INSIGHTS

UTAH STATE UNIVERSITY - COLLEGE OF SCIENCE

When students and faculty learn together... discovery follows.

WINTER 2006

Virtual Math Tutor

USU Researchers Ready to Market eMATH@USU

UtahState UNIVERSITY

Biology | Chemistry and Biochemistry | Computer Science | Geology | Mathematics and Statistics | Physics

FROM THE

DEAN'S OFFICE

Dean Don Fiesinger

It is now mid November and our December graduation is only a few more weeks away. A month or so prior to graduation, I invite a cross section of about 15 graduating students to visit with me to discuss their experiences here at Utah State University. These exit interviews are brief, lasting only about 15 minutes, but I have found this to be more than enough time to get invaluable feedback from our students. I ask questions about accessibility of faculty and advising, strengths and weaknesses of their programs of study, and the hypothetical "magic wand" query: "If you could wave a magic wand over the USU campus, what would you like to see changed?" [Note: I immediately tell students that "parking doesn't count."] I also ask about their activities outside of the classroom and their plans for the future. As you might imagine, the responses are variable as each of our students has found their own particular pathway through this maze we call "higher education." Some have finished in three years, others in five or six; some will be seeking employment or already have leads on jobs, others are going to graduate or professional school. But what I find most satisfying is that the vast majority have had a very favorable experience here at Utah State. For those who are less satisfied, I try to determine the source of that dissatisfaction so that it can be addressed as quickly as possible. On concluding my interview, I introduce our prospective graduates to *Insights,* explaining that it is our vehicle of communication with all of our Science alumni. I hope that in future issues, we will see career highlights from these outstanding soon-to-be Aggie graduates.

This is also the time of year when the College of Science undertakes its annual Phonathon solicitation. I had the opportunity to visit the call center a couple of times in early November to observe the student callers and, when possible, chat with former students of mine and with other alumni that I have gotten to know while in the Dean's Office. Similar to the exit interviews described above, the responses are very positive: our alumni value the time spent here at Utah State where they acquired the skills that have allowed them to succeed in our rapidly changing world.

Current and former students have come to Utah State University expecting that we will do our best to provide them with an outstanding learning experience and I believe we are meeting that expectation here in the College of Science. Within this current issue of Insights, we are pleased to introduce our newest faculty who will be carrying this legacy of excellence forward, and to acknowledge the recent accomplishments of many of our students and faculty. I hope that you enjoy reading about the successes of our students, faculty, and alumni in the College of Science. Please contact me if you have any suggestions for future issues.

Sincerely,

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On the Cover: A library of virtual math manipulatives created by USU researchers provides a colorful array of interactive exercises for K-12 mathematics instruction. The Web-based library is benefiting students throughout the world.

Cover design by Megan Hemmert. Cover photo by Mary-Ann Muffoletto.

VIRTUAL MATH TUTOR
USU Researchers Ready to Market eMATH@USU

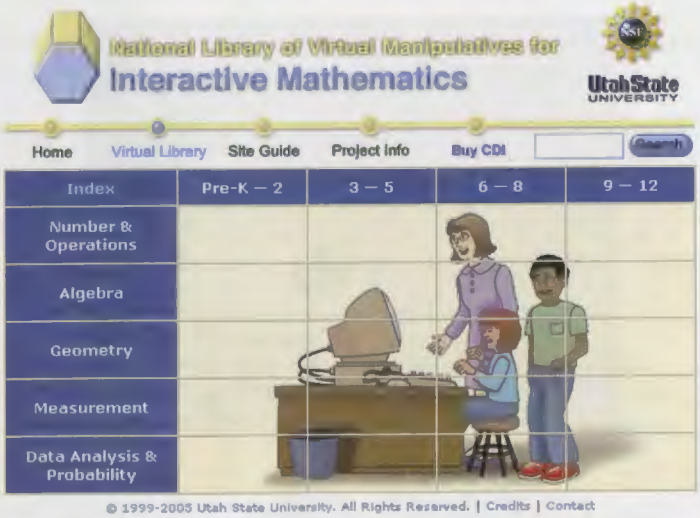
If you've ever rummaged frantically through the kitchen for dried beans or bottle caps prior to the imminent arrival of the school bus, then you're more than familiar with math manipulatives. But if you haven't set foot in an elementary classroom since F Troop was a hit TV show and your memories of primary arithmetic are fogged with vague recollections of multiplication tables and flash card drills, the term may make you feel a bit like Rip Van Winkle.

"A manipulative is simply a concrete object that represents an abstract idea," says **Robert Heal**, Utah State University professor of mathematics.

Manipulatives, ranging from sleek store-bought designs to cast-offs from kitchen junk drawers, are instructional fixtures in many of today's elementary and secondary classrooms. They gained popularity in the 1980s when standards promoting their benefits were published by the National Council of Teachers of Mathematics (NCTM).

Heal and USU colleagues **Professor James Dorward** (Elementary Education), **Senior Research Associate Joel Duffin** (Instructional Technology), and **Professor Lawrence Cannon** (Mathematics) created an interactive, Web-based library of virtual manipulatives after receiving a three-year, $1.2 million National Research Foundation grant in 1999. Named the National Library of Virtual Manipulatives (NLVM), the collection is composed primarily of Java applets, featuring an array of colorful exercises for K-12 mathematics instruction.

Some students easily grasp abstract concepts, but the majority benefit from models that help them visualize an idea, says Doward. "A substantial body of research suggests that they increase student understanding and achievement."



The Web-based National Library of Virtual Manipulatives, at www.nlvm.usu.edu, is used by students throughout the world.

From left, USU researchers Lawrence Cannon, Robert Heal, Joel Duffin, and James Dorward created the National Library of Virtual Manipulatives.

Pennies, paper clips and homemade wood, nail and rubber band geoboards are tried-and-true learning tools, but they have their limits, says Heal. "With the virtual library, students, teachers, and parents have hundreds of concept tutorials at their fingertips," he says. "With the click of a mouse, you can rotate figures, change colors, and create three-dimensional objects." Plus, adds Dorward, you can't shoot a virtual rubber band at your neighbor.

"The virtual exercises are much more interactive than static objects and give teachers a lot of instructional flexibility," says Heal.

Teachers, students, and parents enthusiastically agree. Available on-line and free of charge since 2001, the library has attracted attention throughout the United States and the world. During the school year, the library's Web site, www.nlvm.usu.edu, receives an impressive four million hits a day.

The Web site has garnered such awards as the prestigious *New York Times* ***Educational Site of the Year***. In a recent article in *The New York Times*, reporter Alina Tugend cites a review of math instructional Web sites conducted by a researcher at the Teachers College of Columbia University. The reviewer states that "of the numerous sites that help teach math, the best one …is the National Library of Virtual Manipulatives of Utah State University."

"(NLVM is) extremely effective, particularly in helping students in all grades understand fractions," the reviewer wrote. "It was developed by math teachers for math students."

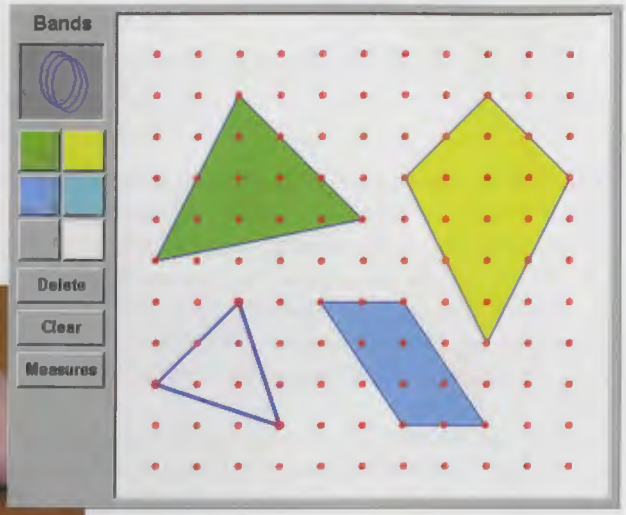
The NVML site is also a finalist for the *Pirelli Award*, the world's first Internet multimedia award, and it has been named one of the *101 Best Web Sites for Secondary Teachers* in a book published by the International Society for Technology in Education. Additional awards include several *Site of the Week* awards from the *Math Forum* and the *Eisenhower National Clearinghouse*.

Since creating the Web-based library, the researchers developed a compact-disk version that allows purchasers to load the entire library onto their own computer systems. It also allows users to

save their work; an important feature for teachers who integrate the manipulatives into their lesson plans.

Well-established education publishers Wiley and Sons, also caught wind of the USU library and incorporated a NVML CD into their existing book, *Mathematics for Elementary Teachers*. "The book went from 'who wants it' to their number one seller," says Heal.

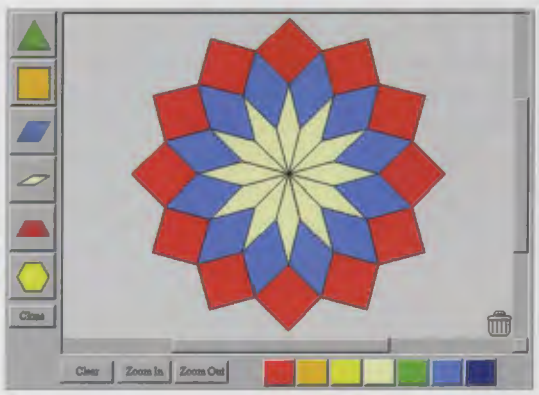
This spring, the State of Maine will place a copy of the NVML CD in the hands of every eighth grader. Beyond US borders, the government-funded Learning Federation of Australia and New Zealand has adopted the library for those countries' public education systems and Denmark has signed on as well, funding the development of a Danish language version of the CD for Danish public schools.



Conventional manipulatives like the geoboard (left) don't allow the versatility of their virtual counterparts (above), says Heal.

USU alumnus **Alejandro Garcia**, who completed a master's degree in computer science from USU last spring, supervised the translation of the library into Spanish, which is now available on the Web site. A French version is nearing completion, plans are under way to create Chinese versions (one for Taiwan and one for the People's Republic of China), and requests have been made for Arabic and Hebrew translations. Corporate giant Apple Computer has also expressed interest in the virtual library.

Impressive results, Heal concedes, from a single Web site that's never been promoted through formal marketing. "We've never advertised the library—it's simply spread by word of mouth," he says. "It's all just taken off."



This could be just the beginning. The Utah Governor's Office of Economic Development Board recently awarded the USU team funding for business counseling as a precursor to the team filing its proposal for the State of Utah's Centers of Excellence (COE) technology commercialization program.

