

2008

2008

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UNDERGRADUATE RESEARCH

at **SIUC**

2008

Published annually by the Office of Research Development and Administration as part of REACH (Research-Enriched Academic Challenge), the undergraduate research program at Southern Illinois University Carbondale. Visit www.siu.edu/~reach.

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Southern
Illinois University
Carbondale

PROJECT EXPLORES AUTUMN OLIVE'S IMPACT ON STREAMS

Folks used to like autumn olive. It smelled good, sheltered and fed wildlife, controlled erosion, and made former strip mine sites look less naked.

But then this kindly shrub turned thuggish. Helped in its spread by people, birds, and beasts, it took over more and more land, shouldering out native species that couldn't keep up with its speedy, dense growth. Today, it's on the "noxious plants" or "invasive species" list of just about every state where it grows.

Even worse, autumn olive roots can manufacture nitrogen out of the air; in effect, the plant is its own fertilizer factory. Where you have fertilizer, you have the potential for water contamination as the unused portion washes out of the soil and into nearby streams. And that's where a long-standing research project run by SIUC forestry students comes in.

"It started about five years ago with a grad student who did her thesis on the water quality impacts of autumn olive," said **Andrew Somor**, a senior who last year won a REACH award (see p. 2) to continue the project.

"She measured the nitrate

—see "Autumn Olive," p. 3



Among a stand of trees from which he has removed all the invasive autumn olive shrubs, Andrew Somor samples the water in the soil, looking for traces of nitrate. Somor was researching whether active control of the species can improve water quality in nearby streams.

Photo provided by Karl Williard.

OF MICE AND HORMONES

Understanding problems with human fertility and reproduction generally starts with very basic research in lab animals—in REACH student **Amanda Rabideau's** case, counting ovarian follicles in mice, among other things. Working in the lab of physiologist Prema Narayan, Rabideau received a \$4,000 Summer Research Fellowship from the Endocrine Society this year to support her work.

A surge of luteinizing hormone (LH) is what triggers the release of the egg from the ovarian follicle. "My current work deals with female mice that have been genetically modified to have an LH receptor that is always 'turned on,' even in the absence of circulating LH," Rabideau says. These mice enter puberty about two weeks earlier than unmodified mice do. The lab also had noticed that they develop ovarian cysts earlier than usual.

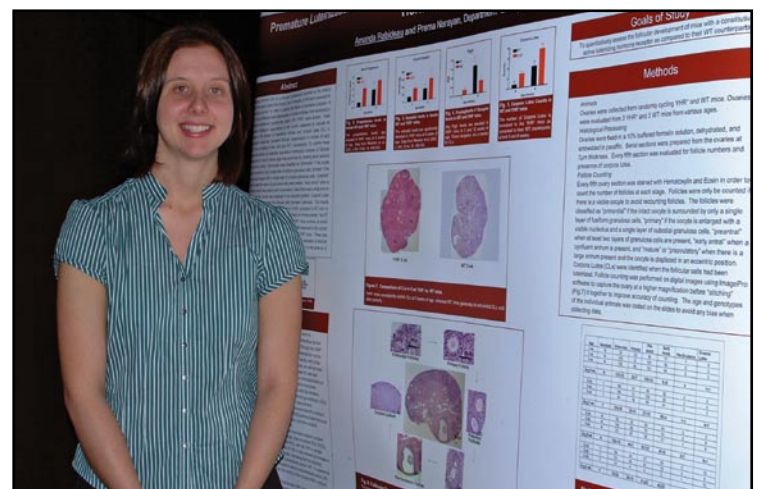
"We're trying to tell exactly when they start ovulating," Rabideau says. To help determine that, she did extensive counting of the follicles in mice of various ages and categorized the stages of follicular development.

Her work indicates that the transgenic mice seem to be ovulating earlier than their counterparts. Her next step: to determine if a continuously active LH receptor can

initiate ovulation without needing a surge of LH.

"These studies will help to create a better understanding of female pubertal development and may present a novel pathway to ovulation," Rabideau says. "They have long-term implications for fertility treatment and the development of ovarian cysts in women."

—Marilyn Davis



Amanda Rabideau received a fellowship from the Endocrine Society for her studies of ovulation in transgenic mice. Photo by Cheryl Broadie.

REACH AWARD WINNERS ANNOUNCED FOR 2008-09

What is REACH?

REACH (Research-Enriched Academic Challenge) publicizes and promotes undergraduate research at SIUC.

Each year, the program awards 20 competitive grants of \$1,500, along with undergraduate assistantships, to students proposing a specific research, scholarly, or creative-arts project under the guidance of a faculty mentor.

REACH also sponsors an annual Undergraduate Research Forum at which students present posters describing their research.

See page 8 for application deadlines for REACH awards and the forum. See www.siu.edu/~reach for information and links to other undergraduate research funding opportunities.

REACH is funded by the Office of the Provost and by the Office of Research Development and Administration, which coordinates the program.



