



BioSynthesis

Volume 4, Issue 1 (February 2005)

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

Spring Semester: Upcoming Events

FEB 14: Biology Club, 7:00 p.m., 142 HSC

FEB 17: Journal Club, 12:20 p.m., HSC 142

FEB 21: "Your Body Fat Composition," Spring Into Health Series, 9:00 p.m., Columbia Fireside Lounge

MAR 1: Journal Club, 12:20 p.m., HSC 142

MAR 3: Journal Club, 12:30 p.m., TALE Ctr.

MAR 7—11: SPRING BREAK

MAR 17: Journal Club, 12:20 p.m., HSC 142

MAR 21: "Stem Cell Research" Spring Into Health Series, 9:00 p.m., Columbia Lounge

APR 2: CPUB meeting, Millersville Univ.

APR 7 & 8: Health Sciences Symposium, KUB

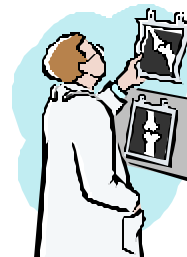
APR 8-10: PA Academy of Science, Camp Hill



Look what's inside:

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New Career Path for Medical Imaging Graduates Radiologist Assistant Degree Program Approved



Bloomsburg University is among leaders in the nation to offer a new health care degree, the radiologist assistant (RA). This new degree category will bridge the gap between radiology technologists (including our medical imaging graduates) and radiologist physicians. It was developed with support from the American College of Radiology, the American Society of Radiologic Technologists and the American Registry of Radiologic Technologists.

A radiologist assistant, working under the supervision of a radiologist, will perform some clinical procedures currently performed by a radiologist. He or she will have duties in evaluating medical histories and patients' conditions before and after procedures, explaining techniques to patients and obtaining consent. The RA will help meet the needs of an increasing number of patients as the population ages, technology advances, and current technologists and radiologists retire. Shortages in the radiology field are predicted to continue through 2030. The new field also provides a career path for radiology technologists who want to take on increased responsibility in a clinical setting. Current career paths often lead to management or teaching positions.

BU is one of the first 10 colleges/universities in the U.S. to offer the radiologist assistant degree program. Drs. Kipe-Nolt, Till, and Matta prepared the program proposal that was approved by the Pennsylvania State System of Higher Education's Board of Governors on Jan. 13, 2005. This masters degree program builds on BU's 25-year-old undergraduate medical imaging program that enrolls nearly 200 students.

The new BU program is set to welcome its first class in the fall 2005. To be eligible a prospective student must have a bachelor's degree, American Registry of Radiologic Technologists certification in radiologic technology and at least three years of full-time work experience as a technologist. Courses in the first semester of the 45-credit, two-year program will be offered online; students will be required to attend classes at BU's campus during the spring and summer semesters of the first year. The second year will be devoted to a year-long clinical experience, supervised by a radiologist mentor who is selected by the student. Enrollment will be limited to 25 new students per year. For more information, contact Dr. Kipe-Nolt.

Science and Technology Symposium

Bloomsburg University hosted its annual Science and Technology Symposium on Saturday, February 12, 2005. The symposium provided an opportunity for high school seniors who are interested in BU's College of Science and Technology and their families to visit campus and meet with faculty and students. The Department of Biological and Allied Health Sciences held a series of information sessions on our various majors and an open house featuring our labs in action. Thanks to following students who participated: Michelle Sienkiewicz, Megan Stehr, Christine Dry, Jamie Willour, Brad Hortman, Jill Remaley, Eric Horstick, Krissie Tofts, Val Van Cleef, and Mike Kaminsky

Allied Health Updates



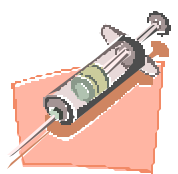
CSI: The Real Story

The Annual Health Sciences Symposium is slated for April 7 and 8, 2005 at Kehr Union. The symposium is an opportunity for the campus and community to explore contemporary health issues in a multidisciplinary setting. The featured speaker is Dr. Gregory McDonald, Assistant Medical Examiner for the City of Philadelphia. Dr. McDonald has extensive experience in forensic pathology having conducted over 4000 autopsies and testified in court over 500 times. Dr. McDonald is board certified in forensic pathology and serves as the medical director of Forensic Medicine at the Philadelphia College of Osteopathic Medicine. He is a graduate of Villanova University and the Philadelphia College of Osteopathic Medicine. Dr. McDonald will present the keynote address on Thursday, April 7, 2005, 7:30 p.m. in Kehr Ballroom. On Friday, April 8, 2005 at 8:30 a.m. in Kehr Ballroom, he will also lead a workshop. In addition to the featured speaker, the symposium will feature posters and presentations by graduate students, undergraduates, and faculty. Awards will be given for outstanding Bloomsburg University undergraduate student posters. The symposium will also feature a Wellness Fair, including over 60 exhibits, demonstrations, and booths on a variety of health and wellness topics. This is always a big hit! Mark your calendars now! The symposium is sponsored by the School of Health Sciences, the Berwick Health and Wellness Foundation, the Provost's Lecture Series, and the University Health Center.



Spring into Health Program Series

Everyone is invited to join the Health Sciences Learning Community for its *Spring into Health Program Series*. All of the featured programs are held on Mondays at 9:00 p.m. in Columbia Hall lounge. Beside interesting topics and lively discussions, there is also FREE FOOD. Please join us for these programs: February 21: *Your Body Fat Composition*. Students from the Exercise Science program will provide free assessments of body fat composition. March 21: *Stem Cell Research: Scientific Discovery and Ethical Decision Making*, Dr. Wassmer. The series is sponsored by the Departments of Audiology/Speech Pathology, BAHS, Exercise Science, Nursing, and Residence Life.



