



# BioSynthesis

Volume 3, Issue 4 (September 2004)

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

## Spring Semester Dates & Special Events

**SEPT 20:** Fall Into Health Series: Bumps, Bruises, Brains: Understanding and Preventing Traumatic Brain Injury, 9:00 p.m., Columbia  
**SEPT 28:** Information Session for Pre-professional Students, 6:30 p.m., Schweiker Room, Library  
**OCT 1:** Dec. Graduation Applications Due  
**OCT 2:** Primary Care Day at Penn State College of Medicine, Hershey; Regional Health Professions Conference, PCOM  
**OCT 8:** Reading Day, no classes; BU Math & Science Center's K-12 Professional Development Day  
**OCT 18:** Fall into Health Series: V.D. and You, 9:00 p.m. Columbia; Tuberculosis Testing, 340 Kehr  
**NOV 12:** MIB proposals due  
**NOV 13:** Practice MCAT, 8 a.m., 79 HSC



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## What's new?

The Department of Biological and Allied Health Sciences (BAHS) extends a hearty welcome to all new freshman, transfer students, and returning students! We hope that you have a rewarding and successful academic year. We encourage you to take advantage of the MANY and VARIED opportunities that the department offers. How can you find out what's going on? Two handy sources of information are: 1) the BAHS Website (<http://departments.bloomu.edu/biology/>) and 2) the bulletin board near the elevator on the "green floor." We also encourage you to read *Biosynthesis*, the department newsletter, for the latest about the people and programs that make up BAHS. The department has been a flurry of activity for the past few months. This first issue of the 2004-05 academic year is devoted to filling you in on "what's new."

## BAHS Adds a "Method" to Our Madness

Biotech has blossomed at BU in the last few years. A new lab space (66 HSC) was dedicated in 2002, and we have added over \$200,000 worth of equipment since 2001. Drs. Hansen, Hranitz, Brubaker, and Davis were recently awarded ~\$160,000 for the purchase of more equipment. The proposal that was funded by the National Science Foundation will be described in more detail in the next newsletter. We have also instituted some curriculum changes, including a new Biotechnology option. One of the required courses in this option is "Methods in Biotechnology" (50.484), a great course for research-minded students. MIB is an investigation-based course in which students research a question of their own design using the tools of biotechnology. Prior to admission to the course, students write and submit a project proposal. This year's proposals will be due no later than Friday, November 12. Proposals must identify the problem to be investigated, the scientific relevance of the problem, the methods involved, the resources required to accomplish the research, and a realistic timeline in which to accomplish the research. Proposals will be reviewed by Dr. Davis and other BAHS faculty who are currently engaged in molecular-based research. Upon approval of the project, students will be allowed to register for the course.

Our goal with this course is to simulate the conditions of an industrial or major research laboratory. Thus, MIB students will have access to the research laboratory at nights and on weekends, as well as during the week when there are no classes occupying the lab. Student researchers meet weekly as a lab group with Dr. Davis and other involved faculty who mainly act in the role of resource people and facilitators. Although Dr. Davis is the instructor of record, history indicates that other faculty will be available and involved. Last year, Dr. Hansen was at every lab meeting, and he will be pressured again this year! By design, students are compelled to pool their knowledge and talents in the solution of problems, even though the research topics may be completely unrelated. At the end of the semester, each researcher must give a presentation of their research. So what does it take to get in? Well, as indicated, you have to have a project in mind and write a proposal which must then be approved. As far as prerequisites, you will need: 1) Introduction to Molecular Biology (50-333) Or 2) Biochemistry II (52-442) 3) Or consent of instructor.

So, if you have an idea that you'd like to explore using molecular methods and want to play with some great new toys, you might want to consider MIB for spring semester. If so, contact Dr. Davis soon (113A HSC or [gdavis@bloomu.edu](mailto:gDavis@bloomu.edu)).

## What's New?



### A New Look

Room 142 has undergone a major facelift this summer! The room was completely renovated and fitted with new cabinets and counters, six student lab benches, and microscope cabinets. A new whiteboard and a videomicroscope system will be arriving soon. Kudos to BU construction crews and to Dr. Hranitz and his many helpers for making this a reality.



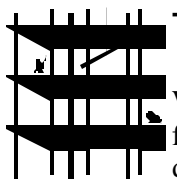
### New Equipment

Several new major pieces of equipment arrived this summer:

The Anatomy and Physiology lab gained six data acquisition systems for use by allied health students. The new Data Acquisition Systems, a product of Biopac, Inc., will replace the Narcotraces (multichannel recorders) that were previously used in physiology experiments in A & P. The new systems consists of an integrated set of hardware and software that allows students to investigate basic body processes ranging from pulse rates to brain waves. The core of the system is a piece of hardware, a data acquisition unit, that contains built-in programmable amplifiers. Various types of electrodes and transducers can be inserted into the data acquisition unit. The signals are then delivered to a computer where they are displayed and analyzed. The systems are already being used in Anatomy and Physiology.

