Fertility clinic for endangered species inspires audience

Known worldwide for her scientific breakthroughs that led to the birth of the first Sumatran rhinoceros in captivity in 112 years, Dr. Terri Roth presented a lecture to USI students, faculty, staff and the community-at-large on the work she does to ensure the preservation of the world’s most endangered species. From testing fecal matter to determine if polar bears are truly pregnant or pseudo-pregnant to nursing a litter of Pallas cats (found in cold, high-altitude places) using a surrogate domestic cat, she discussed ways in which the Center for Conservation and Research of Endangered Wildlife (CREW) finds ways for rare and exotic animals to survive and thrive.

Roth is the vice president of conservation and science, and director of CREW at Cincinnati Zoo and Botanical Garden in Ohio. She was on campus in April as the guest speaker in the Marlene V. Shaw Biology Lecture, the third in the series’ annual presenters. Her interests lie in global conservation of endangered species, but her expertise is Rhinoceros.

As the director of CREW, Roth works with more than 2,000 zoos across the nation in an effort to “give Mother Nature a helping hand” when it comes to procreating endangered species in captivity, and the challenges are great, especially for rare rhinos.

In 1987 there were only 1,000 Sumatran rhinos left in the wild. The United States and Sumatra enacted the Sumatran Rhino Trust agreement, in which the United States would receive half of all rhinos captured in the wild. Capturing them was less than fruitful, and only seven were shipped to the United States; then those didn’t reproduce. By 1996, there were only three of the stout, hairy rhinos left in U.S. zoos: Cincinnati, The Bronx and Los Angeles. CREW collaborated with The Bronx and L.A. zoos to have their rhinos sent to Cincinnati in an effort to breed them.

It was determined that the female rhinos were low in progesterone, and Wonder Bread soaked in the hormone was fed to Emi, the lone remaining female Sumatran rhino in captivity. She lost her first five pregnancies, but the sixth was successful, and Andalas was born in 2001. Through Roth’s efforts at CREW, Andala, the first rhino born in captivity in 2001, was returned to Indonesia in 2007 as part of conservation efforts. Second and third calves were born in captivity in 2004 and 2007.

Today, there are less than a hundred Sumatran rhinos in the world, and while their prognosis may or may not be positive, Roth was sure of one thing, “We need all of you. There are more and more endangered species. If you have any interest in this field, you can find your niche,” she said.
Welcome to the summer 2014 edition of the Periodic Review. The 2013-2014 academic year is in the history books and what a great year it’s been. Every year it seems that we increase our activities with competitions, prominent speakers, new visitors to campus, new programs developed, and faculty and student accolades. We are very proud of the successes and recognitions our faculty and students have received, as some of the most prestigious University awards have been bestowed upon them. Once again Pott College faculty members have been honored for their distinct efforts: Dr. Kent Scheller, associate professor of physics, was named USI’s 2014 Distinguished Professor, and Dr. Jeff Thomas, professor of education, received the 2014 Sydney L. and Sadelle Berger Faculty Community Service Award. Read profiles of them and what they did to earn such honors in this edition.

Pott College students continue to excel in the classroom and the community. In this newsletter, you’ll read about their activities, accolades and successes in a variety of areas, ranging from regional and national competitions to post-baccalaureate achievements. Mr. Samuel Barnett, double major in biophysics and Spanish, was honored as the 2014 Trustees Distinguished Merit Award. He was one of more than 200 deserving students in Pott College who received awards and scholarships at our recent College Honors Convocation. Congratulations to all of the students who’ve received honors and achieved so much over the past academic year.

Our teacher candidates continue to excel as five graduating seniors were named Indiana Outstanding Future Educators. To ensure more USI education majors have opportunities to shine, we’re excited to announce Pott College received a grant for over $835,000 to recruit and retain future Indiana science, technology, engineering and math (STEM) educators. The “Teaching Eagles Scholarship Program” will welcome its first class of scholars this fall.

Summer 2014 will be quite busy as we offer a wide range of undergraduate and graduate courses. In addition, we will have on campus our last class of students in our National Science Foundation sponsored Early Undergraduate Research Program. The student participants will be working with faculty on a variety of research projects which encompass most every department and discipline within Pott College. This highly successful program has involved over 80 students and dozens of faculty. The experience the students received from this program is invaluable and the research undertaken has resulted in many students involved with peer-reviewed publications and presentations.