Have you had your TB test?

Students who will teach or work directly with clients in hospitals, medical clinics, therapeutic clinics, and day care centers during Fall semester 2005 must have the PPD tuberculosis test administered this semester. Cost is \$5. Two screening clinics are offered by the Student Health Center in KUB 340 from noon to 4 pm. FEBRUARY CLINIC: test administered Feb 14 and read Feb 16. MARCH CLINIC: test administered March 21 and read March 23.



It's Interview Season!

Many Medical Imaging students are currently interviewing for clinical programs for the coming academic year. Good luck and remember to be yourself! Once you have made a decision, please see Dr. Kipe-Nolt to finalize your plans and complete the appropriate forms.

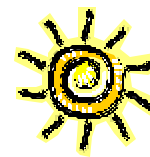


Job Outlook: Clinical Laboratory Science

In order to keep BAHS students apprised of current trends in the allied health sciences, *BioSynthesis* will include features on the job outlook in various professions. The source of this information is: Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2004-05 Edition* at <http://www.bls.gov/oco/ocos105.htm> (visited December 28, 2004).

Clinical lab scientists analyze body fluids, cells, and tissues in order to detect, diagnose, and treat disease. The field has grown increasingly dependent on computer technology and automation and has become more analytical. It is typical for clinical lab scientists in larger labs to specialize in particular areas such as blood bank, clinical chemistry, immunology, microbiology, histology, cytology, or molecular biology. In 2002, about 297,000 clinical lab scientists were employed in the U.S., primarily in hospitals. In the future, employment is expected to grow in other settings such as organ banks, physician offices, outpatient care centers, and research labs. According to the U.S. Bureau of Labor Statistics, the employment outlook is excellent and is expected to grow 10 to 20% through 2012. Currently there are not enough qualified clinical lab scientists to fill the available positions. This high demand is attributed to the increased number of lab tests required as the population ages and the availability of new diagnostic tests. In 2002, clinical lab scientists earned an average of \$42,910.

What Are you Going to do this Summer?



BAHS Summer College Offerings

The following courses will be offered by BAHS during summer 2005: Cells, Genes, and Molecules (Dr. Chamuris); Human Biology (Dr. Melnychuk); Ecology & Evolution - restricted to summer freshmen (Dr. Wood); Anatomy and Physiology I (Dr. Hranitz); Anatomy and Physiology II (Dr. Wassmer); Introductory Microbiology (Dr. Kipe-Nolt); Field Botany (Dr. Williams); Limnology (Dr. Rier); and Human Sexuality (Dr. Wassmer and TBA).

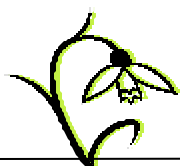
Summer Field Courses

(50.452/552) Limnology (the study of inland waters), 3 credits Dr. Rier
Summer Session VI, Class meets July 11-29

This field-oriented course will introduce the fundamentals of freshwater ecology. It will explore the intimate link between the biology, chemistry, and physics of lakes, streams, rivers and wetlands and how these systems function as components of larger watersheds. Biological investigations will include an introduction to the identification and ecology of algae and other microorganisms, zooplankton, macroinvertebrates, aquatic vascular plants and fishes. Students will also gain a practical knowledge of how humans modify these systems and the strategies employed by local, state, and federal agencies to assess impact and restore degraded systems. Each student will obtain valuable research experience through the development and completion of an individual project.



(50.263) Field Botany, 3 credits, Dr. Williams
Summer Session I, Class meets May 31 to July 8



This course will concentrate on the methods used to collect and identify local vascular plants, with an emphasis on non-woody flowering plants. Field trips to local sites of interest will provide the opportunity to see, collect and identify much of the diverse flora of central Pennsylvania. Additionally we will review the biomes of the United States, discuss principles of plant classification, and learn the characteristics of the 25-30 "most important" flowering plant families.

BALD EAGLE INTERNSHIP

Do you want credit and education/interpretation experience while working with Bald Eagles? There are challenging internships starting this Spring and Summer. The internship includes fielding questions about Bald Eagle natural history and giving short but frequent interpretive presentations to the general public at Knoebel's Grove. Transportation, junior class standing, and a strong work ethic are required. For more information, contact Dr. Corbin (email: ccorbin@bloomu.edu/, phone x4134, office HSC 131).



Summer Research Internships at The Weis Center for Research

The Weis Center for Research, Geisinger Health System in Danville, PA is sponsoring a 10-week summer research intern program. Interns will have the opportunity to do hands-on scientific research under the direct supervision of a Weis Center scientist on topics related to the molecular, cellular, and genetic basis of human disease. Interns will receive a stipend of \$8 per hour. The deadline for applications is February 16, 2005. A flyer detailing the application procedure is located on the BAHS bulletin board on the green floor adjacent to the elevator. For more information about the program, consult Dr. Hansen.