Students majoring in programs from art history to zoology were winners of 2008-09 Undergraduate Research/Creative Activity Awards administered through the REACH program. The awards enable students to run independent yearlong research, scholarly, or arts projects with support from faculty or staff mentors. Awards include undergraduate assistantships and small grants for materials and services. The winners and their proposed projects:

Joseph Batir, senior in geology (see p. 7), will compare the effectiveness of two high-resolution geophysical imaging techniques in locating unmarked graves at the Holli-day Cemetery in Murphysboro, Ill.

Andrew Dennhardt, junior in zoology, will study the ability of great horned owls and barred owls to perceive UV radiation from mammalian urine, indicating the presence of prey in their natural habitats.

Heather Foslund, senior in zoology, will study sediment samples to determine the presence of pyrethroids (pesticides often used in lawn care) in urban creeks and their impact on bottom-dwelling invertebrates.

Lisa Furby, junior in mechanical engineering, will develop a sensor to determine potassium and sodium levels in the body, information to be used to facilitate removal of harmful levels from patients with end stage renal disease.

Alicia Guebert, senior in art history and museum studies, will research, preserve artifacts, and create a self-guided visitor tour for the Creole House, a historic house in Prairie du Rocher, Ill.

Robert Ham, senior in physiology, will genetically alter the moss *Physcomitrella patens* to produce the diterpenoid compound taxadiene-5- α -ol, which could ultimately result in a cheaper source for the cancer drug Taxol.

Sarah Heck, junior in geography, will study whether a diet high in fat and sugar worsens the ability to recover sensorimotor function after traumatic brain injury.

Jennie Irwin, senior in rehabilitation services, will study the effects of a contingency management treatment approach on the attendance of methamphetamine addicts at recovery treatment sessions.

Lauren Kacz, senior in chemistry, will explore the use of volume-sensitive organosilica sol-gels in dynamic modulation of protein folding/unfolding pathways.

Merry Lanker, senior in art education, will work with elementary-school children to create art projects based on a series of books that they will read aloud together. The final product will be an art exhibit by the children.

Chasity Love, senior in chemistry, will study the adsorption of small copper clusters on zinc oxide surfaces, work related to improving production of methanol and minimizing production of methane from coal.

Kevin Loyd, junior in elementary/special education, will compare the effects of experimenter-imposed rules and self-generated rules on human learning.

Gareth McGee, senior in microbiology, will research which native plant species and soil conditions will optimize the growth of bacteria that can break down a pollutant called perchlorate in Crab Orchard Wildlife Refuge.

Elizabeth Patterson, junior in biological sciences, will study the expression patterns of the *Foxd1* gene and its role in the development of the pituitary gland.

Mame Redwood, junior in plant biology and art, will create drawings and 3-D models of the different life cycles of a variety of plants.

Shanna Strieker, junior in physiology, will do research to aid in understanding the role of the protein and transcription factor DEAF-1 in normal development and tumor formation by studying its expression levels and locations in certain mouse and human cells.

Gary Vancil Jr., senior in geology, will study the fossilization process of single-celled organisms called foraminifera to better understand their similarity to ancient foraminifera species in Antarctica. The work relates to climate change.

Stacie Wallace, senior in psychology, will research playful aggression in intimate heterosexual relationships of college students, including students' perceptions, and its connection with intentional aggression.

Sarah Wells, senior in physiology, will work to determine the 3-D structure and identify the function of the zinc finger region of a particular protein important to reproduction and development.

Ann Womack, senior in microbiology, will examine the growth of prostate tumors in mice bred without DEAF-1 and p53 genes to see if deletion of the two, which seem to have a synergistic tumor suppression relationship, will lead to rapid development of tumors.

Undergrads in mass communication tear up the tracks

It was another successful Emmy run for SIUC undergraduates in October 2007 at the National Academy of Television Arts and Sciences Mid-America Regional Chapter Emmy Awards in St. Louis. Their half-hour alternative TV news magazine "alt.news 26:46" garnered five more professional Emmys out of 11 nominations. The series captured the magazine program category for episode No. 803, which aired last year and was co-produced by **Andrew Kastler**, a senior in radio-television, and **Kyle Tekiela**, a junior in cinema and photography. Kastler, incidentally, was one of only three students in the chapter to receive a prestigious **Walter Cronkite Scholarship**.

Awards in individual categories went to **Sean Brown**, a junior in radio-television, for his segment "Bright Idea" in the education/schools category; **Adam Slutsky**, a junior in cinema and photography, for "Shootout" in the writer-spot length (promo, PSA, commercial) category; Tekiela for "All Circuits Are Busy: The Story of Coreh Dameron" in the human interest-program story/feature category; and Tekiela and former student **Jordan Gzesh** for "Bed Bugs Attack!" in the editor-program/program feature category.

