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Join us for Homecoming!

ARABIAN NIGHTS 2008

Fri, Oct 17, 3-5: BioSci BBQ & Open House

East Lawn of Schrenk Hall

Fri, Oct 17, 4-8: Silver & Gold Block Party

Alumni Lounge/Patio, 107 Castleman Hall

BioSci Students Conduct Research in Taiwan

Missouri S&T Public Relations

Pairing quantum dots with a protein transporter, a group of Bio Sci students hopes to develop a more effective and efficient drug delivery method.

It sounds like something that might have happened aboard the Starship Enterprise. Instead, it happened in Taiwan. The students spent the summer in Taiwan as part of an academic exchange program between Missouri S&T and National Dong Hwa University (NDHU). Working with NDHU's professor Han-Jung Lee, they learned how to combine quantum dots and protein transduction domains to improve drug delivery, among other uses.

"The applications of this system are tremendous in both basic biomedical research and clinical significance," says **YUE-WERN HUANG**, associate professor of BioSci and an expert in toxicology. Huang accompanied the students to Taiwan.

Quantum dots are so small that 500,000 of them could fit on the head of a pin. The dots are often used in bioimaging because of their ability to emit fluorescence. By attaching quantum dots to an antibody, it can be tracked inside the body. For example, a drug administered to target a specific organ can be traced to see if it reaches the intended target. Protein transduction domains (PTD) are very small proteins with nine identical amino acids. Their simple makeup allows them to easily enter cells, which are typically very selective. By acting as a transporter, these proteins can be used to carry several biomolecules into cells.

Using the fluorescent properties of quantum dots and the transporter abilities of the PTDs, researchers could send biomaterials, such as drugs, into the body and see which organs they reach. In Taiwan, the Bio Sci students learned to combine the systems.



Yue-wern Huang (left) and BioSci students pose with Taiwanese scholars during their summer research exchange.

HUANG says this interdisciplinary approach is relatively new. "In the past nanoscientists specialized in quantum dots, but now they're teaming with biological scientists, who only know proteins," **HUANG** says. "The multidisciplinary approach combines the two sciences to form unique advantages."

Students participating in the research exchange were **JAMIE STATLER**, a Bio Sci senior from St. Charles, Mo., Angela Rudolph, a recent graduate in chemistry from Kansas City, Mo., and **ISAAC DEATHERAGE**, a Bio Sci senior from Ava, Mo.

KATIE SHANNON, assistant professor of biological sciences, and Jeff Winiarz, assistant professor of chemistry, are also involved with the project. The group is assembling a team and plans to seek funding from the National Institutes of Health.

During their time in Taiwan, the students chronicled their research, and daily life in Taiwan, on Missouri S&T's research blog at visions.mst.edu.

Department Update

Accomplishments

The BioSci faculty had a chance to review Academic Year 2008 at its recent annual retreat. There was a lot to celebrate:

Curriculum: Courses introduced in the past year include Pharmacology, Epidemiology, Advanced Plant Biology and Cancer Biology. A new bioinformatics class, Informatics Methods for Biologists, will be offered next year; the faculty may make this a required course.

BioSci Web Site: The site has been redesigned to increase its accessibility and timeliness (biosci.mst.edu). Your comments and suggestions are welcome,

Department Growth: We reached new highs in the number of majors, minors, student credit hours, applicants, graduates, and scholarships awarded. We are one of the fastest growing departments on campus.

Teaching Quality: Students evaluate all of our courses in multiple dimensions on a 4.0 point scale. In the 13 undergraduate Bio Sci courses offered this spring, our average score was 3.4 (range 2.8 – 4.0); the S&T average is 2.9. This is a remarkable performance.

Faculty Awards: Dr. Anne Maglia was promoted to Associate Professor and received the Outstanding Advisor Award from the Miner Alumni Association; Dr. Melanie Mormile was named Missouri S&T Woman of the Year; and Dr. David Westenberg was named a Scholar in Residence for the Society for Microbiology.

Research: Publications have more than doubled in the past 4 years, establishment of a Center for Bioinformatics and Biological Imaging was approved, grant applications are at an all time high, and extramural funding now accounts for 30% of departmental expenditures.

Design Team: Our iGEM team competed in a national event at MIT. An additional team has been formed and corporate sponsors have been secured.

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

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Or email your news to: biosci@mst.edu

BioFiles is produced twice per year by the Missouri S&T Department of Biological Sciences. Printed by University Printing, Columbia, MO.