Molecular Biology Workshop

Penn State University is offering their workshop on *Techniques in Molecular Biology for State Universities of Pennsylvania* on May 16 -27, 2005 at the University Park campus. This is an intensive 2 week lab workshop for faculty, **graduate students** and **advanced undergraduate students** that focuses on the principles, techniques, and applications of molecular biology. Participants will gain hands-on experience with DNA purification, analysis by restriction enzymes and gel electrophoresis, DNA probes, Southern blots, cloning, sequencing, PCR amplification and analysis of gene products by western blots. No previous experience is necessary. Now for the best part.....The workshop is FREE and includes meals and housing. Applications are due March 31, 2005. Application forms and additional information may be obtained at <http://www.lsc.psu.edu/techniques/workshop2.html>





Pre-professional Committee Updates

Register Now for the APRIL MCAT

The MCAT is a standardized exam required for admission to allopathic, osteopathic, and some veterinary schools. The exam assesses mastery in biology, general and organic chemistry, physics, scientific problem solving, critical thinking, and writing skills. Scores are provided in four categories: biological sciences, verbal reasoning, physical sciences, and writing. The exam is typically taken in the spring of the junior year or the summer between the junior and senior year. The exam runs about nine and one-half hours. **The next exam is scheduled for APRIL 16, 2005. The registration deadline is March 11 and the late registration deadline is March 25.** The summer MCAT is scheduled for August 20. The registration deadline is July 15. To register go to: <http://www.aamc.org/students/mcat/start.htm>

Temple Dental School Program

Temple University School of Dentistry is holding a pre-health professions advisor day on March 18, 2005. The focus of the event will be to provide the pre-health professions and interested pre-dental students with a personal experience of Temple University School of Dentistry. If interested in going, please contact Dr. Melnychuk for further information before 25 February 2005. The deadline for responding to Temple is 28 February 2005.

JAN PLAN

Geisinger Medical Center's Jan Plan brings pre-medicine students into the hospital for a first hand look at the medical profession. Students shadow physicians as they rotate through various departments of the hospital. Participating in Jan Plan this year were BU pre-medicine majors **Nicole Dalessandro, Cassandra Clay, and Tanita Eliam**. Cassie shadowed in physical therapy, orthopedics, and pediatric allergy and immunology. She enjoyed the opportunity to gain hands-on experiences in a variety of fields, particularly in pediatrics. Nicole visited general surgery, IV therapy, interventional radiology, and vascular surgery. In particular, she enjoyed conversing with the doctors and appreciated their good advice, friendliness, and enthusiasm for medicine. All of the students found the JAN PLAN experience to be wonderful and inspiring and recommend it highly to any student interested in a career in medicine.

Opportunities for Pre-medicine Students

Course in Human Anatomy at Johns Hopkins University

The Johns Hopkins University School of Medicine in Baltimore, MD is sponsoring a four week course for undergraduates in human anatomy from June 6 to July 1. This 4-credit course includes both lecture and laboratory and is taught by medical school faculty. Students will explore human anatomy through a regional approach that employs the use of cadavers, various imaging modalities (CT scans and radiographs), and computer programs. The course is open to undergraduates who have completed their sophomore year and who have taken a course in introductory biology. Costs are \$3,700 for tuition, \$840 for dormitory housing, and \$17 per day for a meal plan. For additional information and applications see <http://www.hopkinsmedicine.org/FAE/anatomyinstitute> Deadline is March 1, 2005.

Summer Program at Weill Medical College

The Travelers Summer Research Fellowship Program is a seven-week program for premedical students "from diverse backgrounds who have a major interest in working with underserved populations." The program provides students with an opportunity to do an independent research project and to become acquainted with clinical and public health aspects of medicine that will have particular impact on underserved minority populations. The program is highly competitive and is held at Weill Medical College, Cornell University, New York City. For further information <http://www.med.cornell.edu/education/programs>

Primary Care Scholars Program

The Penn State College of Medicine will hold this year's Primary Care Scholars Program from May 16 to May 27. The program is for pre-medicine students who have completed their sophomore or junior years of college and are interested in becoming a primary care physician. During the first week, students are exposed to primary care in seminars and group sessions at the Hershey Medical Center. Students spend the second week in the office of a primary care physician. For more information see Dr. Ardizzi. Applications are due February 14, 2005.

Minority Pre-Health Conference

Johns Hopkins will host its annual Minority Pre-Health Conference on Friday, February 25 and Saturday February 26. The theme of the conference is "The Cutting Edge: Evolving Approaches to Research, Health Education, and Patient Care." The program will include workshops such as "The Life of a Medical Student." For more information contact mcsav@jhu.edu



Check out what's going on!

BBB Journal Club Underway

So what does BBB stand for? The Bloomsburg Brown-Bag BioLunch, of course. Please join us biweekly for a lively discussion of a current journal article in biology. Everyone is welcome and students are especially encouraged to attend. So bring your lunch and your scientific curiosity. The BBB schedule appears below. Please see Dr. Corbin for copies of the article under discussion or for more information.

Date	Location	Time	Presenter
Thursday, Feb 17	HSC 122 or 142	12:20 p.m.	Dr. Corbin
Topic: <i>Bergmann's Clines in Ectotherms</i>			
Tuesday, March 1	HSC 122 or 142	12:20 p.m.	Dr. Brubaker
Thursday, March 3	Bakeless TALE Center	12:30 p.m.	Dr. Hansen
Topic: <i>Of genes and proteins: sensing, signaling and the learning experience</i>			
Thursday, March 17	HSC 122 or 142	12:20 p.m.	Dr. Surmacz
Thursday, March 31	HSC 122 or 142	12:20 p.m.	Dr. Till
Thursday, April 14	HSC 122 or 142	12:20 p.m.	Michael Kaminsky
Topic: <i>Tri-trophic interactions among highland scotch, weight-training and Scottish chicks: pressure to resist a change in accent</i>			



DEPARTMENT CLUBS ON THE MOVE!

