Student Living and Learning Opportunities

Because learning does not stop at the door of the classroom, the Department of Biology makes it a priority to create many different ways for students to explore the world of science. The Science Learning Community welcomes both resident and commuter students in activities ranging from films to barbecues, mentoring programs to environmental cleanups, field trips to community service. Dedicated on-campus housing in Switlik residence hall provides network building opportunities for students in the sciences. First year students with high GPAs and SAT scores are invited to participate in practicum learning with faculty in their labs during their second semester at Rider. This honors experience helps students explore what it means to actually do science and make connections with upper-level students carrying out research in labs. Opportunities exist for these students to continue with supervised research in the summer following the first year. Since all of our faculty are involved in laboratory and field research, the majority of our students get hands-on experience with real science by working with us and other students. Students coauthor peer-reviewed scientific papers and present their work at regional and national meetings. See inside for more details about the exciting science that is going on in our department.

Laboratory and Computer Room Renovations Completed

Biology classroom laboratories and computer classrooms were completely renovated over the summer. Gone are all the vintage 1960’s cabinets, chairs, and floors. All the rooms have wireless internet, a computerized podium, and overhead digital projectors. Some of the classrooms are fitted with electronic smartboards and carts with laptop computers for student use. Areas of the hallways on all floors of the building were painted and prepared as gathering nooks for students. With these alterations the classrooms will become multipurpose spaces and increase the profile of the Science & Technology Center on campus.
Lowrey Laboratory: Molecular Biology

During the summer of 2007, two Rider students, Rick Sando and Stephanie Lauer, worked in Dr. Lowrey’s lab on a project to make mutations in the mammalian enzyme, casein kinase epsilon (CKIε). Both Rick and Steff were successful in using a PCR-based technique to make two mutations in this enzyme which plays an important role in the mammalian circadian system. Rick is continuing to work on this project this semester. He has successfully expressed and purified the mutant forms of the mammalian protein from the bacterium E. coli, and is now working on in vitro assays to determine the effects of the mutations on enzyme function. Rick will present the results of these experiments at the upcoming Sigma Xi Scientific Research Society meeting in Orlando, Florida in November.

Dr. Lowrey also hosted a Middlesex County Community College student in his lab over the summer. Daniel Sanchez came to Rider to complete a biology research project to fulfill his degree requirements. Dan worked on a project to express and purify Taq DNA polymerase from E. coli for use in PCR experiments. Dan enjoyed his time at Rider and is considering transferring to Rider to complete his bachelor’s degree.

Riggs Laboratory: Immunology

The summer of 2007 saw Dan Silberman and Amanda Bucknum return to the lab for a second round of research fun. Amanda presented her research in a poster titled, “Marked Upregulation of B7-H1 in a Tumor Micro-environment Model,” at the New Jersey Commission for Cancer Research (NJCCR) meeting in May. At the same meeting Dan gave a seminar on his work titled CD28 Ligation Suppresses T Cell Activation in an In Vitro Tumor Micro-environment Model. Dan then presented his research as a poster at the Federation of Clinical Immunology Societies Meeting in San Diego, CA. Of course, Dan, Dr. Riggs, and co-author Dr. John Somerville of Bristol Myers Squibb had to discuss their research over the special ales available at the Stone Brewery and at Pizza Port while in southern California! Amanda and Dan’s research involves deciphering the signaling that leads to macrophage suppression of immune responses. Knowledge gained from their research will contribute to understanding why and how the immune response is paralyzed inside tumors. Amanda is continuing her work this fall as a Bachelorate Honor’s Thesis.

Adam Swider and Megan Kozlowski were rookies in the Riggs’ lab last summer. Adam’s research project expanded upon work conducted by Brian Deeney during the spring ’07 semester. The project involved the study of how B lymphocytes are suppressed by macrophages. It turns out that B cells and T cells are suppressed by different mechanisms. Brian is currently in the MS degree program at Villanova University.

Megan’s project involved determining how macrophage density impacts T cell activation. She found significant differences in the degree of suppression based on the amount of macrophage-T cell contact. In addition, Megan collaborated with Adam on a project to determine if CTLA-4-lg, a novel immuno-modulatory drug produced by BMS, could curb an acute, potent activation of the immune response. These studies, designed to model a bioterror attack, monitored the expansion and contraction of the lymphocyte pool in the presence and absence of the drug.

