

INSIGHTS

UTAH STATE UNIVERSITY - COLLEGE OF SCIENCE

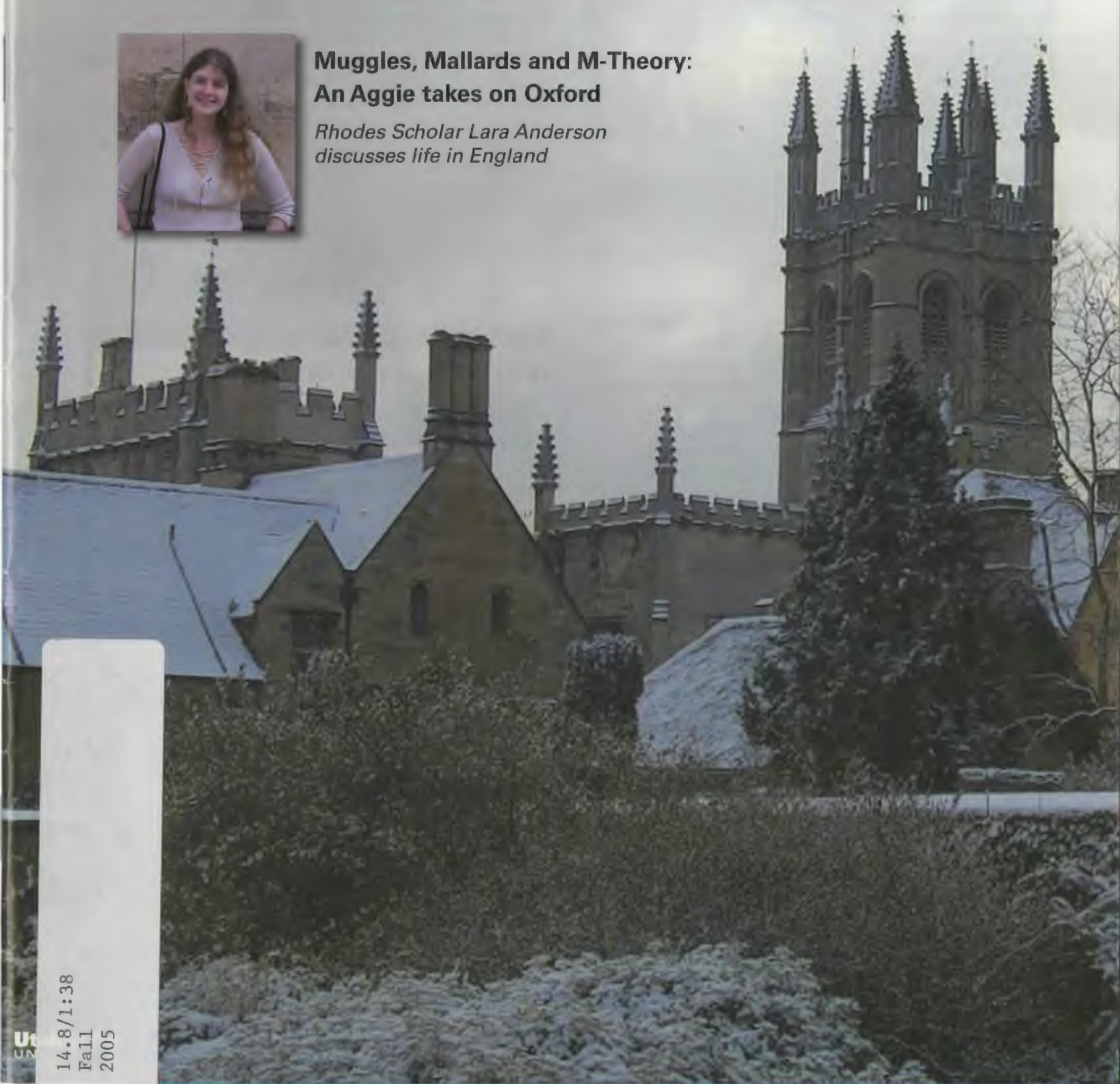
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When students and faculty learn together, ... discovery follows.