Biology Club

The Biology Club has a busy spring semester planned. The club is staffing a table at the Science and Technology Symposium on February 12 to meet with visiting prospective students and their families. Later that evening, we are hosting our first "movie night" so join us for *Finding Nemo* at 6 p.m. in Kuster Auditorium. Our next meeting is Monday, February 14th at 7 p.m. in 142 HSC. **Mike Kaminsky** will speak about his experience abroad at the University of Edinburgh in Scotland, research, and life as a biology major. The Club also hopes to have other speakers in the future. Plans for the April banquet are underway. The club is also considering a trip to the Baltimore Aquarium and a plant sale for Earth Day. Everyone is welcome to attend and new members are always welcome. Biology Club Officers are: President, **Valerie Van Cleef**; Vice-president, **Krissie Tofts**; Secretary, **Keri Ondrusek**; and Treasurer, **Joel Gyimesi**.



Pre-medicine Club

The pre-medicine club will meet at 8:00 p.m. on Tuesday nights during spring semester starting February 8, 2005. If you have any questions, please e-mail **Nicole Dalessandro** at Nicolelegigi@hotmail.com.

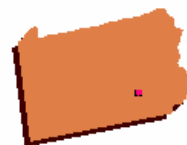
Meet Our Staff

A number of new student workers have joined our ranks this semester. Assisting with cell biology labs are **Benjamin Ringus-Perez** and **Daniel Herring**. **Terrina Dolan** is assisting in the greenhouse and with preparations for the genetics lab. The Anatomy and Physiology crew includes: **Grace Seda**, **Eric Melnychuk**, and **Michelle Sienkiewicz**. **Jordan Ward** is organizing the collections in 142 HSC. Returning student secretaries include **Kristi Brinckman**, **Maxine Ferrante**, and **Carla Botelho**. **Jennifer Intellicato-Young** and **Brian Young** are assisting in the Microbiology labs again this semester. Graduate assistant **Stephanie Benfer** is returning to help in the Concepts in Biology lab. Thanks for your conscientious work and enthusiasm.

PA Biology Faculty and Students to Meet

The Commonwealth of Pennsylvania University Biologists (CPUB) is an organization of biology faculty from the fourteen universities in the State System of Higher Education. CPUB holds annual meetings to highlight student and faculty research. This year's CPUB meeting will be held April 1, 2, & 3 at Millersville University. This is a good venue to present the results of your undergraduate or graduate research projects!

The keynote speaker, Dr. Holmes Morton, will address *Genes, Biology, and Disease: New Perspectives on Old Problems*. See Dr. Williams for more details. **The deadline for registration and submission of abstracts is Wednesday, March 23.**



Salute to Academic Achievement

Congratulations to Biology and Allied Health Students who earned a GPA of 3.5 or greater and were named to the Dean's List for Fall Semester 2005. Great job!

BS Biology

Nicholas Bixler
Bruce Bortree
Sarah Bounds
Rachel Brous
Kelly Bryant
Cassandra Clay
Bryan Crandall
Nicole Dalessandro
Leigh Dudick
Mallory Garnett
(double major, Psychology)
Jared Geissinger
Alicia Gilbert
Laura Halon
James Heim
Amanda Hendricks
Eric Horstick (Biotechnology)
Rebecca Kehler
Chase Kelch
Stephanie Kutza
Hanh Le
MaryJo Melichercik (Marine Science)
Jonathan Munski
Nathan Mutic
Inna Nechipurenko
(double major Business Management)
Jamie Rozowski
Melissa Scubelek
David Sibley
Erica Smith
Jason Smith
Jennifer Soika (double major,
Anthropology)
Jessica Teders
Kristine Tofts
Taylor Triglia
Ashley Welikonich
(double major, Anthropology)
Ashley Yelinek
Tonia Zangari

BA Biology

Kristi Brinckman
Krystle Brown
Eileen Garvey
Kathleen McPeck
Lyndsay Nagy
Linda Yeany

Secondary Education, Biology

Holly Binkley (BS)
Andrew Cole
Paul Farley (BA)
Shannon Hauer (BA)
Katherine Huff (BA)
Rachel Jacobs
Rachel Kaskie (BA)
Robert Maurer, Jr.
Amy Miller (BA)
Ann Marie Nicholas
Eric Segada
Julie Sunday (BA)
Jerry Waltman, Jr.
Leanne Yeagley (BS)
Michael Yohn
Sabrina Ziemer (BS)



Pre-Physical Therapy

Courtney Dean
Kimberly Dodson
Kaylee Fischer
Robert Heim
Maria Johns
Krista Rae Petruskevich
Matthew Sterback

Medical Imaging

Talia Bartko
Al Bino
Robert Blasko
Megan Coyne
Megan Enterline
Megan Frantz
Stephanie Gabel
Keri Garton
Susan Heckman
Amanda Knepp
David Lindemann
Donald Lubrecht
Alison Lukjanczuk
Tanya McFalls
Valery Mead
Emily Miller
Joseph Miller III
Nicole Nestico
Nicole Shambach
Cara Shellenberger
Brock Solomon
Leanne Stoner
Danielle Swartz
Melody Wehry
Bryan Wiest
Jamie Willour
Heather Woodrow

Clinical Lab Science

Kimberly Maddalozzo

Pre-Pharmacy

Donald Astleford
Phuoc Ho
Kaitlyn Sanders

Pre-Occupational Therapy

Lauren Delp

Four BAHS Students Named to Who's Who



Four BAHS seniors were recently recognized by Who's Who Among American College Students for outstanding academic achievement, extra-curricular activities, leadership ability, personal qualities, and professional promise.

