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Join us for Homecoming!

OKTOBERFEST 2007

Friday, Oct 19: 3-5: Departmental Picnic/Open House,
East Lawn of Schrenk Hall
Friday, Oct 19, 4-6: Faculty/Staff/Alumni Beer & Soda
Garden, Havener Center Lawn
Saturday, Oct 20, TBA: Alumni Brunch (RSVP)

BioSci design team to compete at International iGEM

In November students from the Biological Sciences department will compete in the International Genetically Engineered Machines (iGEM) Jamboree at MIT. iGEM is an undergraduate competition in Synthetic Biology, the field of designing and constructing new biological parts, devices, and systems, and re-designing existing natural systems for useful purposes. In other words, it is the manipulation of cells for engineering applications.

iGEM started in 2003 at MIT as a competition for a Synthetic Biology class. By 2006, iGEM had grown to 37 teams from 15 countries. This year's UMR team will compete against 58 other teams for prizes such as Best Part, Best Presentation, and Best Real-World Application. Students must also give a 20 minute oral presentation and a poster about their project. DNA parts constructed by each team are deposited into the Standard Registry of Biological Parts, and are freely available to iGEM teams. The goal is to build a library of interchangeable parts that can be used to construct new biological machines.

The UMR iGEM team, made up of **CORY CHEATHAM**, **RACHEL KLAPPER**, **HERMAN ARMSTRONG**, **AMBER MCFADDEN**, **MORGAN SCHIERMEIER**, **JACKIE SCHNEIDER**, and **BRIAN PINK**, is working on two projects. One is the construction of a biological timer using the sugar arabinose to regulate the expression of a fluorescent protein. The input input to the time is a given amount of sugar, and when time is up, the bacteria will glow green. The second project is a biological breathalyzer. The alcohol-sensitive promoter from a



UMR's iGEM team, from left: Cory Cheatham, Rachel Klapper, Herman Armstrong, Amber McFadden, Morgan Schiermeier, and Jackie Schneider (Not pictured: Brian Pink)

yeast will be put into bacteria to regulate expression of fluorescent protein. The intensity of the fluorescent light will be an indicator of the amount of alcohol.

Students began working on the projects this summer in the labs of BioSci faculty members **KATIE SHANNON** and **DAVE WESTENBERG** and will continue the projects this fall. Several of the students are supported by UMR's OURE program, but the team is conducting fund raising activities, such as bake sales, to defray the cost of registration and travel.

To learn more about UMR's iGEM team, visit the following website: http://parts.mit.edu/igem07/index.php/Missouri_Miners.

Department Update

There is always a lot going on in the BioSci department. Within the past few months:

- We graduated our largest class (by far) in May 2007, 32 students (BA, BS, MS). Please send us some replacements.
- The department Chair's Advisory Board had its inaugural meeting. This group, comprised of alumni and friends involved in education, research, healthcare, and biotechnology, is helping identify strategic opportunities for the department.
- The reorganization of UMR (Missouri S&T) administration was completed. This involved a lot of internal shuffling of personnel and reporting responsibilities.
- Dr. Paula Lutz (Professor of Biological Sciences and Dean of the College of Arts and Sciences) left UMR to become the Dean of the School of Arts and Sciences at Montana State University in Bozeman. Dr. Dev Niyogi will be on a leave of absence that will take him to New Zealand for a year.
- Our undergraduate curriculum continued to evolve. Notably, a Biodiversity course is replacing Plant Biology and Zoology in the sequence of core courses. A certificate program in Biotechnology has been proposed. New courses in Pharmacology and Epidemiology will be offered next semester.
- For the second year in a row, the department welcomed its largest class of first year students. The number of BioSci majors has more than doubled since 2000, and we have added new laboratory and course sections in cell biology and anatomy.
- BioSci alumni in biotechnology positions responded to an appeal for support with donations of centrifuges, chromatographs, spectrophotometers, etc. We are putting this equipment to good use.
- Our alumni and friends also responded generously to our annual appeal. Please note that our increased student enrollment has heightened our need for scholarship funding.
- Exchange agreements have been discussed with 3 universities in Taiwan. These will bring students and research fellows to Rolla for extended visits and create similar opportunities for UMR students in Taiwan.

