



# BioSynthesis

Volume 2, Issue 5 (October 2003)

BioSynthesis On-Line: <http://departments.bloomu.edu/biology/biosynthesis.html>

## Fall Semester: Upcoming Events

- OCT 27:** Marine Science Club Meeting, 25 HSC; BU Science Teachers Association meeting, 7 p.m., 410 Kehr  
**OCT 29:** Biology Club Meeting, 5:00 p.m.  
**NOV 4:** Last Day to Withdraw from a Class  
**NOV 8:** MOCK MCAT, 8 a.m. 79 HSC  
**NOV 9:** Biology Club Trip to Hawk Mountain  
**NOV 10:** BU Science Teachers Association Meeting, 7 p.m., 410 Kehr  
**NOV 18:** Fall Into Health Program, 9:00 p.m., Columbia Lobby  
**NOV 21:** BUSTA hosts Science Bee, Kehr Union, 9 a.m. to 2 p.m.  
**NOV 27:** Deadline: Undergraduate Research Proposals



## Look what's inside:

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## BAHS by the Numbers

Did you know that in the Department of Biological and Allied Health Sciences we have:

- 3 biology minors
- 148 new freshmen
- 18 faculty members
- 39 transfer students
- 11 pre-pharmacy students
- 167 medical imaging majors
- 18 clinical lab science majors
- 47 pre-physical therapy students
- 259 B.S. and B.A. biology students
- 10 pre-occupational therapy students
- 34 students in Secondary Education in Biology

## FACULTY AND STAFF RESOURCES

Department Chairperson	Dr. Margaret Till, 125 HSC
Department Secretary	Ms. Vicki Beishline, 125 HSC
Assistant Chairperson	Dr. Marianna Wood, 103 HSC
Allied Health Coordinator	Dr. Judith Kipe-Nolt, 104 HSC
Graduate Program Coordinator	Dr. Carl Hansen, 123 HSC
Department Webmaster	Dr. George Chamuris, 74N2 HSC
Department Pre-professional Committee Co-chairs	Dr. Joseph Ardizzi, 74N1 HSC and Dr. Mark Melnychuk, 106 HSC

## CONTEST!

How would you like to win a prize from the biology department without doing any work? Simply guess when the eggs will hatch. A wheel bug was recently spotted laying eggs on Hartline Science Center. Check out the great picture by biology major **Lucas Blair**. The eggs will overwinter there and emerge sometime in the spring. The person who guesses closest to the actually date of hatching will win a gift certificate to the bookstore. Directions to find the eggs and a sign-up sheet is located outside of Dr. Wassmer's office. One guess per person please. For more information about the biology of this beautiful animal see <http://www.hiltonpond.org/ThisWeek030901.html>.





# What Electives should I take?

Biology majors who are pursuing the B.S. must take a minimum of 12 credits of biology electives while those enrolled in the B.A. program must take a minimum of 9 credits. Which electives should you take? There are several possible strategies. One approach is to target your electives toward your particular academic and career interests. For example, a student interested in pre-vet might select Comparative Vertebrate Anatomy and Vertebrate Zoology while a student interested in working in the pharmaceutical industry may choose Molecular Biology and Microbial Physiology. Another approach is to take electives to expand your horizons and to explore areas that you want to learn more about. Take advantage of your bio electives and make your choices wisely. They can help you stand out from the crowd! See your advisor to discuss your options. Below are brief descriptions of our spring elective offerings.



## Human Genetics (50-233)

**Dr. Hansen**

**Prerequisites: Concepts in Biology I, or Cells, Genes and Molecules, or Human Biology**

*Biology has its own periodic table, although it includes not 100 elements but 100,000 of them - the genes of the human genome.*  
Eric Landers, 1998

Human genetics provides one path to understanding who and what we are. We will address human heredity and variation from several perspectives: From the molecular basis of a gene to its expression as a trait; from the single cell to the individual; and from individuals to the human population. We will apply our understanding of genetics to address major issues in human society.

- human disease - from cystic fibrosis to schizophrenia to cancer.
- implications of the human genome project for medicine, biotechnology and genetic engineering.
- human origins and the relatedness of human populations.
- nature versus nurture: Just how much of what we are is encoded in our genes?



## Medical Bacteriology (50.342)

**Dr. Parsons**

**Prerequisites: Biology of Microorganisms and Cell Biology**

Provides a study of microorganisms capable of causing disease in humans. Emphasizes epidemiology, laboratory diagnosis, principles of pathogenesis, treatment and prevention. The course utilizes medical models, group and individual projects to attain this goal. Three hours of lecture and three hours of discussion/laboratory per week.