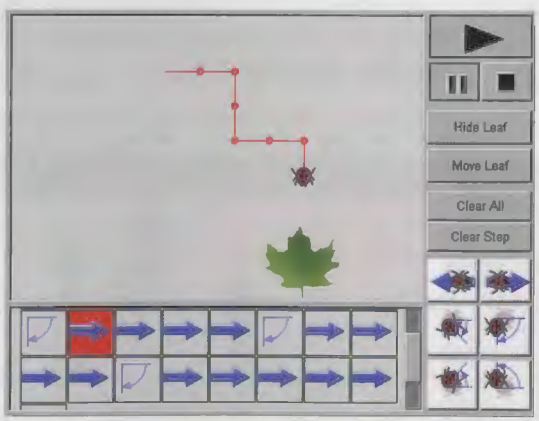
"Two outstanding Utah business leaders will assist our team in developing a business plan, completing our bid to become a Utah Center of Excellence, and launching our product to market," says Heal.

The COE program's track record in helping research ideas evolve into marketable ventures is impressive. Among the program's most successful alumni is USU's Space Dynamics Laboratory.

"One of the things our business counselors will help us develop is a name for our product—'eMATH@USU' is a current contender," says Heal.

Whatever it's called and in whatever language it's offered, the library could play an important role in providing future generations with a solid foundation for advanced study and research in technology-based disciplines.

Heal says the library represents the collective efforts of a number of USU graduate and undergraduate students, as well as the research team. "What this project has shown me is the great things you can accomplish when you combine the varied efforts and expertise of talented people," he says. ■



CAMPBELL SCIENTIFIC, INC. SUPPORTS COLLEGE OF SCIENCE

FATHER AND SON REFLECT ON THEIR RESPECTIVE USU EXPERIENCES

Looking back on his years at Utah State University in the mid-1970s, **Paul Campbell** remembers "those punch cards."

The president and CEO of Campbell Scientific, Inc. worked on campus as a computer programmer, while pursuing studies in chemistry, mathematics, computer science, and business.

"My college years at USU—all two of them—were filled with great friendships, studies, and my job," says Campbell, whose company, which was founded in Logan by his brothers, is an international leader in scientific measurement and data acquisition.

He chose to leave USU before graduating. Campbell Scientific was just getting up and running, Campbell was newly married and college life just didn't fit into the equation.

"I don't regret the decision, but I wish I'd had more time so that I could have enjoyed my USU experience for another year or two," he says. "The classes I took have been very useful to me."

Though his academic career was brief, Campbell and his company are longtime supporters of Utah State. Among a number of gifts to the university, Campbell Scientific provides the Campbell Scientific Science Scholarship in the College of Science, which awards an annual scholarship to a junior or senior majoring in science.

Paul Campbell, president and CEO of Campbell Scientific, Inc., along with many of his family members, has pursued study at Utah State.

Several of Campbell's children are USU alumni, including his son, **John Campbell,** who attended Utah State from 1998-2005.

John, general manager of Black Pine Farm in southeastern Idaho, admits that academia was a struggle, as well as a reward. "I don't think I have the same knack for a classroom education that some of my brothers and sisters have," he says. "For this reason, I feel that my experience in the Department of Geology was extraordinary."

More comfortable outdoors than in the lab or classroom, John says the geology field trips taught him key principles in moments rather than "the hours it would have taken in a classroom or from a book."

"I especially appreciated the hands-on experience I found in **Dr. (Donald) Fiesinger's** mineralogy class," says John. "All in all, my experience in science and geology at USU was one of science in action." John says he hopes to pass the same love of science to the next generation that was instilled in him from his grandfather, father, and his experiences at Utah State.

Both father and son support USU's mission. "We're all part of the same community," says Paul. "Utah State University is an important customer of Campbell Scientific instruments for research, but it also produces, as graduates, many of our valued employees." ■

BALANCING BUGS

USU entomologist **Diane Alston** says biorational approaches to integrated pest management are viable alternatives to harmful pesticides. Such approaches use a combination of insect growth regulation, conservation of biological agents and application of microbial insecticides, as well as insect attractants and repellents, to affect insects' communication systems.

HARD-ROCK MINING

GIFT CELEBRATES UTAH'S MINING HISTORY, SPRINGER LEGACY AT UTAH STATE

Hard-rock mining and Utah State University are both so ingrained in the history of **Jerry R. Springer's** family that he realized celebrating the two together was his only clear and logical choice. Now the Department of Geology in the College of Science at USU is thrilled to agree.

Springer ('61'65MS), of Midway, Utah, donated $10,000 recently to establish the ***Beryl Ott and Tura Holm Springer Memorial Scholarship Endowment*** in the Department of Geology, honoring his hard-working parents who sacrificed so much to instill the value of education in their children.

"Neither of my parents finished high school," Springer said. "But they worked hard all their lives to make sure we kids had every opportunity they didn't."

Beryl Springer's long career in mining began at an early age, eventually spanning 40 years. The Springer endowment is established to honor the family's strong heritage in the industry, as well as its legacy at Utah State University, which now includes five generations of students—including Springer's own grandfather—**Jeremiah R. Springer,** who attended the "Agricultural College of Utah" in 1904-05 after receiving a written invitation to play football. Springer's younger brother, **Rick** '69, and four of Springer's own six children have attended Utah State, and his aunt, **Floris S. Olsen Henderson** '52MS, was named the Robins Award "Professor of the Year" in 1981.

The family has donated mining artifacts, documents, and related photographs to several organizations—including the Park City Historical Society and Museum. By adding the gift to USU, Springer is hopeful the industry will continue to be remembered as an important chapter in Utah's economic history.

"Hopefully, the scholarship will be of significant help to a deserving USU student pursuing a career in environmental geology, petroleum exploration, hydrogeology, or some related course of study," Springer said. "Knowing the family was able to assist a young man or woman to successfully obtain a meaningful education, thus bettering their life—perhaps even mankind in some way—is very satisfying."

Jerry R. Springer said whenever he visits Old Main, he's reminded of how important Utah State University has been to his extended family.

A scholarship endowment in geology has been created to honor Beryl Ott and Tura Holm Springer (pictured circa 1936), their long-standing ties to Utah's mining industry and the Springer family legacy at Utah State University, which now spans five generations. Photo courtesy of Jerry R. Springer.

Interestingly, the initial scholarship gift came from "modest payouts" on mineral rights the family held in Utah's Uintah Basin. Springer, a retired career counselor, who said the thought of making such a gift would have surely overwhelmed his parents, said it "is just a small way for the extended family to demonstrate its appreciation for all that Utah State University has done for us over the last 100 years."

"We are very pleased to accept this generous gift from the Springer family, said **Geology Department Head John Shervais**. "Many of our students must work to put themselves through college, and this scholarship will help these students complete their education and go on to careers in the earth sciences. So the legacy of the Springer family in the mining industry will live on in these students." ■

— Jared Thayne

ORIGIN OF YELLOWSTONE HOTSPOT

USU geologist **John Shervais** is leading a drilling project in Idaho's Snake River Plain volcanic province to test the plume hypothesis. Is the Yellowstone hotspot the result of a volcanic upwelling of molten material from the earth's mantle beneath the continental crust? Or is there another explanation for the migrating hotspot that underlies the Yellowstone plateau?

LEARNING FROM THE MASTERS

EMERITUS PROFESSOR RICHARD OLSEN ESTABLISHES LECTURE SERIES

During his graduate studies at the University of Illinois, **Richard K. Olsen,** Utah State University emeritus professor of chemistry, reveled in opportunities to hear guest lectures from top scientists. "It was a marvelous thing to experience this first hand," he said.

From left, Emeritus Professor Richard Olsen, LaVina Hymas Olsen, and Dr. Dale Boger. Photo by Margaret Dobrowolska.

Olsen and his wife, **LaVina Hymas Olsen,** established the annual **Richard Olsen Lecture Series,** which opened with its inaugural lecture this past fall *(see sidebar)*, to provide USU students with similar opportunities for learning and discovery from renowned chemists. "I hope this series will provide many years of learning to come," he said.

Olsen said the endowed lectureship honors his parents, **Kenneth Beal Olsen** and **Sarah Young Olsen,** who "made many things possible." "My parents always encouraged us, as children, to get a college education," he said.

The lecture series was also established in appreciation to Utah State's Department of Chemistry and Biochemistry and to the university, Olsen said, for providing him the opportunity to pursue his professional goals of teaching and research in the field of organic chemistry.

During Olsen's distinguished career at Utah State, which spanned more than three decades, he had almost continuous funding from the National Institutes of Health. Olsen authored nearly 60 articles in peer-reviewed journals and mentored numerous undergraduate and graduate students.

"Dr. Olsen is fondly remembered by many students who took his organic chemistry class," said **Steve Scheiner,** professor and head of USU's Chemistry and Biochemistry Department. "Even in retirement, he has volunteered to serve as a tutor and mentor of students enrolled in this course."

A Provo native, Olsen earned a bachelor's degree in chemistry from Brigham Young University in 1960. During his graduate studies at the University of Illinois, he was a National Science Foundation Fellow and a Public Health Service Fellow. Following the completion of his doctorate in 1964, Olsen conducted postdoctoral research at the Stanford Research Institute and the University of Utah. He joined USU's faculty in 1967.

Since retirement, Olsen has pursued his interest in fine art and has become a prominent artist in the area. His paintings are shown in local shows and galleries and three of his works grace the Chemistry and Biochemistry Department's library. Beyond the lab bench and easel, he and LaVina, proud parents of five, enjoy square dancing with Logan's Lace 'N Levi's Square Dance Club. ■

TO VANQUISH A MOVING TARGET

Just a day before the US Centers for Disease Control issued its October 19th statement urging hospitals to step up efforts to prevent post-operative infections, renowned organic chemist **Dale L. Boger** was on campus to present the talk, *"Vancomycin: Synthetic and Mechanistic Studies"* to USU students, faculty, researchers and local medical professionals.

Boger, the *Richard and Alice Cramer Professor of Chemistry* in the Department of Chemistry and the Skaggs Institute for Chemical Biology at The Scripps Research Institute in La Jolla, California, was the inaugural speaker of the Richard Olsen Lecture Series.

"It's a distinct honor to have Dr. Boger join us to discuss his research," said **Bradley Davidson,** associate professor in USU's Chemistry and Biochemistry Department. "Dr. Boger is internationally recognized for his work and has made seminal contributions to understanding the DNA-agent interactions of antibiotics."

Vancomycin was first isolated from bacteria found in a soil sample collected from the jungles of Borneo and its structure was established in 1983, said Boger. Its name is derived from the Latin verb meaning "to vanquish."

"Vancomycin is considered the antibiotic of last resort for treatment of clinically resistant *Staphylococcal aureus,*" he said. "The feared event that may ultimately occur," he added, is that the dreaded Gram-positive bacteria, a frequent cause of infection following invasive procedures, will become resistant to the powerful antibiotic.

The research challenge Boger and colleagues face is continually reengineering Vancomycin, to which a strain of enterococci developed resistance in the late 1980s, to conquer evolving bacterial strains. "Among the issues we must tackle are providing the right potency and improving synthesis to provide access to sufficient clinical supplies," he said.