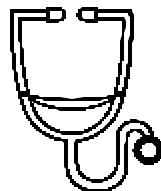
Dr. Brubaker acquired a Thermo/Forma Class II A1 biosafety cabinet for tissue culture experiments. This piece of equipment was funded by the BU Foundation Margin of Excellence and the Research & Disciplinary grants.

Several new microscopes were acquired for labs in Cell Biology and Concepts in Biology.



### The New Wing

Work on the Hartline annex slowed this summer as problems arose related to the instability of the floors. The problems have been resolved and construction is again underway. The projected completion date is April or May 2005 with move-in to occur after the end of the spring semester.



### A New Club

Come and be a charter member of the newest student organization of the Department of Biological and Allied Health Sciences —The Pre-Medicine Club. The new club is open to all students, freshmen through seniors, who are interested in careers in medicine. The group's initial meetings will focus on electing officers and planning group activities. The club is planning to meet every other Thursday from 7:00 to 8:00 p.m. in 343 Kehr Union. For more information, contact **Nicole Dalessandro**, the club's founder or **Dr. Ardizzi**, the club's advisor.



### New office and support staff

The BAHS department office is housed in 125 Hartline (the room with the large picture window!) We welcome back Ms. Vicki Beishline, our department secretary. Ms Beishline is recovering splendidly from hip replacement surgery this summer. It is great to have you back! Our part-time student secretaries are: **Carla Botelho**, **Kristi Brinckman**, and **Grace Seda**. Other student workers are **Jordan Ward** (Marine Lab), **Jennifer Intelicato-Young** and **Brian Young** (Microbiology), and **Ryan Mack** (Greenhouse and Genetics). **Toni Zangari** is working with Dr. Kipe-Nolt as a research assistant.



### New Titles

**Drs. Marianna Wood** and **Gary Wassmer** were recently promoted from assistant to associate professor. Congratulations are also extended to Drs. **Gary Wassmer** and **Kevin Williams** who were granted tenure.

## New Faculty

**Dr. George Croll** joins us this semester to teach a section of Concepts in Biology I lab. Dr. Croll has a BS from Bloomsburg (Secondary Education, General Science), a MS (Biology) from Bloomsburg, and a PhD from the University of Alabama at Birmingham. He has taught Secondary Education Science for 17 years and has recently taught Marine Biology at the Marine Science Consortium at Wallops Island. Dr. Croll enjoys bicycling, SCUBA diving, travel, cross-country skiing, and rejuvenating everything from cars to houses.

**Mrs. Melinda Diltz** is back again this semester to teach Human Biology and Anatomy and Physiology I Lab. She holds a master's degree in biology from Millersville University and a bachelor's in biology degree from Bloomsburg University. She is active in the Fishing Creek Watershed Association, serving as its secretary and co-chairperson for monitoring. She and her husband Chris have two sons and she helps out with the Cub Scouts. In her spare time she enjoys gardening and fishing.

**Dr. Steven Rier** joins BAHS this semester as a new tenure-track member of the faculty. *Bio-synthesis* recently met up with Dr. Rier for this exclusive interview:

*Where are you from?*

I grew up on a small lake south of Jackson, Michigan (1.5 hours west of Detroit). I have also lived in Kentucky and Minnesota.

*Where did you receive your education?*

I received my B.S. and M.S. in Biology from Central Michigan University in Mount Pleasant, Michigan and a Ph.D. from the University of Louisville in Environmental Biology.

*What is your area of expertise?*

I would describe myself as a broadly trained freshwater ecologist. I mainly focus on stream ecosystems and the role microorganisms, primarily algae and bacteria, play in ecosystem function.

*Where have you taught/done research previously?*

During my graduate work at the University of Louisville and first postdoctoral experience at Michigan State University, I studied streams throughout Michigan, southern Indiana, and northern Kentucky. During my second postdoctoral experience at Loyola University Chicago, I lived at the University of Michigan Biological Station in northern Michigan. I taught the Limnology course at this field station on two occasions. This past year, I taught at the University of St. Thomas in St. Paul, Minnesota.

*What classes are you teaching at BU?*

I'm currently teaching labs for Concepts 1 and 2. Next summer I plan to offer Limnology, the study of inland water. I also plan to develop other aquatic courses such as Freshwater Algae and possibly a class on freshwater invertebrates.

*What is your area of research?*

I am mainly interested in the functions microorganisms such as algae, bacteria, and fungi have in stream food webs and how humans can influence these functions. I am also interested in how rising levels of atmospheric CO<sub>2</sub> might indirectly influence stream ecosystems by chemically altering the leaf-litter entering these systems.

*What do you like to do for fun?*

I enjoy sea kayaking, hiking, biking, running, cross-country skiing, and birding.



## WHAT I DID ON MY SUMMER VACATION....

### Research in Costa Rica

**Dr. Clay Corbin** recently acquired a Research and Disciplinary Grant to conduct both stateside and tropical research on the feeding behavior and habitat selection of passerine birds. Dr. Corbin spent a few weeks this summer at the El Zota Biological Station just north of Cariari, Costa Rica. He explored over 10,000 hectares of intact primary swamp rainforest and several hundred hectares of succeeding secondary rainforest and old field habitats. His research examined the behavior and morphology of some passerine birds (sit-and-wait feeders in the family Tyrannidae). The foraging and habitat data collected will act as a base for future work at the biological station.