## Developmental Biology (50.431)

**Dr. Hansen**

**Prerequisites: Cell Biology, Organic Chemistry I or Fundamentals of Organic Chemistry**



*Developmental Biology is at the core of all Biology. It deals with the process by which genes in the fertilized egg control cell behavior in the embryo and so determine its pattern, its form and much of its behavior.* Lewis Wolpert, 1999

The development of multicellular organisms from a single cell - the fertilized egg- is a brilliant triumph of evolution. During embryonic development, the egg divides to give rise to many millions of cells, which form structures as complex and varied as eyes, arms, the heart, and the brain. In developmental biology we will address a diversity of interrelated questions, such as:

- How do cells arising from division of the fertilized egg become different from each other?
- How do they become organized into structures such as limbs and brain?
- What controls the behavior of individual cells such that highly organized patterns emerge?
- How is the organizing information embedded in the egg and, in particular, the genetic material?

We will examine these processes in lecture and in a hands-on-lab. In lab we will learn novel microscopy techniques, collect gametes from sea urchins and follow fertilization, perform micro-surgery on chicken embryos, and examine developmental changes in gene expression.

## Population Biology (50.460)



**Dr. Klinger**

Presents selected themes in the biology of animal, plant and fungal populations. Topics include: population structure and dynamics, population genetics, population ecology and speciation. Fundamental principles and current models and hypotheses will be stressed, along with treatments of research techniques, computer modeling and potential for future research.

## Animal Cell Physiology (50.472)



**Dr. Brubaker**

**Prerequisites:** Cell Biology (50.272), Organic Chemistry I (52.231) or Fundamentals of Organic Chemistry (52.230) or permission of the instructor

Multi-cellular organisms depend upon the homeostasis of cells to maintain their existence. Since cells are the fundamental units of life, a basic knowledge of cell physiology is essential for understanding how organisms work. This course will emphasize topics such as cell-cell and cell-matrix interactions, membrane transport and trafficking, cell signaling and cell cycle. In addition, processes needed for cell functions such as metabolism and DNA replication will be examined. Note: Time is Tu Th 8—9:15 a.m. (changed from schedule newspaper.)

## Plant Physiology (50.477)



**Dr. Williams**

**Prerequisites:** Cell Biology, Organic Chemistry I or Fundamentals of Organic Chemistry

How do plants convert radiant energy into chemical energy? How do plants move water hundreds of feet in the air without a pump? Why and how do plants make nifty drugs such as aspirin and cardiac glycosides? Why don't plants have kidneys? How do plants "know" when to drop their leaves, and why do those leaves those strange colors in the fall? These and other secrets of how the green world works are exposed in Plant Physiology.

## Special Topics: Medical Mycology (50.483)



**Dr. Parsons**

**Prerequisites:** Microbiology (50.242); Medical Bacteriology (50.342) and Immunology (50.343) are recommended

The course is presented in a lecture format with PowerPoint slides. Medical Mycology deals with the fungi [yeast and molds] that are the (a)etiologic agents of infections and/or intoxications found in man and animals. The course will utilize an epidemiological approach to the subject matter.

## Methods in Biotechnology (50.484)



**Dr. Davis**

**Prerequisites:** 50.333 or 52.422 and permission of instructor

This is an investigation-based course in which students undertake a project of their own design employing methods used in biotechnology. Projects can involve a variety of molecular biology, genetic and physiological approaches to address questions on almost any organism - bacteria, plants, animals and yes, even fungi. Students will meet as a research group once per week to learn techniques and problem solve issues related to their research project. Much of the project will be performed by the student independently through out the week. Students interested in this course need to see Dr. Davis ASAP. You must submit and have a short proposal approved before you can register for this course.

Check out this course that can be used to fulfill your Values, Ethics and Responsible Decision Making Requirement.....

## Social Implications of Biology (50.254)

**Dr. Wassmer**

This course explores the societal implications of current thought in biology. The science of biology, and the technological advances that it generates, affects all aspects of our lives. It affects our legal systems, healthcare, politics, social justice issues, families, the environment, and economics. The aim of this course is not so much learning what to think about particular issues which arise from biology and its applications, but how to learn to think about them. Such an understanding will help prepare you to respond intelligently to future scientific findings. This course cannot be counted toward a degree in biology or toward Group



## News from the Pre-professional Committee

The BU pre-professional committee hosted an orientation session for students last month at Andrus Library. We had a great turnout! (perhaps it was for the snacks!) Thanks to all for attending. According to our department database, we currently have 61 pre-professional students who are enrolled in the following programs:

pre-Chiropractic	2
pre-Dental	9
pre-Medical	37
pre-Physician Assistant	7
pre-Veterinary	10
pre-Optometry	1

The mission of the BU pre-professional committee is to HELP YOU gain admission to professional school. We do this by advising pre-professional students, assisting students with the application process, evaluating student credentials, preparing committee letters of evaluation, obtaining resources for students relating to professional schools, and establishing relationships with professional schools. Let us know how we can help you. The co-chairs of the committee are Drs. Joseph Ardizzi and Mark Melnychuk, Department of Biological and Allied Health Sciences. Other committee members include Dr. Cindy Surmacz from Biological and Allied Health Sciences and Drs. Christopher Hallen and Michael Berg from Chemistry. Students are encouraged to check the committee website (<http://departments.bloomu.edu/biology/preprof.htm>) for announcements, current events, information on course selection, pre-professional test materials, and links to important web sites.



