Sophisticated scientific equipment for checkout

STEM trucks bring resources to schools’ doorsteps

Two trucks loaded with state-of-the-art scientific equipment that will allow students from elementary through high school to learn science by doing science will be traveling to schools in a nine-county area in the fall.

Funding for the trucks and equipment comes from the WIRED (Workforce Innovation in Regional Economic Development) initiative, the Indiana STEM Resource Network, the USI STEM Resource Endowment, and the Pott College of Science and Engineering. Approximately $300,000 worth of equipment will be available for use in the classroom. STEM is an acronym for science, technology, engineering, and mathematics.

Aboard the trucks will be equipment that students and teachers otherwise might not have available, including Spec 20 instruments that measure the intensity of light as it passes through a substance. These instruments have application in aerospace, pharmaceutical, paint, and other industries. Gas chromatographs will allow students to identify individual substances in a test sample. Real-world applications include drug detection, fire investigation, or environmental analysis. Equipment such as gel electrophoresis apparatuses used for the separation of DNA and RNA, calculators, a variety of probes, microscopes, and laptop computers also will provide opportunities for students in southwest Indiana to use the tools scientists use.

Dr. Scott Gordon, dean of the Pott College, said, “The K-16 STEM experience is a key step toward developing a workforce of the future and the innovation necessary to be competitive as a region, state, and nation.”

First 18 students selected to participate in Early Undergraduate Research Program

Jessica Lingafelter is interested in the outdoors and the aquatic aspects of the outdoors. Her placement with faculty mentor Dr. Brent Summers for an eight-week research program on campus this summer puts her in a position to discover more about her interests and develop the skills of a research scientist.

Lingafelter is one of 18 freshmen majoring in STEM fields who have been selected to pursue research with faculty mentors during the first phase of the new Early Undergraduate Research Program.

“I thought that if I was accepted, the professors would help me along the way and show me how to bring out my more creative and imaginative side,” Lingafelter said.

Funded by a portion of a $1.2 million grant from the National Science Foundation, the Early Undergraduate Research Program is designed to engage students majoring in science, technology, engineering, and mathematics in hands-on research. The goal is to produce highly qualified innovative students who graduate with the ability to solve complex problems in the workplace.
Letter from the Dean

Welcome to the spring 2009 edition of The Periodic Review. Our college has a lot to be excited about. As I reflect on this year, I can’t help but emphasize that our college’s successes are the result of the dedicated faculty and staff. With continuing growth in the Pott College (10 percent increase in freshman majors over last year), receipt of several major grants, establishment of the Southwest Indiana STEM Resource Center (SwISTEM), and the continued success of our students and faculty, we are well poised for the future.

We have been conducting searches for new faculty and staff to keep up with increased enrollment. This summer construction of the $30 million Business and Engineering Center will continue, and phase two of a major renovation to the “old” Science Center will occur. In addition, we have many workshops planned for regional STEM educators. Enrollment for these is high. We also will begin our Early Undergraduate Research Program with 18 students and 12 faculty. Next summer we will have 36 students and more faculty involved.

I hope you find this edition of The Periodic Review both enjoyable and informative.

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

from the resource center will deliver the equipment and, upon delivery, are available to train the teacher in using it. Allison Grabert, STEM science coordinator, said she also will be available to help teachers during lab sessions.

STEM Resource Endowment

A STEM Resource Endowment has been established in the USI Foundation to provide perpetual support for measurably improving K-16 student achievement in the STEM disciplines. In addition to the traveling laboratories, the endowment will help fund professional development initiatives, a summer STEM academy for high school students, programs to help under-prepared students succeed in STEM fields, and the Early Undergraduate Research Program.

Major gifts to date include $50,000 from Berry Plastics of Evansville and $25,000 from SABIC Innovative Plastics of Mount Vernon, Indiana. Because this venture is so important to USI, the University is matching gifts — dollar for dollar — to encourage support. With the match, Berry Plastics will be recognized for a $100,00 gift and SABIC for a $50,000 gift. Special recognition will be given to those who give $1,000 or more.

For additional information about the STEM Resource Endowment, contact Kira N. Vaal ’03 in the USI Foundation office at 812/464-1925 or knvaal@usi.edu.