In other national competitions, Brown earned \$5,000 from VISA for "What's My Score," a 30-second video detailing the life of "Scott Blair, Amateur Rockstar," and the consequences of high credit card bills and bad credit. He also won The Christopher's 20th annual video contest, whose theme is "one person can make a difference." Brown won \$3,000 from the nonprofit organization for a short film about a middle-school teacher who promotes awareness among his students about global warming. Meanwhile, junior **Timothy Wilkerson** took top honors—and \$10,000—in the iLaugh.com Shortfest Film Festival's 2- to 5-minute live-action comedy category for "Simple Tasks," a purported "tutorial video." The comedy illustrates how to do—and ridiculous ways not to do—the most everyday things, such as walking through a door and cooking a chicken.

Finally, sophomore **Nathan Babian** was part of a production team that captured an Emmy award in January 2008 from the National Academy of Television Arts and Sciences Mid-South Regional Chapter. Babian was co-editor and did audio for field shoots for a show featuring the St. Jude Children's Research Hospital Dream Home Giveaway.

TEAM WORKS TO PRESERVE A PIECE OF HISTORY

Many historic buildings in Southern Illinois and across the nation have been lost to development and decay. A public/private partnership involving undergraduates in four SIUC programs recently worked to help preserve and document the Kornthal Church, built by German immigrants in the early 1850s near Jonesboro, Ill. The Heritage Conservation Network and a community group have been working to restore the church and its parsonage.

The Preservation Summer Program, an annual class currently co-offered by architecture professor Robert Swenson and history professor Michael Batinski, assisted the effort in 2007. History, architecture, and interior design students interviewed community members and former parishioners, who brought snapshots of the church and shared their information and memories about it. Cinema and photography students made large-format architectural photographs to document the church's appearance.

Architecture student **Kaitlin Dorn** was especially involved, participating in a two-week workshop sponsored by the Heritage Conservation Network to restore some portions of the church's parsonage. During the 2007-08 academic year, she worked as an undergraduate research assistant to take field measurements and make computer-assisted-design drawings of the church in a format compatible with Historic American Building Survey standards. Her drawings will eventually be submitted to the National Park Service for possible inclusion in the Library of Congress's Historic American Building Survey collection.

Interior design students also carried the project into the fall, coming up with three options to rehabilitate the church's parsonage into a bed-and-breakfast/caretaker's residence to help fund ongoing preservation of the site.

—Marilyn Davis



Kaitlin Dorn, who documented Kornthal Church extensively, also helped work to restore its parsonage. Photo courtesy Robert Swenson.

Undergraduates in four different programs have worked recently to help research, document, and preserve the historic Kornthal Church and parsonage near Jonesboro, Ill.

AUTUMN OLIVE — FROM PAGE 1

(produced as plants use nitrogen to feed themselves) that leached out of autumn olive stands compared to what happened in grassy areas and found the levels quite a bit higher where there was autumn olive—it was pretty significant leaching. It was sort of unexpected because ecological theory suggests that these kinds of plants make only enough nitrogen to meet their own needs."

The project then passed to an undergraduate researcher working as part of the federal McNair program (see sidebar p. 8). That student found that soil bacteria in fields full of autumn olive also produced significantly more nitrate than soil bacteria did in grassy fields.

Meanwhile, the graduate student, joined at that point by Somor, began looking at nitrate levels in streams in watershed areas with varying coverage by autumn olive stands. Those with more stands also had higher nitrate concentrations in their streams.

"All these outcomes point to one more negative consequence of this invasive species," Somor said.

Somor's piece of the project began last summer and examined the link between water quality and active management of autumn olive. "We wanted to see what would happen to nitrate leaching if you take out the autumn olive, both immediately and over time as other vegetation replaced it," he said.

Working at SIUC's Touch of Nature Environmental Center, Somor marked out nine plots, about 48 feet by 48

feet each, of old stands dominated by autumn olive. He left three alone, chopped down the autumn olive in three others, and in the last three removed the autumn olive and also applied the herbicide Brush-B-Gone™ to the stumps.

Then he installed equipment to sample soil water in the plots. In December he began taking samples twice weekly.

Surprisingly, nitrate levels in the cut areas surpassed those in the untouched plot. "We think that when you cut away the vegetative canopy, you expose the soil to more sunlight, more warmth, more water, and the soil organisms become more active—plus there's all that dead material for them to convert into nitrate," Somor said.

"The assumption is that once you get the initial flush of nitrate from increased microbial activity and new vegetation starts to grow, in the next season nitrate levels would decrease."

The researchers assume, but they don't know. That's the value of ongoing projects, said Karl Williard, associate professor of forestry and Somor's REACH mentor.

"Disturbed soil always boosts microbial activity, so it wasn't unexpected to see this take place," he noted. "But it will be interesting to see if this assumption actually bears out and how long it will take as we keep measuring over the next couple of years."

Somor will be in graduate school by then, preparing for a career as a consultant on water resource issues. But a new undergraduate will step up to take his place.

"That's one of the hallmarks of our program," Williard said. "We help students get their research off the ground, make sure they're collecting their data in the correct manner, and help with the analysis, but the students are the ones who do the work. I like that student focus—it's one of the big reasons I am here."

—K. C. Jaehnig

"We help students get their research off the ground, make sure they're collecting their data in the correct manner, and help with the analysis, but the students are the ones who do the work."