## MOCK MCAT COMING SOON!

The Pre-professional Committee will offer a practice MCAT exam to students interested in allopathic, osteopathic, podiatric, or veterinary medicine, dentistry, optometry, and chiropractic. MCAT, a test developed by the Association of Medical Colleges, is the standardized test required for medical school admission. Although dental and optometry schools have their own specialized standard examinations, pre-dental and pre-optometry students are encouraged to take advantage of this opportunity to gain exposure to the standardized test experience. The MCAT assesses mastery in biology, general and organic chemistry, physics, scientific problem solving, critical thinking, and writing skills. Scores are provided in four categories: biological science, critical thinking, physical sciences, and writing. By taking a practice MCAT you will become familiar with the length and format of the exam and the depth and breadth of its questions. After receiving your "practice scores" you will get a better understanding of the content areas that require further study. This will help you to be better prepared for the real exam. This is a special opportunity! Most colleges and universities do not provide their students with the opportunity to take an MCAT for free. The cost of the practice exams has been offset by a Special Initiatives Grant from the College of Science and Technology. The practice MCAT is recommended for sophomores, juniors, or seniors. Freshmen should probably wait until they have had more college science courses.

**WHEN: Saturday, November 8, 8:00 a.m. to 3:15 pm.**

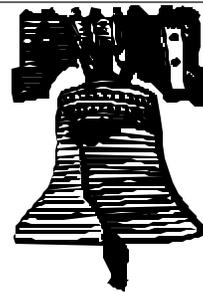
**WHERE: 79 Hartline**

**BRING: A lunch**

**TO RESERVE YOUR SEAT: E-mail Dr. Berg (mberg@bloomu.edu)**

**ANY QUESTIONS? Please feel free to contact any member of the Pre-professional Committee.**

## PRE-MEDS VISIT PCOM



Dr. Melnychuk and eight BU pre-medicine students trekked to Philadelphia (note Liberty Bell at right!) to attend the Open House program at the Philadelphia College of Osteopathic Medicine (PCOM). The consensus was that "PCOM rocks!" The participants recently shared the highlights of their visit with *Biosynthesis* :

**Oluwasayo Adeyemo:** "I really liked it. I had never been to a medical school before. I really enjoyed talking to the medical students and finding out what their lives are like on a daily basis."

**Emily Bray:** "The highlight of the trip was definitely getting to see the cadaver lab!"

**Mallory Garnett:** "I enjoyed talking to the doctors and finding out more about their program. I liked the tour of the anatomy lab."

**Judy Harry:** "I got a lot of good pointers on how to present yourself at an interview."

**Mike Kaminsky:** "I learned a lot from the panel discussion with students. I was impressed with the school and its philosophy. The people seemed really friendly. The cadaver lab was really interesting."

**Amanda Shompert:** "I appreciated the opportunity to talk to the students there about admissions and test scores and to hear their stories."

**Krissie Tofts:** "I was impressed with how people help each other. It seemed like a family atmosphere."

**Val VanCleaf:** "It really seemed like a friendly and welcoming place."

## ALLIED HEALTH UPDATES



### Medical Imaging Students: Think Ahead!

Medical Imaging Students are encouraged to submit their applications to clinical programs early-this semester. Apply to several hospitals—there is a lot of competition. Go on line or call schools for applications.

### Fall Into Health Program

The last "Fall Into Health Series" program this semester is November 18 at 9:00 p.m. in Columbia Hall Lobby. Dr. Sharon Haymaker, Department of Nursing, will lead a discussion on "Avoiding Ephedra & Other Potentially Harmful Ingredients." Free snacks!

### Open House at TJU's College of Health Professions

Our affiliate, Thomas Jefferson University, will host a Fall Open House on Saturday, November 1, 2003 from 11:00 a.m. to 2:00 pm. This is a great opportunity to visit the campus and to learn more about their programs in physical therapy, occupational therapy, and diagnostic imaging. TJU is located in center city Philadelphia. The session takes place at Jefferson Alumni Hall, 1020 Locust St, Philadelphia, PA. To register, call toll-free at 1-877-JEFF-CHP or on line at [www.jefferson.edu/jchp](http://www.jefferson.edu/jchp)

# Santa Cruz Island: A Rose Amongst “Thorns”

by Dr. John Hranitz

In hindsight, I suppose my trip to Santa Cruz Island began in 1999, when I reviewed a colleague’s symposium manuscript on invasive mutualisms during breaks in the meeting of the Society for Integrative and Comparative Biology. That manuscript review has yielded an enjoyable collaboration and, last summer, a wonderful trip to California. My colleague, Dr. John Barthell, received National Geographic Society funding to conduct a follow-up survey on the Santa Cruz Island study he conducted as a post-doctoral fellow and, while in California, why not perform another field experiment on the bees at UC Davis? As an enticement, he offered a most-expenses paid trip to California, including three days on Santa Cruz Island, in exchange for my services as a researcher on the project. From descriptions of his time on Santa Cruz Island, I knew this was an offer I could not refuse!