Vancomycin inhibits bacterial cell wall biosynthesis and prevents enzyme access "by a very beautiful mechanism," said Boger. The daunting task, he said, is developing effective design methods to successfully synthesize variants that can combat ever-changing adversaries. ■

FOR THE LOVE OF BUGS

WILFORD J. HANSON RECOGNIZED FOR SUPPORT OF USU INSECT COLLECTION

Though he officially retired 11 years ago, Utah State University Emeritus Associate Professor **Wilford J. Hanson** continues to visit and assist in the USU Insect Collection several times a week. "I've always been interested in insects and in nature in general," says Hanson, a Providence, Utah native who joined Utah State's faculty in 1963 and served as curator of the collection during his tenure with USU.

Recognized as one of the important collections in the western United States, the USU Insect Collection consists of more than two million specimens, starting with insects collected in the 1890s, and serves as the major information source for research on insect species of the US Intermountain region. Located in Room 240 of the Biology and Natural Resources Building, the lab was recently upgraded with a high-density compact mobile shelving system that conveniently and efficiently houses the collection's specimens and makes the collection even more accessible to researchers on campus and beyond.

Hanson makes annual contributions to the **George E. (Ned) Bohart Endowment for the USU Insect Collection,** which funds collection trips for USU graduate students to enable them to experience, first hand, the excitement of insect collecting. Their efforts bolster USU's collection with new specimens from rapidly disappearing tropical rainforests of South America.

Hanson was awarded a Heart and Hand Award in November 2005 in recognition of his volunteer efforts and his generous support of entomology students. Made annually in celebration of Utah Philanthropy Day, the award is presented by the Utah Nonprofits Association and the Utah Society of Fundraisers.

From his own experiences, Hanson knows the value of participation in research and collection trips. "It's hard to choose a favorite destination," says Hanson of his own journeys. During the course of his career, he made eight collection trips to Mexico, seven trips to Brazil, three to Ecuador, two to Peru, and one to Trinidad.

Dr. Hanson is a regular volunteer in the lab, which was recently upgraded with a high-density compact mobile shelving system that conveniently and efficiently houses the collection's specimens.

From left, Dr. Wilford Hanson, College of Science Development Director Chris Tallackson, and Dean Don Fiesinger attend the 2005 Heart and Hand Awards Ceremony in Salt Lake City, where Dr. Hanson was honored for his efforts on behalf of the USU Insect Collection.

From 1957-60, while pursuing graduate studies at the University of Kansas, Hanson lived in Panama studying insects that transmitted diseases to humans. "I was fascinated by Panama's rainforest," he says.

Hanson resided in an apartment a block away from Panama City's Gorgas Memorial Laboratory of Tropical and Preventive Medicine, where he conducted research and had a jeep at his disposal to travel all around the country and the Canal Zone. "We had a wonderful set-up there and worked with outstanding scientists," he says.

Hanson was investigating a sand fly that transmits the sometimes fatal *Leischmaniasis* to humans. "We were examining six species

of the fly and trying to determine where they were breeding and what their life cycle was," he says.

The researchers ferreted out the breeding grounds of all but one species of the elusive, nocturnal insect. "We discovered the daytime hideout of adults was the underside of leaves of forest shrubs and some species also hid in dead leaves along the ground," says Hanson. "The larvae burrow into the soil."

Another memorable destination was Brazil, where a private landowner, who owned a ranch surrounded by rainforest, allowed Hanson and other researchers to collect insects; an activity now severely restricted by the Brazilian government.

During a trip to Ecuador in the 1980s with 20 fellow entomologists, Hanson recalls nearly giving up his quest for a rare moth related to the North American Luna moth. One evening, the group set up an elaborate web of lights and gauzy, tent-like Malaise traps and took up watch. "I got tired and went back to my cabin to lie down," says Hanson. "I looked at the window and saw the silhouette of a moth. There were no lights at all. I went out and got the moth." As for his watchful colleagues? "They were so jealous," says Hanson.

Hanson displays a rare moth specimen he collected in Ecuador.

The prized specimen, with its sepia-toned patterns and five-inch tail on each hind wing, safely resides in the USU Insect Collection.

"I enjoyed collecting so much," says Hanson. "There are always new discoveries. I would imagine that, as far as insects are concerned, we've only discovered half of the species."

He fondly remembers his mentor and colleague, **George F. Knowlton,** who joined Utah State in 1925 and intensively collected insects for the USU collection until his death in 1987. "I never saw him out in the field without an insect net in his hand," says Hanson. "I don't think there was a piece of vegetation in the State of Utah not swept by his net."

Hanson marvels at the changes that have taken place over the years in the field of entomology—especially the use of computers, digital photography, enhanced microscopy, and DNA identification. "We used to use cyanide on fly specimens," he says. "Now alcohol is used so as not to damage the DNA. But alcohol is harder to work with because it's wet and you lose colors; it rolls up the insects' wings. Cyanide is dry.

"Times have changed in science. I just can't get over the new techniques," he says.

Hanson praises the efforts of Biology Department members **Carol von Dohlen,** director of the collection, and **James Pitts,** the collection's current curator. "I'm really happy that they got him," says Hanson of the latter, who joined USU as an assistant professor in 2005. ■

KNOW YOUR TOKAMAKS

A tokamak is a doughnut-shaped vacuum chamber surrounded by magnetic coils, says USU physicist **Eric Held.** A tool for controlled fusion research, the device extracts useful power from thermonuclear fusion. The name comes from the Russian words describing a toroidal chamber in which plasma, an ionized gas, is heated and confined by magnetic fields.

EARLY BIRD GETS THE WORM

Common North American sparrows called dark-eyed juncos assert their superiority early, says USU biologist **Kim Sullivan.** Juvenile birds that socially dominate their peers are more likely to be successful foragers, survive harsh winters and become prolific breeders. Sullivan is investigating hormonal response to stress in young birds.

NEW FACULTY ENRICH COLLEGE

Erin Hodgson
Assistant Professor
Biology/Extension Entomologist

Mevin Hooten
Assistant Professor
Mathematics/Statistics

Sean Johnson
Assistant Professor
Chemistry/Biochemistry

Anthony "Tony" Lowry
Assistant Professor
Geology

Erin Hodgson

Ants, mosquitoes, Mormon crickets, boxelder bugs, hobo spiders, Japanese beetles, biting flies . . . Since her arrival at Utah State in March 2006, **Erin Hodgson** has been bombarded with questions from the media and public about the region's six-and eight-legged critters.

One might imagine Erin as having been one of those kids who's always capturing creepy crawlies and proudly showing up with wriggling, hairy, squishy specimens at the family dinner table. But that wasn't the case.

"I was not the kid who collected bugs," says Erin, who grew up near Theodore Roosevelt National Park in the southwestern corner of North Dakota. "Actually, I was into sports."

Erin pursued basketball, volleyball, softball, tennis, and track at her high school of 1,000 students in Dickinson (population 16,000) and enjoyed camping and hiking in her free time.

Following graduation, Erin entered North Dakota State University in Fargo, where she earned bachelor's degrees in both biology and botany. Besides enduring endless Fargo jokes, spawned, *doncha know*, by the Coen Brothers' darkly humorous 1996 film, ("I've never even seen the movie," says Erin. "And didn't it really take place in Brainerd, Minnesota??"), Erin's experience at North Dakota State introduced her to entomology.

"I really enjoyed my studies," she says. "But because biology is so broad and I wanted to pursue graduate studies, I narrowed my focus to entomology. I liked that it combined microbiology, genetics, plant science, and other disciplines."

Erin continued her studies at North Dakota State, where she earned a master's degree in entomology. "By the end of my master's studies, I knew I wanted to teach," says Erin. She chose the University of Minnesota at St. Paul for her doctoral studies, where she earned a PhD in entomology.

Erin's appointment at USU includes serving as an Extension entomologist and working with varied publics—from growers to homeowners to 4-H youth groups—to educate them about the region's insects.

Moving to Utah has been an adjustment, says Erin. "Utah has a different climate from Minnesota. Plus, here we deal with different elevation and irrigation management issues." Erin says she appreciates USU's county agent system, in contrast to Minnesota's regional system, which makes it easier to disseminate information.

Her areas of research focus include alfalfa and turfgrass. Alfalfa, Utah's largest cash crop, not only feeds the state's robust dairy and meat industries, but is a principle fuel for specialty feeding niches, including horses, Erin says. The release of genetically enhanced Roundup Ready alfalfa could potentially improve the quality of hay as forage for animals, she adds.

"We're doing research to help growers make more efficient management plans to cut down on unnecessary treatments against pests," she says. "This will save growers time and money. It will also help prevent insect resistance to pesticides, along with reducing pollution from pesticide residue."

Erin is also working with Utah sod producers to develop turfgrass choices with acceptable levels of insects for Utah consumers. "You don't want to eradicate insects completely," she says. "We need to select turf species suitable for our climate that don't require excessive water and pesticide."

Accustomed to frigid, Midwestern winters, Erin is undaunted by reports of northern Utah snowfall. In fact, she revels in such winter sports as snowshoeing, curling, and downhill skiing. "I'm looking forward to my first Cache Valley winter and fixing up my new home," she says.

Chad Mano
Assistant Professor
Computer Science

Supratik Mukhopadhyay
Assistant Professor
Computer Science

David York
USTAR Professor
Biology

Mevin Hooten

It might be surprising to learn that **Mevin Hooten**, who joined USU's Department of Mathematics and Statistics as an assistant professor of statistics this past summer, is a forest ecologist by training. The Kansas City native (from the Kansas side of the river) earned a bachelor's degree in natural resources management from Kansas State University and a master's degree in forest ecology from the University of Missouri-Columbia before pursuing a PhD, also at Mizzou, in statistics.

"The art of statistics is dealing with uncertainty. When we associate probabilities with the phenomena we observe, the big questions we must ask ourselves are: 'What did we know ahead of time and how much did we learn from the data?'" *–Mevin Hooten, assistant professor, Mathematics & Statistics*

"Ultimately, in scientific fields, you end up frequently using statistics to investigate what you're interested in studying," says Hooten. "To learn statistics, you have to immerse yourself in it."

"The great thing about becoming a statistician is that you still get the opportunity to study the scientific things you're interested in," he says. In Hooten's case, that's ecological systems—and that's where Utah State University comes in. "I heard about the interdisciplinary research **Richard Cutler, Jim Powell,** and **Tom Edwards** were doing here at USU and wanted to be involved in this type of research and academic environment," says Hooten.

His research interests include the development of hierarchical models that use spatial and spatio-temporal statistics to study ecological processes. Among Hooten's recent projects are investigations of how invasive species and diseases spread and change over time and space. "The art of statistics is dealing with uncertainty," he says. "When we associate probabilities with the phenomena we observe, the big questions we must ask ourselves are: 'What did we know ahead of time and how much did we learn from the data?'"