— Karl Williard



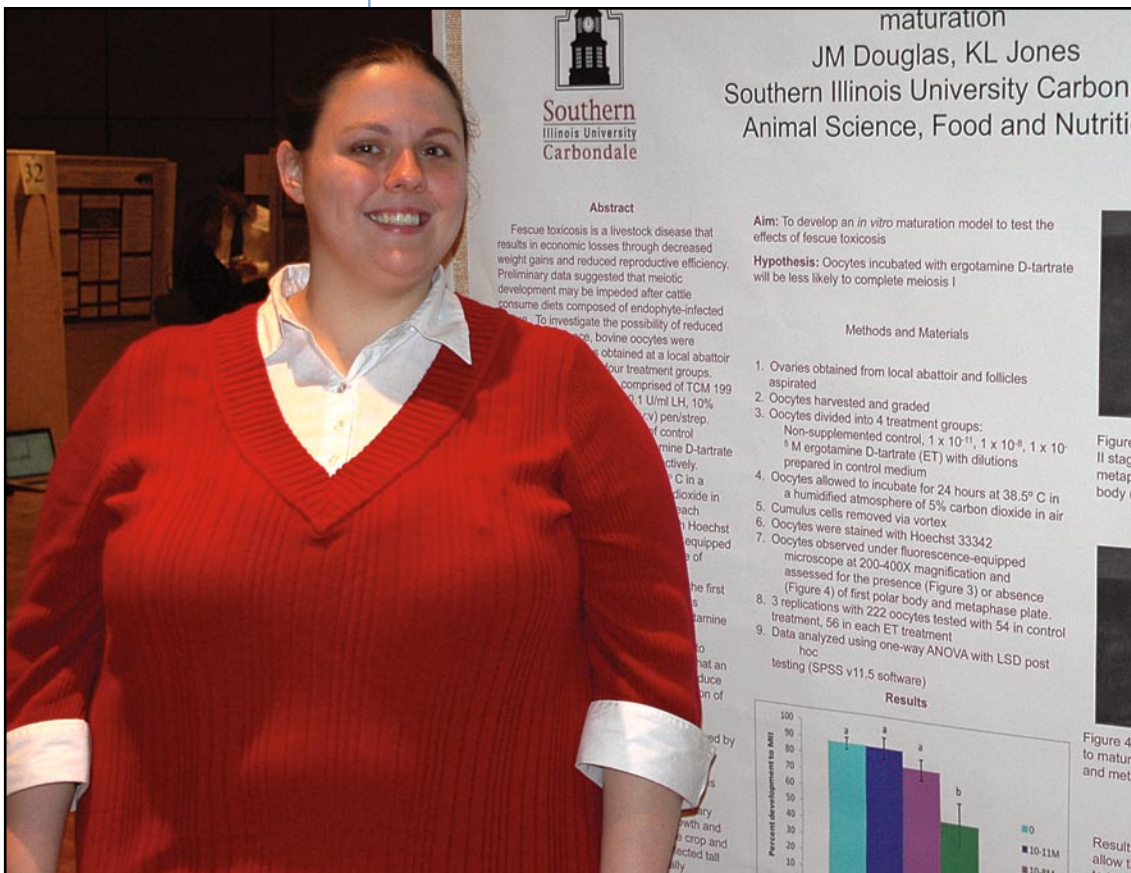
Autumn olive, an invasive plant, may be leaching too much nitrate into streams. An SIUC study involving undergraduates has been researching the issue.

Photo by Jennie Church.

RESEARCH ON FESCUE POISONING WINS INTERNATIONAL AWARD

A senior majoring in animal science and zoology took second place this past spring in an international contest aimed at fostering young scientists.

Jamie Douglas received \$1,000 from Alltech, a global corporation specializing in animal and human nutrition,



“By working on this project, I had the opportunity to network and meet influential people in the industry.”

—Jamie Douglas

Jamie Douglas placed second among 720 students from 80 universities worldwide for her synthesis of research dealing with the effects of a fungus found in fescue pastures on cattle reproduction.

Photo by Cheryl Broadie.

TROUBLESHOOTING FROM AFAR COULD SAVE LIVES

A team of engineering students from SIUC snagged honors at an international engineering contest in Taiwan late last year. The students demonstrated their work in developing wireless Internet sensors and several applications for such networks at the annual Creativity in Action Design Competition there.

The team’s work is an offshoot of a \$1 million Federal Highway Administration Intelligent Transportation Systems



Chris Williams demonstrates a model of his wireless intelligent system capable of detecting a fire in a building and transmitting its room location via a remote server to a fire department. Williams was part of a team that won a prize for creativity in technology integration at the Creativity in Action Design Competition in Taiwan.

Photo by Cheryl Broadie.

grant headed by Shing-Chung “Max” Yen, director of the Materials Technology Center at SIUC. Yen and the students are working on Internet-based wireless sensors and databases aimed at providing near real-time data and analysis of transportation structures, such as bridges. The hybrid system, which combines integrated sensor networks with wireless and Internet technology, could improve safety and efficiency in transportation systems and other applications.

