



# BioSynthesis

Volume 3, Issue 2 (March 2004)

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

## *Spring Semester Dates & Special Events*

- APR 1-2:** Health Sciences Symposium, Kehr Union  
**APR 3:** Commonwealth of University Biologists Meeting, Indiana University of PA  
**APR 4:** Biology Club Trip to the Philadelphia Zoo  
**APR 7:** Spring into Health Series: *Synesthesia*, Dr. Spevak, speaker  
**APR 17:** MCAT Exam  
**APR 18:** Biology Banquet, 6 p.m.  
**APR 25:** Earth Day Fair, Town Park  
**APR 28 and 29:** BU Student Research and Creative Activities Poster Session  
**APR 29:** College of Science and Technology Research Day



## **Look what's inside:**

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## **Biological Research: Learning by Doing**

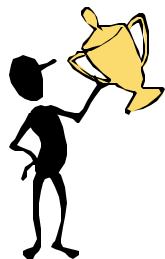
*I hear and I forget, I see and I remember, I do and I learn.*  
Confucius, Chinese philosopher, 500 BC.

Educational psychologists agree with Confucius! They tell us that we retain only a small fraction of what we hear while sitting passively in a lecture. Understanding increases dramatically when we are directly engaged with a subject through hands-on experience. Biology really comes to life through laboratory and field work. Here you can engage in the process of scientific inquiry, experiencing first hand how scientific knowledge is gained. You can further extend your understanding by participating in undergraduate research, either as a project volunteer or in a formal course, Research in Biology (50.390). Why do research? This is an opportunity for you to experience the scientific process. You will observe, hypothesize, predict, conduct experiments, interpret, and analyze data, and reevaluate your hypothesis. This is a time to learn how to think like a scientist, to challenge your understanding of the subject, and to ask some of your own questions about biology. In short, it is an opportunity to actually "do science." Along the way, you will gain valuable experiences in both reading and writing papers, operating research equipment, using computers, and communicating your results. It is an opportunity to work closely with a faculty mentor and in many cases, with your fellow student researchers. Research experiences can be an asset in landing that first job after graduation or in getting into a graduate or professional program.

What type of research can you do here at BU? The research interests of the Department of Biological and Allied Health Sciences are diverse, ranging from molecular biology to whole animal physiology, with specialties in anatomy, cell biology, ecology, and evolution and covering almost all types of organisms. Check out the BAHS website to see a listing of faculty research interests (<http://departments.bloomu.edu/biology/resint.html>). We invite you to approach any member of the BAHS faculty to explore opportunities for research, either as a volunteer to "get your feet wet" or as a formal course. Research is challenging and is a significant time commitment. The benefits, however, are enormous!

In the March and April issues of Biosynthesis, we will feature profiles of several of our student researchers. Read about their projects, what they have learned, and what they have gained from their experience. Several of these students will present their research results at the upcoming annual meetings of the Pennsylvania Academy of Sciences and the Commonwealth of Pennsylvania University Biologists. Local forums that feature student research include the BU Student Research and Creative Activities Poster Session on April 28 and 29 at Kehr Union and the College of Science and Technology Research Day on April 29. We hope to see you there!

## Celebrating Achievement



### BAHS Students and Faculty Recognized by College

The College of Science and Technology held its annual spring banquet on Tuesday, March 18. **Dr. John Hranitz** was recognized for excellence as a faculty member in the Department of Biological and Allied Health Sciences. **Dr. George Chamuris** recognized the following inductees of Beta Beta Beta, the biological honor society: **Emily Bray, Amanda Schompert, Jennifer Kruk, Erica Weiskircher, Michael Kaminsky, Eric Horstick, David Hakim**. Medical Imaging Major **Ed Hance** was inducted in the math department honor society. Congratulations to all honorees!

### BAHS Scholarship Winners



The Department of Biological and Allied Health Sciences recently announced the recipients of the Biology and Allied Health Science scholarships. Recipients of these \$250 scholarships are **Eric Horstick** and **Michael Kaminsky**. Eric is a junior who is pursuing a double major in biology and chemistry with options in biotechnology and biochemistry. Eric has been actively involved in undergraduate research in Dr. Hansen's laboratory. His work has involved both the comparative genomics of heterotrimeric G proteins and the functional analysis of G coupled protein receptors in development. He has presented his research results at BU's Undergraduate Research Symposium, the Commonwealth of Pennsylvania University Biologists meeting, and the Pennsylvania Academy of Sciences. Eric is a member of Beta, Beta, Beta, the biological honor society. Eric plans to pursue graduate work in molecular biology and biochemistry. Michael Kaminsky is a junior majoring in biology, with an option in biotechnology and a chemistry minor. Mike is presently serving as the treasurer of the Biology Club and is a member of Beta Beta Beta, the biological honor society. He is currently working on a comparative genomics research project in Dr. Hansen's lab that involves cloning and sequencing several heterotrimeric G proteins. Mike will present his results at the BU Student Research Symposium and the annual meeting of the Commonwealth of Pennsylvania University Biologists. Mike is interested in pursuing a medical career with a specialization in cardiothoracic surgery. He has shadowed physicians and observed surgeries as part of the Jan Plan at Geisinger Medical Center. Mike plans to study at University of Edinburgh in Scotland during fall semester.



### Congratulations scholar athletes!

Three BAHS students were among the scholar athletes honored at the recent Scholar-Athlete Luncheon for their excellent work both on the field and in the class room. Congratulations to **Elyce Moring**, a Medical Imaging major and member of the Field Hockey team; **Tyson Hale**, a biology major and football player, and **Rebecca Kehler**, a biology major and softball player.