In addition to conducting research, Dr. Corbin saw hundreds of species of plants and animals (the majority of which were insects) that were new to him. This list included three monkey species and over 100 species of birds. His bird list included the evasive Fasciated Tiger-Heron (*Tigrisoma fasciatum*), the Great Green Macaw (*Ara ambigua*), White-necked Jacobin (*Florisuga mellivora*), and a favorite, the Long-billed Gnatwren (*Ramphocaenus melanurus*).

The station was lively with students and researchers from around the world. There were several anthropologists from Scotland studying behaviors of the monkey troops. One friend interested in entomology collected several hundred species of insects including at least one “brand-new” undescribed beetle. He paid for it though by getting nailed by a Bola Ant (*Paraponera clavata*), the “Bullet Ant” – the name says it all.

Dr. Corbin will continue his research in the deciduous forests of our region and plans to return to the rainforests of Costa Rica in the near future. If undergraduate or graduate students are looking for research opportunities locally or in Costa Rica, please contact him at ccorbin@bloomu.edu, HSC 131, X4134.



Strawberry poison dart frog (*Dendrobates pumilio*) close to hut. Photo by Clay Corbin



Common paraque (*Nyctidromus albicollis*) seen on night hike. Photo by Clay Corbin

### Getting “On the Job” Experience

Several BU students got some great experience and earned college credit this summer while serving as interns. **Taylor Triglia** worked in the Public Health and Environmental Laboratories at the New Jersey State Department of Health. She worked in the Sanitary Bacteriology Lab where she tested water samples from private wells, sewage, lakes, and beaches for the presence of coliforms. Dr. Kipe-Nolt was her internship advisor. **Rebekah Keister** and **Katy Peters** worked with bald eagles during an ongoing internship program at Knoebel’s Grove Amusement Park. The internship was sponsored, in part, by the Pennsylvania Raptor and Wildlife Association. Knoebel’s acquired a pair of rescued eagles after they were injured and unable to return to the wild. Becky and Katy were in charge of caring for the eagles and educating the public on their natural history and conservation. Dr. Corbin was their internship advisor. If you are interested in this voluntary position next summer, please see Dr. Corbin.

### Studying cancer in Seattle



**Dr. Kristin Brubaker** spent part of the summer at the University of Washington in Seattle isolating plasmid containing the promoter region of the osteoprotegerin (OPG) gene. This plasmid will be used to determine if Runx2, a transcription factor involved in regulating extracellular matrix expression in bone cells, expressed by prostate cancer (CaP) cells regulates OPG. Additionally, Dr. Brubaker conducted experiments demonstrating that testosterone receptor activity is augmented by the bone morphogenetic proteins (BMPs), which are molecules involved in stimulating bone formation. Anti-testosterone therapy is widely used to prevent prostate cancer growth and recurrence. If BMPs stimulate testosterone signaling pathways in CaP cells, then this finding may explain one of the mechanisms involved in how CaP cells metastasize to bone in an androgen independent environment.

## Fishing the Southern Ocean

**Dr. Carl Hansen** spent two months at sea this summer as a participating scientist of the National Science Foundation sponsored ICEFISH 2004 Expedition. The ICEFISH 2004 Cruise was the first comprehensive international scientific survey of the fishes of the Sub-Antarctic marine environment. The expedition consisted of 31 scientists from 8 countries and entailed 62 days on board the RVIB Nathaniel B. Palmer, a 300 ft ice breaking research vessel. The Nathaniel B. Palmer departed from Punta Arenas, Chile, May 17th and the mission ended in Cape Town, South Africa, July 17, 2004. Fishing 24 hr a day, the expedition sampled the marine fauna around the Falkland Islands, South Georgia, the South Sandwich Islands, Bouvet Island (the remotest piece of land on earth and often referred to as "the most awful place on earth"), and Tristan da Cunha. While, for the most part, the mission had exceptionally nice weather for sailing the Southern Ocean during the austral winter, there were times that it did get cold, with temperatures reaching -15 F and wind chills to -65F in 55 knot winds. Dr. Hansen's research examines the effect of temperature on the molecular and biochemical mechanisms involved in cell communication. During the expedition, Dr. Hansen collected a unique set of tissue samples from 37 different species of fish. Using DNA and RNA isolated from these samples, Dr. Hansen's lab will identify molecular changes that allow fish to live in the cold Southern Ocean waters. Helping Dr. Hansen in his research this semester are biology undergraduates **Eric Horstick** and **Terrina Dolin**. For more information on the ICEFISH 2004 Cruise, please visit its official website at [www.icefish.neu.edu](http://www.icefish.neu.edu).



