



BioSynthesis

Volume 3, Issue 6 (December 2004)

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

Fall Semester: Upcoming Events

DEC 4: Biology Club trip to Baltimore
DEC 10: COST Research Day, 3 p.m. 79 Hartline
DEC 11: Classes End
DEC 13: Finals Begin
DEC 17: Graduate Commencement, 6:00 p.m. Haas
DEC 18: Undergraduate Commencement, 10:00 a.m. Haas
DEC 18: Final Exams End
JAN 4 -10: E-Registration
JAN 10 First Day of Classes, Spring Semester
JAN 17: Martin Luther King, Jr. No Classes

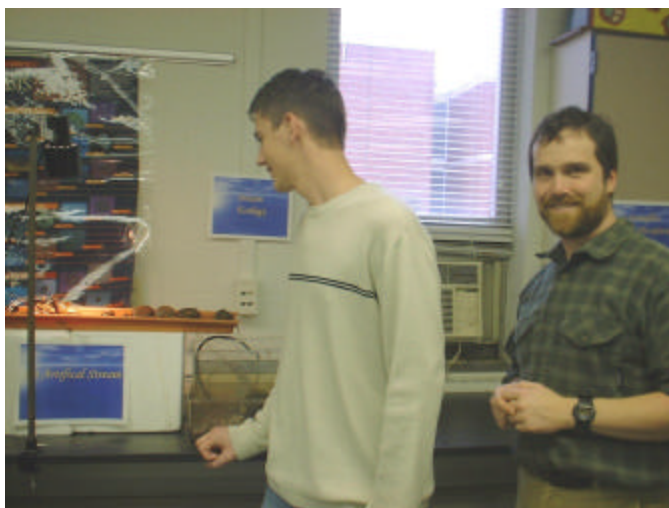


Look what's inside:

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Visitors explore BAHS labs

BAHS hosted a group of high school students from the advanced placement biology and biology I classes at Line Mountain High School on Tuesday, November 23, 2004. The group was led by their teacher and BAHS alumnus **Alan Zelnick**. The students were interested in touring area science labs and had previously visited Susquehanna University and the Weis Center for Research at Geisinger. The group checked out several labs in Hartline, chatted with BAHS faculty and students, and even did some hands-on activities. **Dr.**



Wood greeted the students and outlined some of the many programs offered by BAHS. The students then checked out 149 Hartline for a tour of environmental bioindicators with **Drs. Rier** and **Williams**. Students examined algae, diatoms, insects, and crustaceans in an artificial stream. (See above photo of Dr. Rier and Line Mountain student.) **Drs. Brubaker** and **Hansen** headed to their research labs where students examined cancer cells and discussed some of the applications of molecular biology such as DNA fingerprinting. We hope that they enjoyed their visit and will come back again soon!

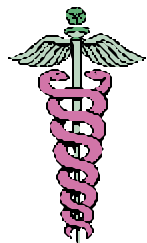


Congratulations December Graduates!

Best of luck to our December graduates. Be sure to stay in touch! Remember to check out Biosynthesis on-line: <http://departments.bloomu.edu/biology/biosynthesis>

Winter commencement for undergraduates will be held on Saturday December 18, 2004. This year, two undergraduate ceremonies will be held to provide more seating for guests.. The ceremony for students in the College of Science and Technology will be held at 10:00 a.m. in Mitrani Hall, Haas Center for the Arts. No rehearsal will be held.

Krystle Brown	B.A. Biology
Sheila Hovi	B.S. Biology
Qudirant Jamiu	B.S. Biology
Mary Johnson	Medical Imaging
Rachel Radel	B.A. Biology
Jennifer Soika	B.S. Biology
Taylor Triglia	B.S. Biology
Allison Zientek	B.S. Biology



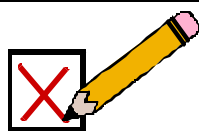
Pre-professional Committee Updates

MCAT Review Courses

MCAT preparation courses are being offered at area colleges. These programs use a real MCAT exam to teach students how to apply their scientific knowledge to the reasoning questions asked on the test. Extensive handouts are provided along with 15 hours of instruction. These courses are led by Dr. James Yoho and William Van Der Sluys.

