

SPECTRUM

ST. EDWARD'S UNIVERSITY

SCHOOL OF NATURAL SCIENCES

FALL 2007

A Keck in the Right Direction

By Frannie Schneider



Professor of Chemistry Eamonn Healy helps students strategize their research into HIV drug resistance.

Undergraduate students at St. Edward's University could soon be contributing to scientific breakthroughs. The university recently received a \$260,000 grant from the Keck Foundation to establish an interdisciplinary undergraduate research project on HIV drug resistance.

In the fall, upper-division undergraduates studying Biology, Chemistry and Bioinformatics will create lesson plans based on research that maps the path of drug resistance for acute diseases. In the spring semester, those same upper-level students will teach the modules during the general education course Science in Perspective.

"During this process, our students will discover science," says **Eamonn Healy**, professor of Chemistry. "This is experiential learning at its best."

While the undergraduate research and teaching opportunities of this grant are significant, the award also validates the university's increasing prestige, says Healy. "Beyond the money, there's a certain profile that comes with the

awarding of a Keck Foundation grant," he says. "It's a testament to the institutional quality of this university."

The process to secure the grant began last November. After two written proposals and a visit from the philanthropic foundation, St. Edward's was one of three undergraduate liberal arts universities to receive the award.

"This grant is really the result of collaboration between University Advancement and the science faculty," says **Carol**

Januszkeski, director of foundation relations in University Advancement. Januszkeski and Healy worked with Assistant Professor of Bioinformatics **Charles Hauser**, Assistant Professor of Biology **Peter King**, Dean of the School of Natural Sciences **Charles Bicak** and Director of Development **Joe DeMedeiros** to make the grant a reality.

Both Healy and Januszkeski note the importance of the place where all this learning and discovery will occur: the John Brooks Williams Natural Sciences Center-North Building. They agree that the building provides a tangible sign of the university's commitment to its science programs, and the building's design lends itself to interdisciplinary projects of this type.

"Our donors to the north building understood the potential for the new facility," says Januszkeski. "It is a resource that fosters new and exciting opportunities at the university."

THE RESEARCH STRATEGY

THE CHEMISTRY TEAM



Led by: Eamonn Healy, professor of Chemistry

The students will look at the chemical structure of potential HIV drugs. They'll use the procedures of rational drug design to view the experimental binding site, build and insert the chemical structure of the drug to be developed, and evaluate the efficacy of the fit.

THE BIOLOGY TEAM



Led by: Peter King, assistant professor of Biology

The team will engineer and purify mutant proteins and test the effect of these mutations on the ability of the drug(s) to inhibit. The specific mutations will be directed by data generated by the other two teams.

THE BIOINFORMATICS TEAM



Led by: Charles Hauser, assistant professor of Bioinformatics

The group will evaluate patient sequence databases and look for mutations that have occurred within individuals infected with HIV. In this way, they can predict a structure based on the similarities found across different protein families.

The Dean's View



As I write this, Thanksgiving is just days away and the end of the Fall 2007 semester is only a few short weeks later. Making my way through the halls of the John Brooks Williams Natural Sciences Center—North Building and the other facilities in which our students and faculty learn and educate, I am struck by the intensity and optimism prevailing across campus. There is indeed a great sense of opportunity that emanates from the

citizens of the St. Edward's University community, no less so than among those in the natural sciences.

The "share" of incoming freshmen who have declared a major in the natural sciences has increased from 9.5 to 14.5 percent this fall, and new students continue to target programs in our school. External grant opportunities engage undergraduate students in extended research projects, and new programs like Bioinformatics

grow and mature as established programs like Biology and Biochemistry flourish.

In our ongoing effort to ensure the best possible education for all students — including those taking general science education courses — we look across campus for partnerships with other schools. Certainly, Professor of Biology **Bill Quinn's** co-leadership with Professor of Business Communication **Catherine MacDermott** and **Mary Katherine O'Brien** from the Office of International Education on the trip to Panama epitomizes this sort of partnership (*see story, page 7*). We also extend our expertise and enthusiasm for prospective collaborations with other universities, hospitals, government agencies and corporations. Take the algae workshop run by Professor Emeritus of Biology **Jimmy Mills**, a program he's worked on for 16 years (*see story, page 4*).

The School of Natural Sciences is a part of the larger St. Edward's community, the greater Austin service region, the state of Texas, the nation and, indeed, the world. In that light, you will note in this newsletter that students and faculty are learning and making contributions in a wide variety of ways. Their efforts are a reflection of our commitment to work at anticipating changes and preparing young men and women to be successful in this rapidly evolving world.