### Good News!

**Meredith Murray** has been accepted to the master's program in the Department of Crops and Soil Science at Penn State University.

**Amy Risen** has been accepted to the doctoral program in Environmental Toxicology at Cornell University.

**Matt Hoehn** has been accepted to the occupational therapy program at Thomas Jefferson University.

**Erica Weiskircher** has been accepted to the doctoral program in Biochemistry, Molecular Biology, and Microbiology at Pennsylvania State University.

**Have you been accepted to a graduate school, clinical program, or professional school? Share your good news in *BioSynthesis*. Please e-mail Dr. Surmacz (surmacz@bloomu.edu) or catch her in the hall!**



### Outstanding BU Women!



Three undergraduates in the Department of Biological and Allied Health Sciences were recently recognized by the Commission on the Status of Women as Outstanding BU Women: Congratulations to **Deddeh Ballah**, Medical Imaging; **Quidirat Jamiu**, BS Biology; and **Samantha Kohlstock**, BS Biology.



## BAHS students honored by Phi Kappa Phi

Phi Kappa Phi is the nation's oldest, largest, and most selective honor society that recognizes and promotes academic achievement in all fields of higher education. Only the top 7.5% of juniors and the top 10% of seniors are invited to become members. The following BAHS students were recently inducted: **Rachel Boring**, medical imaging; **Nicole Dalesandro**, biology, pre-medicine; **Jennifer Dillow**, medical imaging; **Janine Hess**, medical imaging, **Mary Katherine Johnson**, medical imaging, **Jennifer Kruk**, biology, biotechnology; **Katy Parise**, biology. Students in the Department of Biological and Allied Health Sciences who are currently members include **Rebecca Kehler**, biology; **Justin Stevens**, medical imaging; and **Adam Strzempek**, medical imaging.

Each year the BU chapter of Phi Kappa Phi nominates a member to compete in its national fellowship competition. The national organization awards \$8,000 fellowships in support of the first year of graduate study. This year's fellowship nominee is **Jennifer Kruk**. Jenn is a senior majoring in biology with a biotechnology option. Jenn is the vice-president of Beta Beta Beta, the biological honor society. She is a member of the Biology Club and Alpha Phi Omega, a national coed service fraternity. She has been named to the Dean's List six times and has served as a biology tutor. In the community, Jenn has assisted with the local blood drive, the Big Brother/Big Sister program, the breast cancer walk, Kid's Fun Day, AIDS walk, Children's Museum, and Ecoquest. She is employed part-time in the University Relations Office. Last summer, Jenn participated in the REU Interfaces in Biology Program at Los Alamos National Laboratory, Los Alamos, NM. She worked on a research project entitled "Cloning of Tuberculosis proteins for Yeast Expression." She presented her results at the Bioscience Poster Session 2003 and the University of New Mexico, Los Alamos Symposium. This semester Jenn is conducting a research project in Methods in Biotechnology entitled "Molecular Genetic Analysis of the Hardy Kiwi." The goal of her project is to identify specific molecular markers associated with different kiwi varieties in order to aid in early cultivar identification. Jenn plans to pursue a Ph.D. in molecular biology. Congratulations Jenn!

## Scholarship Winner

**Kelly Bryant** has received a P. K. Leroy Irvis Scholarship from the Black Conference on Higher Education. She is one of six recipients in Pennsylvania! Kelly is a junior majoring in biology, biotechnology option and has been named to the Dean's list. Way to go, Kelly!



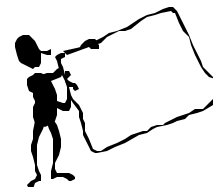
## BAHS Student Down Under!

**Tracy Harbaugh**, a junior majoring in biology with a marine science option, is spending the semester in Yungaburra, Queensland in Australia. Tracy is working at the Center for Rainforest Studies, a part of The School for Field Studies. Tracy is a member of a field-based research team seeking to develop solutions to resource management challenges. She has sent us this photo of Little Red Flying foxes.



## Addition to the Dean's List

**Paul Farley's** name was inadvertently omitted from the listing of students named to the Dean's List for Fall Semester 2003 in the February 2004 issue of *BioSynthesis*. Paul is a sophomore majoring in secondary education, biology. Congratulations Paul! *BioSynthesis* regrets this error.



## ALLIED HEALTH NEWS

### Health Sciences Symposium: Living With Our Genes



The Annual Health Sciences Symposium will be held April 1 and 2, 2004 at the Kehr Union. This year's theme is "Living with our Genes." The featured speaker is Dr. Dean Hamer, Chief of the Section on Gene Structure and Regulation in the Laboratory of Biochemistry of the National Cancer Institute. Dr. Hamer has a Ph.D. from Harvard Medical School, has published over 100 technical papers, and holds three patents in the biotechnology area. His research has led to contributions in a variety of areas including recombinant DNA technology, drug and vaccine production, and gene regulation. His discovery of genetic links to sexual orientation, risk taking, anxiety, and cigarette smoking have changed the way we think about human behavior and raise a host of important scientific, social, and ethical issues. Dr. Hamer will present the keynote address on Thursday, April 1, 2004, 7:30 p.m. in Kehr Ballroom. On Friday, April 2, 2004 at 8:30 a.m., he will lead a workshop entitled "Genetics: Predicting our Future?" This will be followed by a faculty panel discussion at 10 a.m. The symposium will also feature posters and presentations by students and faculty and a Wellness Fair with exhibits, demonstrations, and booths on a variety of health and wellness topics. We hope to see you there!