King's College: February 1 and 3 (Tuesday and Thursday) from 6 to 9 p.m. and February 5 and 6 (Saturday and Sunday) from 10 a.m. to 3:30 p.m. Cost \$300. For more information or to register, please contact Ms. Suzanne McCabe at semccabe@kings.edu

Penn State University: SECTION 1: January 25 and 27 (Tuesday and Thursday) from 6 to 9 p.m. and on January 29 and 30 (Saturday and Sunday) from 10 a.m. to 3:30 p.m. SECTION 2: February 8 and 10 (Tuesday and Thursday) from 6 to 9 p.m. and February 12 and 13 (Saturday and Sunday) from 10 a.m. to 3:30 p.m. Cost is \$395. For more information or to register, please contact Kathy Early at KME12@sa.psu.edu



Have you started a Co-Curricular Transcript? Check out this program!

You are probably familiar with your academic transcript—a listing of your courses, grades, and GPA at BU. What is a co-curricular transcript? This is a supplement to your academic transcript that focuses on your extra-curricular activities. Specific categories of activities that are reported in the co-curricular transcript are community involvement, diversity training, leadership, professional development, research, and work experience. After enrolling in the program, you will receive an activity report form to document and verify your participation in various activities. This will be compiled into an official co-curricular transcript that you can show future employers and graduate schools. Go to the SOLVE office, 224 Student Services Center to enroll in the program. A Listing of Frequently Asked Questions and online forms can be found at <http://departments.bloomu.edu/solve/>



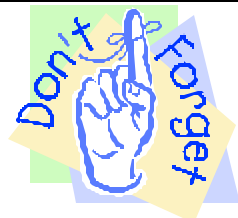
COST Fall Research Day

The College of Science and Technology will host its Fall Research Day on Friday, December 10 at 3 p.m. in 79 HSC. The program will feature 15 minute presentations by student researchers. For more information, please see Dr. Trumbo-Bell, Department of Chemistry. Everyone is welcome to attend!



New Minor in Web Development

The Department of Mathematics, Computer Science, and Statistics and the Department of Instructional Technology are teaming up to offer a minor in Web Development. This new minor is designed to give majors in any academic discipline (like biology!) a variety of useful skills that can enhance your career. To enroll in the minor, go to the Office of Academic Advisement in the Student Services Center. The courses in the minor that are offered spring semester 2005 are: **56.110** Introduction to Computer Science; **56.213** Elementary Topics in Computer Graphics and Multimedia; **56.475** Introduction to Computer Networks; **57.470** Introduction to Web Site Development.



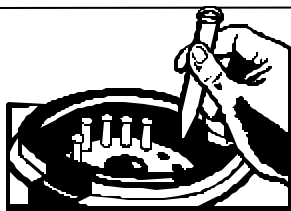
Reminder!

Students in the BAHS sections of University Seminar (Instructors: Drs. Corbin, Davis, Hranitz, Kipe-Nolt, Klinger, Williams, and Wood) will meet on Tuesday, December 7 or Wednesday, December 8. Assignment 10 is due at this class meeting.

BAHS Faculty and Students Solve Crimes!



Dr. James Parsons and students **Janice Kuchinsky**, **Carla Botelho**, **Jennifer Intelicato-Young**, and **Bryan Young** (honorary BAHS student) headed to Lycoming College recently for a day-long workshop on forensics. The group examined documents for forgeries, isolated DNA by two methods, performed hair analysis, and evaluated various poisons. Who knows what could be next? CSI-Bloomsburg?



UNCF-Merck Offers Undergraduate Science Research Scholarships

Applications are available in the BAHS office for the UNCF-Merck Undergraduate Science Research Scholarship. This scholarship program is sponsored by The Merck Company Foundation and is administered by The United Negro College Fund. The goal of the program is to encourage African American students to pursue careers in biomedical science. The award provides tuition support of up to \$25,000 and offers opportunities for paid summer internships at a Merck research facility in New Jersey, Pennsylvania, or California. To be eligible, students must be African American, enrolled in a life science or physical science program at a four year college, a junior, and have a 3.3 GPA. The deadline is December 15, 2004. The scholarship program web site is www.uncf.org/merck/

Alumni News



Andrea L. Boeshore (Secondary Education, Biology) is teaching tenth grade biology at Easton Area High School. She is enrolled in the Biology Education Masters program at DeSales University.