COMPUTER SCIENCE



Associate Professor of Computer Science **James McGuffee** was elected secretary of the Austin Community College Board of Trustees in June.

Computer Science majors **Ray Lange, '09**, and **Bradley Meck, '10**, interned with Caesta, which programs graphics for toll roads.

Computer Science major **Andrew Rider, '07**, created a test for approach-withdrawal theory during an undergraduate research program at Towson University in Baltimore, Md., last summer. The theory states that each side of the brain reacts to stimuli in a predictable way.

Assistant Professor of Computer Science **Sharon Weber** spent her summer working with VMware, a company building virtualization software that allows different operating systems to run simultaneously on a piece of hardware.



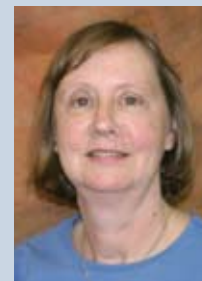
MATHEMATICS

PHD/MASTER'S-BOUND

The following recent Mathematics graduates began pursuing PhDs or master's degrees this fall:

- **Jesse Barbour, '07**, PhD program in Mathematics, UT–Austin
- **Heather Bruch, '07**, PhD in Mathematics, University of Iowa
- **Bobby Grizzard, '07**, master's program in Mathematics, UT–Austin

Professor of Mathematics **Jean McKemie** attended the LARS Ahlfors Centennial Celebration mathematics research conference in Helsinki, Finland, last August.



Travis Finch, '08, presented "A Framework to Benchmark Hard Disk I/O and Scalability in a Multiple Virtual Machine" at the fourth annual McNair Scholars Research Symposium in July. He conducted the research with Assistant Professor of Computer Science **Sharon Weber**.

CHEMISTRY

Five students presented at the 233rd National Meeting of the American Chemical Society in Chicago, Ill., in March. Accompanied by Professor of Chemistry **J.D. Lewis** and Postdoctoral Associate **Jeff Gorman**, the students presented the following papers co-authored with faculty members:

- “Determination of the Origin of Central Texas Chardonnay Wines Using GC-MS,” **Rachel Walker**, '07, and **Henry Altmiller**, professor of Chemistry
- “Quenching Mechanism of Lucigenin Fluorescence: Theory and Experiment,” **Miranda Chavez**, '07, **Nick Cristea**, '07, and **Eamonn F. Healy**, professor of Chemistry



- “Overexpression of Serine Carboxypeptidase II in a pET 32c Vector,” **Lica Abu-Esba**, '07 (*left*), and **Mary A. Kopecki-Fjetland**, associate professor of Chemistry

- “Anaredoxin as a Potential Rubredoxin,” **Margarete Borck**, '07, and **Mary A. Kopecki-Fjetland** (*right*), associate professor of Chemistry



- “Substituent Effects on O-H Stretching Bands in Substituted Phenols,” **Deepthi Chiluvuri**, '07, and **J.D. Lewis**, professor of Chemistry

Professor of Chemistry **J.D. Lewis** presented a paper, “Design and Evaluation of an Integrated Undergraduate Research Laboratory,” at the 234th National Meeting of the American Chemical Society in Boston, Mass. in August. The paper describes the Chemistry program’s approach in designing an undergraduate research laboratory used by multiple research groups.



Professor of Chemistry **Henry Altmiller** (*left*), associate professor of Chemistry **Mary Kopecki-Fjetland**, and professor of Chemistry **Eamonn Healy** co-authored the paper. Lewis also

presented the paper at the 63rd Southwest Regional Meeting of the American Chemical Society in Lubbock in November.

Eight students attended the 51st annual Welch Foundation Conference on Chemical Research in Houston in October. The presenters,

Morgan Baima, '10, **Emily Clark**, '09, **Jackie Pope**, '09, **Adriana Pavia**, '10, **Amanda Riojas**, '08, **Danielle Porras**, '08, **Kara Strickland**, '08, and **Jon Sanders**, '08, also learned more about “Physical Biology — From Atoms to Cells,” the conference’s theme. Professor of Chemistry **J.D. Lewis** and Postdoctoral Associate **Jeff Gorman** (*above*) accompanied the students.

Forensic Chemistry major **Amanda Riojas**, '08, presented a paper co-authored with Professor of Chemistry **J. D. Lewis** that summarized her research findings on “Hydrogen Bond Competition and Concentration-Dependent Shifts of O-H Stretching Bands in Alcohols in the Presence of an Electron-Donating Base” at the 63rd Southwest Regional Meeting of the American Chemical Society in Lubbock in November.