The challenge for statisticians is developing models sophisticated enough to explain natural phenomena, he says. "We're getting better and better at doing that."

Hooten looks forward to Utah State's involvement with NEON (National Ecological Observatory Network). Funded by the National Science Foundation, NEON is intended to become a massive scientific network capable of making thousands of environmental measurements simultaneously throughout the country. Biology trustee professor and USU Ecology Center director **Jim MacMahon** serves as chair of the NEON board of directors. "NEON will measure and capture data on a continental scale," says Hooten. "I am interested in how we will use that data to help us answer questions."

Beyond campus, Hooten and his wife, **Gina Hooten,** who works in the USU Controller's Office, are enjoying life at the mouth of Logan Canyon. "I like that I can walk to work and that I'm just a block away from fishing," says Hooten, who lists skiing, fly-fishing, and bird-watching among his hobbies. "In the Midwest, going snow skiing involves a very long drive."

Sean Johnson

As a specialist in X-ray crystallography, **Sean Johnson,** who joined USU's Chemistry and Biochemistry Department this past summer as an R. Gaurth Hansen assistant professor of biochemistry, uses his expertise to make the underlying structures of biological processes crystal clear.

But as an undergrad at Utah State, his future was anything but clear. "Deciding on a major was the biggest stress in my life," says the Nibley, Utah native. "I started out in engineering but, a few weeks into it, I knew it wasn't what I wanted."

Various courses of study followed and, in the meantime, Johnson was working at Cache Valley's Hyclone Laboratories to support his education. His early duties—which included picking up containers of leftover blood from the E.A. Miller slaughterhouse in Hyrum ("It was messy and smelled bad") —weren't particularly pleasant. But Johnson enjoyed the lab environment and decided he wanted to major in science.

"I considered medicine, so majoring in either biology or chemistry were obvious choices," he says. "Eventually, I decided to bite the bullet and go with chemistry and it all came together."

Johnson worked in **Professor Lance Seefeldt**'s lab doing nitrogenase research and "getting plenty of lab experience," he says. "From there, I knew I wanted to pursue graduate studies."

Johnson and his wife, **Katie Allison Johnson** (BS 1996, composite science/secondary education), headed to North Carolina in 1996, where Sean started graduate studies in biochemistry at Duke University. "We showed up at an opening social as the only married couple there," recalls Johnson.

He describes his studies at Duke as both "fabulous" and "traumatic." During the seven and half years Johnson spent there working toward his PhD, he and Katie added two children to their family. (The couple welcomed a third child this past June.) A postdoctoral position at the University of Utah brought Johnson back to the state in 2004, where he worked in the crystallography lab at the U's School of Medicine.

His hope for a university faculty position came just six months later, when his former mentor, Dr. Seefeldt, invited him to apply for a position with Utah State. "The offer was welcome but the timing wasn't right," says Johnson. "I didn't feel I could leave until I had fulfilled my commitment at the University of Utah."

Fortunately, Utah State was willing to wait. And the interval turned out to be serendipitous, says Johnson. "Working at the University of Utah, I established relationships that will be valuable to future collaborations with Utah State," he says. "We're also outfitting our lab here with used equipment from the U."

Such collaboration with the University of Utah is important, notes Johnson, as Utah State begins its research efforts under the new Utah Science, Technology, and Research (USTAR) Initiative.

As for Johnson, he looks forward to continued research in unlocking the structural secrets of varied organisms. "You really can't understand biology without understanding the underlying structures," he says. "X-ray crystallography is the workhorse of determining DNA and protein structures."

Everything that happens in biology is a three-dimensional issue, Johnson says. "When you can take a big pile of atoms, map their xyz coordinates, and get something to look at—that's cool to me."

Anthony "Tony" Lowry

Tony Lowry, who joined USU's Geology Department as an assistant professor this past summer, describes the life of a postdoctoral researcher as "a hard road with a lot of anxiety."

But despite a decade of uncertain funding and frequent moves, Tony's postdoctoral exploits afforded him research adventures in such exotic locales as New Zealand, the Philippines, and southern Mexico. They're valuable experiences he now shares with students, as he initiates a new program in geophysics for Utah State.

"I'm glad to be back in the Intermountain West," says Tony, who was born in Arizona and raised in Wyoming. He and his wife, **Jacqueline Lowry**, are parents of a young daughter.

He began his college career at the University of Wyoming in Laramie, where a faculty mentor, taking notice of Tony's interest in geology and stellar math grades, guided him toward geophysics. After earning a bachelor's degree in geology, Tony embarked on graduate studies.

Tony's mentor had received funding from the US Department of Energy to research detection of tunnels in the Korean Demilitarized Zone (DMZ) using electrical currents. "Tunnels have properties similar to caves, so we were using techniques similar to those used for karst detection," he says.

Following completion of a master's degree, Tony headed to the University of Utah, where he earned a doctorate and worked with USU alum **Robert B. Smith.** Tony's doctoral research centered on why earthquakes occur where they occur.

"We started GPS studies in Yellowstone and the Wasatch Front in the late 1980s/early 1990s—some of the first in those areas," says Tony. "During that time, I even babysat a GPS unit in Logan."

After completing his PhD, Tony considered a job offer from a major oil company in Houston but decided a corporate position in the huge port city wasn't for him. Instead, he headed to a postdoctoral position at Victoria University in Wellington, New Zealand.

"I traveled between New Zealand's North and South Islands conducting GPS geodetic campaigns, including some helicopter work in spectacular remote areas," he says.

Another postdoc stint followed at Indiana University in Bloomington, from which Tony conducted field work in the Philippines, taking GPS measurements on Taal and Pinatubo Volcanoes on the island of Luzon.

Prior to joining Utah State, Tony was a research associate for six years in the Geology Department of the University of Colorado at Boulder, where he did additional field research in a number of places, including southern Mexico. He has authored and co-authored numerous peer-reviewed journal articles.

Read more about Tony's recent research in the article, *"USU Geophysicist Connects Deep Fault Movement to Climate Cycles,"* which appears in this issue of *Insights*.

Chad Mano

As a youngster growing up in Salt Lake City, only two college destinations were on **Chad Mano**'s mind: University of Utah and BYU.

"Utah State was just that ag school somewhere up north," says Chad.

Then came the opportunity in high school for Chad to attend USU's summer Engineering State program. "I had a great time and I was so impressed with the professors I met that week," he says.

> **"While faith, trust, and love may make a happy home, they make happy criminals and broken networks in the computer world." *–Chad Mano, assistant professor, Computer Science***

Chad made Utah State his college choice, where he initially majored in mechanical engineering. Though his academic focus changed—he switched his major to economics—his favorable impression of USU has never wavered. "I loved the location and the social aspects of the campus as an undergrad and I still do," he says.

After a few years in the working world, Chad decided to explore a new path—computer science. "I'd enjoyed computers as a child, but I was somewhat apprehensive about pursuing studies. It was a risk," he says.

A risk that paid off. Chad returned to USU and enrolled in graduate computer science studies. "Making that change was a struggle at first, but I enjoyed it," he says.

Doctoral studies followed at the University of Notre Dame ("Which I didn't think I could get in to," says Chad), where he completed a PhD in computer science and engineering this past spring.

Chad says he's glad his journey led him back to USU, where he joined the Computer Science Department as an assistant professor this past summer. "I'm excited by the research and teaching goals of this department," he says. "It's a good fit."

He and his wife, **Rachel Mano**, whom he met while a student at Utah State, are the parents of three.

Chad's research focus is computer security and, more specifically, rogue wireless detection, secure communication protocols, and computer security education.

"In today's world, computer security affects everyone," says Chad. "Part of my work is understanding the criminal mind and trying to stay ahead of those who would use technology to steal from and otherwise harm others."

Chad says he looks at computer security education from two perspectives. "First, I focus on the education of future computer scientists," he says. "This includes software developers, testers, and network administrators. All need an understanding of computer security as their projects are all potential targets for malicious activity."

Second, computer users need to be vigilant. "While faith, trust, and love may make a happy home, they make happy criminals and broken networks in the computer world," Chad says.

Security issues have become so broad that an understanding of basic computer security principles, which evolve with each new attack, is as important as word processing or email skills, he says. "As an educator, I ask myself 'What is the core knowledge necessary for users to protect themselves, their home computer, and their employer's network from both current and future attacks?' and 'How can this be integrated into basic computer education?'"

Does Chad have tips for computer users? You bet. "Don't open any email messages, attachments or Internet links from senders you don't know," he says. "And when shopping online, look for the 'lock' icon before entering any account information."

Supratik Mukhopadhyay

Despite meticulous training and repeated drills, the best laid plans can go awry when catastrophe strikes. Just ask any military veteran what "SNAFU" really means. Think back to the obstacles New York City first responders faced on September 11 when trying to deal with the sudden onslaught of massive casualties and destruction.

USU computer scientist **Supratik Mukhopadhyay** is collaborating with colleagues at Arizona State University to leverage the power of adaptive, situation-aware, and secure service-based systems to tackle decision-making requirements of disaster response. Also known as "AS^3," the systems automate reasoning with goals, workflows, and services. A specific application is automation of public safety response to varied urban emergency scenarios to ensure that needed personnel and equipment are dispatched accurately and efficiently to trauma scenes, response times are as short as possible and thus, lives are saved.

Supratik joined USU's Department of Computer Science as an assistant professor this past summer. A native of Kolkata (formerly known to Westerners as "Calcutta"), India, Supratik completed undergraduate studies in India and earned a doctorate degree in computer science from Germany's renowned Max Planck Institute. "The research environment there was fantastic," says Supratik.

Prior to his arrival at USU, Supratik served as a researcher at the University of Pennsylvania and as a tenure-track faculty member at West Virginia University at Morgantown.

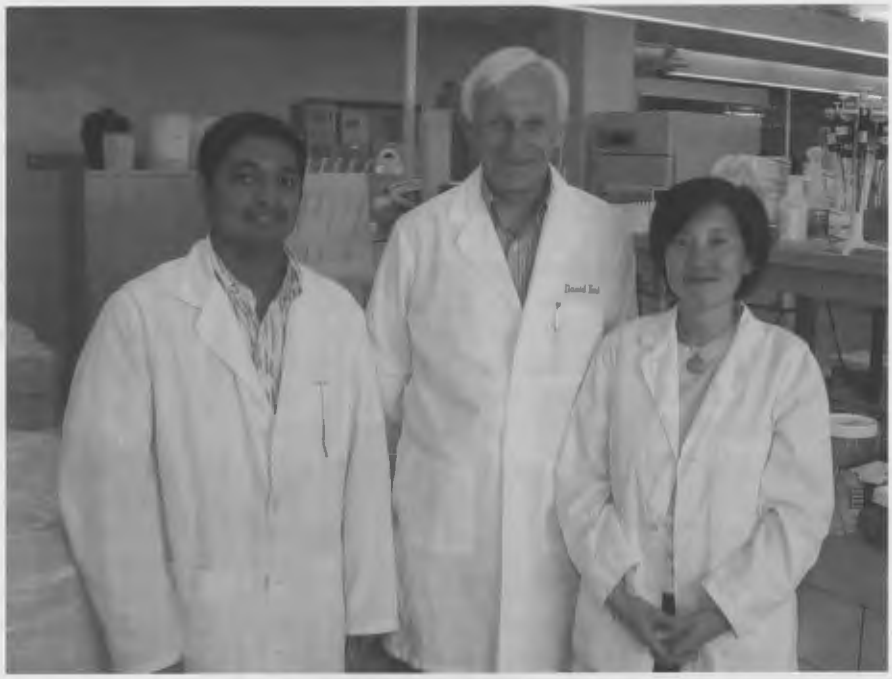
He describes Utah State and its surrounding landscape, respectively, as "very stimulating" and "beautiful." "The system at USU is absolutely fantastic," he adds.