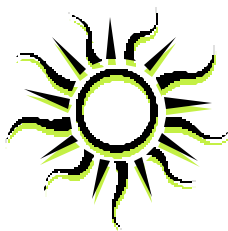
Jennifer Kapusta (B.S. Biology) is working at Charles Rivers Laboratory in Malvern, PA.

Brett Siegfried (B.S. Biology 2003) will start a new job in the Drug Discovery Department at GlaxoSmith Kline, Collegeville, PA. Brett is excited about the opportunity to expand his knowledge about enzyme kinetics and cell signaling!



Mark Your Calendars: PAS meeting

The annual meeting of the Pennsylvania Academy of Science will be held April 8 to 10, 2005 in Camp Hill, PA. The meeting features research posters and presentations on a wide variety of topics. This is a good forum for students to present the results of their research projects. Deadline for abstracts is December 15, 2004. For more information see <http://pennsci.org/index.htm>



Opportunity for Summer Research

The Chemistry Department at Princeton University is sponsoring a nine-week summer research program in the area of molecular biophysics. Students will use a cross-disciplinary approach will be used to investigate biological systems with methodology drawn from physics and mathematics. The program carries a \$3750 stipend and is part of the National Science Foundation's REU program. To be eligible students must be completing their sophomore or junior year. For more information see www.Princeton.edu/~chemdept/mbp/sumprog.html The deadline for receipt of applications is Feb. 15.



Biology Education CORNER

What is the NSTA?

The National Science Teachers Association (NSTA) is a professional organization dedicated " ... to promote excellence and innovation in science teaching and learning for all." The organization is composed of over 50,000 members who include science teachers, science supervisors, scientists, administrators and representatives from business and industry. The NSTA publishes a number of professional journals for science teachers and sponsors regional and national conventions that include hands-on workshops, demonstrations, and updates. To learn more about the member services and opportunities provided by the National Science Teachers Association, check out their website at www.nsta.org.

NSTA poll: What's New in Science Teaching? Forensics!



The NSTA recently conducted a poll of its members to identify new trends in the science classroom. The majority of the middle and high school teachers that responded listed forensics as the most popular new trend hitting the classroom. The popularity of the many crime scene television shows was cited as a major factor that has sparked student interest. To see the survey results go to http://science.nsta.org/nstaexpress/nstaexpress_2004_10_25_forensic.htm. The NSTA offers free curriculum units on forensics that they developed in conjunction with Court TV. These can be downloaded at http://www.courtTV.com/forensics_curriculum.

Secondary Education in Biology Students Named to Dean's List

Congratulations to the following secondary education in biology majors who were named to the Dean's List for spring semester 2004 for achieving a GPA of 3.5 or greater. Keep up the good work!

**Holly Binkley
Shawn Butler
Joseph Holland
Katherine Huffman
Rachel Kaskie
Pamela Kreis
Amy Miller
Ann Marie Nicholas
Eric Segada
Julie Sunday
Leanne Yeagley**



NSTA Issues New Position Statement on Scientific Inquiry in the Classroom

The *National Science Education Standards* (NSES p. 23) defines scientific inquiry as "the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. Scientific inquiry also refers to the activities through which students develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world." The Science as Inquiry Standard in NSES includes the abilities necessary to do scientific inquiry and understanding about scientific inquiry.

Scientific inquiry reflects how scientists come to understand the natural world, and it is at the heart of how students learn. From a very early age, children interact with their environment, ask questions, and seek ways to answer those questions. Understanding science content is significantly enhanced when ideas are anchored to inquiry experiences. Scientific inquiry is a powerful way of understanding science content. Students learn how to ask questions and use evidence to answer them. In the process of learning the strategies of scientific inquiry, students learn to conduct an investigation and collect evidence from a variety of sources, develop an explanation from the data, and communicate and defend their conclusions.

The National Science Teachers Association (NSTA) recommends that all K-16 teachers embrace scientific inquiry and is committed to helping educators make it the centerpiece of the science classroom. The use of scientific inquiry will help ensure that students develop a deep understanding of science and scientific inquiry.

