

THE CONNECTION

Your link to undergraduate researchers at Mizzou

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Biochem major studies bacteria at Berkeley

By Jennifer Meyer

Matt Shirley doesn't view his research as just another resume booster. Instead, he wants to help make his world a better—and cleaner—place.

The senior biochemistry major from Gladstone, Mo., is doing gene research on *D. vulgaris*, a bacterium that breaks down poisonous metals in polluted areas. His project is titled, "Rapidly Characterizing Transposon Insertion Mutants in *Desulfovibrio vulgaris* Hildenborough by Semi-Random Nested PCR."

"Our lab is researching genes in *D. vulgaris* that are of interest in environmental stress response," Shirley said. "This bacterium reduces toxic metals such as uranium and lead, and the long term goal of the project is bioremediation of these metals in contaminated sites."

Shirley, who is into his second year of research, said that working on a project

can have its ups and downs.

"I learn new information that challenges my understanding every day," he said, adding that overcoming failures is the most difficult part of conducting research.

Shirley said that his mentor, Dr. Judy Wall (biochemistry), provided him with a lab in which he was allowed to learn and grow.

"I like the nurturing environment with lots of room to explore on my own," he said.

The room to explore is definitely some-



Undergraduate biochemistry researcher Matt Shirley is using his research to help find solutions to cleaning toxic metals from contaminated areas.

thing that Shirley took advantage of—he was invited to spend a summer at the University of California-Berkeley by some of

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Plant sciences prof passionate, encouraging, says student

By Gregory Yeckel

Dr. Melissa Mitchum, who is now an assistant professor in the Division of Plant Sciences, began as an undergraduate at the University of Puget Sound in Tacoma, Wash. While there, she developed her passion for the plant sciences by conducting undergraduate research on viruses in hop plants.

After this experience, she knew she wanted to pursue plant sciences in graduate school. Dr. Mitchum pursued her master's



Dr. Melissa Mitchum

in plant pathology from the University of Nebraska. From there she moved to North Carolina State University, where she received her doctorate in plant pathology and was first ex-

posed to plant-nematode interactions.

Following completion of her doctorate, she elected to accept a post-doctoral research position at Duke University. At the end of her post-doctoral experience a faculty position in plant-nematode interac-

tions opened up at the University of Missouri and she was then hired on as an Assistant Professor.

Dr. Mitchum's research at MU focuses on the molecular basis of plant-nematode interactions with an emphasis on the interaction between the soybean cyst nematode (SCN; *Heterodera glycines*).

Research in this area is important because SCN is the most economically important group of plant-parasitic nematodes. SCN is the most damaging pest of soybeans grown in Missouri and throughout the United States, causing nearly \$ 1 billion in crop losses annually.

Having Dr. Mitchum as my mentor has dramatically influenced my life in a very

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Congratulations, undergrads!

Congratulations to **Jared Coberly**, who won third place in the poster session among medical and nursing students, Conley Scholars and undergraduates at the MU Health Sciences Research Day on Nov. 1. His poster was entitled, "Five-year mortality of chronically ill patients co-managed using the chronic care model," and was sponsored by Dr. Joseph LeMaster, of the family and community medicine department.

The following undergraduate students also presented posters at the Health Sciences Research Day:

Samuel Engemann. "Inhibition of alcohol-induced sleep by blockage of adenosine receptors in the lateral hypothalamus." Sponsored by Dr. Mahesh Thakkar of the neurology department.

Laura Heinzke. "Investigation of gastrin-releasing peptide receptor-specific 99mTc conjugates." Sponsored by Dr. Charles Smith of the radiology department.

Judy Johnson. "Walk a hound, lose a pound: A community dog-walking program for families." Sponsored by Dr. Rebecca Johnson of the nursing and veterinary medicine department.

Adam Prasanphanich. "In vitro and in vivo analysis of 64Cu-NOTA-8-Aoc-BBN pet imaging bioconjugate for human breast cancer." Sponsored by Dr. Charles Smith of the radiology department.

Shawn Sahota. "Identifying synergistic effects of celecoxib and vitamin D leading to a decrease in COX-2 and PGE2 in the breast." Sponsored by Dr. Edward Sauter of the surgery department.

Sara Schulz. "Pawsitive visits: Students, older adults and animals." Sponsored by Dr. Rebecca Johnson of the nursing and veterinary medicine department.

Suman Vaddi. "Intracranial volume and whole brain volume in infants with unicoronal craniosynostosis." Sponsored by Dr. Kristina Aldridge of the pathology and anatomical sciences department.