Student Affairs: Each of our official student organizations (Helix, Scrubs, and Phi Sigma) had a very active year, with invited speakers, service projects, and field trips; the student study lounge was opened; the department hosted a homecoming picnic, two graduate dinners, and lunch with the faculty events; and our weekly student newsletter (*BioConnection*) completed its first year of publication.

Other Good Stuff: We initiated an exchange program with Dong Hwa National University, and three students spent eight weeks in Taiwan this past summer; we hosted visiting scholars from Tzu Chi University; Missouri S&T was chosen as the state training center for *Project Lead the Way – Biomedical Sciences*; Dev Niyogi returned from a year in New Zealand as a visiting scholar; the department was commended by the UM System for its performance in its recent comprehensive self-study.

Challenges

The faculty is developing strategies to meet some substantial challenges. Our Big Three Challenges are:

Facilities: Our physical facilities are substandard. Improvements are needed in both our research and teaching laboratories.

Graduate Program: While we have achieved all of our goals established for our Masters program, including high student enrollment and achievement, substantial investments are required to allow us to go to the next level, a doctoral training program.

Growth: Our growth has placed strain on our resources in a number of areas, notably faculty teaching and advising efforts, student scholarships, and the availability of research training opportunities for undergraduates.

Fortunately, we anticipate a number of good things happening. Perhaps two of the most important factors are: 1) a \$58 million building to house Biological Sciences, Chemistry and Chemical Engineering is presently the number one building priority on campus, and 2) our alumni support continues to grow in parallel with our alumni base (50% of all UMR/S&T BioSci majors have graduated within the last 5 years!). So there are good reasons for optimism. We appreciate your support, ideas and interest, and we look forward to continuing to report our progress and challenges to you.

Sincerely,



Robert S. Aronstam
Professor and Chair of Biological Sciences



New Research Exchange Brings Taiwanese Scholars to BioSci

Following the success of the summer scholar exchange program with institutes in Taiwan, two professors from Tzu Chi University visited BioSci in August to conduct short-term research projects. Hwei-Hsien Chen and Ming-Huan Chan worked with **ROBERT ARONSTAM**, Chair of Biological Sciences, on research related to neurosciences. Both scholars gave seminars, and held a research day with members of the Neuroscience, Toxicology, and Molecular Biology and Laboratories, and cDNA Resource Center, to facilitate research collaborations. BioSci is pursuing plans to send Missouri S&T students to the scholars' laboratories in 2009.



Robert Aronstam (middle, left) and Yue-wern Huang (middle, right) host Taiwanese professors' visit to BioSci.

BioSci Additions: Welcome Class of 2025 and 2026!



Drew Thimgan

Andrew James Thimgan (7lbs 0.5oz, 21 1/2in) was born by C-section on Oct 16 at PCRMC. Proud parents assistant professor **KATIE SHANNON** and Matt Thimgan say Drew is a very sweet baby who has finally started sleeping through the night! As he approaches his first birthday, he is crawling around, pulling up on things, and loves to stick his hands in the dog's water bowl and the toilet. His interests include toys that make noise, jumping in his Johnny Jump-up, and eating applesauce.

Lucia Gobbi (7 lbs 9 oz.) is the first child of proud parents postdoctoral associate **ANALÍA PUGENER** and Tito Gobbi. Lucia, which means 'light' in Latin, was born by C-section on 20 June at the Women Clinic in Corrientes, Argentina. She smiles a lot and stares with fascination at rattles and brightly colored objects. She also likes to be in her mom's arms as much as possible.



Lucia Gobbi

Brenna Dorothy Martin (6 lbs, 15 oz), first child of Tiffani and Senior Research Lab Technician **ADAM MARTIN**, was born on July 21st 2008 at PCRMC. The marathon wrestling match lasted over 22 hours, and set a new record for the longest "pushing" time for a natural birth (just over four hours). Brenna is putting on weight and increasing her vocabulary to include grunts, cries, squeals and giggles. Aside from a mild, food allergy, she is a happy little girl with very proud parents.



Brenna Martin



Eli Havens

Eli Wilder Havens (5 lbs, 14 oz, 18 in) was born to Ben and graduate student **SARAH HAVENS**, on July 14 at St. John's Mercy Medical Center in St. Louis. He surprised both his parents and grandparents by arriving three weeks early! He is doing great, enjoys walks with his mom though the park, and continues to be somewhat impatient with adults.