## Conducting Molecular Research

**Eric Horstick** was a recipient of a Weis Center Summer Research Fellowship at Geisinger Clinic. He spent 10 weeks in the laboratory of Dr. Janet Robishaw learning techniques to manipulate zebrafish embryos in order to decipher the mechanisms underlying the processes whereby a single celled egg develops into a multicellular organism. **Kelly Bryant** participated in the Kimmel Cancer Center Summer Undergraduate Research Program at Thomas Jefferson University in Philadelphia, PA. Kelly investigated natural killer cell development in the laboratory of Dr. Bice Perussia.

## Taking a class at the beach

Students from across the state came together for three-weeks to study marine ecology with **Dr. Hranitz** at the Marine Science Consortium. The great daily field trips more than made up for the grueling schedule and the high densities of biting insects! Captain Jimmy provided some exciting catches in trawls. Some of the more memorable catches included 11 sheepshead, several smooth dogfish sharks, puffer fish, burrfish, oyster toadfish, and a southern butterfly ray that measured about 36 inches from between the tips of the pectoral fins. The class was also treated to some great sightings of dolphins during an offshore excursion. For more information about Marine Ecology see at <http://facstaff.bloomu.edu/jhranitz/>.



**Marine Ecology Class of 2004.** From left to right: **Charlene Feyers** (Bloomsburg), Steve Webster (Slippery Rock), **Mary Jo Melichercik** (Bloomsburg), **Danielle Wartko** (Bloomsburg), Laura Birst (Saint Francis), **Vicki Albertus** (Bloomsburg), Hollie McClay (Kutztown), Sarah Kaufhold (Susquehanna), Patricia Yetter (Millersville), Jillian Daily (Lock Haven), Katie Bowen (Kutztown), Gretchen Holderman (Millersville)

## Student and Faculty Research



The BAHS research labs are busy this semester! The following students are conducting independent research projects this semester:

**Marnie Cooper** is studying the antimicrobial effects of fungal extracts utilized as dietary supplements. Dr. Parsons is her mentor.

**Terrina Dolin** will be cloning and sequencing novel alpha and beta G protein subunits from Icefish samples collected by Dr. Hansen in the Southern Ocean this summer.

**Eric Horstick** is continuing a variety of independent research projects in Dr. Hansen's lab, ranging from cloning and sequencing novel G protein subunits to studying the roles of orphan G protein receptors in zebrafish development.

**Brad Hortman** is working on two projects with Dr. Wassmer. The first examines antimicrobial activity in the hemolymph of cockroaches. The second investigates the stability of the biological clock in a desert beetle.

**Inna Nechipurenko** is comparing the nucleotide diversity in Pacific Ocean barnacles. Dr. Hranitz is her mentor.

**Toni Zangari** is examining coliform and salmonella reductions during anaerobic digestion and composting of manure. Toni, an honors program student, is enrolled in Honors Independent Study under the direction of Dr. Kipe-Nolt.

## Students Present Summer Research Results



Students from the departments of chemistry, physics and engineering technology, and biological and allied health sciences recently presented talks on their summer research to faculty and students in the College of Science and Technology. Representing BAHS were: **Inna Nechipurenko** who presented "An investigation of the nucleotide diversity of barnacles from the tropical Pacific Ocean" and **Eric Horstick** who discussed "Expression analysis of the G protein gamma2 subunit and G protein coupled receptors." Good job, Inna and Eric.

## A Sampling of Recent Faculty Scholarship

**Dr. Kristin Brubaker** received a Research & Disciplinary Grant for "Determining the Link Between Runx2 and Osteoprotegerin Expression in a Prostate Cancer Cell Line Isolated from Bone." **Allison Zientek** and **Laura Halon** will be working on this project.

**Dr. Clay Corbin** has been notified that his manuscript entitled "A test of correlated evolution in the life history traits of tyrant flycatchers using phylogenetically independent contrasts" will be published in an upcoming issue of *The Journal of the Pennsylvania Academy of Sciences*. The study was partly supported by a Special Initiatives Grant from the College of Science and Technology.

**Dr. Carl Hansen** co-authored two research posters presented at the Sixth International Conference on Zebrafish Development and Genetics, held at the University of Wisconsin-Madison, July 29 to August 2, 2004. The posters were entitled "G protein gamma 15, a zebrafish homologue of mammalian transducin Galphat1, is involved in light controlled melatonin metabolism," and "Signal transduction through heterotrimeric G protein plays a role in convergent extension cell movement during zebrafish development." The posters were co-authored with Dr. Hansen's collaborators at the Weis Center for Research at Geisinger Clinic, Danville, PA and at the Penn State College of Medicine, Hershey, PA.

**Dr. John Hranitz** received a Research & Disciplinary grant to compare DNA nucleotide diversity in eastern versus western Pacific Ocean Barnacles. **Inna Nechipurenko** will be working on this project.

**Drs. John Hranitz** and **Kristin Brubaker** received a BU Collaborative Grant to study the "Influence of Heat Shock Response on the Expression of Immune Response genes in the Leafcutter Bee." Undergraduates working on this project are **Laura Halon**, **Valarie Van Cleef** and **Becky Rugg**.