Emily Clark, '08, **Danielle Porras**, '08, **Jon Sanders**, '08, **Kara Strickland**, '08, **Jackie Pope**, '09, and Postdoctoral Associate **Don Wharry** (*left*) volunteered for the National Chemistry

Week celebration at the Austin Children’s Museum in late October. The effort was a community service project for the St. Edward’s student affiliate chapter of the American Chemical Society.

CALENDAR

Dec. 7

Festival of Lights
6:30 p.m. • Main Building Lawn
Concert following in Mabee Ballroom,
Robert and Pearle Ragsdale Center

Dec. 15

Graduation Ceremonies
Recreation and Convocation Center
10 a.m. • Graduate and New College
2 p.m. • Undergraduate

Save the Date!

Homecoming 2008 • Feb. 22–24

Feb. 23

School of Natural Sciences
Networking Reception
3–4 p.m.
Mabee Ballroom
Robert and Pearle Ragsdale Center

March 28

The Brother Lucian Blersch
Symposium: Evolution of Sociality

Speakers

Joan Strassmann and Dave
Queller, the Harry C. and Olga K.
Wiess Professors of Ecology and
Evolutionary Biology, Rice University
Allan Hook, the Lucian Professor of
Natural Sciences

For details, choose “Calendar” at
www.stedwards.edu

BIOLOGY/BIOINFORMATICS



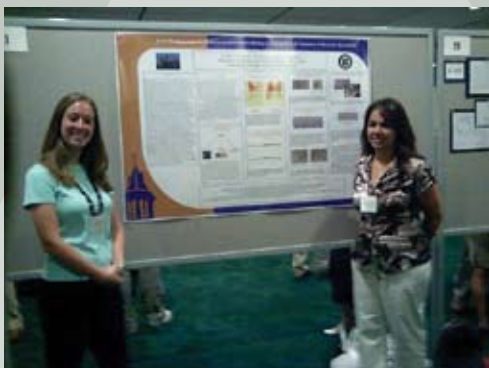
COURTESY OF PATRICIA BAYNHAM

Assistant Professor of Biology Patricia Baynham (back row, second from right), Aissa Longoria, '08, (front row, second from left), and Karla Barrera, '08, (front row, third from left), researched at the UT–Austin Whiteley lab this summer.

Patricia Baynham, assistant professor of Biology, was granted a Research Opportunity Award by the National Science Foundation. This is the first time a faculty member at St. Edward's has received this prestigious award. It supported Baynham as she performed research at UT–Austin last summer as a research associate in the laboratory of collaborator Marvin Whiteley, UT–Austin assistant professor of Molecular Genetics.

The NSF also funded the St. Edward's students Baynham is mentoring — Biology majors **Aissa Longoria, '08**, and **Karla Barrera, '08**. This work focuses on *Pseudomonas aeruginosa*, a bacterium that infects the lungs of cystic fibrosis patients.

At the American Society for Microbiology meeting in Toronto, Canada, in May, **Kim Bandy, '07** (below, left), and **Stephanie Meyer, '07** (below, right), presented



COURTESY OF PATRICIA BAYNHAM

a paper, “The Role of the DNA-binding Protein AmrZ in Phenazine Biosynthesis in *Pseudomonas aeruginosa*.” They co-authored the paper with **Patricia Baynham**, assistant professor of Biology, as her research assistants.

GiNell Elliott, '07, won honorable mention for her poster, “Generating Phylogenetic Profiles for Chlamydomonas using Parallel Blast,” at the 18th annual South Central Regional Conference of the Consortium for Computing Sciences in Colleges in 2006 at Midwestern State University in Wichita Falls. She carried out the research project in the lab of **Charles Hauser**, assistant professor of Bioinformatics.



Charles Hauser, assistant professor of Bioinformatics, co-authored the paper “EST Assembly Supported By a Draft Genome Sequence: An Analysis of the Chlamydomonas Reinhardtii Transcriptome,” published in the journal *Nucleic Acids Research* in March 2007.

Allan Hook, Lucian Professor of Natural Sciences, presented a lecture on general entomology to the Capital Area Master Naturalist Class at the Austin Nature Center. He also gave a seminar, “The Behavioral Ecology of *Bembecinus neglectus* in Central Texas” for the Biology department at Southwestern University in Georgetown.



Workshop Helps Improve Water Quality

By Hans Christianson

Too much algae in water can poison livestock and birds. Usually though, it just stinks — and tastes strange to boot. These problems can be improved with the kind of monitoring taught by Professor Emeritus of Biology **Jimmy Mills** and his “Characterization of Algae in Natural Water Supplies” workshop. Since 1992, Mills has co-organized the two-day workshop for the Texas Department of Health Services Bureau of Laboratories. The class teaches water laboratory workers how to recognize algae in a variety of water sources so they can take action to lessen taste and odor problems.