FALL 2005



Muggles, Mallards and M-Theory: An Aggie takes on Oxford

*Rhodes Scholar Lara Anderson
discusses life in England*



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

FROM THE DEAN'S OFFICE

Greetings from the College of Science. Fall has arrived here in Cache Valley and we have already had two storms bringing snow to the peaks behind campus. Along with the seasonal changes, the USU campus continues to be a landscape in transition: the new Merrill-Cazier Library has opened, the old Merrill Library will soon be demolished, a parking structure and new student housing are under construction immediately west of Widtsoe Hall, and a beautiful new recital hall will open early in 2006 on the east side of campus. With all of these physical changes, Utah State University continues to provide an environment where excellence in teaching and quality research are fully compatible.



Dean Don Fiesinger

outstanding high school students to consider studying science at Utah State University, and participating in various alumni events in support of scholarships and endowments. There are many dimensions to life here on campus and consequently many areas where you might be able to help us.

I hope that you enjoy this issue of *Insights* and please do not hesitate to contact me if you have suggestions for future articles, such as a favorite faculty member or program that you would like to see highlighted, or a profile on alumni accomplishments. *Insights* will be successful only if it provides information of interest and appeal to you, the reader. Please let us know.

Sincerely,

In the College of Science, our students and faculty continue to be engaged in learning and research. In the last three years, we have had three of our six departments (Geology, Chemistry & Biochemistry, and Physics) recognized with University awards for teaching excellence. Outside of the classroom, our faculty involve undergraduates as well as graduate students in challenging research projects, guiding them on a path for future success. In particular, ten of our Science majors have had a busy summer as Willard L. Eccles Undergraduate Research Fellows. Selected via a competitive process last spring, these students initiated research projects with faculty mentors in May. Their projects will culminate in a co-authored research paper or a presentation this spring either on campus or at a discipline-based professional forum.

Within this issue of *Insights*, we present some of our current research efforts, profiles of our various spring award recipients, and interviews with retired faculty members John Wood and Eastman Hatch from the Department of Physics. You will find out how a class project in a course for science education majors triggered a response from the U.S. Food and Drug Administration (FDA); ponder with geologist Jim Evans how population growth is impacting the American West; learn how USU biologists observing evolution in action; and read how Lara Anderson, our valedictorian in 2003 and now a Rhodes Scholar, has adjusted to life at Oxford studying theoretical physics.

As you read of our accomplishments, please keep in mind that much of our success is due to the support received from you, our alumni and other friends of the College of Science. Remember that there are many ways to get involved and support us, such as providing contacts for undergraduate internships and/or employment opportunities, encouraging

Inside Insights

<i>From the Dean's Office</i>	2
<i>Muggles, Mallards and M-Theory</i>	3
<i>New Appointments</i>	4
<i>Welcome New Faculty</i>	6
<i>Aggie Guardsman Receives Hero's Welcome Home</i>	10
<i>Drilling into Earthquakes</i>	11
<i>Emeritus Professor Eastman Hatch</i>	12
<i>Emeritus Professor John Wood</i>	13
<i>Alum Letter from Wayne Rowley</i>	14
<i>Jim Evans Tapped for Last Lecture</i>	15
<i>Roll of Donors</i>	18
<i>Chemistry/Biochemistry &</i>	
<i>Physics Excellence in Teaching</i>	20
<i>Heritage Society</i>	21
<i>Giving Back</i>	21
<i>Student Phon-a-thon</i>	21
<i>Something Strange is Happening</i>	22
<i>A Taste for Poison</i>	24
<i>NCUR 2005 Student Research Showcase</i>	25
<i>College Honors Outstanding Scholars</i>	26
<i>Wardle Receives Alumni Achievement Award</i>	29
<i>Jim MacMahon: Faculty Awards & Recognition</i>	29
<i>Transitions</i>	30
<i>Keeping in Touch</i>	31
<i>Alumnet</i>	32



Muggles, Mallards and M-Theory: An Aggie Rhodes Scholar Takes on Oxford

During formal hall at Magdalen College, you must wear your academic gown to dinner unless you're a crusader. In that case, you may remain armor-clad. If you reside in All Souls College, grab your stick and torch on All Hallows Eve to haunt the ghost of a Mallard duck, whose body was discovered on the college grounds in 1438. If you're graduating with a history degree, have an ice pack ready. You'll be whacked over the head with a bible before your departure. These are just some of the eccentric rules and traditions Rhodes Scholar **Lara Anderson** has encountered since entering England's Oxford University a year ago.