**Drs. John Hranitz** and **Toni Trumbo-Bell** received a BU Collaborative grant to purify and characterize heat shock protein 70 from heat-tolerant solitary bees.

**Dr. Cindy Surmacz** received a BU Individual Grant to examine the "Toxicity of De-icers in an Aquatic Worm: Sublethal Behavioral Responses and Mode of Action." Please contact Dr. S. if you would be interested in working with her on this project.

**Dr. Gary Wassmer** attended the Summer Academy for the Advancement of College Teaching at Millersville University.

# BIOLOGY CLUB!

**Time Commitment:** an hour here and there  
**Yearly dues:** \$5  
**Building Lasting Friendships: PRICELESS!**

Leading the BU Biology Club this year are President, **Valarie Van Cleef**; Vice-president, **Krissie Tofts**; Secretary, **Keri Ondrusek**; and Treasurer, **Joel Gyimesi**. About 24 students turned out for the initial organizational meeting and Pizza Party. The officers distributed Interest Surveys to get ideas for activities and to determine the level of interest in trips, community service, and fundraising. The group is planning to enter a team in the Breast Cancer Run/Walk on October 24, 2004. To obtain a copy of the interest survey or to learn more about the club, see any officer or **Dr. Hranitz**, their faculty advisor.



## UPDATES: SECONDARY EDUCATION, BIOLOGY

### BU Student Teachers: Putting Theory into Practice

Several BU secondary education, biology majors are moving to the front of the class this semester as they begin their student teaching experience. These students and their teaching placements are: **Ryan Boylan** (Shamokin), **Melissa Brutosky** (Crestwood), **Andrew Cole** (Berwick), **Ann Marie Nicholas** (Hazleton), **Eric Segada** (Selinsgrove), **Jerry Waltman** (Benton), **Anita Wilenchik** (Hazleton), and **Chris Yourechko** (Hazleton Heights). Several of these students will have the opportunity to participate in a special program funded by the National Science Foundation called *Collaborative for Excellence in Teacher Preparation (CETP)*. As part of this program, these student teachers will receive training in implementing inquiry-based learning practices in their classrooms. They also will be visited on-site by both education department faculty and faculty from the Department of Biological and Allied Health Sciences.

## BU Hosts Conference for K-12 Teachers & Secondary Education, Biology Majors

The BU Math and Science Center is sponsoring a professional development conference for area K-12 teachers on Reading Day, October 8, 2004. The conference features a variety of practical, hands-on workshops. **Secondary Education, Biology majors are encouraged to attend and REGISTRATION IS FREE! (What a great deal!)** For more information and for a complete schedule of events see: <http://orgs.bloomu.edu/msc/Oct8MainPage.html>

Sessions that may be of special interest to Secondary Education, Biology students are:

**Teaching Evolution: Essentials and Applications**, Dr. George Chamuris

**Testing Sunblocks**, Ms. Faye Hinson

**Ice and Marine Ecosystems in the Antarctic**, Dr. Cynthia Venn

**Using Fruit to Develop Observational Skills in Young Scientists**, Dr. Gary Wassmer

**Water Quality Testing: Using Palm Pilots for Data Collection**, Ms. Deb Slattery

**How Biologists Study Life: Tools for Inquiry-Based Experiences**, Dr. Cynthia Surmacz

**Exploring the Content and Process of Science through Natural History**, Dr. John Hranitz

**Physics in the Field of Medicine**, Dr. David Simpson

**Forensic Detectives**, Mr. James Silvetti

**Molecular Evidence for Gene Mutations**, Dr. K. Bharathan

**SEAS – Student Experiments at Sea**, Ms. Liz Goehring

**The BU Math and Science Center Fast Plants Project**, Dr. Emeric Schultz





## News from the Pre-professional Committee

### What is the pre-professional committee?

The BU pre-professional committee assists students in gaining admission to professional schools such as allopathic, osteopathic, podiatric, or veterinary medicine, dentistry, optometry and chiropractic. The committee's mission is to advise pre-professional students, assist students with the application process, evaluate student credentials, prepare committee recommendation letters, obtain resources for students relating to professional schools, and establish relationships with professional schools. The co-chairs of the committee are **Drs. Joseph Ardizzi** and **Mark Melnychuk** from BAHS. Other committee members include **Dr. Cindy Surmacz** (BAHS) and **Drs. Christopher Hallen** and **Toni Trumbo-Bell** from Chemistry. Students are encouraged to check the committee's website (<http://departments.bloomu.edu/biology/preprof.htm>) for announcements, current events, information on course selection, pre-professional test materials, and links to relevant web sites.