USI is the lead institution for southwestern Indiana in the statewide consortium to improve STEM education.

“Research” continued from page 1

Summers’ research focuses on aquatic ecology, invertebrate zoology, and physiological ecology. Lingafelter said she applied to work with Summers not only because of the nature of his research, but also because she knows him as professor, freshman advisor, and director of the Baccalaureate/Doctor of Medicine program. She is the recipient of a B/MD award.

The following students and faculty advisors will work together in ongoing research projects.

- Phillip Behrens, biology (M.D./Ph.D), Newburgh, Indiana; Jessica Lingafelter, biology (pre-medicine), Wadesville, Indiana; and Alexandra McDaniel, biology (pre-medicine), Evansville - Dr. Brent Summers
- Carrie Wright
- Rebecca Reynolds, biology, Carmel, Indiana; and Daniel Shigley, biology (pre-medicine), Elberfeld, Indiana - Dr. Edie Hardcastle
- Eva Beabout, chemistry (pre-pharmacy), Seymour, Indiana; and Ezekial Setne, a student at Ivy Tech Community College, Southwest, Evansville - Dr. Edmir Wade
- Cody McGill, engineering, Boonville, Indiana - Dr. Glen Kissel
- Christopher Baumgart, biology (pre-medicine), Evansville; and Evan Niemeier, biology (pre-medicine), Evansville - Dr. Henri Maurice
- Andy Frazee, chemistry (pre-medicine), Evansville - Dr. Jeannie Collins
- Ryan Hicks, mathematics, Evansville - Dr. John Donnelly
- Brad Roberts, chemistry (pre-medicine), Mount Vernon, Indiana - Dr. Kenneth E. Walsh
- Brandon Spanhour, engineering, Evansville, and Joseph Vangampler, engineering, Evansville - Dr. Marco Lara Gracia
- Prince Nzeata, biology (pre-medicine), Merrillville, Indiana - Dr. Priya Hewavitharanage
- Logan Storrer, engineering, Evansville - Dr. Ronald W. Diersing

The students and faculty will pursue research this summer, continue their relationship during the academic year, and participate in another eight-week summer program in 2010. Students will receive a $3,000 stipend for each summer in addition to room and board in USI campus housing. Faculty research leaders also will receive a summer stipend.

The program includes guest speakers and field trips to area STEM industries.

Eighteen additional students will be chosen next spring to begin the two-year program in summer 2010.
In the hands of Dr. Marlene V. Shaw, the classroom is a rich venue — a place where courses intersect and each new technique or advance in information offers opportunity to help students see and understand the connections.

A professor of biology, Shaw has been a member of the faculty since 1973. She will retire June 30 from a career that is notable for teaching as well as service to the University and the profession.

“The courses that I taught were exciting to me — always on the leading edge of genetics, molecular and cell biology, and metabolism — and frequently based on the work of Nobel Prize winners,” she said. “It was a continual race to remain current.

“The University enabled me to remain updated by supporting my participation in top-notch short courses, workshops, and annual meetings where I learned the newest information to incorporate into my lecture courses and teaching laboratories. The students directly and immediately benefited. It was a pleasure to do this for three plus decades with talented and gifted students who were excited about learning and reaching their personal and professional goals.”

Shaw was a visiting scholar at Vanderbilt University during 1983-84 and again for three summers in the ’90s. From these experiences and others, she brought new techniques to her teaching labs and developed research that engaged students working under her mentorship.

In 1991, she attended a National Science Foundation Faculty Enhancement Program at Boston University. The following year she received an NSF grant for more than $33,000, which was matched by University funds. The grant funded the purchase of biotechnology laboratory equipment that provided new opportunities for students.

Shaw developed a lecture series called Biology at the Interface that brought top scholars to campus. In 1982, she worked with students to develop a 15-part exhibit called “DNA: The Blueprint of Life” for the Evansville Museum of Arts, History, and Science.

Over the years she has served on many University committees. She is completing the second of two consecutive terms on the Faculty Senate.

In 1991, she was named USI Distinguished Professor.

Shaw is a member of the Information and Education committee of the American Society of Human Genetics.