Fifty S&T BioSci Students Named to Academic Honors List

Biological Sciences is please to announce the following students were named to the Spring 2008 Scholars List:

Herman Armstrong	Issac Deatherage	Amber Kirkpatrick	Jennifer Qualls	Jamie Statler
Andrea Asselmeier	Lauren Dubbert	Casey Kotschedoff	Ajay Rao	Ryan Steele
Joshua Billington	Agatha Dwilewicz	Megan Kreitner	April Rocha	Krista Stewart
Btittany Bockhorst	Joshua Erickson	Jennifer Kresse	Jeffery Ross	Sherea Stricklin
Michelle Brosnahan	Jennifer Goyins	Heather Lavezzi	Morgan Schiermeier	Cassandra Tenney
Stuart Brune	Justin Grady	Jennifer Luebbing	Karen Schilli	Brett Vessell
Angie Bulen	Casey Growcock	Margaret Meyer	Anne Schumer	Richard Watters
Richard Campos	Benjamin Hale	Andrew Moss	Daniel Schwent	Rexann Whorton
Numan Choudhry	Kristen Hinton	Jennifer O'Hara	Suzanne Simpson	Jill Wildhaber
Patrick Courtney	Tyler Johnson	Elizabeth Politte	Courtney Smith	Kaitlyn Wong

Student News

SCRUBS will host the Great Strides 5K run/walk on Saturday, October 11, to raise awareness and money for cystic fibrosis research. The money raised will be donated to the Cystic Fibrosis Foundation. **SCRUBS** is looking for volunteers to help with the event, as well as participants who will raise money through sponsors. If you are interested in participating in the event, or sponsoring a BioSci participant, please contact the BioSci office (biosc@mst.edu) or **DAVE WESTENBERG** (djwesten@mst.edu), **SCRUBS** faculty sponsor.

In recognition of their commitment to charitable endeavors and the promotion of student success, **SCRUBS** was awarded the Most Improved Student organization award for the academic year 2007/2008.



BioSci students raise money for the Cystic Fibrosis Foundation during the annual SCRUBS-sponsored Great Strides 5K.



SCRUBS officers and Dave Westenberg (third from left) accept the Most Improved Student Organization Award.



HELIX members welcome new and returning students, faculty, and staff during their annual Fall ice cream social.

Graduate Student News



BioSci graduate students happily anticipating the new semester.

May 2008 BioSci Graduates

The department is pleased to announce that fifteen students received a B.A. or B.S. in Biological Sciences during the May 2008 Commencement ceremony.



Members of the Class of 2008 pose with department chair, Robert Aronstam (far left), before the May graduation ceremony.

We are pleased to welcome three new graduate students to the department: **AMANDA WATSON**, **JUSTIN GRADY**, and **KARISSA BRAATEN**.

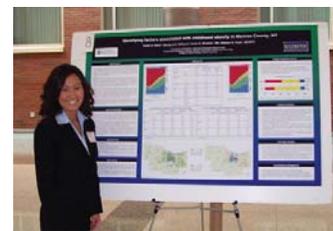
Three BioSci students successfully defended their Master's theses: **MARIA POTTER**, thesis "AFLP fingerprint analysis of hybrid salamanders in the Missouri Caverns section of Onondaga Cave"; **ERIN PRINGLE**, thesis "The identification and characterization of phenylalanine ammonia-lyase gene family members in *Glycine max*"; and **SUYOUNG PARK**, thesis "The Role of Microtubules in Budding Yeast Cytokinesis."

Summer Works Prepares Students for Real World

We asked our students to tell us about their summer research experiences. Here are just a few responses, in their own words.

TAYLOR HAHN

"I participated in the Strong Children's Research Center Summer Training Program through the University of Rochester Medical Center. The focus of my project was to identify the prevalence of childhood overweight/obesity in Monroe County, NY, based on a database of pediatric chart reviews. I compiled a comprehensive database of local food sources to identify future possible nutritional risk factors associated with obesity. Geographic Information Systems mapping techniques were used to generate a map of childhood normal weight, overweight, and obesity in the country."



Taylor Hahn studied childhood obesity.

KATIE STOCKSTILL

"I worked as a research assistant in Dr. Shannon's Cytokines Lab, here at Missouri S&T. During the summer I had a couple of different projects that I was working on. While working on the projects, I was able to learn several new lab techniques. For example I learned how to do Western Blots, make yeast extracts, actin stain slides, and perform CO-IP, just to name a few. Working in lab was a great time for me. I had fun and I learned a lot of useful information."