### Where can I learn more about professional school?

An information session for all students interested in attending professional school will be held **on Tuesday, September 28 at 6:30 p.m. in the Schweiker Room, Andruss Library**. The session provides an opportunity to meet members of the pre-professional committee, to learn about the requirements for professional school, and to gain insights about the application and admissions process. **Refreshments will be served!**

### Upcoming programs

- Penn State College of Medicine will host its annual Primary Care Day on Saturday, October 2, 2004 at Hershey Medical Center, Hershey, PA. The day will include presentations by panels of primary care physicians and medical students and a presentation on admissions. Please see Dr. Surmacz for more information.
- A Regional Health Professions Conference will be held on Saturday October 2, 2004 at the Philadelphia College of Osteopathic Medicine. Following the keynote address, students will have the opportunity to meet with admissions representatives from several health professional schools including Drexel University College of Medicine, Jefferson Medical College, Philadelphia College of Osteopathic Medicine, Temple University (Medicine, Dentistry, and Podiatric Medicine), University of Medicine and Dentistry of New Jersey, and the University of Pennsylvania (Dentistry, Medicine, and Veterinary Medicine.) The program will also include a Health Information Fair and a tour of the facilities at the Philadelphia College of Osteopathic Medicine. Registration is \$10 and is due September 27. For more information or to register, please contact Dr. Ardizzi..

### Campus Visit

Mr. Aaron Berger, a student recruiter with the Ohio College of Podiatric Medicine in Cleveland, Ohio, will be on campus Oct 11 - 15 to discuss careers and opportunities in podiatric medicine. Mr. Berger would be happy to discuss the following topics with any interested students: podiatric medicine today, the podiatric curriculum, academic requirements, financial aid, the city of Cleveland, and specialty areas such as primary care, sports medicine, orthopedics, surgery, geriatrics, pediatrics, and biomechanics. Please contact Dr. Surmacz to arrange an appointment.

### PRACTICE! PRACTICE! PRACTICE!

The Pre-professional Committee will offer its annual Mock MCAT exam on **Saturday, November 13 in 79 HSC from 8 a.m. to 3 p.m.** 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 would benefit by 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. The practice MCAT is recommended for sophomores, juniors, or seniors. Freshmen should probably wait until they have had more college science courses. **To register for the practice MCAT, email Dr. Hallen at [cph@bloomu.edu](mailto:cph@bloomu.edu) by November 9. On test day, bring a lunch with you, but leave your calculators, cell phones, and backpacks at home.**

### Congratulations!

**Alicia Gilbert** was accepted to the New York Chiropractic College in Seneca Falls, New York. Way to go, Alicia.



## Allied Health News

### BU Students Head to Clinical



**Despina Vassou**, a clinical lab science major, is obtaining her clinical experience at Monmouth Medical Center, NJ. The following students have begun clinical programs at Johns Hopkins Hospital: **Joseph Andrulicz, Tanaya Shughart, and Kyle Snell** in Nuclear Medicine; **Elyce Moring, Laura Reynolds**, and **Selena Wright** in Radiology; and **Sara Barrett, Kelly Schwartz, and Tiffany Setzer** in Sonography. The following students have recently enrolled in Geisinger Medical Center's Radiology program: **Curtis Bower, Shaun Gaul, Tiffany Higley, Melissa Latham, Jill Lemoncelli, Stacey Minarski, Holly Ross, Desiree Showers, and Michael Thomas**. Lancaster General Hospital is the clinical site for **Amanda Gladfelter and Janelle Shaw** (Radiology) and **Todd Gray and Jessica Horst** (Nuclear Medicine). The sonography program at College Misericordia is the clinical site for **Carmen Ernst, Janelle Haas, Amber Liotta, Jenna Strakey, Kira Strausser, and Jennifer Tomcavage**. **Lauren Cathers, Kelly Duke, Kathleen Gavala, and Jennifer Kemmerle** are in the radiology program at Abington Memorial Hospital. The following students are in clinical radiology programs: **Nicole Valania** (University of Pittsburgh Medical Center), **Jenna Ghiringhelli** (Reading Hospital), **Kimberly Rotell** (Wilkes-Barre General Hospital), and **Patricia Welsh** (Washington Adv. Hospital). **Christina Lanzos** is in the sonography program at Northampton Community College. **Laura Hummel** is pursuing nuclear medicine at Jackson Memorial Hospital in Miami, Florida. **Brad Smith** is enrolled in the nuclear medicine program at Thomas Jefferson University. We wish you all a productive and successful clinical experience. Stay in touch!



### TB Test Available

A tuberculosis test is required for all students who will student teach or work in hospitals or medical clinics. The test will be administered by the Student Health Center on Monday, Oct 18, 2004 between 1 pm and 4 pm in 340 Kehr. The results will be read on Wednesday, October 20, 2004. Cost of the test is \$5. No appointment is necessary.



### Fall into Health Program Series

The Health Sciences Learning Community will sponsor a series of programs on health-related topics. All programs will be held at 9:00 p.m. in the Columbia Fireside Lounge and free refreshments will be served. Upcoming programs include *Bumps, Bruises, Brains: Understanding and Preventing Traumatic Brain Injury* on Monday, September 20 and *V.D. and You* on Monday, October 18. Everyone is welcome!