In retirement her quest to expand her knowledge will continue. She remains interested in advances in genetics and microbiology and is particularly interested in American and European history as it provides context for understanding the development of biology in the 1800s and 1900s. She plans to tour sites where scientists of that era worked.

“It will be great fun,” she said.

Retirement plans also include extended visits with family, friends, and a host of alumni.

“I look forward to spending time with book and camera in hand in beautiful and peaceful environs such as the red rock formations in the national parks of the American West and in colorful gardens such as Monet’s Giverny,” she said.

**SPIRAL program improves teaching of hands-on science**

Dr. Henri Maurice and Dr. Jeff Seyler of the Pott College faculty will join with the Evansville-Vanderburgh School Corporation and USI partners again this summer to help teachers of grades 1-8 strengthen their expertise in providing inquiry-based science instruction through the SPIRAL program.

SPIRAL is an acronym for Science Performance Improving through Reading and Learning. Maurice and Seyler will provide content support in science areas. In addition to exploring content enrichment and inquiry-centered instruction, participating teachers will learn how to incorporate reading and writing into science instruction.

Maurice said science gets trimmed down significantly from the curriculum because of the need to develop reading skills. SPIRAL helps teachers work on reading skills by using science-related readings.

Twenty-four teachers from EVSC will observe lessons taught by 14 model teachers during morning sessions of Super Summer, a children’s program offered by USI Extended Services. In the afternoons, teachers will meet with Maurice, Seyler, and faculty from the USI Department of Teacher Education to review morning activities and prepare science units the observing teachers will teach during the second week of the program. SPIRAL uses modules from the Full-Option Science System (FOSS), a research-based science curriculum. Super Summer will be held June 8-12 at Cynthia Heights Elementary School and July 6-10 at Fairlawn Elementary School.

EVSC received a grant from the Indiana Department of Education to support SPIRAL in summer 2008 and 2009. Deborah Vannatter, EVSC science coach, is project director. For more information visit www.usi.edu/extserv/personal/supersummer.

**Pott College establishes Student Advisory Board**

A Student Advisory Board has been established to assess and address student needs, provide an outlet for student ideas, and promote involvement in college activities.

Stephanie Wilson, a senior chemistry major, chairs the board. She said, “This group allows select student representatives to bring forth ideas about how to improve the entire educational experience of Pott College students — both in and out of the classroom.”

Other members include Lauren Raikes and David Fickas, biology; Ken Schnautz, David Clayton, and Sarah Storvick, engineering; Ellis Weston, Dustin Stolz, and Christopher Newton, geology; Olivia Bearman, Casey Cambron, and Tara Van Deman, mathematics; and Michael Oestrich and Maggie Schnorbus, chemistry.
Math and business skills can add up to career as actuary

Actuarial track prepares students for highly rated job

Junior Kristen Holzmeyer is well on her way to a degree in mathematics, but she also pops up on the roster in a number of business classes.

Holzmeyer is pursuing a specialized curriculum that combines the study of mathematics with key business courses to prepare for a career as an actuary.

The Department of Mathematics offers the actuarial track coupled with a degree in mathematics.

“Actuaries help a company figure out the risk factors and price its services,” Holzmeyer said. She has had a lot of opportunities to explain the actuarial role. When she says she is a math major, most people assume she is going to teach.

Holzmeyer grew to like the subject of math at Memorial High School in Evansville. She learned about the actuarial profession while studying career materials for people interested in math.

“I saw that it was one of the best-rated jobs. Right now they’re saying that actuaries will have positions even though the economy is in a bad situation,” she said.

In 2002, the Jobs Rated Almanac ranked the job of actuary as the second-best job in the country. Only the career of biologist topped it. The Occupational Outlook Handbook 2008-09 Edition, published by the Bureau of Labor Statistics, says that employment of actuaries is expected to increase by about 24 percent over the 2006-16 period, which is much faster than the average for all other occupations.”

Holzmeyer enjoys the combination of business and math courses. The actuarial track includes courses in economics, finance, and computer science.

“It gives you a break from math. You get a little variety. And you’ll know what the accountants and other financial people are talking about,” Holzmeyer said. “You’d be lost if you didn’t have that.”