I hope you find this edition of Periodic Review both enjoyable and informative, and if you wish to read it online you can find these and other stories at www.usi.edu/science.

Scott A. Gordon, Dean
Pott College of Science, Engineering, and Education

Healthy Kids

Maria Pritchett, who graduated in May with a degree in kinesiology, coaches fourth grader Nolan Jackson during the West Terrace Elementary School’s Afterschool Triathlon Program. The program encourages third, fourth and fifth graders at West Terrace to participate in physical activities. The semester-long training ends with a non-competitive mock triathlon. This is the sixth year USI and West Terrace have collaborated to engage children in more health and physical activities.
Insatiable curiosity led to Distinguished Professor Award

When Dr. Kent Scheller was a young boy, he climbed out on the roof of his house to gaze up at the night sky. Drawn by a need to understand the stars quietly shining overhead, he began teaching himself the star system the best way he knew how, by engaging with them as directly as he could. It was in part this inquisitive nature for how and why things work coupled with his passion for passing that knowledge on to his students that earned the associate professor of physics USI’s 2014 Distinguished Professor Award.

Scheller describes his approach to learning as one of “gut instincts” and strives to instill that in his students. “Physics is all around us, and I try to teach students to see it in their everyday lives,” he said. He does this by bringing the outside into the classroom where students are allowed to break cement blocks on his head or chest (among many other experiments) to emphasize physics principles at work, leaving students with more questions than answers.

“Science is about asking questions,” Scheller said. “If you stop asking questions, you stop doing science.” As the physics program coordinator, he encourages questions inside and outside of the classroom by having an open door policy.

The why and how have always guided his path in life. As an undergrad, he first studied chemistry but quickly learned it was based on fundamental “knowns,” and he was more interested in the unknown. So, he switched his major to physics to satiate his appetite for discovering how matter, energy, force and motion relate to each other. He then earned a doctorate in physics from Notre Dame and returned to Evansville to teach at the University of Evansville for three years before he was “lured to the dark side of industry.”

But teaching is a passion he couldn’t stay away from for long and, three years later, he joined the faculty at USI. “I knew at a very young age I wanted to practice science and teach,” he said. “I took a 60 percent pay cut to come back to teaching, and I’ve not regretted the decision for one moment.”

Scheller is a nuclear physicist by training, and currently is establishing a radon research lab in the basement of Pott College, in part because a friend died from lung cancer, even though he’d never smoked. While Sheller is quick to point out science doesn’t assign symptoms of a single case to a specific cause, he is eager to investigate cancer-causing radon in the southern Indiana region.

“Radon is naturally occurring in the ground because there is uranium in the earth,” he said, referring to the Periodic Table hanging on his wall. “I want to know how much is present and where, and is it significant enough to worry about.”

Scheller’s teaching career began at USI in 1999, and through the years he’s maintained his goal of engaging students in the classroom while conducting scientific research. But, his ultimate aspiration has always been to equip students with inquisitive minds to seek the answers to their question so they can become tomorrow’s problem solvers.
Subtracting fear from mathematics by adding new skills for faculty

Dan Meyer—math expert, former Google employee and TED Talk presenter with 1.7 million views—thinks there’s a better way for students to learn mathematics, one that involves them in the formulation of problems rather than giving them problems. “The way we teach math to students in the U.S. all but ensures they won’t retain it,” he said. “Math text books, when teaching math reasoning and patient problem solving, are equivalent to turning on “Two and a Half Men” and calling it a day. People expect sitcom-like problems that resolve in 22 minutes, three commercials and a laugh track. No problem worth solving is that simple.”

The mathematics department agrees. It wants to ensure USI students not only retain problem-solving knowledge but become critical thinkers as well and brought Meyer to campus to provide faculty with new teaching skills. “We needed to qualitatively rethink our math courses,” said Dr. Kathy Rodgers, mathematics department chair. “With Core 39 in place in the fall, the faculty will be asked to teach differently. We know one workshop won’t make it happen overnight, but it’s a kick-start.”