Declarations

Regarding the use of scientific inquiry as a teaching approach, NSTA recommends that science teachers

- Plan an inquiry-based science program for their students by developing both short- and long-term goals that incorporate appropriate content knowledge.
- Implement approaches to teaching science that cause students to question and explore and to use those experiences to raise and answer questions about the natural world. The learning cycle approach is one of many effective strategies for bringing explorations and questioning into the classroom.
- Guide and facilitate learning using inquiry by selecting teaching strategies that nurture and assess student's developing understandings and abilities.
- Design and manage learning environments that provide students with the time, space, and resources needed for learning science through inquiry.
- Receive adequate administrative support for the pursuit of science as inquiry in the classroom. Support can take the form of professional development on how to teach scientific inquiry, content, and the nature of science; the allocation of time to do scientific inquiry effectively; and the availability of necessary materials and equipment.
- Experience science as inquiry as a part of their teacher preparation program. Preparation should include learning how to develop questioning strategies, writing lesson plans that promote abilities and understanding of scientific inquiry, and analyzing instructional materials to determine whether they promote scientific inquiry.

Regarding students' abilities to do scientific inquiry, NSTA recommends that teachers help students

- Learn how to identify and ask appropriate questions that can be answered through scientific investigations.
- Design and conduct investigations to collect the evidence needed to answer a variety of questions.
- Use appropriate equipment and tools to interpret and analyze data.
- Learn how to draw conclusions and think critically and logically to create explanations based on their evidence.
- Communicate and defend their results to their peers and others.

Regarding students' understanding about scientific inquiry, NSTA recommends that teachers help students understand

- That science involves asking questions about the world and then developing scientific investigations to answer their questions.
- That there is no fixed sequence of steps that all scientific investigations follow. Different kinds of questions suggest different kinds of scientific investigations.
- That scientific inquiry is central to the learning of science and reflects how science is done.
- The importance of gathering empirical data using appropriate tools and instruments.
- That the evidence they collect can change their perceptions about the world and increase their scientific knowledge.
- The importance of being skeptical when they assess their own work and the work of others.
- That the scientific community, in the end, seeks explanations that are empirically based and logically consistent.

-- Adopted by the NSTA Board of Directors, October 2004

References

American Association for the Advancement of Science (1993). *Benchmarks for science literacy*. New York: Oxford University Press.

National Research Council (1996). *National science education standards*. Washington, DC: National Academy Press.

National Research Council (2000). *Inquiry and the national science education standards: A guide for teaching and learning*. Wash., DC: Natl. Academy Press.

This position statement reprinted courtesy of the National Science Teachers Association, Arlington, VA,

<http://www.nsta.org/position>.

Meet the BAHS Honors Students

What do the BAHS Honors Students have in common? They all thrive on challenge, both in and out of the classroom, and enjoy being very busy! The BU Honors Program encourages independent thinking and learning and offers a learning community where students can develop their leadership potential. Honors students take 25 hours of honors courses that include honors general education courses, honors upper division seminars and two semesters of honors independent study culminating in an honors thesis. The honors classes are usually small, affording more opportunities for discussion and study in depth. The classes are frequently supplemented with guest speakers, field trips, and projects. One of the key elements of the honors program for BAHS students is enrollment in Honors Independent Study I and II-Biological Research. This two semester experience consists of an independent laboratory or field investigation of a particular topic in biology conducted under the supervision of a biology faculty member. This is a great opportunity to experience the scientific process. This is a time to learn how to think like a scientist, to challenge one's understanding of the subject, and to ask one's own questions about biology. In short, it is an opportunity to actually "do science." Along the way, students acquire valuable experience in reading and writing research papers, operating scientific equipment, using computers, analyzing data, and communicating results. BAHS honors students typically present their research results at local, regional or national meetings. The honors program boasts a good record of placement of its students in graduate and professional schools.



Meet some of our current BAHS honors students: Front row: **Sarah Bounds** (B.S. Biology), Back row: **Ashley Yelinek** (B.S. Biology), **Krissie Tofts** (B.S. Biology), **Toni Zangari** (B.S. Biology), **Susan Heckman** (Medical Imaging), and **Jennifer Heckler** (Secondary Education, Biology),

My favorite things....