"It's just like the Hogwarts Academy in the Harry Potter series," says Anderson, who earned bachelor's degrees in math and physics in 2003, along with a master's in physics the following year, from Utah State University.

Oxford, located about 50 miles southwest of London, is composed of more than 24 colleges. Students are assigned to "houses," much like those described in the Harry Potter books, where students live, dine, socialize and study, Anderson says. In fact, Hogwarts Academy was partially inspired by Oxford and the Harry Potter movies were filmed at the university.



Rhodes Scholar and Aggie Alum Lara Anderson says she never has to check the weather forecast in Oxford — It's always raining! Cover and article photos courtesy Lara Anderson.

The university was established in the 11th century, which probably makes Oxford the original college town. Anderson attends Magdalen (pronounced "maudlin") College, whose alums include Cardinal Wolsey, C.S. Lewis, Oscar Wilde and Dudley Moore. "The college even has a park with its own herd of very in-bred deer that look just like Bambi and love horse chestnuts — or 'conkers' as the Brits call them," says the Logan native, who recently returned for a brief hometown visit.

Anderson is a doctoral candidate in the college's subdiscipline of theoretical physics — a division of the college that's larger than USU's entire physics department.

"My current research involves M-theory on G2 orbifolds and multi-dimensional M-theory," says Anderson.

Huh? "The 'm' in M-theory stands for magic, mother, master, matrix, manifold — whatever you want it to be," she patiently explains. "M-theory is currently the leading candidate for a unified theory of the universe's fundamental forces."

It's part of the ongoing search for a "theory of everything" or "TOE," Anderson says. "String theory started about 20 years ago and is a collection of theories. M-theory is a bigger attempt at unified theory that combines different string theories."

In addition to her work at Oxford, Anderson continues her research on supergravity with USU professor **Jim Wheeler**, one of her former teachers. Their collaborative venture will soon be ready for publication.

"My undergraduate and master's work at Utah State prepared me well for Oxford," she says.

Despite a melting pot of classmates from countries around the world, Anderson says she and her colleagues at Oxford share a similar skill set and academic knowledge. She says she enjoys the diversity of nationalities at Oxford, but still finds herself in the minority as a woman.

"Out of 200 math and physics doctoral candidates, I'm one of less than probably ten women," she says.

Anderson has followed the controversy regarding Harvard President Lawrence Summers' remarks earlier this year suggesting "innate differences" between men and women may account for the lack of females teaching math and science in universities.

"I was thoroughly angered by his statement," she says. "It's a fair question to ask, but he had nothing to support his claim."

MUGGLES, MALLARDS AND M-THEORY...

Continues on page 28

NEW APPOINTMENTS

COLLEGE WELCOMES NEW ASSOCIATE DEAN

Chemist **Lisa Berreau** keeps a softball mitt handy in the back seat of her car, and some days it gets a lot of use. She recently played in a faculty-versus-student game among the chemists—and the outcome? “I won’t tell you the score,” she says. “It wasn’t pretty.”



Fortunately, Lisa hits home runs when she’s pitching grant proposals to the National Science Foundation, the National Institute of Health, and the Frasch Foundation. Her research expertise and grant writing skills—along with a steady supply of Diet Coke and a strong dose of enthusiasm—help her keep her labs running. She and her graduate and undergraduate students are working toward a greater understanding of how metals function in biological systems.

Lisa has been named associate dean for research and faculty development in the College of Science. “I’m very pleased to have Lisa on board here in the Dean’s Office,” states **Dean Don Fiesinger**. “She brings solid experience in grantsmanship and she is an outstanding research mentor and teacher. I couldn’t think of a better person to help guide our young, talented faculty.”