Supratik isn't the only member of his family who joined the College of Science this past year. His wife, **Arpita Mukhopadhyay,** who earned a master's degree in statistics from West Virginia University, serves as a part-time instructor in the Mathematics and Statistics Department. She and Supratik are the proud parents of a one-year-old daughter, **Orna.**

When he's not at a computer researching AS³ or software for distributed middleware systems, Supratik enjoys ping pong and badminton. "I'm glad to be a part of Utah State and look forward to rewarding research and teaching opportunities," he says.

David York

Logan's Rocky Mountain vistas and Western attitude are a far cry from the balmy milieu and piquant rhythm of Baton Rouge, but new Utah State University **Biology Professor David York** is quickly adjusting to northern Utah, setting up his lab and getting down to business.



USTAR Professor David York, center, with USU's Utah Center for Advanced Nutrition colleagues, Sumeet Juriani, research technician IV, left, and MieJung Park, research assistant professor.

Formerly with Louisiana State University's renowned Pennington Biomedical Research Center (PBRC), York joins USU as one of the first researchers recruited through the Utah Science, Technology, and Research (USTAR) Initiative. Enacted by the 2006 Utah Legislature, USTAR is designed to promote increased scientific research and marketable technological development at the state's flagship research universities–Utah State and the University of Utah.

York is part of USU's nascent Utah Center for Advanced Nutrition (UCAN) research team, which includes **Biology Department Professors Tim Gilbertson** and **Daryll DeWald.** The center's initial areas of research focus are the relationships between nutrition and exercise with health and chronic diseases, molecular and cellular nutrition, nutrient signaling on taste buds and other tissues, and the role of lipids in cell signaling. He expects these areas to expand as the Center develops collaborative projects with faculty in other departments.

York, who saw PBRC grow from a staff of about 35 back in 1989 to its current workforce of 600 and a budget of more than $50 million, sees great potential for USU's UCAN. "Utah State already has the basic research in this area and the collaboration amongst disciplines," he says. "This thing can really expand."

Still, York acknowledges that development of the center, with its emphasis on technological development and commercialization, will be "a huge challenge."

"Unlike electronics or computing, nutrition research is much more difficult to move to technology transfer," he says. "The key is to understand nutrition from the whole animal to the cellular, molecular, and genetic levels. Then technology transfer can come from dietary manipulations/additions right through new technologies, based upon our understanding of the processes and mechanisms at the molecular and genetic level."

York's research interests include animal models of obesity, mechanisms that control food intake and nutrient selection, the molecular basis for the beneficial effects of exercise in preventing neurodegenerative disorders, and the hormone dependence of animal obesity. "Nutrition is fundamental to all aspects of health and disease," he says. "Most chronic diseases and conditions, including cardiovascular disease, Type II diabetes, and obesity, have some relationship to nutrition."

Today's environment is very conducive to the development of obesity, which has become a top public health concern, says York. His research approach centers on understanding the whole organism—including its internal processes and the environment in which it lives. "You can't isolate feeding behavior from everything that's going on in and around the organism."

A native of England, York earned his doctorate in physiology from the University of Southampton. He conducted postdoctoral research at the Medical Center Hospital in Boston, Massachusetts and the UCLA School of Medicine. He then returned to England and served on the faculty of Southampton University Medical School for 18 years before joining the Louisiana State University System and PBRC.

York, along with his wife and colleague, **MieJung Park,** UCAN research assistant professor, and daughter, **Judy Suh,** a middle school student, look forward to making Logan their new home.

"I'm incredibly impressed with the community," says York, who adds that he still prefers soccer, "real football" as he calls it, to American football. Perhaps Utah's professional soccer team—*Real Salt Lake*—has gained a new fan. ■

THE YIN AND YANG OF CELL SIGNALING

USU CHEMIST EXPLORES 'REMARKABLE CHEMISTRY' OF PHOSPHATE AND SULFATE TRANSFER

Consider your body. Day by day, second by second trillions of minute cells undergo a complex array of continuous chemical processes at a dizzying rate. Through the endless ebb and flow of biochemical reactions, life is kept in precarious balance. A kink in the chain and illness, even death, ensues.

Utah State University organic chemist **Alvan Hengge** delves into the chemistry that drives biological systems and seeks to understand how various enzymes accomplish what he calls "remarkable chemistry."

Simply put, enzymes are proteins that catalyze chemical reactions, or trigger activity, in living cells.

The enzymatic mechanisms of phosphate and sulfate transfer are a specific research focus for Hengge, professor in the College of Science's Department of Chemistry and Biochemistry. "These processes have great importance in biological systems," he says.

His work with W. Wallace Cleland, co-director of the Institute for Enzyme Research at the University of Wisconsin-Madison, where Hengge is currently on sabbatical, appeared in a recent issue of *Chemical Reviews*. In October, he presented his research at the Australian Society for Biochemistry and Molecular Biology annual conference in Brisbane, Australia.

"What we're looking at is how phosphatases and kinases work," says Hengge, who adds that human attempts to create catalysts as effective as these natural enzymes have consistently fallen short.

Phosphatases and kinases are two broad classes of enzymes that essentially function as "on" and "off" switches to control various biological processes. Opposing yet complementary controllers, Hengge says the two are often referred to as the 'yin' and 'yang' of cellular signaling.

Kinases synthesize phosphate esters, and phosphatases destroy them. "These dual, opposing activities serve to keep proper levels of activity of particular proteins and receptors in balance within each cell," he says.

Easier said than done.

What confounds chemists, says Hengge, is how these enzymes accomplish their regulatory functions with such speed and ease in nature. Efforts to replicate these processes in the lab are extremely difficult.

Phosphate esters, which are substrates of phosphatases, are extremely stable, says Hengge. Very harsh chemical or kinetic stimuli are required to elicit a reaction from them in a lab setting. How, scientists wonder, do these enzymes ever reach a transition state in the relatively mild environment of a healthy organism?

"The stability of phosphate esters is a protective mechanism that enables the cell to maintain very tight control of this regulatory process and protect the organism's delicate balance," says Hengge. "This makes sense from an evolutionary standpoint."

USU organic chemist Alvan Hehgge's research on enzymatic mechanisms of phosphate and sulfate transfer appeared in a recent issue of Chemical Reviews.

"We're trying to understand the transition states that enzymes stabilize during their reactions," he says, of the tiny chemical-reaction machines that constantly deconstruct and rebuild their substrates like Tinkertoys®.

Hengge describes the transition state as the "fleeting geometry that any reacting compound must go through when it changes from a reactant form to a product."

"In terms of energy, think of a ball flying through the air from one point to another," he says. "The highest point on the arc traveled by the ball is the transition state."

Hengge says biochemists have speculated that the enzymes use a mechanism different from what is observed during uncatalyzed reactions of phosphate esters, but this does not seem to be the case.

Scientists clearly have their work cut out for them, as further study into the structure of enzymes is needed to understand their powerful abilities. For the next few months, the chemistry community can mull over Hengge's findings without him, as he switches gears and shifts his research focus to molecular biology and thermodynamics in the biomolecular chemistry department at the University of Wisconsin-Madison's medical school.

"That's what sabbaticals are for—to learn new things," says Hengge who, in spite of the proximity, is not currently pursuing further study with his colleague and former postdoc mentor Cleland.

Hengge calls the UW-Madison, where he worked as a National Institutes of Health-funded postdoc researcher from 1987-90 and was an assistant scientist for six years beyond that, his "second home."

"Mo (Cleland) and I are not conducting research together, but we're getting the opportunity to catch up and socialize," he says.

Hengge returns to Logan in January 2007. ■

WINTER 2006

College of Science faculty met with prospective students during the university's annual Major Fair. The gathering allows undecided majors to learn more about programs offered in the college.

USU Computer Science alumni gather July 19th in Kirkland, Washington for food and fellowship.

Geology Department Head John Shervais, left, visits with USU alum Jerry R. Springer during a recent gathering. Read more about Mr. Springer's involvement with USU in the article, "Hard-rock Mining," in this issue of Insights.

"Weird Science" was afoot during the College of Science's exhibits at the annual Aggie Family Day held during September's Old Main Weekend. Visitors of all ages had the opportunity to try an array of hands-on science experiments.

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Best regards,

Chris Tallackson
Development Director

BEYOND THE WILD BLUE YONDER

USU ALUM MARY CLEAVE, VETERAN ASTRONAUT AND NASA ADMINISTRATOR, VISITS CAMPUS

If you want to approximate veteran astronaut **Mary Cleave's** experience of traveling in the space shuttle, you can hop on the Zero G Drop Tower at Logan's new Celebration Centre amusement park, said **Jan Sojka,** head of USU's Physics Department. Of course, to make it authentic, he said, you'd have to repeat the ride, which gives you four seconds of real zero G experience, about one million times. By the way, that would set you back about $5 million.

Veteran astronaut Mary Cleave, pictured here during her shuttle flight days in the 1980s, earned a master's degree in microbial ecology and a doctorate in civil and environmental engineering from Utah State. Photo courtesy of NASA.

So began Sojka's introduction of Cleave, his longtime friend and USU alum, who currently serves as associate administrator for NASA's Science Mission Directorate. Cleave visited campus October 6 as a keynote speaker for the joint Four Corners Section Meeting of the American Physical Society and the Zone 15 Meeting of the Society for Physics Students. The gathering was coordinated and hosted by the USU Physics Department.

During her second Atlantis mission in 1989, Cleave "single-handedly deployed the Magellan Venus-exploration spacecraft," said Sojka. "How many of us can say we single-handedly deployed anything?"

Cleave flew with two Atlantis missions, the first in 1985, and logged more than 262 hours in space. Magellan, which NASA considers one of its most successful scientific missions, was the first planetary probe to be deployed from the shuttle.

She was named to her current position in 2005, where she works at prioritizing NASA's limited resources and deciding which projects will be funded. "I've got a boss in the White House and how many hundred more up on the hill who think I work for them and then I've got my own internal bosses at the agency," said Cleave. "Trying to make a decision that makes everybody happy never works."