ERIC HORSTICK. Eric has gained extensive research experiences as an undergraduate biology major in our biotechnology option. He has conducted independent research on G-protein linked signaling pathways with Dr. Hansen and with Dr. Robishaw, Weis Research Center, Geisinger Clinic. He has presented his research on several occasions including meetings of the Pennsylvania Academy of Science, the Commonwealth of Pennsylvania University Biologists (CPUB), and the BU College of Science and Technology Research Day. He received a 1st prize poster award at last year's CPUB meeting. Eric was selected for the competitive summer internship program at the Weis Research Center. He is a Dean's List student, a member of the Biology Club and Beta Beta Beta Biological Honor Society, and a recipient of a BAHS department scholarship. Eric completed a workshop on Bioinformatics and Molecular Biology Techniques at Penn State University.

MICHAEL KAMINSKY. Mike has been an active student during his four years at BU. He has conducted research on the effects of temperature on G-protein signaling pathways and was a 2nd place prize winner for his poster at the 2004 meeting of the Commonwealth of Pennsylvania University Biologists. He is a Dean's List student and a recipient of numerous scholarships including the BAHS department scholarship, the National Eagle Scout Academic Scholarship, the Greek Catholic Union Academic Scholarship, the PHEAA Science and Technology scholarship, a 2 year athletic scholarship, and the Board of Governors Academic Scholarship. Mike is a member of Beta Beta Beta Biological Honor Society, served as the Biology Club treasurer, and has extensive community service. Last semester Mike studied abroad at the University of Edinburgh, Scotland.

REBECCA KEHLER. Becca has been on the Dean's list for eight straight semesters and is a member of Phi Kappa Phi, the interdisciplinary honor society. She has been a member of the BU softball team for four years and served as Co-Captain last year. She has been named a BU scholar-athlete on several occasions. Rebecca has tutored students in microbiology and genetics. To finance her education, she works off campus at Lowe's Distribution Center. Rebecca is interested in pursuing a career as a physician assistant.

AMY MILLER. Amy is majoring in Secondary Education in Biology and is currently student teaching. She has served as the President of the BU National Science Teacher's Association since Fall 2003. Under her leadership, the group sponsored an on-campus program for middle school science students from several area school districts. Amy has spent many hours volunteering her time to tutor and work with youth. Amy is a Dean's List student, a recipient of a Board of Governor's Scholarship, and a tutor for Concepts in Biology I and II and Fundamentals of Inorganic Chemistry.

Beta Beta Beta Biological Honor Society

Beta Beta Beta is an honor and professional society for students of the biological sciences. It encourages scholarship by initiating students who achieve superior academic records and who have an aptitude for and major interest in the life sciences. Its goals are to stimulate scholarship, to disseminate scientific knowledge, and to promote biological research. Membership criteria and applications are available on-line at <http://departments.bloomu.edu/biology/BBB>. They are due February 18, 2005 to Dr. Chamuris. The initiation ceremony will be held on February 28, 2005 in 72 HSC at 5 p.m.



Student Teachers Head to Classrooms!

Several students have headed into area classrooms for student teaching in biology. The students and their placements are: **Amy Miller** (Central Columbia School District), **Tara Rynhart** (Bloomsburg High School) and **Robert Maurer** (Selinsgrove and Shikellamy School Districts). Drs. Surmacz and Wood will be co-supervising these students.

Open House for Graduate Programs at PCOM

The Philadelphia College of Osteopathic Medicine (PCOM) is hosting an Open House on Friday February 18, 2005 from 6 to 8 p.m. for students interested in their masters programs in biomedical science, forensic medicine, or physician assistant. For more information contact Kari Szentesy at 215-871-6700.

NIH Research Fellowship Program for Minority Students

The University of Massachusetts Medical School is offering a 10 week summer program that provides hands-on experiences in biomedical laboratory research to minority undergraduates. For more information please see the program's website (www.umassmed.edu/summer/). Applications must be received online by February 28, 2005.



Research in BLOOM

The research labs in Hartline are certainly busy this semester! The following students are working on research projects either as part of Research in Biology I or II, Honors Independent Study I or II, or as volunteers to gain valuable experience. We look forward to learning the results of their studies at various local or state meetings.

Lindsay Baglini is conducting a PCR-based molecular analysis of the Hardy Kiwi under the direction of Dr. Davis in the course Mitheods in Biotechnology.

Kelly Bryant is cloning and sequencing the phytosiderophore receptor gene from foxtail grass. Kelly is also enrolled in the Methods in Biotechnology course with Dr. Davis.

Carla Botelho will be screening commercially available herbal medicines for antimicrobial properties. Dr. Parsons is her mentor.

Ashley Bucher will investigate whether selection for certain adult characteristics in domestic mallards constrained the development of walking and running. Ashley will compare the morphology and running kinematics of flighted mallard ducklings and their running counterparts (Indian Runner ducklings). The comparison of two morphological types within a species is advantageous because it avoids the problems associated with a cladistic evolutionary history. In other words, we are asking evolutionary questions yet working within the domain of morphological and behavioral variation of a single species. Hence, the study has both evolutionary and agricultural significance. Dr. Corbin is her mentor.

Neema Chandel is currently working with Dr. Corbin to develop a laboratory manual for Vertebrate Histology. Neema will be taking photos of tissues, editing text, and possibly doing some tissue preparatory work.

Cassandra Clay is investigating a Runx2 knockout in prostate cancer cell line PC-3 with Dr. Brubaker. Specifically she will be doing Western blotting for the knockout.

Nicole Dalessandro is investigating antibiotic toxicity in an invertebrate model system. She will test the effects of a number of antibiotics that have differing mechanisms of action on a wide range of physiological responses. Her goal is to compare her results to those in other model systems. Dr. Surmacz is Nicole's mentor.