Dr. Riggs continues to travel to Bethesda, MD several times a year to review grants for the National Institutes of Health. In November, he will be visiting Francis Biondo’s (BIO, ED, 2005) honors biology class at North Brunswick High School to lecture on vaccines and sell the Sciences at Rider. He looks forward to teaching the first ever Virology Seminar during the Spring, 2008 term.

Drawbridge Laboratory: Developmental Biology

JD had a busy summer: Nature’s business went to Iceland with me and science majors Amy Vinarsky (BIO), Michele Ripoll (BPY), Ashleigh Leighton (Marine Sciences). The Drawbridge lab (Vanessa Gerrard, April Kmetz, Kristine Casal, Jimmy Leone) then went to the First Pan American Congress in Developmental Biology in Cancun Mexico. Vanessa and April presented their poster “Expression patterns of Ret, GFRalpha1 and GDNF during pronephric morphogenesis in Xenopus laevis”; Jimmy and Kristine presented their poster “The effect of a Ret splice-blocking morpholino oligo on pronephric duct morphogenesis in Xenopus laevis embryos.” All enjoyed both the sun and the science.

While we were in Mexico, Nicole Revere did a great job of cloning two previously unknown forms of Xenopus GDNF, so work also got done.

This fall Jimmy and Kristine are continuing their studies on the Ret protein tyrosine kinase while Vanessa completes our gene expression studies. And, we are always looking for interested freshmen and sophomores to join us in our quest to understand how the amphibian excretory system gets made.
The Weber lab has split its efforts into two projects this year. **Tara Legates**, a Biopsychology major who graduated in May 2007, stayed on over the summer to finish some important experiments on circadian rhythms in “jetlagless” mice before she departed for graduate school at Johns Hopkins University. Her findings, some of which she presented last year at the biannual meeting of the Society for Research on Biological Rhythms, are about to be submitted for publication to the Journal of Biological Rhythms. **Kelley Vandergrift**, a sophomore Biology major, continues her work from this summer on the effects of chemotherapeutic anti-cancer drugs on neurogenesis in the hippocampus of adult mice. Kelley’s beautiful immunohistochemical staining results show dramatic inhibition of cell proliferation, which up-and-coming Biopsychology freshman **Chris Mondie** will examine for correlations with cognitive and behavioral performance using tests for depression-related behavior and spatial memory formation.

**Weber Laboratory: Biological Time Keeping**

**Bidle Laboratory: Molecular Genetics**

Kelly Bidle is currently working at the Institute for Marine and Coastal Studies at Rutgers University while on research sabbatical. She is focusing her efforts on elucidating the mechanisms by which halophiles, or “salt-loving”, microorganisms induce programmed cell death in response to adverse environmental stressors. Students continue to work in her lab at Rider under the supervision of her technician, **Jennifer Nannen** (RU ’05). These students are working on a variety of projects examining, among other things, the effects of UV stress and repair in halophiles, the diversity of moderately halophilic microbes found in salt marshes along the NJ coast, the putative circadian response of halophiles, and the effects of chronic antibiotic treatment on the oral microflora in dogs. Students in the Bidle lab include **Jennifer Smith**, **Katrina Stehle**, **Elizabeth Karwacki**, and **Michael Ciarabella**.

**Karp Laboratory: Neural-Immune Interactions**

**Jennifer Bechtel** (BPY) and **Brittany Baxter** (BIO) participated in a collaboration with scientists in Texas studying an animal model of Parkinson’s disease. Jenn and Brittany measured dopamine and its metabolites in mouse brain samples using our HPLC. Their data are part of a manuscript currently under review for publication in a scientific journal. **Nicole Adams** (BCM) is studying the effects of the glutamate receptor antagonist, ketamine, on immunity both *in vivo* and *in vitro*; she wants to determine if exposure to this sometimes recreational drug influences the ability of stress to change an immune response in mice. **Jenny Stanwix** (BPY) joined the lab after an incredibly successful semester abroad in Australia and is continuing a project started last year by **Sujata Kumar** (BPY). Jenny is studying the effects of a psychological stressor on antibody production in mice that lack the ability to respond to a specific cytokine; she is examining the hypothesis that interferon-gamma is part of the mechanism that helps protect animals from the immunomodulatory effects of stress.
Jivoff Laboratory: Marine Biology