### Spring into Health Program Series



**Dr. Alan Spevak** of the Department of Biological and Allied Health Sciences will present the final program of the "Spring into Health Program Series" of the Health Sciences Learning Community. Dr. Spevak will discuss *Synesthesia: When Letters Have Colors and Sounds Have Tastes*. on Weds., April 7, 2004 at 9:00 p.m. in Columbia Hall lounge. Please join us to learn more about this intriguing topic! FREE FOOD!

### Medical Imaging Updates



- Medical Imaging majors are reminded to see **Dr. Kipe-Nolt** once they have made a final decision on a clinical site for this summer or fall to complete the appropriate paper work and get their pictures taken.
- Our affiliate, The Johns Hopkins Hospital, will present a session entitled *Diagnostic Medical Imaging: Careers for the Future* at 1:00 p.m. in Kehr Union Ballroom 2 as part of the Health Sciences Symposium. Anyone interested in medical imaging is invited to attend.

### Career Feature: Doctor of Pharmacy

by **Dr. Carl Hansen**



The role of pharmacists in our society has greatly expanded from filling prescriptions and counting pills, to a profession that serves at the interface between medicine and patient care. Because of the ever-expanding varieties of medicines available today, pharmacists have taken on active roles as gatekeepers looking for potential drug-drug interference, as educators informing patients on the use and side effects of medications, and as business people working to minimize the cost of health care. Pharmacists must possess a broad knowledge of physiology and drug action and have well-developed interpersonal, communicative, and organizational skills. The standard degree for a pharmacist today is the Doctor of Pharmacy. Typically a six year program, this degree is offered by a variety of accredited pharmacy schools and students may directly apply for entrance into their six year Doctor of Pharmacy program. Since the pharmacy curriculum for the first two years is a broad-based exposure to the sciences and the humanities, most pharmacy schools allow students to take the first two years of their program at an accredited undergraduate institution. As such, students enroll in a pre-pharmacy program and then transfer to the pharmacy school of their choice. Bloomsburg University offers a well-developed, two year pre-pharmacy program that prepares students to enter pharmacy school at the beginning of the third year of their program. Our program provides students with a strong scientific background, while also offering opportunities to be exposed to other areas in the life sciences. For more information, see **Dr. Hansen**, pre-pharmacy advisor.

There are five schools of pharmacy in Pennsylvania:

Nesbitt School of Pharmacy, Wilkes University, Wilkes-Barre, PA <http://www.wilkes.edu/pharm/default.asp>)

Temple University School of Pharmacy, Philadelphia, PA <http://www.temple.edu/pharmacy/>

Philadelphia College of Pharmacy, University of the Sciences in Philadelphia, Philadelphia, PA <http://www.Usip.edu/pcp>

University of Pittsburgh, School of Pharmacy, Pittsburgh, PA <http://www.pharmacy.pitt.edu/default.lasso>

## TIPS FOR SCHEDULING WISELY for 2004 - 2005

Be sure to schedule the courses you want before the end of scheduling period. The State System Administration (Harrisburg) has mandated canceling low enrollment courses. So if you want it, schedule it NOW, please.

**General Education Considerations:** During the fall semester, the department is offering **Drugs in America** (50.275) which will meet the **Values, Ethics, and Responsible Decision Making** requirement. The plan is to offer it again in the spring semester. **Social Implications of Biology** (50.254) also meets the Values, Ethics, ... requirement and will be taught spring 2005.

**Biology Juniors & Seniors** should try schedule one biology elective each semester.

Please remember **ONLY** Writing in Biology and Composition 2 may count as your second writing course. (Literature courses with writing components do not count for Composition 2 for majors in B&AHS.)

**BIOLOGY Majors:** You need to schedule **Writing in Biology** (WIB, 50.290) during your sophomore year (after completing Composition 1 and Concepts 2). If you did not have Composition 1 during your freshman year, schedule it for the fall 2004 semester; then schedule WIB for the spring 2005 semester. WIB is offered fall and spring semesters.

If your option in biology requires **physics** and **Genetics**, schedule the physics for your junior year. Physics' lectures (54.111 and 112) meet at the same time as Genetics' lectures (MWF 11).

If you plan to take **Molecular Biology** (50.333) next year, it is only offered in the fall semester.

**Plant Pathology** (50.350) is being offered Fall 2004 for the first time since 2001. Dr Nolt will be teaching his specialty and it promises to be interesting. Pre-requisite is Concepts 2.

Pre-professional students (medicine, dentistry, veterinary, etc) and pre-physical therapy (BA Biology majors) should sign-up for **Comparative Vertebrate Anatomy** (Fall semester; 50.361; pre-requisite is Concepts 2). Pre-physician assistant majors looking for a biology elective should schedule this course, also.

If you plan to take **Genetics** (50.332) and **Immunology** (50.343) next year, be sure to take Genetics in the fall semester to be able to schedule Immunology in the spring.

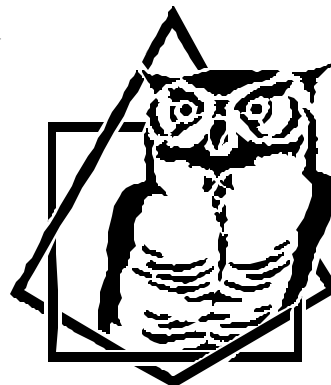
If you plan to take **Neurophysiology** in the spring 2005 semester, be sure to schedule its pre-requisite, **Vertebrate Systems Physiology**, during the fall semester 2004.