- After two years of planning (light speed in university time), construction began on the BioSci Student Study Lounge.
- Our graduate program remains fully subscribed and 6 advanced degrees were awarded.
- Dr. Maglia's AmphibAnat ontology project received major, multiyear funding from the National Science Foundation.
- The UMR cDNA Resource Center surpassed \$1 million in sales since its inception in 2004. The Center was acknowledged in 176 scientific publications in the past 12 months.
- BioSci Faculty continued to reap awards for teaching (Terry Wilson), advising (Dave Westenberg) and excellence (Melanie Mormile). The faculty continues to publish its discoveries in leading journals. Some of this activity is documented elsewhere in this newsletter.
- UMR was the site for AP biology training for the state of Missouri and has been selected as the lead institution for Project Lead the Way – Health Sciences. Secondary school educators increasingly recognize UMR as a superior institution for advanced training in biology (UMR isn't just for engineering anymore).

The goals of the BioSci department remain the same: to provide outstanding educational opportunities in biology and to contribute to knowledge in biology. Our strategies are also fairly constant: to increase our student population, to increase our scientific productivity, and to obtain the resources needed to achieve our goals. Your help and insight is solicited, necessary and always appreciated. UMR (Missouri S&T) continues to be an exciting place, and I look forward to discussing our programs with you.



Robert S. Aronstam
Department Chair



2007 BioSci Chair's Advisory Council

This committee, comprised of alumni and friends involved in education, research, healthcare, and biotechnology is helping identify strategic opportunities for the department.

Margaret Brown	Linda Michaelsen
Rachel Carter	Barbara Patterson
Ted Day	Amy Reeves
Brian Haggard	Joseph Safron
Anthony Kaczmarek	William Van Stoecker

Tell us about your family, special interests, employment, and projects for future issues of BioFiles. Send your information to:

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BioSci-Taiwan exchange developed

ROBERT ARONSTAM and **YUE-WERN HUANG** visited Taiwan in August to discuss exchange programs with several leading universities. They visited National Cheng Kung University (Tainan), National Health Research Institutes (Zhunan), National Dong Hwa University (Hualien), Tzu Chi University (Hualien), National Taiwan University (Taipei), and Academia Sinica (Taipei). **ARONSTAM** and **HUANG** gave five seminars during their visit, and met with faculty, administrators and students to discuss methods to facilitate the exchange of student, post-doctoral fellows and faculty members, and implement protocols to permit the exchange of research materials and resources.



Drs. Aronstam and Huang visit scholars in Taiwan.

Alumni Notes

Where are they now?

KELLY KIPP is teaching high school science in Ohio.

MAGGIE THOMPSON is in medical school in Kansas City.

KRISTA DAVIS is teaching high school biology in Waynesville.

LIBBY COOLEY is a research technician in San Francisco and will start graduate school at Dartmouth next year.

JACOB ELMER is pursuing graduate study in biomolecular engineering at Ohio State.

KRISTEN RUSSELL is in graduate school at Kansas University Medical Center.

JENNIFER JACOBI is a graduate student at Purdue University.

KYRAN WEAVER is coaching the offensive line for the UMR football program.

SHAMIM JALEEL is in graduate school at Missouri State University.

Student News and Awards

CORY CHEATHAM and **JENNA TUNE** were selected as 2007 OURE Fellows. The fellowship supports interdisciplinary research projects and only 10 are awarded each year.

DAVID CALCARA, AGATHA DWILEWICZ, JAKE ELMER, WESLEY GLICK, AMY HUNT, SHAMIM JALEEL, HEATHER LAVEZZI, MARSHALL MCDANIEL, AUDREY OAKLEY, and **KATIE STOCKSTILL** represented the department in the 3rd annual UMR Undergraduate Research Symposium. **GLICK** won first place in the Natural Sciences Poster section and **STOCKSTILL** won second place in the Natural Sciences Oral section.

AUDREY OAKLEY received an American Society of Microbiology Undergraduate Fellowship to work with **MELANIE MORMILE** on the project titled Isolation and Characterization of Haloalkaliphilic Bacteriophages from Soap Lake, Washington, which she presented at the ASM annual meeting in May. **JAKE ELMER** and **NICK ADAMS**, also working with **MORMILE**, received OURE grants to conduct their research projects, which were published this year (see 2007 BioSci Publications).

Students in the **CARIBBEAN BIODIVERSITY** course raised money this Spring to purchase a computer and digital projector for the San Salvador Island, Bahamas High School. The school was damaged by Hurricane Frances in 2004. The class traveled to San Salvador in May to study tropical and marine biodiversity, and donated the items to give back to the small island community that welcomed them.