Still, she said, "I think we have plenty of projects to keep everybody busy for a long time."

During her visit, Cleave, who earned a master's degree in microbial ecology and a doctorate in civil and environmental engineering from Utah State, offered the conference's banquet address and also met informally with students; a gathering she specifically requested.

"Everyone needs to understand that studying the solar system, the earth, and the universe is important," she told students. "We need to put ourselves in context. You need to understand your neighborhood. That's what we're doing."

Cleave detailed four major areas in which her directorate divides upcoming projects: astrophysics, earth science, planetary science, and heliophysics. NASA currently has 60 spacecraft in orbit, each logging data, she said. Thirty spacecraft are in development.

"Our planetary science group has had a good week," Cleave said, referring to the Cassini spacecraft's photographic capture of icy material stretching from Saturn's Enceladus moon. The material could consist of tiny ice particles being ejected from Enceladus' south polar geysers, she said.

Cleave met with students during her USU visit.

Cleave also noted the successful touchdown of NASA's Stardust Comet Sample Return Mission capsule in Utah's West Desert, which captured particles from comet Wild 2, along with the successful deployment of the two Mars rovers—Spirit and Opportunity. "They've lasted way past their design life," she said of the Mars rovers. "They're just like Energizer Bunnies."

NASA's earth science projects are emerging as critical, collaborative efforts with other organizations. "We're getting partnered up with the National Weather Service, US Geological Survey, the Department of Energy, and others," said Cleave.

She quickly listed a variety of projects where NASA is working with these groups to monitor climate change, hurricanes and other weather events, altered coastlines, glacier movement, wildfires, worldwide water cycles, and more.

BEYOND THE WILD BLUE...
Continues on page 24

ACADEMICS, ATHLETICS NOT POLES APART, SAYS RECENT COS GRAD

USU GRAD STUDENT KAT DUHADWAY EXCELS IN THE LAB AND ON THE TRACK

Kat DuHadway

Kathryn "Kat" DuHadway doesn't necessarily play in the same sand pit as everyone else. A grad student in exercise science, who graduated from Utah State last spring with a bachelor's degree in computer science and a minor in biology, she follows an unbeaten path that has taken her across disciplines and through a rather unconventional career in collegiate athletics.

Initially, DuHadway wasn't sure she'd get the chance to pursue her chosen sport—pole vaulting—at the college level. The USU women's track team didn't allow walk-ons. But her luck changed about a year or so into her undergraduate career, when USU's new pole vaulting coach **Joel Johnson** decided to give her a chance and invited her to join the team. "It turned out to be a blessing in disguise," says DuHadway, who had suffered a back injury in high school. "Time off from the sport gave me plenty of time to heal." And it didn't take long for DuHadway, who holds a personal best of 13.25 ft.—a USU record for women's pole vault—to prove her worth. "They want me now," she says.

It wasn't the first time DuHadway, who is the daughter of Computer Science Department **Lecturer Linda DuHadway,** had to convince a coach she had the ability to tackle pole vaulting. "It's a dangerous sport and you have to be strong and fast," she says. She first attempted the sport back in 7th grade; much to the amusement, then surprise, of her first coach. "He just laughed when I told him I wanted to try it," she remembers. "I barely weighed 80 pounds."

But DuHadway succeeded in propelling herself over the bar. Soon after, she placed second in the event at a city track meet. "Pole vaulting is mentally and physically challenging, but I just knew I could do it," she says.

An Honors Program student during her undergrad years, DuHadway has applied the same determination to her academic pursuits. She has consistently received academic accolades during her USU studies, including receipt of one of the inaugural **Willard L. Eccles Undergraduate Research Fellowships** and membership

ACADEMICS, ATHLETICS NOT POLES APART...
Continues on page 24

THE PHYSICS OF POLE VAULTING

How high could a pole vaulter vault if she had absolutely perfect technique?

First, let's figure out her kinetic energy (KE) when running at full speed, and then let's calculate how high she could vault if she used all of that KE to increase her height and, therefore, her potential energy (PE) without wasting any of it. If she converted all of her KE to PE, then we can solve the equation by setting them equal to each other:

$$1/2\ m\ v^2 = m\ g\ h$$

Since mass is on both sides of the equation, we can eliminate this term. This makes sense because both KE and PE increase with increasing mass. If the runner is heavier, her PE and KE both increase. So we'll eliminate the mass term and rearrange things a little to solve for h:

$$1/2\ v^2 / g = h$$

Let's say our pole vaulter can run as fast as anyone in the world. Right now, the world record for running 100 meters is just under 10 seconds. That gives a velocity of 10 m/s. We also know that the acceleration due to gravity is 9.8 m/s2. So now we can solve for the height:

$$1/2 \times (102 / 9.8) = 5.1\ m$$

So 5.1 meters is the height that a pole vaulter could raise her center of mass if she converted all of her KE into PE. But her center of mass is not on the ground; it is in the middle of her body, about 3 ft (1 m) off the ground. So the best height a pole vaulter could achieve is in fact about 20 ft (6.1 m). She may be able to gain a little more height by using special techniques, like pushing off from the top of the pole, or getting a really good jump before takeoff.

Source: Karim Nice, courtesy of HowStuffWorks.com

ACADEMICS, ATHLETICS NOT POLES APART...
Continued from page 23

in the US Track and Field and Cross Country Coaches Association's (USTFCCCA) Division I Women's All-Academic Track & Field Team and the Western Athletic Conference (WAC) Academic Team.

"Developing a Mathematical and Computer-Based Model of a Network of Stomata (pores on the surface of plant leaves)," was the title of DuHadway's 12-month Eccles Undergraduate Research Fellowship project, which she conducted under the mentorship of **Physics Professor David Peak** and **Biology Professor Keith Mott.** "We were watching the network of communications that occur between parts of a leaf," she says.

It was interesting to observe the process by which leaf pores, called stomata, work together, processing and exchanging the information necessary to open and close at opportune times, DuHadway says. "Plants need to take in as much carbon dioxide through their pores as possible without losing water," she explains. "Somehow, the stomata communicate with each other to achieve a constant balance."

What's amazing about this process is that plants have no central processing unit, says DuHadway. "A process like this is a simple task for humans," she says. "We have brains."

DuHadway's interest in computer science as a tool to solve scientific problems led to her interest in computational biology; a field in which she plans to pursue doctoral studies. For now, she's combining her interest in computer science and athletics with graduate study in exercise science. Remaining at Utah State also allows her to extend her pole vaulting career into her graduate studies. Her delayed start in collegiate athletics affords another year of competitive eligibility.

DuHadway vaults in the 2006 Wilson Motors Invitational. Photos courtesy of USU Athletics.

DuHadway thinks academics and athletics create a perfect balance. Despite a busy schedule of training and study, she says she's become more productive and efficient in all aspects of her life since becoming a student-athlete. "I think I'm more focused now that I'm involved in both," she says. "I think everyone would do better if they pursued some sort of physical activity along with their studies or work." ■

BEYOND THE WILD BLUE...
Continued from page 22

Ecological monitoring is becoming a key focus, Cleave said. While all projects under NASA's consideration pose complicated technological and scientific challenges, the biggest hurdles may be the political ones. Everyone has an opinion, but not everyone understands the many facets of deep space science, said Cleave. "It's my job to try to sort out priorities," she said. "The target may change, but the goal doesn't." ■

Cleave is introduced by longtime friend Jan Sojka.

AWARDS & RECOGNITION

Biology

Effective August 1, 2006, Assistant Professor of Biology **S. K. Morgan Ernest,** assumed the directorship of the NSF LTREB: Experimental Manipulation and Monitoring of an Arid Ecosystem at Portal, Arizona. Morgan has been actively involved with the research at this LTREB for the past 11 years. According to NSF, an LTREB (Long-Term Research in Environmental Biology) allows investigators to ask "[m]any important questions in ecology, behavior, and environmental biology [that] require the acquisition of long time series of data."

Chemistry & Biochemistry

Lisa M. Berreau was named to the editorial board for the *Journal of Coordination Chemistry* from 2006-2009.

Physics and The Center for Atmospheric & Space Sciences

Robert B. Schunk was elected to the International Academy of Astronautics at its meeting in Beijing, China, July 16, 2006.

USU GEOPHYSICIST CONNECTS DEEP FAULT MOVEMENT TO CLIMATE CYCLES

TONY LOWRY'S RESEARCH ON SLOW SLIP FAULTS FEATURED IN *NATURE*

Scientists call the tendency of physical objects to vibrate when excited by a certain frequency "resonance." A guitar string, for example, oscillates in response to tones sounded in the same room. A visually memorable example of resonance is the 1940 collapse of the original Tacoma Narrows Bridge. Aptly nicknamed "Galloping Gertie," the Puget Sound suspension span twisted and failed due to wind-induced vibrations.

Utah State University geophysicist **Tony Lowry** suggests that movements observed at regular intervals on the earth's deep tectonic faults are resonant responses to the weight of groundwater and ocean water shifted about by weather cycles. His research, funded by the National Science Foundation, appeared in the August 17 issue of *Nature*.

"Fault movements similar to earthquakes, but much slower, have been recorded at various subduction zones around the world, including southern Mexico, Japan, New Zealand, and the United States' Pacific Northwest," says Lowry, who recently joined USU's Geology Department as an assistant professor. "But the underlying causes of these events have been poorly understood."

The movements, known as "slow slip events" or "silent earthquakes," are actually not earthquakes and produce no noticeable ground shaking, he said. And unlike earthquakes, which recur at unpredictable times, slow slip events typically occur at regular intervals of six to 18 months.

USU geophysicist Tony Lowry

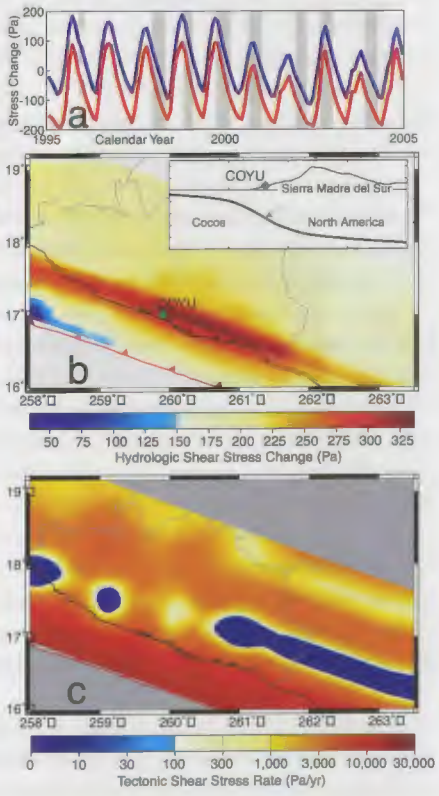
While researching slow slip phenomena in southern Mexico, Lowry found that events occurred at almost exactly the same time each year. Other researchers had already noted that repeating slip in the Pacific Northwest closely matched the frequency of the "Chandler wobble," a small shift in Earth rotation caused by changes in the weight of ocean basins. "This suggested to me that the slow slip events might have something to do with the changes in pressure caused by annual and other cycles of surface fluid movements," he says.