Terrina Dolan is analyzing the molecular phylogeny in heterotrimeric G-protein alpha subunits in Antarctic Icefish. Dr. Hansen is her mentor.

Jeff Fellman is testing mutagenized strains of the fungus *Neurospora tetrasperma* with BDM, a drug believed to inhibit cytoskeletal growth and function. His goals are to discover drug-resistant strains, to characterize the effects that the mutations have on development, and to determine the number of genes involved and their interactions. Dr. Ardizzi is Jeff's mentor.

Sarah Fisher, a double Anthropology/ Biology major, is analyzing paleoethnobotanical remains of the Hopewell/Adena culture. Hopewell refers to several Native American groups centered in the Ohio River Valley between 200 BC and 500 AD. Working in conjunction with Dr. DeeAnne Wymer (Department of Anthropology), Sarah is identifying and categorizing botanical remains from samples taken from the Hopewell earthworks. Questions regarding the use of wild and domesticated plants, the patterns of occurrence, density of species, and diversity of species will be addressed. Dr. Chamuris is her mentor.

Laura Halon is performing western and northern blots of Heat Shock Protein 70 and is performing siRNA transfections for Runx2 knockouts in prostate cancer cell line PC-3. Laura's mentors are Drs. Brubaker and Hranitz.

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 recently co-authored a poster with Dr. Wassmer that was presented at the annual meeting of the Society for Integrative and Comparative Biology. The poster was entitled "Effects of Gravity on the Stability of the Biological Clock in the Desert Beetle *Trigonoscelis gigas*." Co-investigators were A.M. Alpatov and T.M. Hoban-Higgins. Brad is continuing his research with Dr. Wassmer this semester and is examining the anti-microbial activity in the hemolymph of cockroaches.

Michael Kaminsky is continuing his research on the effects of temperature on G- protein signaling pathways. Dr. Hansen is Mike's mentor.



More Student Researchers

Janice Kuchinsky is determining the antimicrobial effects of over-the-counter products designed for the keratin containing areas of the human body. Janice's mentor is Dr. Parsons.

Rebekah Keister is investigating sex determination and sequencing of the Z-gene in the American Bald Eagle (*Haliaeetus leucocephalus*). Becky is enrolled in Methods in Biotechnology with Dr. Davis.

Marie Malitsky and **Michelle Reiner** are investigating the association between foraging behavior and morphology of sit-and-wait passerine birds (mostly flycatchers in the family Tyrannidae) from Costa Rica. Preliminary analysis shows that morphology significantly predicts the foraging behavior within this group of birds. Species that are doing a lot of aerial hawking (catching prey in the air) have very wide bills that act like a sweep net. Birds that are using more closed, dense habitats tend to have shorter, more maneuverable wings. This suggests that there is a fairly good relationship between morphology and foraging behavior which is predicted by an adaptive evolutionary hypothesis. Dr. Corbin is their mentor.

Laura Marnin is investigating the toxicity of several alternative road de-icers in the aquatic blackworm *Lumbriculus variegatus*. Laura will determine the lowest concentration that causes an observable effect for each de-icer for a wide variety of sublethal behaviors including pulse, tactile response, peristaltic crawling, reversal behavior, helical swimming, and fragmentation. Dr. Surmacz is Laura's mentor.

Mary Jo Melichercik is using a PCR-based approach to address the question "Can the control region of mitochondrial DNA be used to improve the parentage assignment probabilities of parents in collared lizards?" Dr. Hranitz is Mary Jo's mentor.

Nathan Mutic. The drug 2,3-butanedione monoxime (BDM) interferes with actin and myosin cage development during nuclear migration and ascospore formation in the ascomycete fungus *Neurospora tetrasperma*. Nate intends to examine the effects of BDM on the development of normal *N. tetrasperma* using bright-field and phase-contrast microscopy. He will then compare these observations with those on mutant strains that are either insensitive or supersensitive to the drug. Nate will also prepare to map the genes affecting BDM resistance and sensitivity in *N. tetrasperma*. Dr. Ardizzi is Nate's mentor.

Inna Nechipurenko is characterizing the coding sequence of a Heat Shock Protein (HSP70) in the Leafcutting Bee (*Megachile apicalis*). Dr. Hranitz is Inna's mentor.

Jill Remaley is comparing the effects of temperature on locomotion in two cockroaches, the tropical Surinam cockroach and the temperate woodroach. Jill's project will provide her with good experiences for her future graduate study in entomology. Jill's mentor is Dr. Wassmer.

Krissie Tofts is collaborating with The Fertility Center at Geisinger Medical Center to assess the contributions of obesity and smoking to infertility in males and females with increasing age. Krissie is a pre-medicine student enrolled in Honors Independent Study I. Dr. Surmacz is her mentor.

Valerie Van Cleef and **Becky Rugg** will also be working on the Heat Shock Protein 70 project with Drs. Brubaker and Hranitz.

Jordan Ward is screening new microsatellite loci for use in parentage analysis of collared lizards. Currently four microsatellite loci are being used resolve parentage at 50-95% confidence in a population. The addition of four more microsatellite loci should improve the confidence to levels acceptable for study of natural populations. Dr. Hranitz is Jordan's mentor.

Jamie Willour, a medical imaging major, is beginning her two-semester Honors Independent Study Project. She is conducting a statewide survey of clinical radiology departments to assess their knowledge and understanding of the new Radiologist Assistant profession and to determine their perceived need. Dr. Kipe-Nolt is Jamie's mentor.