BAHS honors students share some of their favorite aspects of the BU honors program:

- *The numerous extracurricular activities such as field trips and the summer abroad programs.* Kim Dodson
- *Taking trips and opportunities to study abroad over the summer for credit.* Sarah Bounds
- *Group events such as snow tubing and the day trip to New York City to see the Broadway musical Chicago. We also have the opportunity to attend regional and national conventions.* Ashley Yelinek
- *Being in our own small community-solidarity.* Jen Heckler

Some of our BAHS honors program students take time to pose for *Biosynthesis*: Upper left: **Katie Huffman** (Secondary Education, Biology); Upper right: **Eileen Garvey** (B.S. Biology); Lower left: **Jamie Wil-lour** (Medical Imaging); Lower right: **Kim Dodson** (B.A. Biology-Physical Therapy) Missing from photos: **Leanne Yeagley** (Secondary Education, Biology)



The Reading Lamp: Current Topics in Evolutionary Biology

George Chamuris, Professor



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

In the 28 October 2004 issue of the journal *Nature*, anthropologists from Australia and Indonesia reported on the discovery of skeletal remains of a hitherto undescribed species of *Homo* from a cave on the Pacific Island of Flores (Brown et al., 2004; Morwood et al., 2004). The team discovering the remains was led by Australian archeologist Michael Morwood. Named *Homo floresiensis*, this species, now known from at least seven individuals, is the smallest of the known *Homo* species. The authors propose that *Homo floresiensis* is a species derived from an isolated population of *H. erectus*. *Homo erectus* migrated out of Africa into Asia some 1.5 to 2 million years ago (Lewin & Foley, 2004).

Calibrated accelerator mass spectrometry (similar to radiocarbon dating, but actual atoms are counted), thermoluminescence, uranium series and electron spin resonance dating indicate that *H. floresiensis* existed from before 38,000 to at least 18,000 years ago. For perspective, keep in mind that the oldest *Homo sapiens* remains known, from Ethiopia, are approximately 160,000 years old (Clark, et al., 2003; White et al., 2003), and that the oldest *H. sapiens* remains in Australasia are about 40,000 years old (Lewin & Foley, 2004). In other words, *H. sapiens* and *H. floresiensis* may have coexisted on some islands in this region.

The remains are remarkable in several respects. First, although covered in sediment, the extremely fragile bones were not fossilized or covered in calcium carbonate. Second, *H. floresiensis* represents the smallest *Homo* species known, with a stature of approximately 1 m, and an endocranial volume of 380 cm³. This puts *H. floresiensis* in the size range of the African *Australopithecus* species. [For reference, *H. sapiens* endocranial volume ranges from 1150 to 1750 cm³ (Jurmain et al., 1997).]

As always, new discoveries await critique, confirmation, and analysis from the scientific community. Not all agree that these remains represent a new species of *Homo*. Although as yet unpublished, Australian scientists Maciej Henneberg (a paleopathologist) and Alan Thorne (an anthropologist) argue that the small cranium is actually from a *Homo sapiens* that suffered from microcephaly, citing a similar, 4,000 year old microcephalic *H. sapiens* skull recovered on the island of Crete (Balter, 2004). Morwood counters that all seven individuals found have small skulls, making it unlikely that they all suffered from microcephaly. Also, the pelvis of *H. floresiensis* is similar to that of *Australopithecus*, which cannot be explained as a deformity such as microcephaly. Small stature is known from isolated *H. sapiens* populations (e.g. Pygmies - Bailey & Shea, 1996), which at least supports the possibility of an extreme phenotype being manifest in an isolated population.

Bailey, R.C., and B.T. Shea. 1996. Allometry and adaptation of body proportions and stature in African pygmies. *American Journal of Physical Anthropology* 100:311-340.

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Brown, P., T. Sutikna, M.J. Morwood, R. P. Soejono, Jatmiko, E.W. Saptomo, and R.W. Due. 2004. A new small-bodied hominin from the Late Pleistocene of Flores, Indonesia. *Nature* 431:1055-1061.

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Jurmain, R., H. Nelson, L. Kilgore, W. Trevathan. 1997. *Introduction to physical anthropology*. 7th Edition. West/Wadsworth, Belmont, CA.

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White, T.D., B. Asfaw, D. Degusta, H. Gilbert, G.D. Richards, G. Suwa, and C. Howell. 2003. Pleistocene *Homo sapiens* from Middle Awash, Ethiopia. *Nature* 423:742-747.