Upon arriving in California, we embarked on another of our epic driving marathons through California, from Ontario (CA) to Ventura to Davis, picking up an undergraduate researcher en route. After conducting the field experiment at UC Davis, we traveled to Pomona to stay overnight with another faculty researcher, Dr. Joan Leong and her undergraduate students. The next morning, we all boarded a catamaran boat to Santa Cruz Island. During the 40-minute boat ride, we encountered sea lions basking on a buoy marker and striped dolphins which followed our boat for a considerable distance. The dolphins in particular seemed to enjoy the fuss and put on a wonderful display with many photo opportunities. As we approached the island, we encountered numerous sea kayakers against the backdrop of the 22-mile long Santa Cruz Island, with its black basaltic rock, rising from the sea. While the approach by boat was quite beautiful, I was excited to see a habitat I had never seen once we debarked from the boat. Steep mountains rising 2-3,000 feet above the valley floor were covered by a savannah with coastal and scrub oak trees on south-facing slopes and scrub-oak thicket on north-facing slopes. Traveling to the UC Field Station required driving over a mountain ridge and through the central valley of the island. Once there, we settled in, sharing the station with about 12 people who were involved in removing fennel (a non-native plant on the island) and three graduate students. Before dinner, we hiked around the station and surrounding habitats to check that the experimental plots of yellowstar thistle were still intact and ready to be collected in two days. Throughout our hike, I spotted small puffs of dust rising from the road about six feet in front of us as we walked. Closer observation revealed these to be hatchlings of a side-blotched lizard darting for cover. On the second day, we drove 15 miles over rugged terrain from the field station to the western end of the island (3.5 hours drive!). We hiked the western end of the island, including some hiking and rock climbing in the rocky intertidal zone. The black basaltic rock of the intertidal zone was encrusted with a layer of marine invertebrate life (including mussels, chitons, limpets, sea anemones) and algae. Oystercatchers were seen moving among the rocks choosing from the invertebrate menu before them. Standing atop the cliffs overlooking the bay, it was easy to see the large expanses of kelp just beyond the intertidal zone. With the last full day on the island upon us, we collected the yellowstar thistle seed heads from the experimental plots. This was comparable to picking up a pin-cushion in which all of the pins were facing sharp end out. The spines of the thistle are long and sharp, not unlike hypodermic needles. The last morning of our island stay was enjoyable because we had time to visit with some of the other researchers at the station before we all boarded the catamaran back to Ventura. Among the graduate students we met: Jeff who has been mapping the soils and human (recent and prehistoric) activities on the island to study the effects of human habitation on the ecology of the island, Heidi who studies the island skunk (and no one gets too close too), and Rachel who studies the island (dwarf) fox. When all was said and done, the three days on the island were busy and exhausting but left me wanting to see more!

# News from Student Organizations...

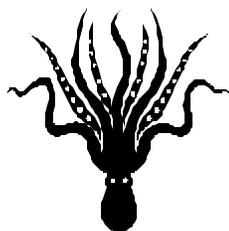


## Biology Club



Biology Club is off to a great start this year! They were crowned TRIVIA KINGS (or at least RUNNER UPS to the faculty team) at the trivia contest sponsored by BUGS (the Bloomsburg University Geological Society.) The Biology Club also recently invited Dr. Clay Corbin, a new BAHS faculty member, to a meeting to learn about his background and research program. Future speakers will include Dr. Kris Brubaker, another new BAHS faculty member and visitors from Temple University Dental School and the Ohio College of Podiatric Medicine. Fun events are also planned such as a hayride at Jason George's farm. Don't miss the bio club excursion to Hawk Mountain on November 9. Drs. Hranitz and Corbin will lead the group to see the migration of the Golden Eagle. Planning is also underway for a T-shirt sale featuring an "All-Hartline T-shirt." If you are interested in any of these programs, contact Erica at honijo842@yahoo.com or X 2852. Biology club officers are: President: **Erica Weiskircher**, Vice-President: **Denise Lucas**, Secretary: **Katy Parise**, and Treasurer: **Mike Kaminsky**. Next meeting is Weds, October 29 in 86 HSC.

## Marine Science Club



Are you interested in Marine Science? Then this club is for you! You don't have to be a marine science major to join in the fun. Everyone is welcome! The group meets every other Monday in 25 HSC. Next meeting is Monday, October 27, 2003. At a recent meeting, Dr. Cindy Venn, Department of Geography and Geoscience, presented slides of Antarctica. Future programs may include information sessions on graduate programs in marine science and on how to build your resume. The group is considering a spring semester trip to an aquarium, either in Baltimore or Camden. A goldfish fundraiser is also being planned! For more information, please contact any officer of the Marine Science Club: President: **Kevin Brace**, Vice-President: **Jordan Ward**, Secretary: **Katy Parise**, and Treasurer, **Ben Day**.