Mathematics may not play a part in every class a student takes, but it impacts every discipline—as well as our personal lives. Meyer taught USI faculty to make mathematics accessible by breaking down textbook problems, reformulating them so they support mathematical reasoning and patient problem solving. For instance, when teaching students to calculate word problems such as how long it takes to fill a bucket of water, Meyer doesn’t present them with a formulaic math model, instead he shows them a video of a bucket being filled with a hose and asks, “How long will this take?”

He calls this “baiting the hook” because students soon start thinking, “How long is this going to take?” Once they’ve asked themselves the question they’ve become engaged and start discussing ways to answer it. “Kids who won’t join math conversations join in,” Meyer said.

Engaging students in real world mathematical problems gives them powerful problem-solving skills and takes the fear out of math. Meyer said 99 percent of his students feared word problems until he changed his approach. “We’re no longer averse to word problems because we’ve redefined what a word problem is. We’re no longer intimidated by math because we’re slowly redefining what math is.”

Rodgers said the department wants to prepare students for the future by exposing them to great ideas and providing them with practical problem-solving methods. “We want to help them understand issues in their daily lives, to be critical thinkers, informed decision makers and intellectual consumers of qualitative information.”

Team wins trip to NASA

Even though the team didn’t know what a spectrometer was when they decided to design, engineer and fabricate one to enter in the 2013 National Student Solar Spectrograph Competition, they none-the-less researched and constructed a winner. The seven-member, interdisciplinary team crafted an instrument that employs diffracted light to identify chemical compounds and determine concentrations of chemicals with the intent of it being an educational tool for area high school students so they can familiarize themselves with one before encountering college. The USI team crafted their spectrometer over the course of two semesters on a $2,000 budget and won “Best Presentation Result” at the competition held in Montana last spring. The award included $12,000 and a three-day, all-expenses-paid trip to NASA for the launch of the MAVEN spacecraft to Mars.

From left: Jesse Rhodes, Danielle Eckert, David Bruce, Tanner Hayes and Aaron Williams. Additional members of the team, Luke Maurer and Eric McCord, are not pictured.
Staying current through collaboration earns recognition

Dr. Jeff Thomas, professor of education, understands that to provide his USI students (emerging educators themselves) with the best education, he must remain involved with elementary and secondary school practices. To help him do this he established Project ConneCT, a series of science lessons he co-teaches with USI student volunteers and Trisha Kavanaugh, a second grade teacher at West Terrace Elementary school in Evansville. “This connection helps me stay current in the profession and enhances my authentic voice toward speaking about issues and trends facing elementary teachers,” Thomas said.

Staying connected and engaged with schools and the community has earned him the University of Southern Indiana’s 2014 Sydney L. and Sadelle Berger Faculty Community Service Award. One of his mottos is “be helpful,” and it’s one that he regularly puts into practice as he collaborates with fellow faculty, students and staff at USI, as well as EVSC teachers and administrators.

Thomas partnered with Kavanaugh to initiate Project ConneCT (the C and the T in ConneCT are capitalized to emphasize Classroom Teaching) three years ago, and since its inception he’s created 25 lessons teachers at the school can use. The project not only keeps him current in the classroom but also provides USI students an opportunity to become familiar with the developmental stages of second graders. “I learned so much from just observing him, and I got to see how great he was with kids,” said Nina Totten, an education major. “He was very helpful and encouraging when I would help him teach a lesson. He always ended the day by telling me what I did well with and what I could improve on.”

Since joining USI’s faculty in 2000, Thomas has been involved with numerous projects, publications and workshops. The Indiana Science Tradebook Annual Reading list (INSTAR), started three years ago, is one that is gaining national attention. Thomas and his partner, Dr. Joyce Gulley, USI associate professor of education, developed a list of children’s literature to use as supplemental teaching material of science concepts for grades K-6. Their research, along with Dr. Gina Berridge’s, assistant professor of education, revealed the Indiana Department of Education’s Indiana Reading list was outdated. “[It] contained titles with some bias in its selections, and was ill-suited to provide quality books connecting with science,” Thomas said.