Mills, who retired from full-time teaching at St. Edward's in 2004, presented the latest algae workshop in September with Jerry Brand, director of the UTEX Culture Collection of Algae at UT–Austin. Mills says the program keeps him active in research. “It's a way of sharing what I know with others — it's a way to pay it forward,” he says.



Jimmy T. Mills (left) answers questions at the Algae workshop he's led every year since 1992.

COURTESY OF JIMMY T. MILLS

Sweet Smell of TG Intern Success

By Brandon Renner, '07



COURTESY OF RAMIN POURIRAN, '09

Ramin Pouriran, '09 (left), studied mutations with Charles Hauser, assistant professor of Bioinformatics (right), as a part of TG Interns for Success.

Two years ago, when he was inducted into the freshman class, *St. Edward's University Magazine* snapped a picture of **Ramin Pouriran, '09**, speaking with President **George E. Martin**. Martin advised Pouriran that he could achieve anything through hard work and patience. Since then, Pouriran has taken those words to heart by focusing on getting into medical school.

Pouriran took strides toward this goal last summer through an internship with the TG Interns for Success program. A Round Rock-based nonprofit, TG gave St. Edward's an \$80,000 grant to launch the Interns for Success program, which targets financial-assistance-eligible students from underrepresented backgrounds who have a GPA of 3.0 or higher. The grant

creates opportunities for interns to serve as study group facilitators, teaching assistants and researchers and funds career development activities for students preparing for graduate and professional school.

Pouriran spent his internship researching gene therapy with **Charles Hauser**,

assistant professor of Bioinformatics.

Pouriran hopes the research will help him stand out when applying to medical school this fall.

"The TG program gave me a fantastic opportunity," he says.

Pouriran, president of the Academic Society for the Advancement of Minorities in Medicine, eventually wants to train as a cardiologist, ideally at UT-Galveston or UT-Houston. He wants to practice in Texas as well. "I love how everyone here is so friendly," he says.

“The TG program gave me a fantastic opportunity.”

— Ramin Pouriran, '09

Internship Watch



ELOISE MONTEMAYOR, '10

NAME: Maura Valle, '09

MAJOR: Computer Information Technology and Accounting Information Technology

I SPENT MY SUMMER: Interning at the Bioinformatics Institute in Genomic Science at the University of Southern California

HOW I FOUND OUT ABOUT THIS PROGRAM: Through the McNair Scholars program at St. Edward's

WHY I PARTICIPATED: This program appealed to me because of the opportunity to conduct cancer research. I watched my aunt struggle through four years of treatment for breast cancer before she passed away, and I knew that if I participated in the summer program, I would contribute a little to the ongoing search for the cure.

WHAT I ACCOMPLISHED: I conducted research on colon cancer by comparing gene sequences from different species using BLAST, BLAT and GenScan techniques.

ONE OF THE HIGHLIGHTS: During my time at USC, I worked with and met a lot of interesting people from the fields of bioinformatics and genomic science, including Michael Waterman, professor of Biological Sciences, Mathematics and Computer Science.

ADVISORY BOARD



COURTESY OF WERNER BRAUN, '67

When **Werner Braun, '67**, arrived in the United States at age four with his parents, the family's entire belongings fit inside three suitcases. They had left post-World War II Germany in search of a better life. Nearly two decades later, Braun continued his family's dream when he pursued science at St. Edward's University and graduated with a BS in Chemistry, becoming the first in his family to earn a college degree. Immediately after graduation, Braun started working at Dow Chemical's Life Science Division as an analytical chemist and stayed with the company for almost 31 years until his retirement in 1997. But retirement didn't last long — in 2000, he joined the Carpet and Rug Institute in Dalton, Ga., as president and CEO.

For the past year, Braun has served on the School of Natural Sciences Advisory Board and is involved with the school's new mentor program. He spoke with *Spectrum* about life as a chemist and some of the new challenges facing tomorrow's scientists.

Natural Chemistry: Q&A with Werner Braun

By Hans Christianson

What's the difference between being a Chemistry student at St. Edward's in 1967 versus 2007?

We worked with bear skins and rocks. I'm kidding. The technology wasn't as advanced back then as it is now — I remember using a slide rule in calculus class — but we learned with the equipment that was available to us. We did get one of the first computers of the time, and it filled the entryway of Fleck Hall. One thing that hasn't changed between then and now

is the dedication and passion for education that faculty members in natural sciences display.

What's the hardest part of a chemist's job?