Cory Cheatham



Audrey Oakley



The Caribbean Biodiversity class presents a digital projector to the San Salvador High School.

Fifty-one BioSci students earn Dean's List honors

The Biological Sciences department is proud to announce that the following students made the Spring 2007 Dean's List:

Chad Abernathy	Elizabeth Cooley	Kristen Hinton	Audrey Oakley	Jamie Statler
Andrea Asselmeier	Patrick Courtney	Jennifer Jacobi	Heather Perdue	Ryan Steele
Andrew Bassett	Charles Cox	Shamim Jaleel	Ajay Rao	Katherine Stockstill
Brianne Blue	Krista Davis	Loraine Johnson	April Rector	Sherea Stricklin
Ashley Bruns	Isaac Deatherage	Daniel Koehler	Candice Reiter	Erin Toney
Angie Bulen	Agatha Dwilewicz	Heather Lavezzi	Jeffery Ross	Augusta Turner
Addie Cable	Eric Evans	Jennifer Luebbering	Kristin Russell	Laura Ward
David Calcara	Wesley Glick	Danielle Lyman	Morgan Schiermeier	
Richard Campos	Casey Growcock	Marshall McDaniel	Daniel Schwent	
Debra Cartagena	Leslie Hagen	Amber McFadden	Ashley Sheek	
Cory Cheatham	Benjamin Hale	Andrew Moss	Michael Shocklee	

Student Organization News

During Spring semester 2007, **HELIX** sponsored several speakers, including BioSci faculty member **YUE-WERN HUANG**, who spoke about his toxicology research, and University of Missouri-Columbia faculty members Drs. Garcia, Cornelison, Jaramillo, and Setzer. Dr. Garcia spoke about his studies on molecular and cellular analysis of axonglial interactions and neurodegenerative and demyelinating diseases. Dr. Cornelison discussed her research on signaling and activity of skeletal muscle satellite cells. Dr. Jaramillo spoke about morphological innovation and diversification of tropical plants. Dr. Setzer spoke about the mechanisms and control of transcription of eukaryotic genes. A representative of the Missouri Department of Conservation gave a presentation about the animals in Missouri and ways that the public can protect them and their environment. UMR alumna and advisory board member **LINDA MICHAELSEN** spoke to **HELIX** about her studies at UMR and her professional career. The group visited the Missouri Botanical Gardens for their spring field trip, and volunteered their efforts for the annual Bridging the Gap event that brings Girl Scouts of all ages to UMR to explore science.

The Gamma Iota chapter of the **PHI SIGMA** national biological honor society held its annual picnic and initiation at Lion's Club Park at the close of Spring semester. Thirteen new members were initiated during the ceremony. **PHI SIGMA** members participated in several volunteer activities, and the group is finalizing plans for this year's service learning project.

The 2006/2007 academic year has been an active one for **SCRUBS**. In its first year as an official student organization, **SCRUBS** has seen a dramatic increase in membership and



Candice Reiter (back) teaches students how to brush giant teeth during **SCRUBS**'s "Body Walk."

meeting attendance. In January, **SCRUBS** hosted "Body Walk" for almost 200 students from Wyman Elementary school. The feedback was great and they look forward to doing it again in 2008. **SCRUBS** also sponsored a Great Strides Walk/Run for Cystic Fibrosis in April. This was the 5th Great Strides Walk/Run in Rolla. After 5 years of poor weather in April, they will try again October 6. If you would like to participate or sponsor a walker/runner, visit the **SCRUBS** website (<http://web.UMR.edu/~scrubs/>) for sponsor forms or contact **DAVE WESTENBERG** (djwesten@umr.edu). The 2007/2008 academic year is off to a great start with almost 60 students attending the first meeting. This year's officers (**TAYLOR HAHN**, President; **AGATHA DWILEWICZ**, Vice-President; **KRYSTLE MINCOFF**, Treasurer; **RICHARD CAMPOS**, Communications and **AJAY RAO**, Publicity) have a lot of activities and a great group of speakers planned.

May 2007 BioSci Graduates

Thirty-two UMR students received a B.A. or B.S. in Biological Sciences during the May 2007 UMR Commencement ceremony. This year's graduating class was the largest BioSci class to date.



Dr. Aronstam, with help from Hopper, honors the 2007 BioSci graduates during the May graduation reception.

Graduate Student News

Eight new graduate students joined the department: **SARAH HAVENS**, **CHUAN-CHIN HUANG**, **SANDRA LUSK**, **VERNON MODGLIN**, **JESSICA MUELLER**, **ERIN TONEY**, **VARUN PAUL**, and **YI "JENNY" XU**.