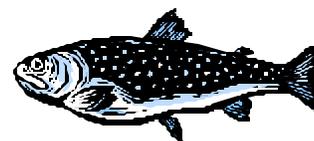
## BUSTA to host Science Bee



The newly re-activated BU Science Teacher Association (BUSTA!) is hosting a Science Bee for area seventh and eighth graders on Friday, November 21 from 9 a.m. to 2 p.m. in Kehr Union. Teams of 5 students will compete in the area of life science and earth and space science. Participating school districts include: Berwick, Bloomsburg, Danville, Millville, Benton, Shamokin, Southern Columbia, and Central Columbia. BU profs and students will also join in the fun by conducting demonstrations and leading activities. BUSTA would love your help! See President **Amy Miller** for more information. BUSTA meets every other Monday at 7 p.m. in 410 Kehr Union. Upcoming meetings are slated for October 27, November 10, and November 24. All science and education majors are welcome.

## Internship Available

One of the speakers at this year's Career Days was Wade Jodun of the U.S. Fish and Wildlife Service. He spoke about careers in fisheries management and stressed the importance of internships for those interested in this field. He mentioned that he often has positions available for dedicated students. If you are interested contact Wade Jodun at 570.726.4247 x33 or at Wade\_Jodun@fws.gov



## Graduate Open House at PCOM: Learn about Programs in Forensics, Physician Assistant Studies & Biomedical Science

The Philadelphia College of Osteopathic Medicine is hosting an Open House to discuss their graduate programs in Biomedical Sciences, Physician Assistant Studies, and Forensic Medicine. The Open House is being held on Friday, November 7, 2003 from 5:30 – 8 p.m. Please RSVP to PCOM's office of admissions by November 6, 2003. They can be contacted at 1-800-999-6998 or admissions@pcom.edu PCOM is located at 4170 City Avenue in Philadelphia, PA .



## Career Feature: Forensic Scientist by Dr. John Hranitz

A bikini-clad co-ed in a lounge chair is sleeping on the beach during Spring Break. She isn't awakened by the incoming tide and fellow party-goers, a scene hinting at an unfortunate and untimely death. This is a job for (no, not Superman) forensic science! The scenario described above was the opening scene of a recent "CSI: Miami" episode. Not only has forensic science become a familiar and popular theme for television shows but, it has also become one of the hottest fads in education. Forensic Science curricula are appearing nationwide and students in the traditional sciences are being attracted to careers in forensics. Indeed, **scientists** are needed. But what should you know before jumping into this field? There are some important issues to consider while contemplating a career in forensic science.

### What is Forensic Science?

Forensic science is the application of science to any aspect of the law or law enforcement. It is a multi-disciplinary field involving skills in biology, chemistry, criminology, psychology, physics, and sociology.

### What is a Forensic Scientist?

With such a diversity of disciplines contributing to forensic science and the expectation that forensic scientists be expert in their field, the forensic scientist is someone who obtains their education in one of the principal disciplines and is cross-discipline educated in related areas sufficiently to work with forensic scientists trained in other fields. No single individual could possibly be expert in all the necessary areas. Therefore, it is more appropriate to think of teams of forensic scientists composed of individuals that perform specific roles in an overall investigation. The forensics team typically works together at a crime scene after which individuals separate to perform their duties as required of a particular investigation and testify in court, if necessary. Typically members of a forensic team include specialists in:

Firearms and toolmark identification	examines relationships between projectiles and firearms (including explosives) or tools and marks at a crime scene (e.g., crowbar versus indentations on a door frame)
Forensic Psychiatry and Profiling	diagnosis of mental disorders and description of potential offender from crime scene evidence
Questioned Document Examination	studies the relationship of documents to crimes (e.g., handwriting analysis, authenticity of records)
Criminal Law	defines the crime and determines how it should be prosecuted (lawyer)
Forensic Photography	photography as it applies to investigations
Forensic Toxicology	chemical analysis of body fluids and substances at crime scenes
Personal Identification	Identifies either victim or perpetrator based on fingerprints, genotyping, dental records and/or other means.

### What type of education should I get?

All forensic science jobs require a minimum of a Bachelor of Science in areas related to the specific job requirements. Some specialized positions may require the master's degree or a doctorate in medicine (e.g., pathologist). While some universities offer degree programs in Forensic Science, it is important to know that **there is no industry standard degree**. Your choice of degree and elective requirements is a matter of personal preference and should be carefully matched for your individual career interest. Your advisor can help you formulate a program of study. To become a **Forensic Science Technologist**, course work in your program of study should emphasize microscopy, anatomy and physiology, genetics, chemistry, molecular techniques, statistics, and experience conducting research in an area related to your area of interest. For example, forensic toxicologists are generally chemists or biologists while those in the area of personal identification are generally biologists.