Dana Willbrand. "A human-relevant rat model of breast cancer." Sponsored by Dr. Edward Sauter of the surgery department.

Katherine Zalasky. "Regulation of cholesterol transport processes in the liver by citrus flavonoids." Sponsored by Dr. Lene Holland of the medical pharmacology and physiology department.

Congratulations to **Alyce Johnson** for winning national recognition at the Annual Biomedical Research Conference for Minority Students, held Nov. 7-10 in Austin, Texas. Her poster was entitled "Maternal Herd Structure in Custer State Park," and her mentor is Dr. Josh Millspaugh of the fisheries & wildlife department.

Two other students also presented posters at the conference:

Amelie O. Mafotsing Popoussi. "Characterization of the mechanism of action of the ultra-potent HIV inhibitor 4'-ethynyl-2-fluoro-2'-deoxyadenosine." Faculty mentor is Dr. Stefan Sarafianos of the molecular microbiology & immunology department.

Krystal D. Purnell. "The influence of increased contact rate among racoons on a directly transmitted nematode, baylisascaris procyonis." Faculty mentor is Dr. Matt Gompper of the fisheries & wildlife department.

Biochemistry major

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Dr. Wall's collaborators. Shirley participated in the Virtual Institute for Microbial Stress and Survival and attended a collaborative research conference, where he presented a poster.

Shirley said he had a great time in sunny California, especially sampling the local cuisine.

"The weather was mild, and the tomatoes and fish were amazing," he said.

Shirley added that he learned an important lesson in letting go of first impressions, but overall he said the trip was one of his most rewarding experiences.

"I was proud this summer when I was generating useful data for others, both locally and in collaborative labs," he said.

Besides commuting across the country, Shirley has given two poster presentations at Mizzou and won one of the Chancellor's Awards for Excellence in Undergraduate Research in April 2007. His next feat is presenting his work to legislators this com-

ing April at Undergraduate Research Day at the Capitol in Jefferson City.

When he's not researching, Shirley said he likes to play his saxophone, watch movies and volunteer locally with "Project Science."

Shirley said he hopes to attend graduate school and stay in academic research following graduation, and he offered some advice to undergraduates who are new to research.

"Look at the faculty research pages and e-mail a PI (primary investigator) that interests you," he said. "Express interest in their research."

Jennifer Meyer is the public relations graduate assistant for the Office of Undergraduate Research.

Practical Pages

Your guide to resources on the Web

<http://www.webguru.neu.edu/>

The Web Guide to Research for Undergraduates (WebGURU) helps undergraduates overcome the hurdles of an undergraduate research experience.

Resources available on this Web site include information on all the technical aspects of undergraduate research, from lab safety to oral presentations, and a discussion board where you can talk research with other undergraduate students.

Also included are links to undergraduate research programs, scholarships and more.

Be sure to check out the "Structuring a UR Experience" and "Mentoring Issues" links for information on becoming a self-directed researcher and networking to find a mentor that suits your project goals.



The fun of science: Humor, relationships important in undergraduate research

By Dr. Paul Bolls

The end of a semester is a perfect time for faculty mentors and students to reflect on what is truly great about the opportunity to engage in undergraduate research experience. Please bear with me as I share some thoughts on what I've gained though the tremendous privilege of mentoring some of the most amazing students in the universe.

One of the great things about engaging undergraduate students in my research is that it has allowed me to significantly increase my "nerd quotient" while still feeling kind of "cool." This is a pretty big deal for an old guy who in an earlier chapter of life used to be a cool radio deejay and now gets accused by colleagues of ensnaring unsuspecting journalism students in his web of nerdy mad science.

Unlike too many graduate students, most of the undergrads I've mentored have not forgotten that even academic life should be fun and there should be joy in the joy of discovery.

One of the more cool fun things undergrads have encouraged me to do is to start a quotable quotes board for the lab. Open your ears to the things "scholars" say around labs and you open yourself up to a whole new world of humor.

My favorite PRIME Lab quotable quote so far comes from one of my fellow lab directors who said "We are nothing if not transparent!" Remembering that good science can also be fun science is one of the truly great things I've gained from participating in undergraduate research experience.

A second truly great thing I've gained from undergraduate researchers are deep relationships that are nearly impossible to obtain in a classroom. Part of my research philosophy includes a belief that nothing takes a mentoring relationship to a deeper level like a good nickname.

So far I've been privileged to mentor a "Tigger," "Rabbit," and "Bugs," who gave me the nickname "Doc." Yes, most of our

intellectual inspiration in the lab comes from Winnie the Pooh and Warner Brothers cartoons.