## NEWS From GEISINGER

### A Milestone

July 30, 2004 marked the first graduation of The Geisinger Medical Center School of Radiologic Technology since the program's reopening. The following BU students received diplomas: **Ember Baton, Desiree Hackenburg, Janine Hess, Lisa Kruskie, Calvin Mahoski, Adam Strzempek, and Lindsey Smith**. The commencement speaker was Freeman Betz, former director of Geisinger's radiology program and class speakers were **Janine Hess** and **Adam Strzempek**. Attending from BU were **Drs. Kipe-Nolt, Surmacz, and Cole** (BAHS faculty emeritus). Diplomas were presented by Kenneth Roszel, M.S., RT-R program director.



### Say Cheese!

The radiology students at Geisinger Medical Center take time from their busy clinical schedule to pose for a picture. Front Row: **Desiree Showers, Holly Ross, Faith Warner, Kelly Boslego, Jill Lemoncelli**;

Second Row: **Michael Thompson, Stacy Minarski, Melissa Latham, Tiffany Higley, Carrie Hoffman, Michelle Blandina, Gina Bolinski, Owawu Asunde**; Third Row: **Shaun Gaul, Curtis Bower, Dave Simcox, Tiffany Schnure, Amanda Lukas**.

## 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 EVOLUTION OF BITTER TASTE PERCEPTION IN HUMANS

Virtually every biology student is familiar with the phenylthiocarbamide (PTC) taster and nontaster phenotypes. Once thought to be controlled by a single gene displaying simple Mendelian dominance (the ability to taste the bitter PTC being the dominant trait, and the inability to taste PTC the recessive), recent genomic studies have revealed that this is not the case. Actually, there are at least two genes involved: one gene is located on chromosome 7q, and the other on chromosome 16p (Drayna et al., 2003). The gene on chromosome 7, called PTC, is a 1002 bp sequence comprising a single exon. It encodes a seven-transmembrane domain G protein-coupled receptor (Kim et al., 2003). The G protein-coupled receptors (T2R's or TAS2R's) are expressed in taste receptor cells in the epithelia of the tongue and palate. Kim et al. (2003) estimated that there are at least 23 bitter taste TAS2R genes clustered on chromosome 7q. Also, many women are identified as supertasters, which further blurs that simple taster/nontaster classification (e.g. Bartoshuk et al., 1994).

Has natural selection shaped our ability to detect bitter substances? Do TAS2R's have adaptive significance, or are they selectively neutral? Wooding et al. (2004) have addressed these issues, providing evidence for stabilizing or balancing natural selection maintaining both the taster and nontaster alleles. (It is interesting to note that R.A. Fisher proposed over 60 years ago that stabilizing selection was operating on this trait!)

If we reduce the polygenic reality of the PTC phenotypes to the one gene-two allele system associated with the PTC gene on 7q, it is clear that taster and nontaster alleles are in roughly equal frequencies in 348 populations sampled by Guo and Reed (2001). Given the frequency data and the detailed genomic structure of PTC, we are now able to apply statistical tests designed to detect selectively neutral traits vs. those being shaped by natural selection (e.g. Bamshad and Wooding, 2003; Fu and Li, 1993; Wooding, 2004). These tests are sensitive to assumptions about population size and growth rate; Wooding et al. (2004) took these into account.

Wooding et al. (2004) identified five SNP's (single nucleotide polymorphisms) within the PTC gene. All nucleotide substitutions resulted in amino acid substitutions. Since mutation has not introduced any *stop* codons or deletions that might render the gene nonfunctional, the nontaster allele does encode a gene protein. Wooding et al. (2004) hypothesize that the nontaster protein may be a receptor for other aspects of taste. This hypothesis awaits proteomic investigation. Seven haplotypes for the SNP's have been identified, which vary in frequency depending on the population (Wooding et al. sampled African, Asian, European and North American populations). Two of the haplotypes, however, were predominant - *hsA* is strongly associated with the taster phenotype and *hsG* with the nontaster (Drayna et al. 2003; Kim et al., 2003).

The statistical test results led Wooding et al. (2004) to reject the hypothesis of neutrality, providing support for natural selection operating to maintain the *hsA* and *hsG* haplotypes. Where do we look, then, for explanations as to the adaptive significance of these alleles? PTC does not occur in nature, however perceiving the bitter taste of PTC is strongly correlated with the ability to taste other bitter compounds, many of which can be toxic, especially if eaten in large amounts (e.g. Tepper, 1998). Vegetables such as broccoli and brussels sprouts, and fruits such as grapefruit, contain bitter molecules similar in structure to PTC, such as isothiocyanates and goitrin.

Studies have shown (e.g. Drewnowski and Rock, 1995; Drewnowski et al., 2001; Tepper, 1998) that the ability to taste bitter substances in foods is correlated with food preferences and therefore with the nutritional quality of the diet. Early humans having the ability to taste potentially toxic bitter substances and then avoiding those foods would have an obvious selective advantage.

But there is another angle – many of these bitter phytochemicals in vegetables, wine, and green teas have been strongly associated with prevention of cancer and coronary heart disease (e.g. Craig, 1997). Tasters might avoid bitter foods and be protected from toxicity, but they would be missing out on important nutrients. Nontasters might get the benefit of the bitter anti-oxidants, but might become poisoned. So natural selection may have favored both phenotypes, maintaining both alleles. Once the function of the nontaster protein group has been elucidated, the possibility of heterozygote advantage may be tested.