This summer, three students worked out of the Jivoff laboratory; Vicky Raimundo (a freshman marine science major) worked in the laboratory at Rider, while Andy French (senior biopsychology major) and Tim Swavely (senior marine science major) worked at the Rutgers University Marine Field Station in Tuckerton, NJ. Vicky examined carapace strength in green crabs of different carapace coloration from four locations that span this invasive species’ range on the east coast of the US. Andy and Tim compared species diversity, organism abundance, sediment characteristics, and presence of vegetation in front of natural shorelines (beach and marsh) with those of artificial shorelines (bulkheads) throughout Barnegat Bay in a study funded by the Barnegat Bay National Estuary Program. Dr. Jivoff and Dr. Eric Spokas (adjunct in Chemistry) shared mentor responsibilities for several Project Seed students who examined oxygen transportation across the gills of killifish, Fundulus heteroclitus.

Hyatt Laboratory: Plant Ecology

This summer, four students contributed to the Hyatt Lab’s ongoing study of invasive species. Dan Hewins, ’07, environmental studies major, Sheena Gayomba, a junior biochemistry major, and Danielle Cheong, a junior biology major, all worked on projects in the field, the lab and the greenhouse to understand the physiology and population dynamics of invasive garlic mustard. Chenshan Wu, a sophomore biology major, as part of her freshman honors experience, carried out greenhouse experiments to examine the ecology of earthworm invasions and how they interact with plant growth.

Team Garlic Mustard traveled together to Chicago to attend the 2007 joint meeting of the American Botanical Society of America and the American Society of Plant Biologists. They presented a poster, entitled “Jack of all Trades: Biological invasion facilitated by use of multiple forms of nitrogen.” Dan was awarded a $300 travel prize from the Ecological Section for his poster, and he and Dr. Hyatt have coauthored a paper that is currently in review for the scientific journal Plant and Soil. Dan has moved on to graduate school at New Mexico State University, where he is supported by a research and teaching fellowship. The lab is continuing to investigate potential biological control agents through their demographic and experimental studies.

What Happens in Vegas Stays in Vegas

Jen Smith, a senior biology major, just returned from an NSF-sponsored summer Research Experiences for Undergraduates program at the University of Nevada in Las Vegas. During this selective and highly competitive 10-week program, students learned about environmental microbiology using current techniques and scientific ethics using case studies.

Jen worked with Assistant Professor Helen Wing on a project entitled “The Regulation of the icsP promoter in Shigella flexneri by VirB and Host Environmental Conditions.” She earned a $4000 stipend while living on campus for free. When not in lab, the group of students got to travel around the Las Vegas area seeing petroglyphs and ancient lava flows. Jen broke even at the slots and tables.
Travel Opportunity: Nature's Business

Biology students and faculty have expanded their understanding of the natural world by participating in a course called Nature’s Business. Dr. Susan Denbo, a faculty member in the College of Business Administration, has been running a course examining the sustainability of businesses that capitalize on our planet’s rich natural resources.

The most exciting aspect of this course is that it involves international travel either in the January interterm or during the summer. In the past, courses have traveled to Costa Rica and Cuba.

Last summer, Dr. Julie Drawbridge traveled with a mixed group of business and science students and faculty to Iceland where they visited glaciers, geothermal electric plants and deCODE Genetics, a company developing genome-based approaches to find cures for genetic diseases. In January 2008, Drs. Drawbridge, Hyatt and Jivoff will travel with Dr. Husch of the GEMS Department, Dr. Denbo and Dr. Newman of the Marketing department and a variety of students to the Galapagos Islands, an important location for the development of the theory of evolution by natural selection. Future trips are planned to India and South Africa.