Katie Stockstill worked in the Cytokines lab.

AJAY RAO

"I was a genomics intern at Monsanto, and an assay developer in the Molecular Quality Control and Characterization division. I was responsible for isolating flanking sequences of inserted transgenes, then using these flanks, I would develop assays that determined the deletion site that the transgene induced when being inserted. This allowed for a zygosity test which allowed us to push successful DNA events to the next step in the Monsanto research pipeline and commercial development of genetically modified crops."

ISSAC DEATHERAGE

"I conducted nanobiotechnological research at National Dong Hwa University in Taiwan. The purpose was to investigate the presently unknown mechanism of cellular uptake of protein transduction domains paired with quantum dots. Dr. Huang led the research team in Taiwan, and hopes to use this research to develop a more efficient drug delivery method."



Issac Deatherage (right) studied nanotechnology in Taiwan.

Faculty News and Awards

Associate professor **RON FRANK** published a paper entitled "Validation of an NSP-based (negative selection pattern) gene family identification strategy" with two coauthors in the journal BMC Bioinformatics. He also presented a paper "Preliminary identification of ribosomal protein gene family members in *Glycine max*" with undergraduate BioSci student **DANIEL SCHWENT** and two co-authors at the Molecular and Cellular Biology of the Soybean Conference in Indianapolis.



Ron Frank

DAVE WESTENBERG, associate professor, received the 2008 Extraordinary Faculty/Staff award from StuCo and the Corporate Development Council.

MELANIE MORMILE and her colleagues had three papers published in 2008: "Microbial diversity of a meromictic soda lake in Washington, USA: Spatial and temporal patterns" in the journal Applied and Environmental Microbiology, with BioSci alum **PEDRO DEMITRIU** and two other co-authors; "Active hematite concretion formation in modern acid saline lake sediments: A model for early diagenetic hematite on Mars?" with professor **FRANCISCA OBOH-IKUENOBE** and three co-authors in the journal Earth and Planetary Science Letters; and "Hairy blobs: Microbial suspects preserved in modern and ancient extremely acid lake evaporites." with four co-authors in the journal Astrobiology,



Melanie Mormile

ANNE MAGLIA received tenure and promotion to associate professor. She received the 2008 Outstanding Student Advisor Award from the Miner Alumni Association, and she and her research recently were featured in the 2008 documentary film *Why Frogs Call...And Why We Should Listen* by Ravenswood Media.

Research News

Niyogi Returns from Research Leave in New Zealand

DEV NIYOGI, assistant professor of Bio Sci, recently returned from spending a year in New Zealand, where he conducted research and taught classes in freshwater ecology. **NIYOGI** was based at the University of Canterbury in Christchurch, the largest city on the South Island of the country. He collaborated with professors Jon Harding and Angus McIntosh, two eminent stream ecologists in New Zealand.

NIYOGI conducted research on the effects of coal mines on streams and rivers along the West Coast of the South Island. Several active and abandoned mines discharge acidic, metal-laden water that enters streams. Several large streams have pH values as low as 2.7. This acidic water can have dramatic effects on most types of life, especially higher animals such as fish that are absent from these streams. However, other types of aquatic life, including algae and fungi, thrive in the acidic environment with less competition and no grazing animals to limit their growth.

This research was part of a larger program funded by the Foundation for Research, Science, and Technology of New Zealand. The main goal of the project is to set up a framework that mining companies and regulatory agencies can use to understand and predict the effects of mining before new activities are even started. With such foresight, companies can budget enough money to treat the mine drainage to limit its effects on downstream ecosystems.

NIYOGI also helped set up a new research program on the role of riparian zones in filtering contaminants from agriculture to streams around Christchurch, and conducted



Dev Niyogi examines the mine drainage in a stream flowing through a New Zealand podocarp (a type of conifer) forest.

some toxicity tests with native fish and invertebrates to establish thresholds of pH and metal concentrations. **NIYOGI** also taught in several classes, including teaching during a weeklong fieldtrip around streams in the snowy Southern Alps in September (late winter in the southern hemisphere).

NIYOGI will maintain his collaboration with researchers in New Zealand, and is planning a short trip next June to conduct new research. When not in New Zealand, he will continue his teaching at Missouri S&T and his research on streams in Missouri and Colorado.

Got news? Updates? We want to hear it!

We love to hear from our alumni! Let us know where you are and what you are doing. Email your updates, news, and story ideas to: biosci@mst.edu



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