Toni Zangari is examining coliform and salmonella reductions during anaerobic digestion and composting of manure. Toni, an honors program student, has completed her data collection and is now analyzing it. Toni is enrolled in Honors Independent Study under the direction of Dr. Nolt.



Check out these Research Opportunities with Dr. Corbin!

Dr. Corbin has a variety of opportunities available for students interested in an undergraduate research experience. Please see him if you are interested in these or other projects (email: ccorbin@bloomu.edu, phone: x4134, office HSC 131)

- 1) Developing a bird species list for the recently developed streamside park in Lightstreet (work can start immediately.)
- 2) Drs. Corbin and Hranitz will be receiving blood samples of introduced Mediterranean geckos from the Southern US. We are interested in the genetic variability within and among populations of this species as well as questions about parentage and evolutionary fitness of individuals within the populations.

The Reading Lamp: Current Topics in Evolutionary Biology

George Chamuris, Professor



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

Intelligent Design – A Threat to Science Education

Last October the Dover Area (PA) School District board voted 6-3 to instruct science teachers to read a statement to their students that evolution is an imperfect scientific theory, and that the theory of intelligent design (ID) is an alternative view on equal scientific footing as evolutionary theory. The resolution attempts to circumvent the established science standards emphasizing evolutionary theory. The dissenting board members resigned, and the teachers refused to read the statement (Mervis, 2005); but, administrators came into the classroom last month to read the statement at the beginning of the evolution unit in 9th grade biology. The school system is being sued by a number of parents in the district to have the board's resolution reversed. Last month, similar resolutions were made by school boards in Tennessee and in Wisconsin.

What is intelligent design? The roots of this idea are old – reaching back to the so-called “natural theologians,” such as William Paley, of the 18th century. This new version of creationism began in the 1980's, surfacing as a more or less cohesive idea in the 1990's in the US. It arose as an anti-evolution strategy following Supreme Court decisions banning laws specifying “equal time” for “scientific” (Biblical) creationism in public schools. Basically, ID is a defeatist (and nonscientific) attitude: if we encounter a challenge that is too complex for us to understand, then we invoke the participation of an “intelligent designer.” This attitude is sometimes called “God-of-the-Gaps.”

Intelligent design is based on two ideas, both of which are flawed and have been exhaustively de-bunked: irreducible complexity and the design inference.

Irreducible Complexity

Mechanisms proposed by evolutionary biologists that incorporate mutation, natural selection and genetic drift, are viewed as being inadequate to explain the perceived complexity and diversity of life. Supposedly, examples of this can be seen in “irreducibly complex” structures and processes. Irreducibly complexity derives from viewing biological structures as machines – if you remove one of the parts, the machine fails to function. Therefore, the parts could not have been added sequentially by natural selection. Authors such as Michael Behe (1996) give bacterial flagella, the human eye, and the blood clotting cascade as examples.

Numerous biologists have shown that Behe's examples are flawed. There are eyes, cascades, and flagella that function just fine without all the parts that he cites. Also, proponents of ID are portraying the process of evolutionary change as linear – adding one component at a time, with each component being retained. Actually, natural selection recruits and borrows structures with one function to carry out another function. For example, many of the blood clotting factors are serine proteases – molecules that function in the complement system, tissue remodeling, embryonic development and many other processes (e.g. Krem and Di Cera, 2001; 2002).

Also, ID proponents do not consider that a complex structure or process may have had a part that was critical to its evolution, but is no longer useful or even present. Consider a stone arch as an analogy. Masons will use scaffolding to construct the arch, but remove the scaffold once the keystone is laid and the arch is stable. Ten years later, the arch appears to be irreducibly complex – removing one stone will cause the arch to collapse.

The Design Inference

William Dembski (e.g. 2002) has proposed that design by an intelligence can be inferred based on whether we can reasonably attribute the structure or occurrence to predictable “nature” (e.g. phases of the moon), chance, or if there is a “specification” whose symmetry or complexity seems is judged to be improbable, to design by an intelligence. He refers to this logic as a “design filter.” After the sorting process, improbable and specified events or structures are only reasonably explained by intelligent design. The design inference can only work given our current state of knowledge or lack thereof. In the Middle Ages, fairy rings (circular patterns of mushroom growth) were attributed to the ring-dancing of fairies when nobody was looking. According to Dembski's filter, the specified structure (an improbable and unpredictable specified circle of mushrooms) would

be attributed to an intelligent designer in the Middle Ages. But now we know better – mycelia tend to grow as expanding rings, and sporulate at their margins. Today fairy rings are explained by natural causes.

ID proponents do not publish their ideas in scientific journals or at meetings of scientific societies - only in books, articles, and web pages that are aimed at the general public. They generate no data or observations – they simply use the data and observations published by scientists who have used the scientific method, and interpret these findings in their own way.

They do not participate in the culture of science. They offer no hypotheses or predictions that can be tested. All they offer is incredulity and defeat – “I cannot believe that something this complex could have arisen by natural processes, therefore this is evidence of a Creator.” We should teach our students that all of human knowledge is incomplete and imperfect – science is defined by its methodology, not its perfection.

If ID is included in the curriculum, what would teachers teach in a science classroom? No research exists that provides any positive evidence for their position, no testable hypotheses or predictions have been proposed. All a teacher could do is to present perceived inadequacies in evolutionary theory, and jump to “it must be the designer.”

Support for ID exists among conservative Catholic and Protestant Christians, few Jews, and few Muslims (e.g. in Turkey). Supporters are uncomfortable with the secular and required agnostic position of science. Earlier attempts to block the teaching of evolution, or to include equal time for creationism, have failed. ID is the best that they can do to attempt to discredit evolutionary theory.