Four students successfully defended their Master's theses: **ARUNA LAMBA**, thesis title Antimicrobial activities of aldehydes and ketones produced during rapid volatilization of biogenic oils, **ANDREW JUGAN**, thesis title Water cycling effects of *Populus deltoides* x *Populus nigra*, Clone #34 on the degradation of aromatic hydrocarbons, **PRADNYA PATIL**, thesis title Influence of S-Nitrosylation on Muscarinic Acetylcholine Receptors, and **BO-YOUNG HONG**, thesis title Microbial Ecology of Hypersaline Lakes in Western Australia and Victoria, Australia. **SCOT HARMS** and **TRAVIS TINSLEY** also were awarded Master's degrees (non-thesis) in 2007.

Several grad students presented their research at scientific conferences this year, including **AMANDA WEIMER**, North American Benthological Society, **JOHN CAMPBELL**, Joint Meetings of Ichthyologists and Herpetologists, and **BO-YOUNG HONG**, American Society of Microbiology.

Faculty News and Awards

KATIE SHANNON recently was named as an investigator in UMR's Environmental Research Center. Shannon joins other BioSci faculty **YUE-WERN HUANG**, **ANNE MAGLIA**, **MELANIE MORMILE**, **DEV NIYOGI**, and **DAVE WESTENBERG** who also are affiliated with the center.

DAVE WESTENBERG received a 2007 Outstanding Student Advisor Award for his work advising biological sciences majors, pre-medical students and **SCRUBS**.

DAVE WESTENBERG also was selected for the American Society for Microbiology Scholars in Residence program. This year long program trains faculty in the scholarship of teaching and learning. **WESTENBERG** attended a Scholarship of Teaching and Learning workshop at the ASM headquarters in Washington, D.C. where he developed a research project that he will conduct during the 2007-08 academic year.

ANNE MAGLIA, postdoctoral associate **ANALÍA PUGENER**, and two colleagues, were awarded \$1,116,729 from the National Science Foundation for their project titled Semi-Automated Construction of an Ontology for Amphibian Morphology.

MELANIE MORMILE and her collaborators received \$500,000 from the National Science Foundation for their proposal titled: MRI: Acquisition of a Dual Beam Focused Ion Beam System as a Regional Resource for Collaborative Research and Education in Missouri. **MORMILE** and three colleagues also received \$150,000 from the Department of Air Force for their project Development of High Energy Density Bio-Inspired Power Systems.

MELANIE MORMILE also served as the President of the Missouri Branch of the American Society for Microbiology, and oversaw the society's annual meetings at the Christopher Bond Life Sciences Center in Columbia, MO in March. **MORMILE** is also participating in the University of Missouri Leadership Development Program.



Dr. Katie Shannon



Dr. Westenbergs accepting Outstanding Advisor Award.