Weather cycles move a lot of mass around the Earth's surface and changes in atmospheric pressure also impact rock stress at depth. Though tiny, relative to tectonic stress, these changes are large enough to excite fault movement at their resonant frequencies.

The 1940 collapse of the original Tacoma Narrows Bridge is a visually memorable example of resonance.

"Fault slip resonance with climatic mass cycles explains why slip events are periodic, and the dependence of resonant frequency on fault properties explains why slip periods differ from place to place," says Lowry.

Understanding the connection between surface weather and fault movement provides a potentially valuable tool for probing faults and better understanding their behavior, he says. "This knowledge will help to illuminate the frictional properties of faults, which should improve our understanding of earthquakes." ■



***Stress on the fault surface. a:** Time series of normal stress (top line; positive indicates fault compression) and shear stress (bottom line; positive favors thrust slip) at a point beneath a GPS site in Mexico. Gray bars denote periods of deep slow slip; peak slip occurs at the center of the bar. **b:** Map view of peak-to-peak shear stress perturbation, projected from the plate interface to the surface. Inset shows plate geometry and strike-averaged topography versus distance from the trench; arrow indicates location of time series sampled in **a**. **c:** Rate of accumulation of tectonic shear stress.*

GETTING MORE INFORMATION OUT OF INFORMATION

STATISTICIAN ADELE CUTLER OFFERS INSIGHTS ON FACTS, FIGURES AND FINDING YOUR LIFE'S PASSION

Cutler's fascination with statistics never wanes. "If I get a day when I can do anything I want, I'll sit at the computer and work on Random Forests," she says.

Struggling to learn a difficult subject? Try teaching it to someone else.

"It's amazing how quickly you learn when you're standing on the other side of the desk," says Utah State University statistician **Adele Cutler.** "As a teacher, your brain processes things differently from the way you try to understand new concepts as a student."

Among the classes Cutler teaches is an introductory statistics course she jokingly refers to as "Stats for Poets." The suggestion of studying statistics elicits groans from most people—until they experience Cutler's class. Her students walk away from the course with a new appreciation for the "Rodney Dangerfield" of subjects and say they enjoy Cutler's enthusiasm for the discipline.

"I was once in their shoes," says Cutler, who says she never aspired to becoming a statistician. "In college, statistics was my worst subject."

Cutler, who was recently promoted to full professor in the Department of Mathematics and Statistics, was born in England and grew up in New Zealand. "From my accent, the Kiwis know I'm English, the English are quite sure I'm American, and the Americans usually think I'm Australian," she says.

She chose business as her initial college major but soon switched to science, then physics, then mathematics and statistics.

"I ended up where I am through no carefully planned career path," says Cutler who, along with her husband, Richard Cutler, joined USU in 1988. "I simply followed my passion."

Cutler's passion has taken her to the boundaries where statistics converges with computer science and electrical engineering and led her to research projects using such tools as bioinformatics, archetypal analysis, and machine learning. She's applied these methods to diverse fields ranging from genetics, medicine, and astronomy, to banking, air traffic control, and national security.

"An advantage of statistics is that you can participate in exciting research in a lot of different disciplines without restricting yourself," she says. "As statisticians, what we're really trying to do is think of better ways to get information out of data."

Of particular significance to Cutler is her ongoing work with Random Forests™, a trademarked statistical classifier developed by the late Leo Breiman, her mentor and longtime colleague. Breiman, professor emeritus of statistics at the University of California-Berkley, died July 7, 2005 at the age of 77. Renowned for his work with statistical computation, Breiman was elected a member of the National Academy of Sciences and of the American Academy of Arts and Sciences.

"Random Forests was really a work of a lifetime," says Cutler, who collaborated with Breiman for more than 20 years. "It's a powerful, versatile tool that outperforms traditional statistical tools."

Many data sets encountered in today's scientific fields are much bigger and complex "than anything we've dealt with before," she says. "Random Forests allows us to interpret data and gain insights in ways other tools can't. We can explore, for example, why a 'yes' is a 'yes.'"

Each of us encounters applications using Random Forests, says Cutler, though we may not even realize it. Did you look up anything on Amazon.com or another online retailer today? You may not have noticed, but the site automatically logged your interests and, like an attentive salesperson, offered up a slew of suggestions for you.

Adele Cutler's young son Phil's depiction of Random Forests was her mentor Leo Breiman's choice for illustrating the simplicity of the statistical classifier he developed.

Or perhaps you had a non-virtual shopping experience and handed your keys, with a colorful, dangling array of bar-coded, frequent shopper cards, over to a human checkout clerk. "Retailers collect an amazing amount of information about our preferences," says Cutler.

In the life sciences, where recent developments in genomics have created floods of information, she says, Random Forests provides researchers with the ability to distill critical insights from huge data sets.

Cutler's fascination with statistics never wanes. "If I get a day when I can do anything I want, I'll sit at the computer and work on Random Forests," she says.

Her goal is to continue Breiman's work and complete a book on the subject. He even chose the cover art for the book – a work by Cutler's young son, Phil.

For a presentation at a conference, Cutler selected a photo of a forest showing bare branches shrouded in fog. "I thought it was really pretty, but Leo (Breiman) said, 'Too gloomy.'

So Cutler commissioned her son Phil, then seven years of age, to come up with a drawing. "Leo loved Phil's crayon drawing. He said, 'It's bright, cheerful and, most importantly, shows the simplicity of the method.'"

In a world obscured by mystery, complexity and reams of data, says Cutler, statistics provides a light at the end of the tunnel. "Statistical tools give scientists that moment of clarity, where it all becomes clear," she says. ■

RISING FROM THE ASHES

Willard L. Eccles Graduate Fellow **Kristin Bakkegard** found that the rough-skinned newts of Mount St. Helens' timber-strewn blowdown zone have mingled with wayfarers from afar to replenish their genetic diversity. Bakkegard, a USU doctoral candidate in biology, is investigating amphibian response to habitat destruction.

UNEXPECTED ATTRACTION

USU chemist **Steve Scheiner**, in collaboration with a colleague at Arak University in Iran, is investigating weak molecular interactions. Of particular interest to the research duo is the recently discovered dihydrogen bond, in which two hydrogen atoms on different molecules are attracted to each other.

A TALE OF TWO KARSTS

A karst is an area of irregular limestone in which erosion has produced fissures, sinkholes, underground streams and caverns. USU geologist **Peter Kolesar** is investigating springs in two alpine karst aquifer systems along the Logan River in Utah's Bear River Range. One of these is the main water source for the city of Logan, Utah.

OLD MAIN WEEKEND 2006

COLLEGE OF SCIENCE PART OF NEW TRADITION

Utah State University began a new tradition September 15-16 during the first "Old Main Weekend," which featured two days of activities designed to showcase both the history and future of the university.

The weather did its best to dampen the weekend's festivities, but the Aggie spirit was able to shine through, resulting in many highlights. A number of new activities were planned as part of the two-day event, and while the rain had a considerable impact, the response of participants was positive.

The College of Science was among the groups hosting exhibits on Aggie Family Day during September's Old Main Weekend. Guests participated in a number of hands-on activities. Of course, a plentiful supply of Aggie Ice Cream was on hand.

The weekend was planned as an enhancement of the annual Old Main Dinner, the yearly gathering for members of the university's Old Main Society, which honors those who have made significant gifts to support USU.

Among the weekend's activities were opportunities for Old Main Society members to see first-hand many examples of the successes at Utah State, including a lecture featuring College of Science research. **Biology Assistant Professor Mike Pfrender** presented the talk, *"Life in a Changing World: How Organisms Respond and Adapt to Rapid Environmental Change."*

Festivities culminated Saturday with Aggie Family Day, followed by a pre-game party before the football game against the University of Utah.

The Old Main Society was established in 1967, to recognize alumni and friends whose support makes possible the fulfillment of Utah State's mission. Membership represents the pinnacle of recognition for those who express their belief in the institution through significant philanthropic support.

USU's Office for Advancement plans to schedule another Old Main Weekend in Fall 2007. ■ *—Patrick Williams*

BALKAN SOJOURN PROVIDES CULTURAL AND ACADEMIC INSIGHTS

STEPHEN BIALKOWSKI COMPLETES FULBRIGHT PROFESSORSHIP IN SLOVENIA

Stephen Bialkowski

While seeking an apartment for his six-month stay in Slovenia as a Fulbright professor, **Stephen Bialkowski**'s prospective landlady informed him that she was Serbian. She asked if he was still interested in the property.

"It was one of those times when you know a person's comment holds significance, but you don't really understand the context," says Bialkowski, who is a professor of analytical chemistry in USU's Chemistry and Biochemistry Department.

The reason for her upfront comment would become clearer as Bialkowski immersed himself in Slovenian culture and gained greater awareness of the complex web of diverse ethnicities, intense nationalism, divided loyalties, and uneasy armistice that defines the Balkan states after centuries of bloody conflict.

From January to July 2006, Bialkowski conducted research and lectured at the University of Nova Gorica in Slovenia's westernmost Goriška region. Perched on the southern slope of the Julian Alps, between Italy's northeastern border and the Adriatic Sea, the Soca River valley, in which the institute is situated, boasts picturesque villages and rolling hills filled with olive groves and vineyards.

The most homogeneous of the Balkan states and a recent entrant into the European Union, Slovenia remained virtually unscathed in recent conflicts. But its communities harbor many ethnic Serbs, Croats, Albanians and others, who, like Bialkowski's landlady, sought refuge and better job opportunities from their war-torn homes in the former Yugoslavia.

"I saw the former homes of Serbs, now burned out and abandoned, during a visit to Croatia," says Bialkowski. He noted fresh garbage strewn about the disheveled dwellings, perhaps a continuing insult to forces led by the late Slobodan Miloševi.

Bialkowski participated in a number of bike races during his European stay, including L'Etape du Tour in the French Alps. Widely considered one of the world's top amateur cycling competitions, the race follows part of the Tour de France route. Photos courtesy of Dr. Bialkowski.

At Nova Gorica, Bialkowksi taught both undergraduate and graduate students and instructed fledgling researchers in the use of photothermal spectroscopy. Measurement of environmental pollution is a key focus of the institute's research activities, including monitoring of the spread of organophosphate pesticides, which are widely used in Slovenia, the United States and throughout the world.

USU analytical chemist Stephen Bialkowski taught and conducted research at the University of Nova Gorica in Slovenia's Goriška region.