This December I get to directly feel the depth of these relationships when I watch the first MU Undergraduate Research Scholar I mentored walk through commencement. I'm not too proud to admit that I'll likely tear up like a proud papa.

Any knowledge we gain by conducting experiments in the PRIME Lab is limited and will likely eventually be replaced by someone conducting a better, more insightful experiment. However, the relationships built by involving undergraduates in conducting these experiments are irreplaceable.

The point in giving you more insight into the twisted mind of this mad scientist than you probably wanted to know is to encourage you to look beyond the typical "university line" about the value of undergraduate research experience to discover what is truly great about it.

My holiday wish for you is that even in the insanity of the end of another semester, you don't become so blinded by your science you forget to put some fun in the process.

Paul Bolls is an assistant professor at the journalism school and an undergraduate research mentor. In 2007 he was given an Outstanding Undergraduate Mentor Award by the Office of Undergraduate Research.

"There is nothing like looking, if you want to find something. You certainly usually find something, if you look, but it is not always quite the something you were after."
~ J.R.R. Tolkien

Plant Professor

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positive way, because she brings a passion and dedication that only a person who loves what they do can have.

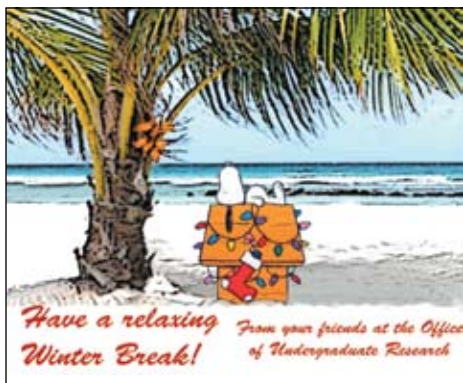
Before working in her lab, I had no direction as to where I wanted my life to head, but since joining her lab and having her as mentor, my life's goals have become much clearer. She saw potential in me to become a good researcher, when I lacked that insight myself.

Through her encouragement and advice I have developed not only as a researcher, but also as a person. She gives advice without dictating orders and encourages independence, yet offers support. She is willing to give up her time to work with me if I encounter any hardships. It is for these reasons that I believe Dr. Mitchum makes a great mentor.

Greg Yeckel is a senior biology major and an undergraduate research ambassador from St. Louis, Mo. His research project is entitled, "Characterization of soybean genes involved in soybean cyst nematode (SCN) resistance."

Announcement

The Program for Humanities Development (PHD) at the Ohio State University is a two-year research and mentoring program that serves humanities majors from historically underrepresented groups from any U.S. college or university. The PHD focuses on providing developmental programming and support for students interested in pursuing graduate study in the humanities. Awarded during the sophomore year, the program provides two summers of guided coursework, research, mentoring and cohort building. During their junior and senior years, PHD students will receive ongoing programmatic support at their home institutions. The deadline for application to the Program for Humanities Development is Jan. 15, 2008. For information or to see if you qualify visit humanities.osu.edu/studentinfo/undergrad/phd.



Announcements

Southern Research Fellows Program

• Southern Growth Policies Board has launched the Southern Research Fellows Program to involve undergraduate and graduate scholars in research related to the economy and quality of life in the South. The Southern Research Fellows Program promotes scholarship relating to economic development and quality of life in 13 southern states. Fellows will prepare an original report that will be incorporated into Southern Growth's 2008 Report on the Future of the South and distributed at Southern Growth's annual conference, and will also receive a cash award of \$1,000. The application deadline is Jan. 11, 2008. For information and to download the application, visit www.southern.org/research/fellowship.shtml.

MUURS program applications available

• Non-science students—get funding for your research project! Applications for the 2008 summer and 2008-09 academic year MU Undergraduate Research Scholars program are available. Students majoring in business, humanities, journalism, education, social and behavioral sciences and the arts are strongly encouraged to apply. Students should attend one of two informational sessions prior to applying: Monday, Jan. 28, from 4-5 p.m., and Tuesday, Feb. 5, from 4-5 p.m. Both workshops are in Bond Life Sciences Center room 572. Applications are due Feb. 14, 2008, by 5 p.m. For information contact the Office of Undergraduate Research, 150 Bond Life Sciences Center, (573) 882-5979 or visit undergradresearch.missouri.edu.