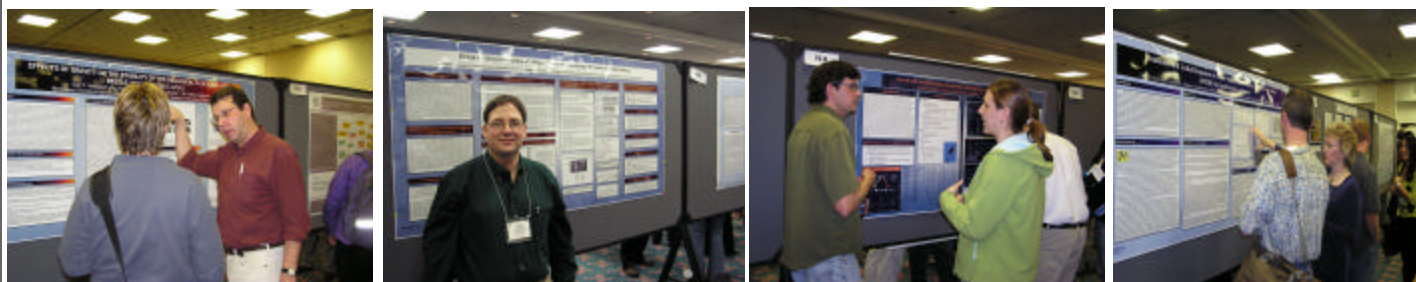
Our own US senator Rick Santorum has expressed, in public and on numerous occasions, anti-evolution views and support for ID. Supporters of ID will often claim that their views are not connected to religious beliefs or agendas. One has only to visit ID ‘headquarters’ – *The Discovery Institute* – to learn that the real agenda is for broad social change toward Christian values (<http://www.discovery.org/csc/>). They call it the “renewal of culture.”

Many scientific societies have expressed their pro-evolution and anti-ID positions in formal statements and press releases (e.g. <http://www.aaas.org/news/releases/2005/0202id.shtml>). We all need to become more informed on this issue, and to express our views to our legislators.

Action at the level of the school board, as in Dover, can occur only if people who are uninformed about the nature of science make the decisions without input from informed citizens. We should not sit back and allow those with “renewal of culture” motives to damage the already fragile state of science education in this country. The future and quality of science education is at stake – scientifically-literate people need to get involved.

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Greetings from the SICB Meeting

by Dr. John Hranitz

This year, San Diego hosted the annual meeting of the Society for Integrative and Comparative Biology (SICB). SICB promotes the study of biology using integrative and comparative techniques. Integrative approaches are used widely in disciplines such as physiology, behavior, and genetics to investigate the underlying mechanisms (from molecules to whole organism) that allow organisms to function in their environment. Comparative approaches investigate characteristics (morphology, behavior, physiology, molecular biology) of different taxonomic groups to understand their evolution. Four of us (Drs. Corbin, Hranitz, Surmacz, and Wassmer) headed to San Diego on January 4 to present research posters. See the above photos for proof! For most of the meeting, biologists could be seen scurrying between raindrops from one meeting room to another to attend interesting talks. I gravitated to the presentations on lizards (just how hard does a lizard bite? Are northern lizards larger than southern lizards?), heat shock proteins, and marine larvae. Dr. Corbin could be found in the talks on functional vertebrate morphology. Capturing his attention was the research of Sustaita and Hertel of the University of California Northridge that showed that the killing behavior of raptors is related to their bone anatomy and musculature. Dr. Wassmer enjoyed the symposium on adaptations to desiccation and extreme environments. He also learned lots about dendrites and propagation of action potentials (ask him about it, he'd love to tell you more.) Meanwhile, Dr. Surmacz enjoyed presentations on physiological adaptations to high altitudes and molecular mechanisms of muscle contraction. This meeting had something for everyone! Dr. Corbin even brought along his field glasses and was able to add another bird species to his life list of birds observed in the field. All good things do have to come to an end, so we all departed on January 8 for our return to campus and a promising Spring 2005 semester!

Opportunities for Student Researchers

Student Research Funds Available

The Pennsylvania Academy of Sciences has funds available for undergraduate and graduate student research in any area of the natural sciences. Grants of up to \$500 will be awarded to fund supplies, small pieces of equipment, and travel. Proposals must include the following sections: introduction, methods and materials, role of study participants, and budget. Proposals are due May 1, 2005. Funds will be released October 15, 2005. For more information, see Dr. Surmacz.



Summer Research Opportunity at Hershey Medical Center

The Penn State College of Medicine is sponsoring a ten-week Summer Undergraduate Research Internship Program for rising juniors and seniors. The program is targeting to students who are considering graduate school or are considering careers in life sciences or bioengineering. Each student is matched with a faculty mentor. During the program students still will gain hands-on experience in a research lab, write and present their work, and attend weekly lunch research and career seminars. Students will receive a stipend of \$3,000. For an application or more information see <http://www.hmc.psu.edu/summerresearch> The deadline is February 11, 2005

Sigma Xi Student Research Symposium

The 16th annual Sigma Xi Research Symposium will be held on Friday, April 8th, 2005, at Saint Joseph's University in Philadelphia. The keynote speaker is Dr. Joy Crisp, Lead Project Scientist for the NASA Mars Exploration Rovers Projects. A reception and student poster session will follow from 7:00 to 8:30 p.m. Abstracts for posters are due March 28. Register online at (<http://www.sju.edu/honor-society/sigma-xi>).