Translating risk to the public. With something like carpet, it uses a latex glue, which in sufficient amounts could kill a person — but so can aspirin if you swallow the whole bottle. I've spent most of my career trying to figure out how to take logical, science-based discussions and translate them into layman terms.

Why do you give back — both of your time and expertise?

For me, it's part of giving back to American society, which has given so much to me. I try to remember that we're not an island unto ourselves; we're part of the global community. And it's the right thing to do.

“ Sometimes you have to leave a place, even if it's comfortable, and stretch into a new area. ”

What advice do you have for current science students?

Don't be afraid to go outside of your comfort zone. Every step of my career involved branching into unfamiliar territory. Even as I moved away from my original starting point of math and chemistry, I was building on a solid foundation. Sometimes you have to leave a place, even if it's comfortable, and stretch into a new area. When you do, you'll not only grow as a person but you'll increase your skill set.

Global Science in Action

Course: Contemporary World Issues — Tropical Ecology Seminar • Panama
May–June 2007

THE TRAVELERS

Professor of Business Communication **Catherine MacDermott**, Professor of Biology **Bill Quinn**, International Education Coordinator **Mary Katherine O'Brien**, and 14 undergraduates.

THE ASSIGNMENT

The students took two courses — a Tropical Ecology seminar with Quinn and a Contemporary World Issues class with MacDermott and O'Brien. This trip represented the first interdisciplinary abroad experience for students at St. Edward's.

THE HIGHLIGHTS

Students worked with community leaders in Boquete, a small village in the highlands of western Panama, to come up with solutions for integrating the village's resources with the growing demands of an increasing retirement population residing in the same area. Another aspect of the project involved students working on the reforestation of a mangrove forest. In addition, students improved their Spanish by participating in a three-week intensive study as well as living with host families for a week.

THE RESULTS

"The interdisciplinary aspect of the program worked out very well," says MacDermott. "Whether students were in the rain forest or on the beaches of Panama studying tropical ecology, they were exposed to the cultural aspects, patterns of thought, and political and economic issues we were studying. Though different in course objectives and content, the two courses overlapped in

wonderfully surprising ways."

QUINN'S PERSPECTIVE

"The students didn't just learn about the tropics; they were a part of the tropics. Experiencing that level of diversity, that climate, that geographic variety, made all of the difference. I hope that it opened the students to new ways of looking at the world, both biologically and culturally, and that they will be more likely to seek such experiences as they learn in the future."



Students work at a permaculture farm in Bocas del Toro, Panama.

COURTESY OF BILL QUINN

STUDENT'S PERSPECTIVE

Lena Assaf, '08: "Panama opened my eyes to an exhilarating culture. Even though I was a stranger to most people there, I made many friends and am still in contact with a few of them. It was amazing getting to live with a host family and being able to experience their lives."

Symposium Tackles Alternate Energy

Lots of businesses today say they want to help the environment, but how? By hiring scientists like Mark Newton, environmental policy manager for Dell's Sustainable Business division. At the 10th annual Natural Sciences Career Symposium at St. Edward's in September, Newton, who earned his Chemistry degree from UT–Dallas, gave a keynote speech on the global environmental design requirements he's integrated into Dell. Other speakers included Dorothy Gattis, program director for the Texas Workforce Commission, and Michael Honeycutt, manager of the Toxicology Section of the Texas Commission on Environmental Quality.

EXPERT OPINION: ENERGY OPTIONS



Professor of Chemistry J.D. Lewis

Biodiesel and ethanol have some promise. The big consideration with ethanol is developing ways to produce it that don't use a food crop. The price of other produce is going up because corn is being used for ethanol, when switch grass and sugar cane work just as well.

Your net energy gain is much better for biodiesel, which currently comes from waste. Of course, you can only produce so much from waste materials.

But with these options, you still put CO₂ in air. Global warming is the big long-term issue, and that means we have to produce alternative energy sources that don't produce carbon dioxide. That means alternatives like solar, hydroelectric and wind power.

COMING SOON: The South Building



Since the opening of the John Brooks Williams Natural Sciences Center–North Building, students and faculty have come together in their quest for scientific discovery. The building's state-of-the-art design fosters interdisciplinary collaboration and hands-on learning for Biology and Chemistry majors, as well as other students.

But this building is only half the story. The center's south building will open its doors in 2011. Students and faculty in Computer Science, Mathematics and Physics will benefit from technology-rich classrooms, high-powered computers for research, and laboratory spaces that foster learning and discovery across all disciplines.

We've seen the difference the north building has made in the learning opportunities we can give to our students. Now you can help make the south building a reality.

To help fund this critical project, contact Joe DeMedeiros, director of development, at joed@stedwards.edu or 512-233-1443.



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