The team of students includes **Chris Williams**, a junior in civil and environmental engineering; Oliver Yang, a doctoral student

for her paper on the ill effects of fescue poisoning on beef cattle reproduction. The competition drew more than 700 students from some 80 universities around the world. Judges considered clarity, validity, originality, scientific thought and understanding, significance, and thoroughness in selecting the winners.

Douglas’s paper grew out of her experience as an undergraduate research assistant for SIUC animal scientist Karen Jones. Jones has spent much of her career at SIUC studying the effects of a fungus, common in fescue pastures, on the reproductive health of both cows and bulls.

Douglas began her research by looking for all the scientific publications she could find detailing the bodily processes affected by fescue poisoning, the symptoms it causes, and research aimed at understanding or treating the disease. When she heard about the Alltech competition, she decided to turn her findings into a contest entry.

“By bringing it together in one place, readers will have a more thorough grasp of the condition without having to read through 52 different papers (or more)—they can just read one,” Douglas said.

Because her entry didn’t include details of the experimental work she has done with Jones, Douglas didn’t expect to win. “I didn’t see it coming, but it made me feel pretty good,” she said. In her lab research, which was supported by a REACH award, Douglas found that the toxin produced by the fungus can reduce fertility in cows by impairing the maturing of their eggs. Her work won an honorable mention at the 2008 Undergraduate Research Forum. She plans to continue her study of fescue toxicosis as an SIUC graduate student next year and will use the award money for research or travel to conferences.

—K. C. Jaehnig

in electrical engineering; and Adam Miller, a senior in electrical engineering. They won the prize for creativity in technology integration by demonstrating three applications for the wireless Internet-based sensor network, Williams said: how the sensors would work to monitor structural integrity of a bridge, monitor water quality, and work as a fire detection network.

This last application was Williams’s project for a REACH award. As he explained in his report, “The fire detection model uses light bulbs to represent a fire erupting in specific rooms of a building. It demonstrates that a temperature sensor or photoelectronic smoke sensor can be installed in each room and that these sensors can send a wireless signal via the sensor node to a router and Internet server that is located in a safe shelter away from the building. This shelter would have its own back-up power source.

“A trigger can be transmitted to a local fire department via a Wi-Fi device if a specified sensor reading is reached. If the proper information [about floor plans, etc.] were programmed in a database, the fire department would know the location of the fire in the building before arriving at the site. The necessary information would be transmitted before the fire could destroy the sensors and the sensor node.”

Williams said the sensor networks they are working on in Yen’s lab represent important advances to current such networks. “By being Internet-based, it makes it cutting-edge and available to plug in almost everywhere in the world,” he said. “And it’s all wireless.”

—Tim Crosby

SOUNDSCAPE ECOLOGY FOCUSES ON PANAMA

In addition to research—specifically, capturing the sounds of the rainforest—the lesson plan for the new course included riding in a dugout canoe, releasing endangered animals, and getting a rare glimpse of massive construction work on a deeper, wider Panama Canal.

“It was an eye-opening experience,” said **Eric Eickmeier**, a senior majoring in forestry at SIUC.

“I was taken into a wilderness—another world. There’s something about being there—you get so much more out of it than you do just seeing a picture.”

Eickmeier was one of 11 SIUC students—nine undergraduates and two graduate students—enrolled in the University’s first-ever acoustic ecology field course, eight days of non-stop activity aimed at combining the science of rainforest conservation with the art of “soundscape” recording in the Panama Canal Watershed.

Held during spring break, the course grew out of joint research projects conducted in the area by Andrew Carver, associate professor of forestry, and Jay Needham, assistant professor of radio-television. Carver, active in Panama since the decade’s start, had teamed up with Needham during the previous spring break with the idea of capturing sounds as a way of documenting both wildlife presence (types and abundances of species) and noise pollution.

“Our data will reveal a lot about sounds invading that natural environment and what it means for the quality of life of both humans and animals,” said Needham, an artist and documentarian who specializes in sound.

The canal’s watershed includes two national parks, a wildlife preserve, and EcoParque Panama—nearly a thousand acres of tropical forest abutting both the canal and Panama City and subject to increasing manmade noise. More than 2,500 types of plants, 159 species of mammals, and 564 kinds of birds flourish in the dense woods.

While the students received two to three credits for completing the field course, this was more than just another class, Carver said.

“We wanted to share the sense of a research expedition with them. We tried to immerse them in grassroots rainforest conservation—through research, meeting with nongovernmental organizations, animal rescue, eco-tourism.”

As Joshua Gumiela, a graduate student working on his master of fine arts degree, says, “In a location such as the rainforest, it’s important to realize that there is a level of encroachment on the natural soundscape that affects the animals living there. These animals are not only physically displaced by the canal expansion, but their sonic environment is undergoing drastic change as well.”

During the course, the students did sound recordings and

set up motion- and-heat-triggered “camera traps” to add to the data on wildlife species. They also helped release into safe areas animals removed from the canal expansion sites; traveled by dugout canoe to an Embera village to learn from these indigenous people; walked one of bird-watching’s most famous trails; and much more.