So far, one of her favorite courses in the math curriculum was MATH 475 Regression and Time Series. She was one of only three students in the section.

In the business curriculum, she especially liked economics. “It pretty much helps you understand what’s going on right now with the economy,” she said on a recent day when the Dow sank again.

Holzmeyer plans to complete a minor in finance.

Actuaries achieve professional status by passing a set of examinations sponsored by professional associations. Holzmeyer will be prepared to take the first two exams this spring.

Holzmeyer is from Chandler, Indiana. She works part-time as a math tutor.

Dr. Yalcin Sarol, assistant professor of mathematics, coordinates the actuarial track for the Department of Mathematics and advises all students in the program.

Seyler sabbatical in Hawaii focuses on hydrogen generation

Dr. Jeffrey W. Seyler, professor of chemistry and chair of the Department of Chemistry, worked with Dr. Craig Jensen at the University of Hawaii - Manoa last fall during a sabbatical leave.

The research involved the synthesis and study of organoiridium dehydrogenation catalysts focusing on the generation of hydrogen gas from various indole derivatives. This concept may have applications in onboard hydrogen storage systems for fuel-cell-powered vehicles.

Fuel cell vehicles can be fueled in two ways — with pure hydrogen gas stored onboard or with hydrogen-rich fuels (such as methanol) which must first be converted into hydrogen gas by an onboard device called a “reformer.” Seyler’s work with Jensen is focused on the latter method.

“The onboard storage of pressurized hydrogen is considered more of a hazard, so efforts are being made to find onboard hydrogen generation,” Seyler said.

Seyler is using the sabbatical experience to further catalytic and substrate development with other faculty and undergraduate students at USI. Students Joey O’Brien, Adam Chenoweth, A. J. Evans, and Kami Schneider are participating in the research with him.

Dr. Kenneth E. Walsh, assistant professor of chemistry, and undergraduate research student Kristen Jones will collaborate on the project to synthesize indole derivatives to serve as the hydrogen source.

Dr. Evan L. Millam, assistant professor of chemistry, will assist with computational analysis of both substrates and catalyst complexes to provide further understanding of the thermodynamics and catalytic mechanism. A student will begin working with Millam in the fall.

Seyler became interested in this research several years ago and met Jensen in 2005 when he was in Hawaii for the International Chemical Congress of Pacific Basin Societies (Pacifichem).

Doss to lead geology course at Yellowstone

USI students will study the Yellowstone “geosystem,” continental hotspot volcanism, and the geology of the Yellowstone Plateau when they travel to Yellowstone National Park this summer for a course taught by Dr. Paul K. Doss, associate professor of geology.

Doss was supervisory geologist for Yellowstone in 2000-01, during which time he helped develop the park’s volcano observatory. The geological field experience will take place June 16-27.
Summer 2009
Southwest Indiana STEM workshops: for elementary, middle, and high school teachers

TI-Nspire Workshop  June 8–12
This workshop uses TI-Nspire and TI-Nspire CAS technology by Texas Instruments to enhance the teaching and learning of mathematics in high school classrooms. Each participating teacher from Indiana will receive a TI-Nspire calculator. Location–USI
High school level

Earth Science Methods  July 6–9
This workshop focuses on new, easy, and interesting ways to teach some of the most basic and important concepts of earth science. Location–USI
Middle school and high school levels

Engineering Problem Solving Using Legos  July 15–17
This workshop concentrates on methods to help students define and solve engineering problems using the LEGO Mindstorms NXT kit. Each participating teacher from Indiana will receive one LEGO Mindstorms kit worth $500 for classroom use (one kit per school). Location–USI
Middle school and high school levels

STEM Truck Training Workshops

Physical Science  July 20–21

Chemistry  July 22–23

Life Science  July 27–28
High school level

Middle School Science  July 29–30
Middle school level

Choose the STEM Truck Training Workshop appropriate to your teaching field (high school), or choose the middle school workshop. Participants will learn how to use the STEM Truck as a classroom resource and incorporate equipment from the truck into inquiry-based activities and laboratory exercises. Location–USI