### How does the B.S. in Biology degree at BU prepare you for a career in Forensic Science?

The B.S. in Biology is a degree for students who want to become scientists (biologists). Students receive a broad and rigorous science (biology, chemistry, physics) education in core areas and specialize in areas related to their interests (e.g., forensic science) through electives and independent research/internship experiences. With the appropriate electives, degree option, research experience, or degree minor, students with the B.S. in Biology can pursue a career in Forensic Science. A forensic scientist is a scientist first and specializes in forensics second.

### How does the B.S. in Clinical Lab Science degree at BU prepare you for a career in Forensic Science?

The Clinical Lab Science degree program combines a rigorous natural science and liberal arts education with clinical instruction. Students complete 90 credit hours (3 years) of core science and general education classes at BU followed by one calendar year in a hospital clinical program. Clinical lab scientists perform many of the laboratory tests used in the detection, diagnosis, and treatment of diseases. They are valuable in a forensics setting because they are trained to analyze blood, tissues, and fluids using a variety of precise methods and technologies.

**Many Course Recommendations for Majors Interested in Forensic Science Careers**

Area of Training	Electives with Relevant Topic Areas
Microscopy	Microbiology (Medical and Clinical), Histology, Scanning Electron Microscopy: Marine Applications
Anatomy and Physiology	A&P 1 and A&P 2 (human), Comparative Vertebrate Anatomy, Vertebrate Zoology, Immunology, Clinical Hematology, Vertebrate Systems Physiology
Genetics	Genetics, Human Genetics, Population Biology, Evolution ( the latter two courses provide population genetic theory)
Molecular techniques	Molecular Biology, Biochemistry 1 & 2, Animal Cell Physiology, Clinical Immunology/Serology
Chemistry	Biochemistry, Quantitative Analytical Chemistry, Clinical Chemistry
Statistics	Introduction to Statistics OR Basic Statistics, AND Biostatistics
Internship	Internship in Biology and Biology Research (50-490; with an internship mentor and off-campus internship site (e.g., FBI)).
Research Experience	Independent Study (scheduled with a research mentor)
<b>Options in General Education Requirements, Degree Options, or Degree Minors</b>	
Communications or Group A electives	Sign language, Spanish, French, German, Russian, etc.
Related B.S. in Biology Degree Option	Biotechnology related to molecular techniques (e.g., DNA isolation, genetic analysis)
Related Minor Areas of Study (or Group B courses)	Anthropology, Chemistry, Psychology, Sociology/Criminal Justice
Extracurricular Activities	Read journal articles in your area of interest, join a forensic science society and attend meetings

**What are the career opportunities for Forensic Scientists?**

As indicated above, many career options exist but how many jobs are available? How difficult is it to be hired as a Forensic Science Technologist? How many more positions will open up in the future? Where are the jobs? Department of Labor Statistics for 2000 show that 6,150 Forensic Science Technicians were in the labor force with a mean hourly wage of \$18.95 and mean annual earnings of \$39,410. Compare the statistics for Forensic Science Technicians to those for Biological Technicians. In 2001, there were 43,560 Biological Technicians earning a mean hourly wage of \$16.36 and a mean annual earnings of \$34,030. Reports from universities nationwide indicate forensic science enrollments are increasing. Ohio University reports an enrollment of 100 students. Meanwhile, Eastern Kentucky University reports an enrollment of 180 students. Such enrollments are likely to ensure that forensic science jobs will be competitive but that qualified, motivated, and persistent students will find jobs. One advantage of the B.S. in Biology (Biotechnology Option) and the B.S. in Clinical Laboratory Science is that it allows graduates to apply for jobs in forensics or biology labs.

**Post-Graduate Studies in Forensic Science**

While the B.S. in Biology prepares students for careers in forensic science, specialized training may be needed for certain career paths or for that competitive edge in applying for jobs in a competitive job market. Such training can be obtained from certification programs and graduate programs specializing in forensic science. In choosing such programs, remember quality of education is important. Because forensic scientists are scientists, first and foremost, faculty in quality programs in forensic science should be conducting research and publishing in the journals of their field. Investigate the curriculum and the faculty training students to be certain they offer the skill level you desire.