**Population Biology** (50.461), with Dr Klinger, will be offered during the spring 2005 semester. Its pre-requisites are **Ecology** and **Genetics**. So, if you're interested in this cool course, make sure to complete Ecology and Genetics before spring 2005.

If you are planning on taking **Methods in Biotechnology** (spring semester; 50.484, a molecular research course), its pre-requisite is Molecular Biology (50.333). Talk with Dr Davis **early** in the fall semester about the course.

**CLINICAL LAB SCIENCE Majors:** You should complete both **Microbiology** (50.242) and **Cell Biology** (50.271) before spring 2005. During the spring semester, plan to take **Medical Microbiology** (50.342), if you haven't previously. If you are a junior (i.e. going to your clinical affiliation during 2005-06), be sure to schedule **Immunology** (50.343).

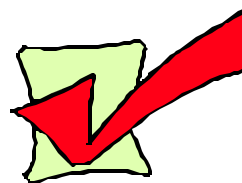
**NEED TO SEARCH FOR A COURSE?** Use <http://adminapps.bloomu.edu/courseschedule/search> to find classes by subject, day, time, etc. Then click Advanced Search.



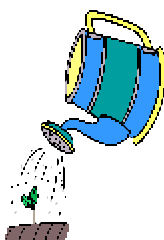
FALL 2004 BIOLOGY ELECTIVES	SPRING 2005 BIOLOGY ELECTIVES
50.333 Molecular Biology	50.342 Medical Microbiology
50.350 Plant Pathology	50.343 Immunology
50.361 Comparative Vertebrate Anatomy	50.460 Population Biology
50.411 Radiation Biology	50.484 Methods in Biotechnology
50.489 Special Topics	50.476 Neurophysiology

## Fall Semester 2004 Electives: Check them out!

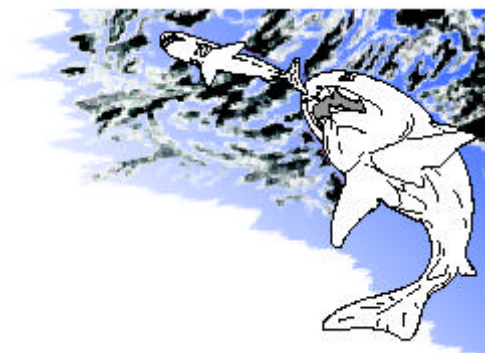
Unsure about what electives to take? Read on... Electives can help you explore new fields or strengthen an area of particular academic or career interest.



**50.333 Molecular Biology — Dr. Davis.** Investigates the practical and theoretical aspects of molecular biology and gives students an opportunity to explore ontogenic and developmental problems from a molecular perspective. Topics include information processing from DNA to proteins, regulation of gene expression, DNA mutability and repair, and genetic engineering. Two hours lecture/discussion, three hours of lab per week. Prerequisites: 50.271, 50.242, and 52.231 or 52.230.



**50.350 Plant Pathology —Dr. Nolt.** Plants get sick too! Plants are plagued by members of the same groups of microbes that afflict people and animals, including fungi, bacteria, and viruses. How do you know whether a plant is diseased or not? Which biotic organism or abiotic factor is causing the signs or symptoms on the plant? Are there ways to prevent or control plant disease agents from spreading? These and other practical questions will be addressed in this course by: 1) learning diagnostic methods for identifying plant pathogens; 2) studying the life cycles of disease agents and how they are disseminated; 3) understanding the mechanisms of pathogenesis; and 4) discussing control methods for limiting the spread of plant diseases. This course will prepare students to make the call whether the houseplant on the windowsill is “just under the weather” or ready for the ER!



R. Carr 1995

**50.361 Comparative Vertebrate Anatomy —Dr. Corbin.** This course is essential for students who are interested in both the health professions and biology careers. In other words, to be a well rounded biologist, you need this course! For most students, this will be an eye-opening course into the adaptive phenomenon that is the vertebrate body plan. Concentrating on the vertebrates, we will cover topics such as hard-core anatomy, morphogenesis, evolutionary adaptation, and cutting edge trends in functional and ecological morphology. In the lab we'll focus on dissection/prosection of (at least) lamprey, shark, and cat. Possible field trips include the Marine Science Consortium at Wallops Island, Virginia (additional student cost). Also, we will be digging into the latest primary literature surrounding the ever growing field of CVA. This action-packed course consists of two hours of lecture and three hours of laboratory per week. Prerequisite: 50.115 or consent of the instructor.

P.S. Check out this cool picture of Dunkelosteus. Used with permission from: Carr, R. K., 1995. Placoderm diversity and evolution. VIIth International Symposium: Studies on Early Vertebrates. Bulletin du Muséum d'Histoire Naturelle, Paris, 17:85-125.

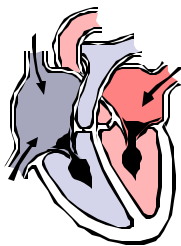
**50.411 Radiation Biology —Dr. Simpson.** This course discusses the biological effects of ionizing radiation and the applications of radiation in research and medicine. The tremendous increase in our understanding of biological systems in the last fifty years has been driven in large part by the ability to use small amounts of radioactive materials to label and trace biological processes. Most new medicines trace their discovery to some use of radioactive materials. In addition, the field of nuclear medicine continues to grow rapidly and research is currently ongoing to develop new and improved radiopharmaceuticals. These medicines can target cells or organs so that they can be visualized by radiation imaging techniques such as PET, CT, and gamma cameras. Some of these medicines can even be used as “magic bullets” to target and kill cancer cells while sparing the surrounding tissues. Labs will include sophisticated techniques routinely used in biological research such as liquid scintillation counting as well as radiation safety labs to demonstrate the properties and potential applications of various types of ionizing radiation.