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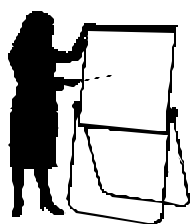
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Tepper, B.J. 1998. 6-n-Propylthiouracil: a genetic marker for taste, with implications for food preference and dietary habits. *American Journal of Human Genetics*, 63:35-44

Wooding, S. 2004. Natural selection: sign, sign, everywhere a sign. *Current Biology* 14:R700-R701.

Wooding, S., U.-K. Kim, M.J. Bamshad, J. Larsen, L.B. Jorde, and D. Drayna. 2004. Natural selection and molecular evolution in PTC, a bitter-taste receptor gene. *American Journal of Human Genetics* 74:637-646.



## UMBC sponsors Undergraduate Research Symposium

The Seventh Annual Undergraduate Research Symposium in the Chemical and Biological Sciences is being held on Sunday, October 15, 2004 at the University of Maryland, Baltimore County. Students are invited to submit proposals for poster presentations relating to their original research in chemistry, biology, and biochemistry. Student posters will be judged and prizes will be awarded. The program will also feature tours of the UMBC research facilities. To register and submit an abstract see <http://www.umbx.edu/UGSymp/> Abstracts are due Sept. 24. The conference, lunch, and refreshments are free!

## THE BU MASTERS PROGRAM

The Department of Biological and Allied Health Sciences offers both a Master's 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, prepares students for rewarding careers, 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).

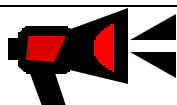
## Welcome Graduate Assistants!

The department has three graduate assistants this semester: **Stacy Rogers, Erik Weidenboerner, and Stephanie Benfer**. They are the behind the scenes individuals that make your laboratory experiences in Anatomy & Physiology, Cell Biology, Integrated Physiology, and Concepts in Biology so efficient and exciting. Erik and Stephanie are new to our program this fall.

**Julia Fabrega-Climent** finished her MS biology program this summer. Her thesis was entitled "Effects of Naphthalene on Early Developmental Stages of the Green Sea Urchin *Strongylocentrotus droebachiensis*." Dr. Klinger was Julia's thesis advisor. Julia is now enrolled in a Ph.D. program of the University of Southern California.

**Connie Wilson** successfully defended her master's thesis this summer. Her thesis was entitled "An Evaluation of Anaerobic Digestion of Swine Manure with Cheese Whey." Dr. Kipe-Nolt was her thesis advisor. Connie is currently enrolled at Temple University Dental School.

**Amy Mudry, Justin Reis, and Khalique Ghani** are planning to finish their programs this semester.



## Calling All Seniors

The last day to apply for December graduation is October 1, 2004. Take your completed form to Ms. Beishline, department secretary. If you have a minor, complete a minor form and take it to its respective department.

Be sure to check out the Career Development Center (CDC) in Room 201 of the Student Services Center. Seniors may pick up a free copy of Job Choices 2005 for Science, Engineering, and Technology, while supplies last. The publication is produced by the National Association of Colleges and Employers. The CDC also has a variety of resources related to graduate and professional school and a copy of the Job Search Guide. Carol Barnett, Director, and Jeanne Fitzgerald, Assistant Director, would be happy to meet with you to discuss the center's services.

## Alumni News

**Emily Bray** (B.S. Biology, Spring 2004) is currently enrolled in the master's degree program in Biomedical Science at the Philadelphia College of Osteopathic Medicine in Philadelphia, PA.

**Margaret Overholzer Harvey** (pre-physical therapy) received her degree in osteopathic medicine (D.O.) from the Philadelphia College of Osteopathic Medicine in June 2004. Marty was the recipient of the Galen S. Young Award by the department of surgery for showing exceptional interest and ability in the field of surgery and the Sigma Alpha Omicron Award for maintenance of high scholarship in didactic work.

**Carey McNeill** (B.S. Biology, 1998) is an optometrist in Wilmington, Del. A graduate of The Pennsylvania College of Optometry, she has worked with very young patients at The Eye Institute in Philadelphia and with elderly patients at Moore Eye Foundation in Springfield. She has also traveled to Guatemala to provide free eye care.

**Diana Naugle** has recently graduated from Lancaster General Hospital and is currently employed in the nuclear medicine department at Bloomsburg Hospital.

**Kristel Price** (B.S. Biology) has been accepted to the School of Veterinary Medicine at the University of Wisconsin, Madison.

**Andrea Schmidt** (B.S. Biology, Spring 2004) is working as a research technician in the laboratory of Dr. Emad Alnemri, professor of microbiology and immunology, at Thomas Jefferson University. The laboratory investigates the molecular pathway of apoptosis, programmed cell death.

**Angela Wickstrum** (B.S. Biology, Fall 2003) is enrolled in the physician assistant program at Lock Haven Univ.