**Some Interesting Web Sites** (\* indicate sites with career or job information)

American Society of Crime Lab Directors\* <http://www.ascd.org/>

American Association of Forensic Scientists\* <http://www.aafs.org>

UC Berkeley Forensics <http://www.forensidna.com>

National Center for Forensic Science\* <http://ncfs.ucf.edu/>

Federal Bureau of Investigation\* <http://www.fbi.gov>

U.S. Fish and Wildlife Law Enforcement (fascinating)\* <http://www.le.fws.gov/>

U.S. Fish and Wildlife Forensics Laboratory ( Dr. Clark R. Bavin, Director of the National USFW Forensics Laboratory)–very, very fascinating! <http://www.lab.fws.gov/>

Mitotyping (private company; State College, PA) <http://www.mitotyping.com/>

Pennsylvania State Police, Bureau of Forensics (6 Regional CSI Laboratories and 1 DNA Laboratory) - no web site located but contact information is available on the web: Bethlehem Regional Laboratory, Bethlehem, PA

DNA Laboratory, Greensburg, PA; Erie Regional Laboratory, Erie, PA; Greensburg Regional Laboratory, Greensburg, PA

Lima Regional Laboratory, Media, PA; Harrisburg Regional Laboratory, Harrisburg, PA

Wyoming Regional Laboratory, Wyoming, PA

# What have the BAHS Faculty Been Up To?

**Dr. Joseph Ardizzi** had a busy summer setting up WEB pages and revising course materials. He is looking forward to the portion of his Microbial and Molecular Genetics class where students serve as lab instructors and design actual lab experiences for their classmates. Dr. Ardizzi's research expertise is in the area of microbial genetics. He would welcome students interested in participating in any of his ongoing research projects.

**Dr. Kristen Brubaker** attended the annual meeting of the American Society for Bone and Mineral Research in Minneapolis, MN to present the poster *Bone Morphogenetic Protein Signaling in Prostate Cancer Cell Lines*. Check it out—it is located in the lobby display case.

**Dr. George Chamuris** is currently involved with two research areas both involving student collaborators. One project is the completion of a manuscript to be submitted to the journal *Environmental Entomology* that involved inventories of the total invertebrates and of the Collembola at two study sites (Jakey's Hollow and Upper Campus). The other project is to document and characterize any aberrations in meiosis or sporogenesis that would result in basidiospores lacking a nucleus.

**Dr. Clay Corbin** is heading to New Orleans in January for the annual conference of the Society for Integrative and Comparative Biology where he will present *Ecomorphological Concordance Between Old and New World Flycatcher Communities*. Dr. Corbin will also be chairing a session on Population and Community Ecology at the meeting.

**Dr. George Davis** has returned to the department full-time this academic year. It is great to have him back! Dr. Davis taught in the summer research camp, *Fun with DNA*, at the Weis Center for Research, Geisinger Clinic for 6th—8th graders. Dr. Davis is continuing his research on molecular marker analysis in kiwis and would welcome any interested students to contact him.

**Mrs. Melinda Diltz** is serving as the secretary of the Fishing Creek Watershed Association. She is also co-chairperson for monitoring.

**Dr. Carl Hansen** continued his research in the area of G protein-mediated signaling over the summer and participated in the First Penn State Workshop in Bioinformatics held at University Park. He also helped organize and teach two summer research camps at the Weis Center for Research, Geisinger Clinic. The first, *Science is Fun*, introduced local 3rd-5th graders to how scientists think and how science works. The second program, *Fun with DNA*, introduced 6th-8th graders to molecular biology.

**Dr. John Hranitz** received a Research and Disciplinary Grant from Bloomsburg University. The objective of this research is to investigate levels of gene flow among barnacle populations in the tropical Pacific Ocean using mtDNA sequence data from the cytochrome oxidase I locus. This project complements the investigations conducted by Dr. Venn, Dr. Klinger, and their students.

**Dr. Judy Kipe-Nolt** presented the results of anaerobic digestion research at the regional meeting of the National Resource Conservation Service at Syracuse University this summer.

**Dr. Thomas Klinger** is serving as the Vice President for Academic Affairs at The Marine Science Consortium, Wallops Island, VA. Dr. Klinger advises students who are interested in BU's Marine Science Option and is currently mentoring two research students who are investigating aspects of sea urchin physiology.

**Dr. Mark Melnychuk** assisted with the administration of BU's Summer College. He recently led a group of pre-professional students on a trip to PCOM and is currently planning visits by professional schools to BU.

**Dr. Barry Nolt** attended the second annual *Molecular Biology Workshop For State Universities of Pennsylvania* at the Biotechnology Institute at Penn State University in June.

**Dr. Jim Parsons** recently returned from Portland, Oregon for the annual meeting of the National Association of Biology Teachers. Dr. Parsons attended a "Bioterrorism Workshop" and a variety of allied health microbiology presentations.

**Dr. Alan Spevak** joins us this year from Shippensburg University most recently. He is an accomplished nature photographer. Check out his website at [www.lightsinger.com](http://www.lightsinger.com) and the wooly bear picture on the next page!

**Dr. Cindy Surmacz** traveled to Las Vegas, NV in June to present a workshop on scientific inquiry at the annual conference of ABLE, the Association for Biology Laboratory Education, an organization dedicated to improving the undergraduate biology laboratory experience.

## More Faculty Updates...

**Drs. Margaret Till, Casey Shonis and Judy Kipe-Nolt** hosted elementary and middle school students from the Berwick school district this summer as part of a program called Brain Links. This program featured hands-on activities in neuroscience and was funded by a grant from the Northcentral Area Health Education Center.