Fostering Algebraic Thinking  June 11–12, 15–16
This workshop uses a professional development toolkit created by the Education Development Center. It has four modules: analyzing student work, listening to students, documenting patterns of student thinking, and asking questions of students. Location–Vincennes University
Elementary, middle school, and high school levels (grades 3-10)

Middle-Level Mathematics Activity  June 1–5
This workshop focuses on making the math classroom more interesting — even fun — while maintaining the educational integrity of the material. Participants will explore the use of activities and manipulatives such as strip calculators (TI-73 and/or TI-84), Geoboards, fractions and decimal activities, algebra tiles/blocks, Internet resources, and activities for review. Location–USI
Middle school level

Department of Defense Physics and Engineering at Naval Surface Warfare Center – Crane Division  June 23–24
This two-day workshop will explore the science and technology used by our troops in combat from the facilities at Naval Surface Warfare Center – Crane Division. High School teachers from Southern Indiana will perform hands-on study of four separate exercises demonstrating the physical principals behind tactical techniques. The focus will be on the application of Crane technology, equipment, and personnel to four of the main components to the Indiana Department of Education’s Physics 1 Standard, the Principles of Physics. Accommodations will be available for an overnight stay as some demonstrations may take place late into the evening, as well as an evening networking experience for teachers with Crane personnel. Teachers who complete this workshop will have the opportunity to bring their classes to Crane during the school year, and this workshop will include discussion and planning time for those return visits.
High school level

Structures of Life FOSS Workshop  July 13–17
This workshop focuses on active learning and developmentally appropriate concepts and materials for teaching life science using the inquiry-based FOSS (Full Option Science System) science curriculum. Each participant’s school (one kit per school) will receive a FOSS Structures of Life Materials Kit worth $500 for classroom use. For more information, see www.fossweb.com. Location–USI
Elementary school level (grades 3 – 4)

Relearning to Teach Arithmetic  June 5, June 8–10
This workshop uses a professional development package developed by Technical Education Research Centers. It helps elementary teachers think critically about how students develop an understanding of whole number operations. Location–Vincennes University
Elementary school level

Enroll early. Workshop sizes are limited.
Workshops include cash stipends and/or classroom resources and equipment for participating teachers. For details and online registration, visit www.usi.edu/STEM.
Weber, Rono in USI Athletic Hall of Fame

Eileen Weber ’98, chemistry, and Elly Rono ’98, mathematics, are members of the 2009 class of the USI Athletic Hall of Fame. A Presidential Scholar, Weber played women’s basketball from 1994-98. Rono was the first USI cross country and track athlete to win national championships. Members selected for this year’s USI Athletic Hall of Fame were inducted in February during Homecoming Week.

Actuary Brian Pauley

Brian Pauley ’00, mathematics and chemistry, recently presented the college’s Alumni-in-Residence program titled “The Professional Actuary: Turning Risks Into Careers for Math Students.” Pauley is an associate actuary with Humana Inc. in Louisville, Kentucky. He is responsible for the pricing and financial analysis of Medicare Advantage Plans for 21 markets in the southeastern region of the United States.

Pauley is an associate of the Society of Actuaries and a member of the American Academy of Actuaries. He earned a master’s degree in mathematics in 2003 from the University of Louisville.

He serves as president of the Greater Louisville Chapter of the USI Alumni Association.

Around the college

Math students dined on chili and hot dogs at the first of a series of informal events to bring them together.

Math students get to know their Major as Home

The Department of Mathematics sponsored a series of three get-togethers this semester for faculty and students with funding from a Major as Home grant. The events offered opportunities to learn mathematics beyond the classroom with friendly math competitions and activities as well as food.

Dr. Kathy V. Rodgers, chair of the Department of Mathematics, said, “By interacting informally with students, we hope to encourage attendance at office hours and promote a deeper level of engagement in math courses.”

Sponsored by the USI Office of Academic Affairs, the Major as Home grant is designed to build community.

Big Creek fish survey completed

Biology majors April Hensley and Ashley Warren and geology major Adam Powell worked with Dr. James H. Bandoli, professor of biology, on a survey of the fishes of Big Creek in Posey County, Indiana.