LSUROP research internships

• The Life Sciences Undergraduate Research Opportunity Program is pleased to announce research internships for the 2008 summer and 2008-09 academic

year. Undergraduate interns will participate in basic, theoretical and/or applied life science research with MU faculty members. Students are encouraged to attend one of the following workshops before applying: Thursday, Jan. 24, from 4-5 p.m. and Monday, Feb. 4, from 4-5 p.m., in 572 Bond Life Sciences Center. Application deadline is Feb. 14, 2008. For information contact the Office of Undergraduate Research, 150 Bond Life Sciences Center, (573) 882-5979 or visit www.lsurop.missouri.edu.

Summer research programs

• Students who want to learn more about off-campus summer research programs in the sciences should attend the workshop on Tuesday, Jan. 29, from 4-5 p.m., in 572 Bond Life Sciences Center.

New life sciences undergrad research club

• Are you interested in life sciences research? Then consider joining the newly formed Society of Undergraduate Researchers in Life Sciences. This student-run and organized club will hold monthly meetings that will include faculty and student presentations, journal article discussions and GRE prep ideas. If you are interested in being a charter member of the club, contact Tyler Alderson at tagd8@mizzou.edu.

UMEB application deadline

• Undergraduate Mentoring in Environmental Biology (UMEB) applications are due Jan. 15. UMEB provides 14 months of faculty mentored environmental research experience plus a monthly stipend of \$1000. Especially seeking undergraduates from all majors with an interest in the environment and under represented minority students (Black/African American, Latino/Hispanic, Native American, Native Pacific Islander). Download the application at <http://www.umb.missouri.edu>.

New MU SACNAS chapter

• The Society for Advancement of Chicanos and Native Americans in Science is a new organization open to everyone with a goal of bringing together those pursuing and interested in careers in science, mathematics and engineering. The goal of SACNAS is to encourage those individuals, particularly underrepresented minority students, to pursue those careers through building a network of outreach, social connection and support. SACNAS is an established national organization with a record of supporting scientists, mathematicians and engineers from the undergraduate level and upwards. Please contact Dr. Elene Valdivia at valdivia@missouri.edu if you are interested in joining or for more information.

Featured Fellowships

Morris K. Udall Foundation

Eligible students are sophomores and juniors with a minimum of 3.0 GPA, majoring in environmental sciences and policy studies, agriculture, political science, natural resource management, sociology, anthropology, American Indian studies, tribal policy, history, English, theater, landscape architecture and public health, to name just a few areas.

This fellowship program is dedicated to funding scholarship recipients who exhibit leadership, character, integrity and well-roundedness. Commitment to pursuing a career related to the environment is necessary. This award can be redeemed at any school.

The fellowship awards up to \$5,000, and requires a campus nomination, three letters of recommendation, a transcript, biographical background, personal narrative, educational plans and a 600-word essay.

The campus deadline is Jan. 31, 2008. Udall Scholars are announced in late April.

For information contact Jan Weaver, weaverjc@missouri.edu, (573) 882-3037, or visit www.udall.gov.

Rotary Ambassadorial Scholarship

Live and study abroad as a Rotary Ambassadorial Scholar. Increase awareness and respect regarding cultural differences while enrolled in a university in any country where there is a Rotary Club.

Applications will be available Dec. 1, 2007, for the 2009-2010 awards. All students are eligible to apply.

For more information, contact the Fellowships Office, fellowships@missouri.edu, or visit the Web site: <http://fellowships.missouri.edu>.

Deadline for application is March 15.



By
Jorge Cham

DECIPHERING ACADEMESH YES, ACADEMIC LANGUAGE CAN BE OBTUSE, ABTRUSE AND DOWNRIGHT DAEDAL. FOR YOUR CONVENIENCE, WE PRESENT A SHORT THESAURUS OF COMMON ACADEMIC PHRASES

"To the best of the author's knowledge..."	=	"WE WERE TOO LAZY TO DO A REAL LITERATURE SEARCH."	"It should be noted that..."	=	"OK, SO MY EXPERIMENTS WEREN'T PERFECT. ARE YOU HAPPY NOW??"
"Results were found through direct experimentation."	=	"WE PLAYED AROUND WITH IT UNTIL IT WORKED."	"These results suggest that..."	=	"IF WE TAKE A HUGE LEAP IN REASONING, WE CAN GET MORE MILEAGE OUT OF OUR DATA..."
"The data agreed quite well with the predicted model."	=	"IF YOU TURN THE PAGE UPSIDE DOWN AND SQUINT, IT DOESN'T LOOK TOO DIFFERENT."	"Future work will focus on..."	=	"YES, WE KNOW THERE IS A BIG FLAW, BUT WE PROMISE WE'LL GET TO IT SOMEDAY."
			"...remains an open question."	=	"WE HAVE NO CLUE EITHER."

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