Each book selected is evaluated based on nine criteria, ranging from substance of content to positive reviews in professional journals. Additionally, the books must meet Indiana science teaching criteria and be widely available. INSTAR has proved so successful that Thomas has partnered with educators in Texas, Tennessee, Illinois and Ohio to help them develop their own reading lists.

“He’s been involved with many school partnerships and has worked diligently to develop and promote sound educational programs and practices in our region.” Dr. Scott Gordon

“Dr. Thomas has a long and distinguished record of community service during his tenure at USI,” said Dr. Scott Gordon, dean of the Pott College of Science, Engineering, and Education. “He’s been involved with many school partnerships and has worked diligently to develop and promote sound educational programs and practices in our region.”

Some of Thomas’ other projects are: co-developing curricula packages, instructional videos and field trip experiment guides for Naval Surface Warfare Center, Crane Division; running graphic organizer workshops at Reitz High School; and creating laboratory manuals with the science chairs of area high schools.
Scholar maximizes college experiences

When Sam Barnett says, “It’s all about maximizing the college experience,” he could be referring to himself, his fraternity brothers or a group of potential USI students he’s given a campus tour to as an Amigo. But no matter who the audience is, the intent is the same: to heighten one’s experience and engagement in college and life.

Barnett, who graduated in May as a double major in biophysics and Spanish, is the 2014 Trustees Distinguished Merit Award winner. The award recognizes outstanding achievement not only in the student’s major but also in the liberal arts and sciences that form the core curriculum. Each college nominates one student for the honor, which includes a $1,500 award.

While being selected for the award made Barnett proud, it’s not surprising given that the Presidential Scholar takes advantage of most opportunities he encounters and makes it part of his mission to provide the same for others. As a member of Lambda Chi Alpha fraternity he’s set up a tutoring program within his chapter and conducted workshops to improve his fraternity brothers’ study habits and time management skills. “I wanted to join a brotherhood and be with other men committed to higher education and participate in campus philanthropy,” he said.

Although Barnett grew up in and around USI (his mother taught biology here), he had a number of offers from other colleges but chose to attend USI because he knew how caring and helpful the faculty is. “I originally thought I might not stay around, but once you come to campus and meet those involved and see how beautiful it is; they’re huge selling points,” he said. “The faculty go out of their way to give recommendations and help you find scholarships.”

Barnett didn’t feel he’d have the same opportunities at other universities as he’d have at USI. Larger institutions often are too vast for faculty to provide one-on-one mentorship, and smaller institutions might not offer as many opportunities. USI’s biophysics program captured Barnett’s interest most. “It is unique because its program is interdisciplinary, something not found at many other schools,” he said.

“…and be with other men committed to higher education and participate in campus philanthropy.”

Sam Barnett

The term “interdisciplinary” speaks to who Barnett is. He grew up listening to National Public Radio, where he got the idea he wanted to learn to play the violin. He entered the Suzuki Violin Program at the University of Evansville when he was 12 years old. Today he still plays in the orchestra but also gives private lessons to seven students. Last summer he studied Spanish abroad for 10 weeks in Granada, Spain, because he was interested in the Arab cultural influences within the city.

This fall, Barnett will start medical school at Indiana University, and while he’s unsure where medicine will take him—a research lab or into communities internationally—he is certain to maximize his own experience as well as those around him.

Future scientists seek better ways

Chemistry majors Reuben Warshawsky, a sophomore and a BMD scholar, and senior Aaron Spahr check the purity of a new fluorescent compound they’ve synthesized, as Dr. Priya Hewavitharanage, associate professor of chemistry, observes. The new compound will potentially be used to improve the efficiency of light absorption in dye-sensitized solar cells.
New hires and honors

New Hires

Dr. Keith Powers
Director of Advising
Advising Center – Science, Engineering, and Education

Mr. Justin Amos
Lab Manager
Applied Engineering Center

Awards

Dr. William Elliott, associate professor of geology, was awarded both the 2014 Darrel Bigham Faculty Engagement Award from Historic Southern Indiana and the 2014 New Harmony Outreach and Engagement Award from Historic New Harmony. His project re-establishes displays in the Working Men’s Institute, in New Harmony, Indiana, showcasing in part the geological work of William Maclure (known as the “Father of American Geology”) and David Dale Owen (a prominent geologist in the early 19th century and son of New Harmony founder Robert Owen), and establishing a timeline of geological studies conducted from New Harmony. The exhibition highlights the importance of geoscience education and provides K-12 educators with opportunities to create hands-on activities for students. The displays will be completed this summer as part of New Harmony’s bicentennial celebration.