**Meet Dr. Simpson:** Radiation Biology is taught by Dr. Simpson, a new member of the physics department. In his doctoral work, Dr Simpson used nuclear medicine procedures to image the bones and lungs of thoroughbred horses. He has served as the Radiation Safety Officer at the University of Nebraska. He continues to teach at the Department of Energy Radiation Emergency Assistance Center/Training Site (REAC/TS) in Oak Ridge, TN where he once served as lead health physicist. Questions regarding Radiation Biology can be directed to Dr. Simpson in room 59 HSC or at 389-5142.





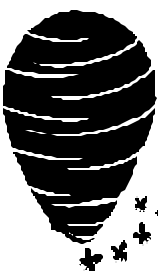
## MORE ELECTIVES:



**50.474 Vertebrate Systems Physiology —Dr. Till** - Studies the major organ systems and how they work together to maintain body conditions compatible with life. Uses human systems to explain function, but includes examples from other vertebrates to broaden students' understanding of the variety of mechanisms used to maintain homeostasis. Mechanisms by which the systems' functions are integrated in the whole organism are emphasized. Three hours lecture and discussion per week. Prerequisites: 52.230 or 52.231, or permission of the instructor. Competence in college algebra.

### 50.478 Microbial Physiology—Dr. Kipe-Nolt

In this course you will learn how and why certain microbes synthesize the following: xanthan gum that gives smooth texture to “gushers” and keeps gravy thick; monosodium glutamate that enhances the flavor of all those oriental dishes; insect toxins that are used to control gypsy moth and Japanese beetles; proteases that act as stain removers in your detergents; plastics that are biodegradable; and antibiotics that you use to treat nasty bacterial infections. Which microbes can breakdown cellulose and lignin? How do they do it? Meet the best ethanol producers, those that grow at 110°C, and those that prefer a pH of 1.0. How can some organisms survive several megarads of ionizing radiation? Learn about the microbes that fix nitrogen (they are my favorites), those that get their energy by oxidizing heaps of coal mining spoils, those that produce sulfur granules instead of oxygen in photosynthesis, and many many more.



### 50-489 Current Topics in Biology: Behavioral Ecology-Dr. Wood

Can a blue jay remember all the thousands of places it has buried seeds? Why do honeybees live in a colony with one queen and several hundred workers while orchard bees are solitary? Why do cowbirds lay their eggs in other birds' nests and why don't the other birds recognize and reject cowbird young? How do parasites change the behavior of infected pillbugs? When a male lion takes over a pride, why does he kill all the cubs? Why do vampire bats share blood meals? Why do some fish change sex? Learn the answers to these and other questions about the ecological and evolutionary basis of animal behavior.  
Pre-requisites: Ecology and permission of the instructor. 3 hr of seminar/week--meets Tuesday 6:00-8:50 (Watch for the opening of this course—not yet listed on computer.)

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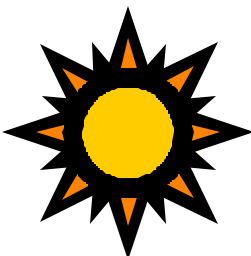
## NEW COURSE

### 50.275. Drugs in America—Dr. Till

This is a 3 credit course that fulfills the Values, Ethics, and Responsible Decision Making objective of the general education curriculum. It can also count as a Group C course (but for biology and allied health majors that is of little consequence, since you have many Group C courses). This course will educate you about how drugs (legal and illegal, prescription, and over-the-counter (OTC)) work without preaching. The introduction covers terminology, drug sources, federal laws, and principles of drug action. More specific mechanisms will be discussed for the following categories: narcotic analgesics, stimulants, barbiturates, tranquilizers, marijuana, hallucinogens, anti-ovulatory agents, OTC pain relievers, other common OTC medications, and antibiotics. Pre-requisites are Concepts of Biology I (50.114) OR Anatomy and Physiology II (50.174).

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## BAHS Summer College Offerings



**Session 1: June 1 — July 9.** Human Biology, Anatomy and Physiology I, Research in Biology 1 and 2, Internship in Biology/Allied Health Science, Honors Independent Study 1 and 2, Human Sexuality (09.230)

**Session2: June 21 — July 30.** Ecology and Evolution

**Session 3: July 12 to August 20.** Cells, Genes and Molecules, Anatomy and Physiology II, Research in Biology 1 and 2, Internship in Biology/Allied Health Science, Honors Independent Study 1 and 2, Human Sexuality (09.230)

**Session 4: June 1 to June 18.** Ornithology

**Session 5: June 21 to July 9.** Dendrology

**Session 8: June 1 to August 20.** Internship in Biology/Allied Health Sciences

## STUDENT RESEARCH PROFILES

### EMILY BRAY

**Mentor: Dr. Judy Kipe-Nolt**  
**Honors Independent Study I and II**

*BioSynthesis:* What are you investigating in your research project?

EM: I am studying the quality and quantity of methane gas production from anaerobic digestion of hog manure. I have also examined methane production after the addition of cheese whey to the manure.

*BioSynthesis:* What have you determined so far?