Lisa’s success can be attributed to her thoughtful and energetic approach. “I go through stages of grant writing,” she says. “Reading, analyzing, contemplating where to go with research. Then I go talk it over with my students and rethink things. It’s always in the back of my mind.” Proposal writing, she says, can bring a remarkable clarity to one’s work. “It focuses the mind.” Although Lisa often travels to Salt Lake City for fun and good food, cheers for the Minnesota Twins and Vikings, and plays softball and other sports, she also finds time to pore over books with keep-you-up-at-night titles like “Getting Funded.”

A native of Minnesota, Lisa has found “some of the finest undergrads you’ll ever see” at Utah State. “Some are scary-smart,” she says. “They have a lot of drive to succeed, coupled with strong intelligence.” She likes the fact that the Chemistry Department at USU is a “mid-sized program,” which allows her the time to supplement her research with other endeavors, including teaching Honors courses and advising university librarians on the selection of science journals and books. Each day brings a steady stream of students knocking on her door, and many students name her as their strongest influence and mentor at USU. The College administration is pleased to welcome Lisa on board.



COLLEGE WELCOMES NEW DEVELOPMENT DIRECTOR

The College of Science welcomes **Christopher T. Tallackson** as director of development. Chris assumed his new post August 15.

Chris arrives in Cache Valley from Walla Walla, Washington, where he was a Development Officer with Whitman College, developing relationships with alumni through

major giving and annual fund campaigns. Chris holds a BA in Economics ’82 from Whitman. He has been a regular visitor to Central Idaho since 1970, where his family vacationed and his parents have lived since 1985. “My family feels very much at home in Utah’s mountainous landscape.” Chris was raised in Bellevue, Washington, and Portland, Oregon.

“I enjoy hearing people’s stories and helping them apply their financial support in a way that is meaningful to them and also strengthens the university,” says Chris. “For so many alumni and faculty, their USU experience provided the inspiration and foundation for a meaningful life long journey. The dedication faculty members demonstrate in guiding their students on a challenging and successful academic journey is remarkable. Students at USU have access to an incredibly personal learning experience.” Prior to entering higher education development, Chris pursued a 15-year career in industrial power supply sales and support in the telecommunications industry.

Beyond campus, Chris looks forward to enjoying Cache Valley’s fly fishing and skiing with his wife, Barbara, a Sun Valley, Idaho, native, and their two young children. “My son is adjusting quickly—he loves doing the ‘Scotsman Cheer’ at Aggie events, and both kids love our Saturday night stops for Aggie ice cream.”

NEW DEPARTMENT HEAD NAMED FOR PHYSICS

With **John Raitt’s** departure, Professor **Jan Sojka** takes the helm as head of the physics department. Sojka, who was named Utah’s Carnegie Professor for 2002, lists the Dallas Cowboys, country music, family, and outer space,



among his passions. That list also includes teaching students “of all ages.”

“Physics can be a tough subject to teach when you are teaching a room full of students whose first love isn’t the subject,” says Jan. “I have to do something to keep the students awake. My Scottish accent and a sense of humor helps. But I find what works best is getting the entire class out of their seats to participate in group demonstrations.”

Jan uses the “wave,” known to sports fans the world over to liven the action when there is a lull in a game, to demonstrate simple laws of physics.

He believes that interaction with one’s audience and enthusiasm for the subject go a long way toward bridging the gap among the interested, the disinterested and the unenlightened.

“My first upper division physics course was taught by (Jan),” says former Aggie **Jason Sanders**. “His love for the subject was so strong it was almost tiring. Once in a lecture he humorously and accurately described the principles of flux by relating it to bunnies hopping in and out of a garden. His energy at the blackboard was exciting; he loved the subject and it was contagious.”

Jan has served as longtime faculty advisor for the NASA Get Away Special (GAS) project at Utah State. The GAS team includes interdisciplinary undergraduate students developing experiments that have flown on the NASA Space Shuttle. Utah State has put more experiments into space than any other university in the world. ■

JOHN RAITT TAKES A BOW

When **John Raitt** first heard about the Utah Agricultural College, he was dubious. He looked it up in an encyclopedia, and sensed it was in the middle of nowhere—compared to the somewhere he lived—London. Born in England, John’s childhood was disrupted by World War II. He was a toddler when the troops retreated from Dunkirk through England, and his father, an engineer in a munitions plant, was given two days to relocate his family to safety, away from German bombers.