“We were always on the move, and when we weren’t moving, we were out recording sounds—and that’s how it is to do research,” Carver says. “You have limited time in the field, and so much is happening.”

The U.S. Forest Service helped SIUC sponsor the course. Besides Eickmeier, undergraduates involved in the project were **Lindsay Warner**, **Jolene Wright**, **Allie McCreary**, **Guy Schmale**, and **Matthew Stevens**, all seniors in forestry; **Brendan Scahill**, a junior in forestry; **Daniel Kantor**, a junior in cinema and photography and radio-television; and **DuVale Riley**, a senior in cinema and photography.

The students presented research posters and played their recordings at a symposium back in Carbondale.

—K. C. Jaehnig

“I was taken into a wilderness—another world. There’s something about being there—you get so much more out of it than you do just seeing a picture.”

—Eric Eickmeier



Daniel Kantor, a dual major in cinema & photography and radio-TV, holds a high-definition audio recorder (with windsock) while **Brendan Scahill**, a forestry major, listens to the sounds of the bamboo as it moves in the breeze. *Photo courtesy Andrew Carver.*

The power of words

An SIUC debate team was the best in the nation for the 2007-08 season, and a second SIUC team placed fifth. The duo of **Kevin Calderwood**, then a sophomore in political science, and **Kyle Dennis**, a senior in economics who has since graduated, defeated 54 teams to win the **National Parliamentary Tournament of Excellence** in March, the most highly regarded national debate competition in the United States. “This is more proof that SIUC can compete with anyone academically when we put our efforts in it,” wrote Todd Graham, director of the team, in an e-mail after the SIUC victory was announced.

At the **National Parliamentary Debate Association Tournament**, also in March, Calderwood finished with the top individual award, cementing his position as the best debater in the nation. Dennis took third place in the individual awards. There were 500 debaters competing for the individual awards. The SIUC duo of **Katie Thomas**, a political science major, and **Adam Testerman**, a major in cinema and photography, took fifth in the team category.

The members of the SIUC debate team were honored at the State Capitol in Springfield in May. Shown in the photo at right: **Josh Campfield**, Thomas, Dennis, debate program director Todd Graham, graduate assistant Benjamin Haas, Calderwood, **Nicholas Demi**, and Testerman with some early-season trophies. Not pictured: GA Brian Norcross.



MCNAIR SCHOLARS ROUNDUP

Students presented research results at the 2008 McNair Scholars Research Symposium in areas ranging from marketing to chemistry. (See the sidebar on p. 8 for more about the McNair program.) In McNair's Summer Research Institute, students work with faculty mentors to learn what constitutes research, choose a topic to explore, carry out experiments, interviews, or other scholarship, write up findings, and give a 12-minute public presentation at the symposium.

Aléc Perry (communication disorders and sciences) looked at the ability of graduate students in her field to adapt to the needs of clients from cultural backgrounds other than their own.

Interviews by **Jonaté Govan** (health education) indicated that college football players' rates of binge drinking, which are higher than those of other students, result from their isolated social environment, in which drinking is in effect a team-bonding activity.

Jennie Irwin (rehabilitation services) examined whether attendance correlated with better employment and higher income in methamphetamine addicts enrolled in a program using a particular treatment approach.

A project by **Vernon Johnson** (health care management) concluded that African-American college students need more prevention information about Type 2 diabetes, which has become much more prevalent among this group.

Inadvertently shedding some light on that particular problem, a study by **Conisha Brownlee** (food and nutrition) assessed how students' food choices change when they transition from home living to campus living.

Stacie Wallace (psychology) showed that researchers surveying couples about aggression in their relationships need to consider context—that is, to differentiate playful aggression from intentionally harmful aggression—and consider how one might lead to the other.

Kandace Vallejo (history) explored education majors' perceptions of the meaning of democracy, trying to see if students are being taught the concept as little more than just voting, or if they have received more comprehensive citizenship education.

Michael-Ann Johnson (history) conducted interviews and scoured old newspapers to uncover the ways that integration resulted in the closing of many municipal swimming pools in towns large and small due to racial conflict and white residents' abandonment of these public places.

Using discarded objects from roadways and dumpsters, **C. Grant Cox III** (art - painting) created abstract assemblages to explore new ways of creating art while highlighting the problem of waste and documenting human culture.

Chasity Love (chemistry) experimented with different



Sarah Owusu's project involved gene expression in the pituitary gland. Photo provided by the McNair Scholars Program.

ways to get small copper clusters to bond to zinc oxide structures. The ultimate purpose is more efficient production of methanol and minimization of methane from coal.

In work that may have an eventual connection with infertility in humans, **Raquel Brown** (biological sciences) showed the sequence of expression of a cluster of reproductively important genes during ovulation.

Sarah Owusu (above; physiology) also looked at gene expression—in this case, a gene that may be important to proper development of the pituitary gland.