Dr. Melanie Mormile

2007 Bio Sci Publications

- Arahal, D.R., R.H. Vreeland, C.D. Litchfield, M.R. Mormile, B.J. Tindall, A. Oren, V. Bejar, E. Quesada, and A. Ventosa. In press. Recommended minimal standards for describing new taxa of the family Halomonadaceae. In: *J. of Systematics and Evol. Microbiol.*
- Aronstam, R.S. and P. Patil. In press: Muscarinic Acetylcholine Receptors. *Encyclopedia of Neuroscience*, 4th Edition, Elsevier.
- Benison, K.C., B.B. Bowen, F.E. Ikuenobe, E.A. Jagniecki, D.A. LaClair, S.L. Story, M.R. Mormile, and B. Hong. 2007. Sedimentary processes and products of ephemeral acid saline lakes in southern Western Australia. *J. Sedimentary Research*, 77: 366-388
- Burken, J. G., Gilbertson, A. W. and Westenbergs, D. J. 2007. Bioengineering impacts on organic contaminant rhizodegradation. p.135-148. In: Z. Jiang, and J.C. Hoogendoorn (eds.) *BioEco 2007-Session 8: Bioresource and Biodiversity*.
- Brown R.F., Day D.E., Day T.E., Jung S., Rahaman, M.N., and Fu, Q. In press. Growth and differentiation of osteoblastic cells on 13-93 bioactive glass fibers and scaffolds. *Acta Biomaterialia*
- Guntly, L., Leopold, J. L. and A. M. Maglia. In press. Determining domain similarity and domain-protein similarity using functional similarity measurements of gene ontology terms. *Proc. IEEE 7th Int. Symp. on Bioinf. Bioengineering*
- Huang, Y., D.J. Hoffman, and W.H. Karasov. 2007. Oxidative stress induced in PCB-exposed northern leopard frogs, *Rana pipiens*. *J. Toxicol. Envir. Health A*. 70:676-681.
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- Mormile, M.R., Elmer, J.J., S. J. Spychala. 2007. Radiotolerance of microorganisms isolated from radiation fields on a university campus: Implications for shallow subsurface growth of microorganisms on Mars. p. 6694-46. In: R.B. Hoover, G.V. Levin, and A.Y. Rozanov. (eds.) *Instruments, Methods and Missions for Astrobiology X, Proc. SPIE Ann. Meeting*, v6694.
- Mormile, M.R., Hong, B., Adams, N.T., Benison, K.C., F. Oboh-Ikuenobe. 2007. Characterization of a moderately halo-acidophilic bacterium isolated from Lake Brown, Western Australia. p.6694-33. In: R.B. Hoover, G.V. Levin, and A.Y. Rozanov. (eds.) *Instruments, Methods and Missions for Astrobiology X, Proc. SPIE Ann. Meeting*, v. 6694
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- Rui X., Wunsch, D. C., Il, and R.L. Frank. In press. Inference of Genetic Regulatory Networks with Recurrent Neural Network Models Using Particle Swarm Optimization. *IEEE Trans. Comp. Biol. and Bioinf.*
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Department News

Dr. Joseph Safron honored with Professional Degree

JOSEPH A. SAFRON, Senior Research Director for Technology Resources at Baxter Healthcare was honored with a Professional Degree at the May 2007 commencement. Professional Degrees are awarded to persons who have made important contributions to their profession. While recipients of these degrees are usually UMR graduates, a distinguished career is the predominant criterion for selection.

SAFRON earned a bachelor's degree in life sciences from UMR in 1979. After receiving his veterinary medicine degree at the University of Missouri-Columbia in 1983, he practiced general veterinary medicine for two years. In 1988, he completed a residency in laboratory animal medicine in Columbia. He joined Baxter Healthcare Corp. in 1991. SAFRON is currently a senior research director for the technology resources division at Baxter Healthcare, which is a diversified global biotechnology,



Dean Paula Lutz, Dr. Joseph Safron and BioSci Chair Robert Aronstam at the May 2007 UMR Commencement.

medical device and specialty pharmaceutical company. SAFRON also serves on the BioSci Chair's Advisory Council.

Shannon lab, imaging facility lead to new collaborations

KATIE SHANNON joined the BioSci faculty in 2005 and established the UMR Cytokinesis Lab. Cytokinesis is the separation of cells that occurs after chromosome segregation in mitosis. This process must occur at the right time and place in to prevent aneuploidy or polyploidy, conditions that are associated with cancer. Seven students have worked with SHANNON, including undergraduates AMY HUNT, who found that deletion of a gene encoding an RNA-binding protein produces a cytokinesis defect, and KATIE STOCKSTILL, who worked on a deletion of the gene DUG2. Two graduate students also worked in the lab: JUNGEUN PARK, who completed her thesis on the mutagenesis of phosphorylation sites in the cytokinesis protein Hof1, and SUYOUNG PARK, who studies how the timing of cytokinesis is regulated by Bub2.

SHANNON also established the UMR Cellular Imaging Facility, which includes an Olympus inverted epifluorescent microscope optimized for both fixed and live cell imaging. SHANNON'S team and collaborators in BioSci, Chemistry, Chemical and Biological Engineering, and Environmental Engineering have used this imaging equipment heavily. SHANNON has trained 14 students to use the microscope, and almost 600 hours of microscope use were logged in the past year. SHANNON'S current collaborations include work with YUE-WERN



Dr. Katie Shannon at the inverted epifluorescent microscope.

HUANG to investigate the import and transport of nanoparticles in cells and work with Nuran Ercal (Chemistry) to study toxic effects of radiation and ethanol on cells (see 2007 BioSci Publications).

In addition to her research, Shannon taught Cell Biology and developed a new course in genetics for non-majors called Genetics: Decoding Your Genes. Next fall she will be teaching a new course in Advanced Cancer Cell Biology. She, along with DAVE WESTENBERG, is advising the UMR iGEM design team. She is also working on a developmental biology project: anticipating the birth of her first child this fall.



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