EM: The quality of the biogas remained constant as the pigs grew older and the quantity improved slightly with the addition of cheese whey.

*BioSynthesis:* What do you think are the benefits of doing an independent research project?

EM: I have had the opportunity to solve problems in different ways than in a classroom. For example, many questions came up that required a lot of thought, even though they seemed simple at first. When doing research you can't flip to the back of the book and see if you got the right answer. It is trial and error. I will take with me a greater appreciation for research scientists, a better understanding of "green energy" and anaerobic digestion, and one life-long friend.

*BioSynthesis:* What did you find the most challenging aspects of conducting research?

EM: I found it most challenging to get up in the morning and smell the manure from 1000 pigs!



### Eric Horstick

**Mentors: Dr. Hansen and Dr. Robishaw (Weis Center for Research)**  
**Research in Biology**

*BioSynthesis:* What are you investigating in your research project?

ERIC: I am working on several projects related to G proteins and G-protein receptors. One project involves the cloning and sequencing of G protein gamma subunits from eurythermal *Fundulis heteroclitus* and the stenothermic Nothothenoid ice fish *Gobionotothen gibberifrons*. Our goal is to compare their novel sequences to the zebrafish model system in order to understand how temperature may have affected G protein evolution..

*BioSynthesis:* What have you determined so far?

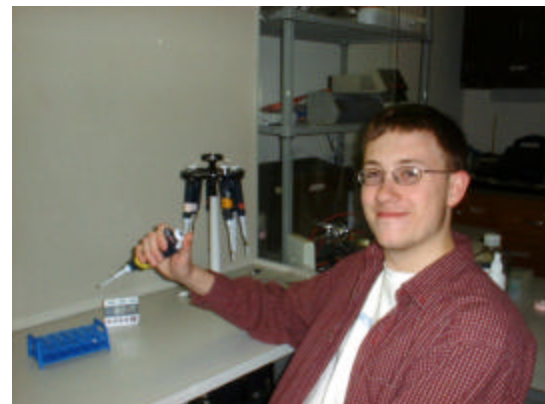
ERIC: One of the sequences shows a remarkable degree of conservation between the eurythermal and the stenothermic species, while a second sequence reveals distinct differences. This information will be useful in the debate over the evolution of G-protein gamma subunits in cell signaling in warm versus cold adapted animals.

*BioSynthesis:* What do you think are the benefits of doing an independent research project?

ERIC: It has been a valuable experience to work collaboratively with BU and the Weis Center for Research. This research experience has nurtured by my own curiosity for science. I have undertaken projects and gained perspectives that will shape my future. Research has taught me not only useful techniques, but a model of thinking driven by a desire to understand.

*Biosynthesis:* What did you find the most challenging aspects of conducting research?

ERIC: The most difficult aspect of conducting research has been learning to focus on just a few interesting questions. I am learning to balance my workload through experience and through the help of my mentors.



**Stay tuned next month for more Student Research Profiles....**



## BAHS UPDATES



### It's a Girl!



Dr. and Mrs. Corbin and big brother Charlie welcome Jane Suzanna Corbin. Jane arrived on Friday, February 20 at 2:53 p.m. at Bloomsburg Hospital and was 8 pounds 6 ounces and 19.75 inches long. The consensus is that Jane is adorable! Congratulations to all!

## Student Research Funds Available



The Pennsylvania Academy of Science is awarding grants up to \$500 to support UNDERGRADUATE AND GRADUATE COLLEGE STUDENT research in the natural sciences. Proposals should be written and submitted by the student under faculty guidance. The proposal must include an introduction and lit summary, a materials and methods section, a list of study participants and their roles, and an itemized budget. Deadline is May 1, 2004. Notification of successful proposals will be by October 15, 2004. For proposal guidelines see **Dr. Surmacz**.

## NEWS FROM BAHS CLUBS

### Biology Club

The Biology Club is heading to the Philadelphia Zoo on Sunday April 4, 2004. The group will be leaving around 8:30 a.m. Cost for the trip is \$20. Please see President **Erica Weiskircher** if you are interested in going or phone her at X2852. The Biology Club will be sponsoring the annual Biology Banquet on Sunday, April 18 at 6:00 p.m. at Rolling Pines (formerly Willow Run.) Please contact Erica if you would like to nominate a professor for an award.

### BUSTA

Last semester BUSTA (The Bloomsburg University Student Teachers Association) hosted the first annual Science Bee for middle school students. The day was a success. The kids had fun answering questions, watching demonstrations, and visiting the campus. BUSTA thanks all the professors who helped with the Science Bee. The second annual Science Bee is slated for spring semester 2005. This semester members of BUSTA have joined the SHARE program to tutor kids in local schools. For more information contact **Amy Miller** at 389-2561 or ammiller@bloomu.edu.



## Pre-professional Committee Updates

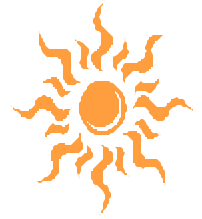
### Summer Opportunity

The Susquehanna Health System is offering a summer program to undergraduates who are interested in a career in medicine and who have completed their sophomore year. The goal of the program is to introduce students to the responsibilities and roles of physicians in the current healthcare environment. This seven week summer program begins June 8 and includes a weekly lectures on medical specialties each Tuesday at 6:30 p.m. at The Williamsport Hospital and a weekly four hour volunteer experience in one of the hospitals departments. The total time commitment is five to seven hours per week. For more information contact **Drs. Ardizzi or Melnychuk**. Students may also apply online at [www.shscare.org/vol](http://www.shscare.org/vol).