Monica Mason (journalism - news editorial) examined gender stereotyping by advertisers on the popular social networking website Facebook, showing how ads on the same topic were targeted differently to males and to females.

Finally, **Levell Mables** (marketing) created a survey exploring SIUC sports fans' motivations for sports attendance, which will be used by Saluki Athletics to better tailor their marketing and customer relationship efforts.

The McNair program is funded by the U.S. Department of Education. Four of the McNair Scholars were supported by the Illinois Louis Stokes Alliance for Minority Participation, a National Science Foundation initiative to recruit minority students into science and technology disciplines.

Former SIUC McNair Scholars have held or are holding internships or positions with the National Science Foundation, the *Chicago Tribune*, the Taiwan Ministry of Education, Bechtel SAIC Co., the Council for Opportunity in Education's International Leadership Training Program, and more.

“Being a McNair Scholar has challenged me in almost every capacity. Where I was weak, I grew strong, and where I was strong, I grew stronger.”

—**Krishna Pattisapu**,
2008 McNair Program
graduate

Dating stakeouts and nursery counts

A zoology undergraduate was trawling for fish in the Middle Mississippi River this summer as part of a conservation project. Not just any fish, but pallid sturgeon, a fierce-looking, federally endangered species being illegally harvested for its eggs (caviar).

Earlier this year, a sturgeon “stakeout” had been conducted by zoology professor James Garvey and a team of graduate students, several of whom had gained research experience as undergraduates processing samples in his lab. They'd been patrolling an area of the Mississippi near Cape Girardeau, Mo., seven days a week, 24 hours a day, tracking two egg-laden pallid sturgeon that were hanging out nearby. The researchers were waiting for the magic moment—probably triggered by rising water temperature—when the fish would decide to leave that area and swim to their spawning area.



In early May, the females made their move: about 20 miles south, to a spot where the river is fast-flowing and has a lot of exposed rock on the bottom. In June, zoology major **Jonathan Seibert** worked as part of a crew that followed up by trawling in the river for offspring—sturgeon fingerlings—to gauge reproductive success of the species, not just in that area but elsewhere. The researchers had little time: with flood levels rising, it would soon be too dangerous to have the boats on the river.

Why so much energy devoted to identifying spawning areas or counting offspring? The more researchers know about these matters, the better they can conserve the species by advising river managers on protecting favorable conditions and sites for the fish.

STUDENTS EXCEL AT 2008 UNDERGRADUATE RESEARCH FORUM

Nearly 50 students from academic programs across campus presented posters at the 2008 Undergraduate Research Forum on March 31. Once again the psychology program came away the biggest winner.

Nicholas Kuypers, a senior in psychology, and **Bryan McConomy**, a junior in psychology and physiology, tied for first place. Both projects had to do with speeding recovery from brain injury. Kuypers won for investigating the effectiveness of pyridoxine (vitamin B6) on behavioral and anatomical measures; his mentor was professor Douglas Smith. McConomy, whose mentor was assistant professor Michael Hoane, explored the importance of norepinephrine in recovery of function.

Amanda Rabideau (see p. 1), a senior in physiology, took second place for her project "Premature Luteinization of Granulosa Cells Due to Constitutive Activation of the Luteinizing Hormone Receptor." Her mentor was assistant professor Prema Narayan.

There was a three-way tie for third place. **Jared Burde**, a senior in physics, studied how certain kinds of molecules adsorb to carbon nanotube bundles, research with energy and other applications; he worked with assistant professor María de las Mercedes Calbi. **Michael Burns**, a junior in zoology, won for analysis of two subspecies of a fish called the Blenny darter that concluded they are actually distinct species. His mentor was professor Brooks Burr. And **Krishna Pattisapu**, a senior in speech communication (see below), examined representations of interracial relationships in the Paul Haggis film *Crash*. Her mentor was assistant professor Naida Zukic.

Another student working with Michael Hoane, psychology junior **Nicholas Birky**, took honorable mention for modeling post-traumatic stress disorder in an animal model of traumatic brain injury. **Jamie Douglas** (see p. 4), a senior in animal science and zoology, won honorable mention for studying how a chemical sometimes found in pasture fescue reduces fertility in cows by impairing the maturing of their oocytes. She worked with Karen Jones, associate professor of animal science.

Matthew Picchiatti, a senior in psychology working with professor David Gilbert, won the Independent Researcher Award for studying the effects of nicotine on brain waves and cognitive performance of male smokers and nonsmokers with ADHD symptoms.

Finally, **Katie Butera**, a junior in physiology and psychology, won the People's Choice Award. Mentored by Lisabeth DiLalla, professor of behavioral and social sciences, she studied cooperation development in young twins.



Top: Kimberly Bell discusses her research with forum attendee Hugh Muldoon.

Bottom: Poster judging. Photos by Cheryl Broadie.