Sustainable Rider

Junior Biology Majors Valerie Sodi and Donjae Catanzariti, along with Biopsychology major Rick Sando have formed a student organization called Sustainable Rider to build awareness of the linkages between student behaviors and their ecological implications. This year’s planned activities include a “vampire appliances” demonstration for Halloween, a sale of reusable coffee mugs for use at campus coffee cafes, and a campaign to reduce paper use and encourage recycling. Throughout the year, they are spearheading the campus’s Million Monitor Drive (www.rider.edu/mmd). The drive aims to encourage computer users to set their monitors to go black after fifteen minutes of disuse instead of using electricity to run screen savers. This will save at least $20 of electricity per computer per year, a move that can lead to a significant reduction in carbon emissions. Their work is complemented by the recently formed Energy and Sustainability Steering Committee, a group comprised of faculty, staff and students who are working to implement the recently signed College and University Presidents’ Climate Commitment. CUPCC obliges Rider to devise and implement a plan to make Rider University carbon neutral in its operations.

Tri-Beta: National Honor Society

The Rider chapter of Tri-Beta, the national biology honor society, is making the effort this year to become more active in the Rider community. Look for our upcoming events around campus. This fall we’ll be hosting a plant sale, a Halloween candy sale, and a Thanksgiving bake sale/can drive. We’d also like to extend our participation in the science community with a t-shirt design contest to unite all the sciences at Rider. T-shirts will be made using the winning design and will be offered for sale to Rider students.

We’d also like to work in conjunction with the Science Learning Community to plan another science field trip to the Franklin Institute or other museums in Philadelphia. It is our hope that these planned events for the fall (and more to come this spring) will increase the growth and interest in Tri-Beta and science at Rider.

Jen Smith, President, Tri-Beta Biology Honor Society
Jon Hayashi: Biology Adjunct and New Director of PROBE

The Department welcomes Dr. Jon Hayashi as an adjunct professor and as director of PROBE (Program for Outreach and Biology Education). Dr. Hayashi’s studies the nervous system of insects; he is particularly interested in the function of ion channels in insect neurons. Before coming to Rider, Dr. Hayashi worked in commercial laboratories in the agricultural industry where used a variety of whole-organism and molecular mechanisms to investigate insect specific neuronal targets for large crop pesticides. Dr. Hayashi trained as a neurobiologist at the University of North Carolina, Chapel Hill, where he received his PhD. He did postdoctoral work at the University of Arizona (Tucson).

Dr. Hayashi teaches laboratory sections of Neurobiology (BIO 310L) as well as both lectures and laboratories in Cell and Molecular Biology (BIO 117). Through his association with Rider PROBE, Dr. Hayashi continues his interest in developing an intellectual appreciation of the sciences in high school students.

Examples of Professional & Graduate School Placements 2006/2007

- **Kate Berenson**, premed postbac – Wright State, Boonshoft School of Medicine
- **Christina Caiazzo** ’07 – Drexel University, Doctorate in Physical Therapy Program
- **Frank Doroba** ’06 - University of Pennsylvania School of Dentistry
- **Steve Goldberg** ’06 – Thomas Jefferson University School of Medicine
- **Samuel Hardy**, premed postbac – UMDNJ Robert Wood Johnson School of Medicine
- **Dan Hewins** ’07 – New Mexico State University, PhD program in environmental science
- **Tara Legates** ’07 – Johns Hopkins University Graduate Program in Cell and Molecular Biology
- **Rajmeet Mann** ’06 – Philadelphia College of Optometry
- **Amy Roth**, premed postbac – Lake Erie School of Osteopathic Medicine
- **Alan Rathbun** ’07 – UMDNJ Masters in Public Health program
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**BIONEWS**
Laura Hyatt & Jonathan Karp

**BIOPSYCHOLOGY**
Jonathan Karp

**ENVIRONMENTAL SCIENCE**
Laura Hyatt

**MARINE SCIENCE**
Paul Jivoff & Kelly Bidle

**MEDICAL & DENTAL SCHOOL**
Jim Riggs

**HOSPITAL INTERNSHIP**
Jim Riggs

**PRE-ALLIED HEALTH**
Todd Weber

**SCIENCE & BUSINESS**
Jonathan Karp

**TRI BETA HONOR SOCIETY**
Phil Lowrey

**FRESHMAN HONORS PROGRAM**
Todd Weber

**BACCALAUREATE HONORS PROGRAM**
Laura Hyatt

Why did the students’ cross the river?
Biology is associated with a diverse array of majors and programs at Rider.

What biologists study can help you prepare for a wide variety of career options.