### MCAT Preparation Course

The Pre-professional Committee reminds students that an MCAT preparation course is being offered this summer at King's College in Wilkes Barre, PA. The program includes 15 hours of instruction, extensive handouts, and review of a real MCAT exam. The course is being taught by Drs. James Yoho and William Van Der Sluys. The course includes three sessions: Saturday, June 5 from 9 a.m. to 4 p.m.; Saturday June 12, 10 to 3:30; and Sunday, June 13, 10 to 3:30 p.m. The course costs \$300. For more information or to register, contact Ms. Suzanne McCabe at [semccabe@kings.edu](mailto:semccabe@kings.edu) Deadline: June 1, 2004.

## Summer 2004 Field Courses: Dendrology and Ornithology



Sign up for one or both field courses this summer! You can apply these courses toward the biology elective requirement, and Secondary Ed biology students can apply the course toward their field requirement. Also, Ornithology is dual-listed and carries graduate credit. Please register as soon as possible if you are planning to take a field course – once full the classes are closed.

### ORNITHOLOGY – The study of birds.



50-459-41 (undergraduate); 40-559-41 (graduate), **Dr. Corbin**, Session 4, June 1 – June 18, Monday – Thursday, 9 a.m. to 3 p.m.

This course will concentrate on the biology of Eastern North American Birds. The general daily schedule will include a short lecture and laboratory. This will be followed by daily trips to the field. Lectures will include subject matter on adaptation, flight, evolution, ecology and biogeography. The field component will concentrate on the identification of local and regional species. Also, I've planned a 4-day trip to Wallops Island which will include exploring bird habitats of the eastern coast. As with Dendrology, plan on working outside for long hours and in a variety of weather and habitat situations.

### DENDROLOGY – The study of trees and shrubs.



50-200-51, **Dr. Chamuris**, Session 5, June, 21 – July, 9, Monday - Thursday, 9 a.m. to 2 p.m.

In this course we will learn how to identify eastern trees, shrubs, and woody vines and ground covers using summer and winter characteristics. We will also study biogeography, tree anatomy, physiology and ecology, and selected aspects of tree diseases and insect pests.

Be prepared to be outside much of the time - we will venture out to a number of sites, including Ricketts Glen State Park. You should be in good physical condition and have good footwear for walking for hours at a time in the woods. You should also have hydration gear (e.g. canteen or hiker's water bottle), insect repellent, and a cap.

## Study at the Marine Science Consortium this summer!

A variety of classes are being offered this summer at the Marine Science Consortium. For a complete listing, see **Dr. Klinger** (5 HSC on the red floor) or check out the February Issue of Biosynthesis. (Extra issues are in the pamphlet holder next to the elevator on the green floor.) Among the courses offered are this one by BAHS' own **Dr. Hranitz**:

**Marine Ecology (55-260)** Would you enjoy three weeks studying ecology in coastal marine environments at the Marine Science Center (MSC) in Wallop Island, Virginia? **Dr. Hranitz** is teaching Marine Ecology during Session IV (July 19 – August 6). Marine Ecology students are introduced to ecological principles in daily lectures and apply ecological principles in hands-on exercises in daily field trips. Marine Ecology satisfies the ecology requirement for the Marine Biology Option and provides an excellent opportunity to acquire skills that are important to all students pursuing ecology as a career. Field trips instruct students to measure physical/chemical factors (e.g., salinity, pH, sediment particle size), seining, benthic sampling and trawling from boats, quadrat sampling, boxsieving, and snorkeling in Tom's Cove. Computer labs are available to analyze data collected in the field for population estimates, size-structure analysis, age-structure analysis, life tables, community similarity and biodiversity indices. Students pay tuition to Bloomsburg University and station fees to the Marine Science Center. Housing, meals, equipment fees, and boat trips are included. For more information about the MSC see <http://www.msconsortium.org>. The course syllabus is available through the "Courses" link at <http://facstaff.bloomu.edu/jhranitz>.



## The Reading Lamp: Current Topics in Evolutionary Biology

George Chamuris, Professor



*Nothing in biology makes sense except in the light of evolution.* – Theodosius Dobzhansky

The subfields of biology are becoming elaborately interconnected. We are on the verge of formulating a unified, general Theory of Evolution that will fully interweave knowledge from genetics, ecology, molecular biology, cell biology, developmental biology, systematics, behavior, and paleontology into a rich conceptual tapestry. Such interconnections can be seen in the evolutionary framework employed in the investigation of the causes and treatments of human diseases (see Levin et al., 1999).

A recent article published in the *American Journal of Human Genetics* provides a good example of the integration of molecular genetics, anthropology, demography, evolutionary theory and the genetic basis of cancer (Niell et al., 2003). The authors studied the colorectal cancer-susceptibility allele APC I1307K in the Ashkenazim (Eastern European Jews).