Organophosphates are akin to chemical warfare nerve gas agents, says Bialkowski. Applied in spray form, they drift indiscriminately into schoolyards, residential areas and water sources and pose a serious health threat—especially to children. He and colleague Mladen Franko, a Nova Gorica professor, have pioneered a less-costly and less-invasive testing method, using spectroscopy to measure human exposure and promote timely treatment.

Beyond pesticides, the institute's researchers are investigating a broad array of environmental concerns, ranging from the use of

BALKAN SOJOURN PROVIDES...
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FAST FAULT

USU'S SUSANNE JANECKE AMONG RESEARCHERS PROBING AGE OF FAULT ZONE —BY JOE BAUMAN

The following article originally appeared in the November 6, 2006 edition of Deseret Morning News and is reprinted with the permission of the newspaper and the author.

A fault zone about 20 miles west of California's infamous San Andreas Fault may be younger and moving faster than earlier believed, according to research in which a Utah State University geologist is participating.

The latest study on the subject is "Stratigraphic Record of Pleistocene Faulting and Basin Evolution in the Borrego Badlands, San Jacinto Fault Zone, Southern California," published in the November issue of the *Geological Society of America Bulletin.*

Authors are: Andrew T. Lutz and Rebecca J. Dorsey of the University of Oregon, Eugene; Bernard A. Housen of Western Washington University, Bellingham; and **Susanne U. Janecke,** USU, Logan.

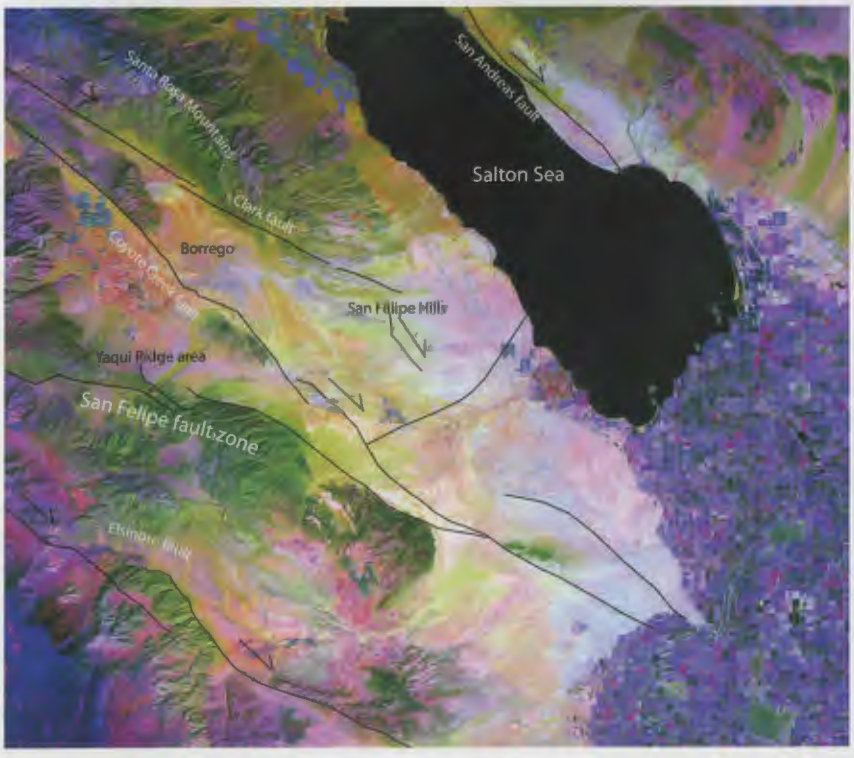
The paper was based on a master's thesis by Lutz, said Janecke, associate professor in the university's Geology Department.

New dating of the arrival of gravel material in the Borrego Badlands showed the material was carried in by alluvial fans and streams a little before one million years ago. Meanwhile, another study by Janecke and USU alum **Stefan M. Kirby '05MS,** now

Arrows show the trace of the Clark fault of the San Jacinto fault zone at the base of California's Santa Rosa Mountains. The Clark fault first delivered coarse sediment into the former muddy Borrego lakebed (foreground and middle distance) about 1 Ma. This major change in the basin dates the propagation of this part of the San Jacinto fault zone to the surface (Lutz et al., 2006). The Fonts Point Sandstone is exposed in the right foreground, in the upper few meters of the exposed cliff face. This sandstone is about 0.6 million years old and was used to date reorganization of the San Jacinto fault zone at that time. See also Kirby et al. (2007, in press in the Journal of Geology*) and Steely (2006, MS thesis at USU). Photograph by Susanne Janecke.*

with the Utah Geological Survey, found that 30 miles to the east, about the same time, "coarse sediment arrived in this basin."

She added, "Then all of a sudden, just a little bit before a million years ago, the whole area was flooded by sand and gravel. And up to half a kilometer (about 0.3 mile) of sand and gravel accumulated after that." The new sediments were not three-tenths of a mile wide, but that deep.



Landsat image of the research site. While satellite imaging is a valuable research tool, Janecke says meticulous field work is still critical for accurate study. Image courtesy of Dr. Janecke.

Another study dating to 1991 came up with the same date. "Three places, widely separated," had a "big, abrupt change," she said.

The dating was possible because of a change in Earth's magnetic field, with the fluctuations preserved in the alignment of magnetic particles in the sediments. "We were lucky in being able to very precisely date the first arrival of the coarse sand and gravel because it coincided with a reversal of the Earth's magnetic field," Janecke said.

The top of the gravel was about 600,000 years old, the bottom a little over one million years old.

Earlier work estimated the age of this San Jacinto fault zone at about two million or 2.5 million years. Another study from 1993 estimated the northwest end of the San Jacinto fault zone was 1.2 million to 1.5 million years old, and "that was not accepted by our whole (geologic) community," she said.

"There were still a number of geologists who suspected the fault had initiated earlier."

USU geologist Susanne Janecke on the Utah Salt Flats.

But the new indications are that the fault is even newer.

The age of a fault plays a role in estimating how fast the ground continues to move in the region. If it has been moving a long time, it may be a slow slip rate; if for a shorter time, the fault may be moving faster.

An earlier estimate of the slip rates was "significantly slower" than what the new research may indicate. In fact, recent studies using Global Positioning System satellite data also apparently show the slip "is quite rapid."

That's not to say it's always moved at the same rate. "Maybe the fault was faster at some times and slower at some times," she said. "We don't know. Or maybe it had a steady state."

It's important to resolve the question because the slip rate will give a better idea of when to expect future earthquakes, she said. The new study will help scientists understand how faults work in the earthquake cycle, Janecke said. "We need more and more data" to interpret the findings. ■

BALKAN SOJOURN PROVIDES...
Continued from page 28

titanium oxide in window coatings to fight air pollution to the measurement of ibuprofen in municipal wastewater.

"I'd never heard of anyone studying the amount of Advil in local watersheds," says Bialkowski, who adds that little is known about whether or not accumulation of the popular painkiller has a significant environmental impact.

A similar and intriguing study by researchers in nearby Milan, Italy, measured the amount of cocaine in a local river basin. Findings indicated that cocaine use in the Lombardy metropolis was neither predominately recreational nor "weekend only" as previously thought.

"As in many European countries, Slovenia has a strong research emphasis in bioremediation and environmental science," says Bialkowski. "There's a lot of interest in and concern for public health."

Bialkowski hopes to arrange an exchange program in environmental science involving faculty and graduate students from Utah State and Nova Gorica.

In contrast to American doctoral students, he says, Slovenian scholars write their own research proposals and secure their own funding, usually from European Union scientific authorities or from private industry. "Successfully conducted research, funded by a private corporation, virtually guarantees job placement with that entity upon graduation."

"I was impressed with the professionalism of the students," Bialkowski says. "PhD students own their research problems and, upon graduation, are well equipped to compete in public and private research arenas."

An avid cyclist, Bialkowski took advantage of opportunities to train on steep mountain roads, as well as enjoy scenic tours of the Adriatic coast and Venice—all within a 100-kilometer radius. While tackling an alpine ride on a particularly raw February day, he met a member of the Goriška Brda cycling team, which adopted the Yank into their circle.

"They gave me their full team attire emblazoned with their motto, which, roughly translated, means, 'We ride bikes well 'cause we drink well,'" he says.

Bialkowski was one of approximately 800 scholars from the United States who traveled abroad during the 2005-06 academic year through the Fulbright Scholar Program. Established in 1946 under legislation introduced by the late Sen. J. William Fulbright of Arkansas, the program's purpose is to build mutual understanding between the people of the United States and other countries. ■

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KEEPING IN TOUCH

We received an Alumnet response from longtime USU supporter and donor **Isabel Katana,** who sends greetings to *Insights* readers. A retired psychiatric nurse and active community volunteer, Isabel was one of the first recipients of the USU Women's Center's *"Women Over 65 Achievement Awards."* At 93, she continues to share her views and insights through letters to the editor to Logan's *The Herald Journal* newspaper and through *Utah Public Radio*'s call-in programs.

1960s

David F. Coppin (BS **1966,** Zoology), Logan, Utah, retired after 36 years of practice as an OB-GYN physician, having delivered 8300 babies. He and his wife, **Kathy Coppin** (**'65** Art) have four children, all of whom graduated from USU.

Ronald J. Hirko (PhD **1969,** Physical Chemistry), Brookings, South Dakota, recently joined the faculty of the Chemistry Department at South Dakota State University.

FOLD FOLD

1970s

Allan Andrew (PhD **1974,** Bacteriology), Indiana, Pennsylvania, helped to develop a program in weapons of mass destruction for the National Guard. He currently serves as Dean's Associate and Professor of Microbiology for the College of Natural Sciences and Mathematics at Indiana University of Pennsylvania. He plans to retire in May 2007 after 34 years at IUP.

Cheryl Raella Milton Hardesty (BS **1977,** Biology), Canyon Lake, California, is a stay-at-home mom of six. After serving an LDS mission in Albuquerque, New Mexico, she earned an MS degree from BYU in 1981. Cheryl operated a computer consulting business for 20 years.

2000s

Michael Cameron (PhD **2000,** Biochemistry), Port St. Lucie, Florida, was recently promoted to the position of Associate Director of Drug Metabolism and Pharmacokinetics at Scripps Research Institute's new Florida facility.

Lacey Larie Jones Gunter (BS **2001,** Statistics), Ann Arbor, Michigan, earned an MS degree in statistics and is currently working toward her doctorate at Michigan State University. She and her husband, **Jacob S. Gunter** (BS **2001,** Political Science and Geology), an attorney, are the parents of Samual Issiah, born in 2005.

Tyler Shiner (BS **2003,** Biology), Owings Mills, Maryland, is working toward a DDS degree from the University of Maryland School of Dentistry.

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Insights *is the alumni newsletter of the Utah State University College of Science. Our mission is to inform alumni and friends of current events, projects, and news within the college. The newsletter also provides a forum for alumni to follow the careers and professional development of colleagues.*

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