymerase-based amplification. Amplification of a modified nucleic acid library will be achieved by translating the strands to an unmodified library using hybridization interactions. We hypothesize that modified nucleic acids containing a variety of chemically-interesting side groups will be effective aptamers at a far smaller size than those traditionally evolved. Our glucose sensors employ arylboronic acids rather than the glucose-oxidase enzymes used in current diabetes strips. We are synthesizing novel glucose-selective chemosensors, and developing in vivo glucose modification reactions. Our goal is to reduce the instability and expense inherent to current test strips, enabling more globally wide-spread diabetes monitoring.

John F. Wheeler, Professor of Chemistry, Director, Integrative Research in the Sciences, Furman University, john.wheeler@furman.edu, 864-294-3371.

Research in our labs involves applying analytical chemistry to a diverse group of chemical problems, and we currently include 8 undergraduate research students in that effort. At present our efforts are heavily focused on the characterization of transition metal complexes, specifically novel Cr(III) diimine systems synthesized in-house that intercalate and/or covalently adduct with DNA, and which have the potential to serve as DNA photocleavage agents. Cyclic voltammetry, isothermal titration calorimetry, capillary, gel and capillary gel electrophoresis, electron microscopy and electrospray MS (RPLC-MS) are essential tools in probing and characterizing these interactions using a range of Cr(III) complexes and custom oligomers. We are also involved in a collaborative effort with Dr. Eli Hestermann (Biolog) involving isolation of active ingredients in the traditional medicinal herb *Prunella vulgaris*.

Department of Psychology Research Collaboration Opportunities

Judy Grisel, Associate Professor of Psychology, Furman University, judy.grisel@furman.edu, 864-294-3218.

A primary focus of the Grisel lab is to help elucidate the neural antecedents to drug addiction. Inbred strains of mice are employed to parse contributions from genes, experience and their interaction. For example, in order to understand the relationship between endogenous opioid peptides, environmental stimuli and alcohol sensitivity we use transgenic mice with varying levels of b-endorphin in tests of drug reinforcement. In particular we are interested in how a biologic predisposition is triggered by the environment to alter gene transcription, neurotransmission and ultimately, behavior. Fellows with experience in molecular biology desirous of gaining knowledge in behavioral genetics and pharmacology are especially encouraged to apply.

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Clafin University
Orangeburg, SC
www.clafin.edu

Department of Biology Research Collaboration Opportunities

Kamal Chowdhury, Interim Chair and Associate Professor, Department of Biology, Clafin University, kchowdhury@clafin.edu, 803-535-5723.

1. Plant-made malaria vaccine production and an option to try other suitable biopharmaceuticals in plants
2. Genetic engineering of stress tolerance in plants (cold or drought)
3. Biofuel production from biomass
4. Crop improvement using biotechnological tools

Randall H. Harris, Assistant Professor, Department of Biology, Clafin University, rharris@clafin.edu, 803-535-5390.

Once considered a harmless commensal, *Moraxella catarrhalis* is now recognized as significant cause of respiratory tract infections in humans. The microbe is third leading cause of otitis media in infants and children and infectious exacerbations in patients with chronic bronchitis. My laboratory studies the interaction between *M. catarrhalis* and the innate immune system. The laboratory is currently focused on the molecular mechanisms by which *M. catarrhalis* survives within neutrophils. Neutrophils represent an early barrier to infection through their ability to ingest, kill, and degrade microorganisms. We have identified genes responsible for in vitro resistance to reactive oxygen species and cationic peptides, two major classes of neutrophil antimicrobial molecules. We are currently defining how these genes are regulated and their contribution to *M. catarrhalis* survival within neutrophils.

Naseema M. Hoosein, Associate Professor, Department of Biology, Clafin University, nhoosein@clafin.edu, 803-535-5503.

Research Interests: Neuroendocrine differentiation in prostate and colon cancer. Role of neuroendocrine substances in cellular proliferation and invasiveness. Biomarkers of tumor progression. Expression and activity of certain voltage- and ligand-gated ion-channels in prostate, colon, breast and lung cancer.

Department of Mathematics and Computer Science Research Collaboration Opportunities

Wei Wan, Assistant Professor, Department of Mathematics and Computer Science, Clafin University, wwan@clafin.edu, 803-937-9833.

My general interests are in Optimization, Stochastic Optimal Control and Computation. In recent years, my interests are investigating the existence problem of Differential Game in infinite dimension space; the inverse problem of Differential Game model; the efficient algorithm to solve general Differential Game model; and using Stochastic Differential Game to investigate how competition affects the evolvement of financial market, social network. Math Analysis, Math Modeling, and Numerical computation are involved in my daily work.

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College of Charleston
Charleston, SC
www.cofc.edu

Department of Chemistry and Biochemistry Research Collaboration Opportunities

Justin K. Wyatt, Associate Professor, Department of Chemistry and Biochemistry, College of Charleston, wyattj@cofc.edu, 843-737-3714.

I have a few different projects going on in my lab at this time. We are working on developing a SAR study for the antibiotic Cytosporone E (this involves synthesis and testing). We are also beginning to work on an SAR study for the anticancer drug Combretastatin A4 (this involves synthesis and possible testing). A third project we are working on is developing a chiral methodology of the powerful Meyers ortho-alkylation of chiral aromatic oxazolines. The last project is focused on developing a quick synthesis of a folic acid derivative N10-formyl-5,8-dideazaforlic acid.