Carrie Wright, instructor in geology, won the Cutting Edge Award Exemplary Teaching Activity for her M&M Decay class project created to help students understand the concepts of geologic time to counter the misconceptions they have concerning dating material. Of the 3,000 projects submitted, only 10 to 20 percent of the entries were awarded “exemplary” status by the National Association of Geoscience Teachers’ Science Education Research Center, an online resource center for geoscience educators, K-16 and beyond.

“I’ve found that many students in my introductory classes express anxiety over math problems, even simple ones, and avoid it as often as possible,” she said. “This simple activity encourages students to do math, collect data, construct graphs, and then interpret their data/graphs to answer questions. And all the while, they get to eat M&Ms, which I have found makes crunching the numbers a little sweeter.”

Dr. Katherine Winsett, lecturer in biology, was awarded a $10,000 grant from Canvas by Instructure to develop software that makes it possible to “conduct robust data collection, analysis and collaboration to support active inquiry.” She wanted an application that facilitated research in classrooms on a large and frequent scale, something current models didn’t offer, and decided to apply for the grant to create something of value for the University. “This proposal was about developing a tool to expand opportunities for students to create new knowledge through organizing and analyzing information about the world around them. I believe that when we provide students with authentic research experiences and opportunities to think critically about information, they are better prepared to solve current and future problems.”

Dr. Kent Scheller
Associate Professor of Physics
2014 Distinguished Professor Award

Dr. Jeff Thomas
Professor of Education
2014 Sydney L. and Sadelle Berger Faculty Community Service Award
Nearly $1 million in funds to recruit STEM educators in Indiana

USI and the Pott College of Science, Engineering, and Education have been awarded $835,138 through the Indiana STEM Teacher Recruitment Fund grant program, part of Indiana’s Education Roundtable. The grant will fund USI’s proposed “Teaching Eagles Scholarship Program.”

The goal of the multiple-year Teaching Eagles program is to increase the number of content-rich, classroom-ready science and mathematics teacher candidates graduating from USI. The program will recruit science and mathematics teacher candidates from a large pool of students majoring in the science, technology, engineering and math (STEM) fields as well as elementary education majors interested in minororing in mathematics and science. A unique component of this program is the ability of students to gain valuable experience and contacts through the Southwest Indiana STEM Resource Center (SwiSTEM), housed within USI’s Pott College.

“We’re excited to receive this grant which will provide scholarship opportunities for outstanding USI students interested in teaching science and mathematics at the K-12 level,” said Dr. Scott Gordon, dean of USI’s Pott College of Science, Engineering, and Education. “USI has a rich history of producing strong STEM majors and outstanding classroom teachers, and this grant award will allow us to develop a cutting edge program to provide unique opportunities and support for these students.”

Specific goals of the Teaching Eagles Scholarship Program include:

- Providing appropriate pedagogical preparation for students majoring in STEM content areas such as engineering, biology, chemistry, environmental science, geology, mathematics or science and mathematics teaching.
- Providing appropriate STEM content preparation for students majoring in elementary education.
- Providing content specific supplemental support experiences for both elementary and secondary teacher education students.
- Providing co-curricular service learning opportunities.
- Providing a learning community for emerging STEM teachers.

To learn more about the Teaching Eagles Scholarship Program contact the Pott College of Science, Engineering, and Education at 812-464-1977 or pottcollege@usi.edu.

USI and Crane collaborate, elevating SeaPerch to state level

This year Southwest Indiana STEM Resource Center (SwiSTEM) teamed up with Naval Surface Warfare Center, Crane (NSWC Crane) in a move that transitioned USI’s SeaPerch underwater robotics competition from regional to state level.