The Ashkenazim number about 10 million today, but most of their DNA comes from a few thousand Jews who settled in central Europe in the Middle Ages (Olson, 2002). The APC allele, however, appears to be centuries older (Niell et al., 2003). Since their arrival in Europe, Ashkenazi populations have experienced several bottlenecks; for example, following the Cossack massacres of 1648-1649. Among the Ashkenazim, 7.7% were identified as carriers of the allele, compared to 1.3% among Middle-Eastern and North African Jews. The allele results from a thymine to adenine substitution, which impairs DNA replication. This results in a mutational hotspot associated with colorectal cancer (Laken et al., 1997). The authors presented evidence to support the hypothesis that the high allele frequency can be attributed to genetic drift – differences in allele frequencies in populations due to chance events. They found no evidence for natural selection affecting allele frequencies. Even if a selective advantage could be envisaged for the heterozygotes, it is unlikely that selection would be a factor since colorectal cancer typically affects individuals past reproductive age (Stern et al., 2001). An example of a deleterious allele conferring an advantage to heterozygotes would be the sickle-cell allele, in regions where malaria is prevalent (e.g. Friedman, 1978). Heterozygous individuals have higher fitness than homozygous-normal individuals because they are resistant to malaria. The high frequency of the APC allele among the Ashkenazim can be traced to the chance high frequency either in the original founding population or in the populations surviving the bottlenecks. Subsequent rapid population growth involving individuals carrying the allele has given us the high allele frequencies observed today.

Friedman, M.J. 1978. Erythrocytic mechanism of sickle cell resistance to malaria. *Proceedings of the National Academy of Science of the USA* 75:1994-1997.

Laken, S.J., et al. 1997. Familial colorectal cancer in Ashkenazim due to a hyper mutable tract in APC. *Nature Genetics* 17:79-83.

Levin, B.R., Lipsitch, M., and S. Bonhoeffer. 1999. Population biology, evolution, and infectious disease: convergence and synthesis. *Science* 283:806-809.

Niell, B.L., Long, J.C., Rennert, G., and S.B. Gruber. 2003. Genetic anthropology of the colorectal cancer-susceptibility allele APC I1307K: evidence of genetic drift within the Ashkenazim. *American Journal of Human Genetics* 73:1250-1260.

Olson, S. 2002. *Mapping human history. Discovering the past through our genes.* Houghton-Mifflin.

Stern, H.S., et al. 2001. APC I1307K increases risk of transition from polyp to colorectal carcinoma in Ashkenazi Jews. *Gastroenterology* 120:392-400.

## Bald Eagle/Wildlife Interpretation Internship



Would you like to earn college credit this summer while working with bald eagles, learning about their natural history, and sharing your knowledge with the public? Then this internship is right for you! The Department of Biological and Allied Health Sciences in association with the Pennsylvania Raptor & Wildlife Association and Knoebel's Grove Amusement Resort are sponsoring internships in Bald Eagle/Wildlife Interpretation. Interns will field questions about bald eagle natural history and give frequent presentations to the general public at Knoebel's Grove Amusement Park near Elysburg, PA. Junior class status and a strong work ethic are required. To learn more about the internship, please see **Dr. Clay Corbin**, 131 HSC, phone 4134, e-mail ccorbin @bloomu.edu

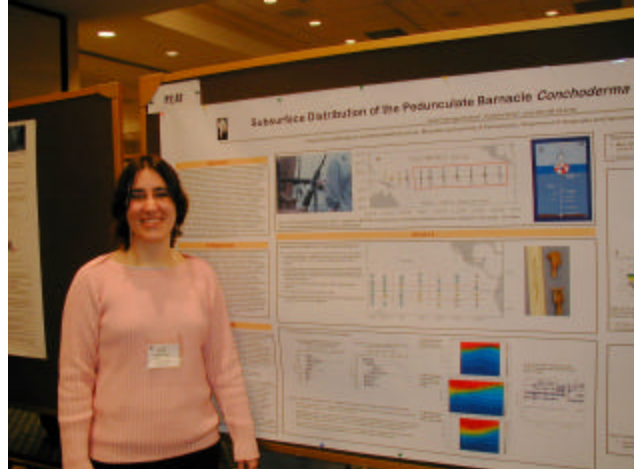
## THE BU MASTERS PROGRAM

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).

### Graduate Student Research

#### Julia Fabrega-Climent

Julia Fabrega-Climent presented a poster at the 2004 Annual Meeting of the Society of Comparative and Integrative Biology in New Orleans. Her poster examined the depth distribution of Pacific goosenecked barnacles. Julia is conducting her thesis research on the effects of organic pollutants on larval and adult sea urchins. **Dr. Klinger** is Julia's mentor. Julia has recently been accepted into the doctoral program in Environmental Marine Biology at the University of Southern California in Los Angeles. She is looking forward to the warm weather! Congratulations Julia!



#### Connie Wilson

*Biosynthesis: What is your thesis research project?*

Connie: I am investigating the reduction of odor and production of methane following anaerobic digestion.

*Biosynthesis: What have you learned so far?*

Connie: Odor and pleasantness values are lowered through anaerobic digestion.

*Biosynthesis: What were the most challenging aspects of your research?*

Connie: It was challenging work to with an on-farm prototype and to face equipment/mechanical problems that were beyond my control. Field research is tough...warm weather, cold weather, rain, etc.

### BAHS Students at PAS

Three students recently presented the results of their independent research projects at the annual meeting of the Pennsylvania Academy of Science in Monroeville, PA. **Katy Parise** presented a paper with co-authors Dr. Hranitz, Troy Baird, Ronald Van Den Busssche, and **Inna Nechipurenko** on "Reproductive Success in a Natural Population of Territorial and Yearling Male Collared Lizards." **Amy Risen** discussed her work with Dr. Surmacz on "Lethal and sublethal effects of two water pollutants, calcium acetate and methyl tertiary butyl ether, in *Lumbriculus variegatus*." **Eric Horstick** presented a poster with co-authors Jasper Humbert, Anna Kempinski, Drs. Robishaw and Hansen on "Cloning and sequencing of fish