The survey was part of a larger assessment of the Big Creek drainage, which has been impacted by agricultural and petroleum activities. The Big Creek Watershed Project, a consortium of soil and water conservation districts, is gathering baseline data to use in future grant proposals aimed at remediation.

Bandoli said 32 sites on Big Creek were sampled and 40 species of fish belonging to 11 families were identified. More than 4,400 fishes were captured using seines with most identified in the field and released. The study was funded by a USI Faculty Research and Creative Works Award.

Science Fair biggest ever with 500 projects

The Pott Foundation Tri-State Science and Engineering Fair was the biggest yet with approximately 500 projects on exhibit. Senior division winners Tommy Dauer and Tony Huang will compete May 10-15 in the Intel International Science and Engineering Fair in Reno, Nevada.
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Raul Ramirez is Homecoming royalty

Raul Ramirez, a junior with plans to attend medical school, was the 2009 Homecoming king.

Ramirez is majoring in Spanish and biology. He holds the Lewis and Anne Harpole Presidential Scholarship and is the first Hispanic to be selected as Homecoming king. Ramirez has been involved with Student Government Association, Student Ambassadors, the Honors Program, Pre-Professional Health Club, and Model United Nations.

Along with his involvement in his organizations, he also enjoys volunteering with Habitat for Humanity, ECHO Community Health Center, and the Tri-State Science and Engineering Fair. He served as the student representative on the Presidential Search committee to select USI’s third president. He is from Oakland City, Indiana.

Ramirez was crowned in February during Homecoming festivities. Claire Robison, a nursing major, was Homecoming queen. The king and queen are chosen by student vote, scores from interviews by USI administrators, and individual academic records.

Jamie Johnson to receive President’s Medal

Jamie Johnson, the student trustee on the USI Board of Trustees, will receive the President’s Medal, the highest honor given to a graduating senior for academic work and service to the University. The award will be presented May 10 at Commencement.

Johnson has excelled in the classroom, maintaining a 4.0 grade point average while majoring in chemistry. In 2008, she was one of 321 college students nationwide to be named a Goldwater Scholar. The Goldwater Scholarship program encourages outstanding students to pursue careers in mathematics, science, and engineering. She also has received a majority of the merit-based awards available to chemistry majors at USI.

In addition to her work as a trustee, Johnson served on the Presidential Search Committee, which recommended candidates for the presidency of USI. She is active in student organizations, serving as associate vice president of Academic Affairs for the Student Government Association. She is co-founder and president of the Pre-Health Professions Club. She will continue her academic work at Indiana University School of Medicine in the fall. Johnson is from Newburgh, Indiana.

Trustees approve faculty promotions

The USI Board of Trustees has approved promotions for faculty members in the Pott College.

Dr. Paul K. Doss, geology, will be promoted from associate professor to professor.

Dr. Cindy Deloney-Marino, biology; Dr. Adrian Gentle, mathematics, Dr. Edith Hardcastle, biology; Dr. Anton Maria, geology; and Dr. Richard Ruhala, engineering, were approved for tenure and promotion to associate professor.

The changes are effective August 24.
Engineering major Alex Schnautz is one of 11 college students from throughout the country chosen as interns this semester for the Undergraduate Student Research Project at Marshall Space Flight Center. The facility in Huntsville, Alabama, is operated by the National Aeronautics and Space Administration.

Schnautz works in Environmental Control and Life Support Systems, a department that focuses on the technologies astronauts need to live a healthy and normal life in the International Space Station (ISS). His assignment relates to improving the Water Recovery System that turns wastewater (including urine, perspiration, and water from shaving and brushing teeth) into potable water.

“My part of this project is to do some experiments with photocatalytic reactors to see which commercial model is the most efficient,” he said. “I am using a gas chromatograph to see what compounds exist in the water and tell how much is there. The tests are run in modules that are the same as sections of the ISS — big cylindrical rooms.

“I’m learning a lot because this is heavily focused on chemistry. I’ve taken only one chemistry course, but as an engineer, you have to be ready for anything that gets thrown your way and be ready to do a lot of research about what you don’t know.”

The 15-week internship includes a $9,000 stipend.