**Dr. Gary Wassmer** is presenting a poster entitled *Observations of the effects of light and gravity on biological rhythms in the desert beetle* *Cryptoglossa verrucosus*, at the Society for Integrative and Comparative Biology conference early in January, 2004.

**Dr. Kevin Williams** headed to Lock Haven University recently in his role as BU's director of the Commonwealth of Pennsylvania University Biologists (CPUB.) CPUB is an organization of biology faculty from the fourteen universities in the State System of Higher Education. CPUB's mission is to promote research and teaching in biology.

**Dr. Marianna Wood** is currently exploring teaching strategies in her classes that incorporate students' various learning styles. Dr. Wood is coordinating the department's University Seminar classes and Outcomes Assessment initiatives.

## Meet our Staff

Our main department office is located in 125 Hartline Science Center (the room with the picture window!) **Ms. Vicki Beishline** is the department secretary. She has been at the University for 25 years and holds a bachelor's degree from BU in Office Administration. Our part-time student secretaries are **Meredith Murray (Biology), Suzanne Peist (Nursing), and Kristi Brinckman (Biology.)** Other student workers include lab assistants **Angela Mignogna, Jennifer Intelicato, and Jordan Ward.**

## Meet the Woolly Bear Caterpillar!

Dr. Spevak provides us with this great photo of the woolly bear caterpillar, common in the fall. As most know, folklore attributes to the caterpillar the ability to forecast the severity of the coming winter by the amount of black (cold) or brown (warm) in the color of its hair. All he has seen this year, like the one at right, have had mostly brown hair!



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## News You Can Use!



Deadline to withdraw from a class: **Tuesday, November 4, 2003**

Deadline to submit proposals for Undergraduate Research in Biology to Dean's Office: **Nov 27, 2003**

Change in times for 50.472, Animal Cell Physiology, to TuTh 8 a.m. (to prevent conflict w/ Biochemistry)

Change in 50.107-01, Medical Terminology, to Tu 8:30. All students must see Dr Kipe-Nolt to enroll (all seats are reserved).

**NEED HELP IN CHEMISTRY?** Tutoring is available from the Chemistry Club, **Mondays at 8 p.m. in 238 HSC.**



## THE BU MASTERS PROGRAM

The Department of Biological and Allied Health Sciences offers both a Masters of Science degree (M.S.) and a Master of Education (M.Ed.) in Biology. Our master's program in general biology provides opportunities for course work and research at the supraorganismal, organismal, cellular, and molecular levels of biology. The program prepares students for admission to doctoral programs or professional schools and also enhances the knowledge and experience of high school biology teachers. For more information, contact the graduate program coordinator, Dr. Carl Hansen (123 HSC).

### SPRING 2004 GRADUATE COURSES

Graduate student courses for the spring will include:

- Biostatistics
- Developmental Biology
- Plant Physiology
- Animal Cell Physiology
- Population Biology

## BAHS ALUMNI UPDATES

**Karen Avery** (M.S. Biology) is teaching biology at Milton High School.

**Kim (Martin) Baldwin** has returned from her stint teaching in Samoa. (She petted a sea snake, locked herself IN her classroom over the weekend... and had many similar adventures...)

**Joe Bernardo** (M.S. Biology) has recently received a promotion and is now a Senior Project Scientist in Vaccine Regulatory and Analytical Sciences at Merck and Co. in West Point, PA. Joe does assay transfers and technology transfers of live virus vaccines.

**Jen Bryan** stopped by recently to visit from Lake Erie College of Osteopathic Medicine. Jen is working hard and is enjoying her first year.

**Dr. Zachary Hoffer** has received his Ph.D. and is now doing a postdoctoral fellowship at Hershey Medical Center.

**Dr. Eric Lovely** recently completed a year-long global circumnavigation/honeymoon and is now in a tenure track position at the University of Central Arkansas.

**Rodney McAllister** is married, living in Seattle, and working for the National Oceanic and Atmospheric Administration

**Annie Rick** has been accepted into the pharmacy program at The Ohio State University. She will have her pharmacy doctorate in four years.

**Mary Jean Rosini** (BS Biology 98) has been recently promoted to Senior Professional Representative Merck & Co., US Human Health Division.

**Chad Springer** is employed by Centocor as an operator of a large bioreactor for cell culture. The monoclonal antibodies produced are used in clinical trials.

**Jessica Stombaugh** has left her position as the Senior Instructor for High School Programs at the Marine Science Center and is now in Indiana helping to develop environmental programs for youth.

**Kelli Schaeffer** is a Senior Quality Assurance Microbiologist at Accupac, Inc. in Mainland, PA.

**Evan Yost** has recently accepted a research technician position at The Weis Center for Research, Geisinger Clinic, Danville, PA and is working in the area of G-protein localization.

**Jiazheng Yuan** received his MS (Agriculture) from Southern Illinois University and is working on his PhD at the University of Guelph in Canada.