SeaPerch trains educators to assist students—fourth through 12th graders—in building underwater remote operated vehicles (ROVs). Students follow a curriculum that teaches basic engineering and science concepts to construct the ROVs using kits provided by NSWC Crane. USI and NSWC Crane partner on programs to advance STEM (science, technology, engineering and mathematics) education. This is the fourth annual competition USI has hosted.

“SeaPerch takes students out of the classroom and gives them the opportunity to learn about science and engineering in a fun and interactive way,” said Allison Grabert, director of the SwiSTEM program in USI’s Pott College of Science, Engineering, and Education.

This year’s competition had a record number of participants, with 121 state-wide teams, consisting of more than 500 students.

Outstanding Future Educators Honored

Five USI students preparing for careers as teachers have been named Indiana Outstanding Future Educators by the Indiana Association of Colleges for Teacher Education. (From left to right) Krista Barton, elementary education; Jessica Eckert, English education; Travis LaMar, physical education; Samantha Tuley, early childhood education; Kristine Farmer, special education. All five students completed their undergraduate studies in May. They were chosen for the Outstanding Future Educator Award based on recommendations made by faculty in the USI Department of Teacher Education and University student teaching supervisors.
Mathematics makes sense of the business world

Most days Jill Scheirer ’08 juggles her time between financial reports, vendors, live chatting with customers, packaging orders and selecting frames to put on Ditto’s website—an online company that allows customers to virtually try on a variety of designer glasses to see if they fit their faces and personalities. “It’s chaos!” she says, but the math major managed the roller-coaster ride of working for a start-up by employing what she learned from math. “It’s not subjective. You show your work. It lines up. It’s beautiful.”

Scheirer’s love of mathematics began in middle school, when her algebra class went to Kentucky Kingdom in Louisville. There they learned to measure the speed and velocity of roller coasters, making math real. “Like life, math has certain rules, especially once you get into math logic. There’s a structure you follow that’s proof-based. Follow the structure and you find your answer every time,” she said.

Because she loved and understood math she planned on being a math teacher, but during her junior year at USI she had a realization and decided to explore another route. “I love higher levels of math, but I wouldn’t be able to teach at that level without a master’s degree or Ph.D. So I went over to the [Romain] College of Business and learned my major worked well with a minor in finance.”

During her senior year, Scheirer secured an internship at a major financial institution working with marketing models and risk level scores that senior management used to determine economic feasibility of the company. Her performance was outstanding and she was hired full-time after graduation. While at the company, she rode a wave of corporate transitions experienced during the economic downturn, successfully applying the critical thinking strategies and problem-solving strategies she learned at USI.

Scheirer wasn’t looking for a new job, but when a friend suggested she check out Ditto, the job description intrigued her. The idea of working for a young start-up sounded like a fun challenge, one that fit her energetic personality. Today, Scheirer wears many hats as part of a four-person team at Ditto’s Evansville operation dealing with frames, customer service, accounting and social media, while the headquarters in San Mateo, California, handles engineering, technology and overall management of the company.

When Ditto moved into the old Wool Factory building in downtown Evansville, Scheirer unpacked boxes, established relationships with vendors, figured out the new phone system and much more. “Working for a start-up is like getting an MBA,” she said. “I’ve seen all aspects of business. I’ve learned so much: from patent legislation to search engine optimization. With a start-up, everything is new and unpredictable every day, math is a creative way to establish order and begin processes.”

“Like life, math has certain rules, especially once you get into math logic. There’s a structure you follow that’s proof-based. Follow the structure and you find your answer every time.” Jill Scheirer
2014 Calendar of Events

June 1-5 GoSTEM Summer Camp
June 4 Demo for Evans Elementary 6th grade at 11 a.m. at USI
June 6 Hands-on chemistry activity and demo for cMoe summer camp, 10 a.m. – Noon at USI
June 9-13 USI Super Summer camp, Chemistry of Cooking, 9 a.m. – Noon each day (advertised on the web and in engage newsletter)
June 18 Mt. Vernon Library summer reading program, 2 p.m. demo (library contact Anne Cottrell at 812-838-3286)
June 23-27 Girl Scout Camp
July 7-11 EMC² (Engineering and Manufacturing Creativity Camp)