OTHER SPECIAL MENTIONS

Joe Batir, a senior in geology who hopes to become an astronaut, is one of just 80 students nationwide to receive a \$5,000 **Morris K. Udall Foundation scholarship**. Batir, who is minoring in math and physics, plans to conduct research to improve and promote the increased use of non-invasive geophysical data collection and manipulation techniques. The data from his work will be used for detection of pollutants in groundwater and other



Udall Scholarship winner
Joe Batir.

environmental remediation projects. Batir is part of the University Honors Program, which, he says, "has given me opportunities to...learn much more than just what can be found in the classroom."

Jared Burde, a senior majoring in physics and electrical engineering, has been awarded a \$5,000 national **Phi Kappa Phi Graduate Fellowship**. Burde plans to attend Michigan State Univer-

sity, where he'll develop applications for filtration and chemical detection via adsorption of molecules on carbon nanotubes.

Krishna Pattisapu, a senior in speech communication, won second place in the undergraduate competition at the **2007 National Communication Conference** in Chicago. Pattisapu's research examined how interracial relationships were represented in the Paul Haggis film "Crash."

"The University Honors Program has given me opportunities to... learn much more than just what can be found in the classroom."

—Joe Batir

Important Deadlines

Applications for **2009-10 REACH Awards** are due on **Friday, January 30, 2009**. Application materials and information, including eligibility requirements, can be found at www.siu.edu/~reach/awards.html. For other research funding opportunities, see www.siu.edu/~reach/funding.html.

Letters of intent to participate in the **2009 Undergraduate Research Forum** are due on **Friday, February 13, 2009**, with abstracts to follow on **Friday, February 27**. Information can be found at www.siu.edu/~reach/forum.html. The 2009 forum will be held on **Monday, March 23**.

SIUC's Ronald E. McNair Postbaccalaureate Achievement Program (**McNair Scholars Program**), funded by the U.S. Dept. of Education, prepares undergraduates who are first-generation-college/low-income students or minority students to succeed in doctoral study. McNair Scholars work closely with mentors, conduct summer research projects, and present findings at a July symposium.

Applications are accepted all year. For information and eligibility requirements, see www.siu.edu/~mcnair.

STUDENT RAKES IN BIG REWARDS WITH IMPROVED DESIGN

What started out as a project for a design class earned **Ryan Jansen** much more than a grade.

Jansen's design, "The Rake N' Take," won first place in the 2008 Eye for Why - Dyson Student Design Competition. The national contest challenges students to re-envision an existing product, correcting any shortcomings in it.

Jansen improved on a lawn-care staple, the rake. Observing how often people raking their lawns had to bend over to pick up the leaves, he decided to find a way to take that time-consuming nuisance out of the raking process. His design uses a combination handle to operate a rake that clutches the leaves rather than merely moves them.

The project was conducted in faculty member Walter Hargrove's class in the School of Art and Design. The assignment: enter a new design in a contest. Jansen, a senior, entered the International Housewares Student Design Competition, where he won an honorable mention.

He entered the Dyson competition as an afterthought. His winning design earned him \$5,000, a trip to New York City, media interviews, and a meeting with inventor James Dyson (famous for his bagless vacuum cleaners). His advisors, Hargrove and Steve Belletire, won \$2,000, which they donated to the School of Art and Design.

Jansen will now represent the U.S. in an international-level competition. He has a patent pending on his invention and says he has several options for marketing the product.

—Andrea Hahn



Back saver: Ryan Jansen demonstrates his "Rake N' Take" prototype.

Photo courtesy Ryan Jansen.

UNDERGRADS IN RESEARCH: WHY AND HOW?

The word *research* conjures up images of faculty and graduate students clustered around lab workbenches. But at SIUC, the activity and the people involved are much more diverse. Many research projects here rely heavily on undergraduates. As just one example: **the first community-based program in the nation to help kids at risk for Type 2 diabetes involved undergraduates as a key part of the research team.** Science, agriculture, and engineering projects often could not take place without the help of undergraduates. There are opportunities in the social sciences, humanities, and arts as well.

When you participate in research, **you learn more than you would in the classroom** and you contribute your efforts to advance your discipline. You gain skills that will improve your ability to find a job or go on to graduate school when you graduate.

We use the term *research* broadly, to refer to projects that lead to **new knowledge, new interpretations of information, and new expressions of creativity.** In this sense, research takes place in the lab, in the field, on the farm, on the computer, in the library stacks, in the studio, on the stage, in the community—almost any venue imaginable.

As an undergraduate, **you have many ways to get involved in research.** The REACH program, described on page 2, is only one. You may be eligible for the McNair Scholars program (see the sidebar on this page), which prepares students for eventual doctoral study. The University Honors Program includes a research component. Check with the Financial Aid Office for undergraduate assistantships, many of which are research positions, and for research-related student worker positions.

If faculty members in your discipline hold grants, ask if there is a way you can be involved. Check bulletin boards for information about summer research internships at outside agencies, or talk to the staff at the Office of Research Development and Administration (453-4540, Woody Hall C-206). Most departments also offer independent research classes.

Because SIUC believes that doing research is perhaps the most effective way of learning, we are in the process of raising funds to **establish an endowment to support undergraduate research** so that more students can be involved. Our faculty and other supporters of the University will be hearing more about this effort as it progresses.

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