John’s father fed his son’s interest in the physical sciences with books, and John ended up at Kings College London studying physics. His classes were held in “quite an old building, with old-style classrooms and labs.” In those days, at that college, “students mixed more with faculty. We had afternoon tea.” The hot topic was the novel new concept of DNA, discovered by biophysicists on the King’s College and Cambridge campuses. “We probably didn’t

realize its relevance at the time,” John says, but the race to see which group got there first was on.

As a faculty member at University College London, John received a fellowship from the European Space Research Organization (now the European Space Agency) to study at the University of California, San Diego, with **Peter Banks**. They were looking at experiments for NASA’s space shuttle when Peter asked, “Are you interested in joining our group?” and “By the way, I’m moving to the Utah Agricultural School to head up their Physics Department.”

John’s initial reservations soon turned to enthusiasm. He was impressed with the Utah school’s facilities, and ascertained the school’s promising capacity to develop space exploration research. The Space Dynamics Laboratory was still in its infancy, but the four colleagues Peter brought with him infused energy into space research.

John worked with Peter and others to develop a vehicle charging experiment that flew on the third shuttle flight—among the first science experiments flown on the shuttle. They fired a beam of electrons into space and monitored how the action affected the electrical charging of the shuttle. After another series of charging experiments on the Spacelab-2 shuttle flight, the charge handling instrumentation was incorporated into an experiment to fly a tethered satellite. The tethered satellite system was attached to the shuttle by an insulated, electrical conducting wire, which had to be a sophisticated cable—strong enough to handle mechanical loads and resist the space environment. Although a deployment problem limited the first attempt, and the second attempt was plagued by a broken wire, the results gave people confidence that a tethered system was viable. “We demonstrated that you could generate electricity from a deployed conducting tether, which could be used as a source of energy for the space station.” John also studied the electrical charging and discharging of space vehicles with sounding rockets.

In 1988, John was tapped to be department head, and though he carried on research already in the works, administration duties eventually grounded new space projects. “It’s a good department,” John says. “There’s not a lot of controversy. I have no regrets.”

“It’s been a pleasure to work with John,” says Dean Don Fiesinger. “He’s been a strong advocate for his faculty and staff.”

John is moving to Arizona, where he’s bought a home. “It’s hard to make the decision. I still enjoy being here.” His many friends make it difficult to leave, he says. “The problem is, I’m not a sporting person. Tucson is full of golf courses, but I don’t think I’ll do that.” What he would like to do is travel, with an important caveat: “That’s *not* to meetings!” As Trekkies might say to a departing friend: Live long and prosper. ■



NEW FACULTY ENRICH COLLEGE



Paul Cliften
Assistant Professor
Biology

Paul Cliften

Having recently returned to the Intermountain West and eager to enjoy the outdoors, **Paul Cliften** considered taking up golf. "But I changed my mind," he says. "It might cut into my fly-fishing time."

Raised in Idaho's Upper Snake River Valley, Paul began his academic career at Ricks College, now known as BYU-Idaho, in Rexburg. He says he loved his freshman microbiology class so, early on, there was little question in his mind of which major to pursue. After two years at Ricks, he transferred to Utah State, immersed himself in molecular biology, and subsequently earned both bachelor's and master's degrees.

Paul worked in the lab under the tutelage of Professor **Jon Takemoto**, with whom he researched the yeast gene *SYR2* that causes resistance to the bacterial phytotoxin, syringomycin.

"You learn a lot from the lab that you don't learn from the classroom," says Paul of his undergraduate and graduate research experiences at Utah State.

Paul headed to the University of Colorado Health Sciences Center in Denver where he earned his doctorate in biochemistry and genetics. From there, he accepted an NIH postdoctoral fellowship at the Genome Sequencing Center at the Washington University School of Medicine in St. Louis.

Paul continues his research in yeast genomics and is currently focused on comparative techniques used to identify conserved sequences that regulate genes. This process involves comparing DNA sequences from related species to determine which sequences or motifs are similar in the different species. It has been used for a number of years to identify and characterize gene sequences, but now that sequence data is more readily available from related organisms, the process is being used to discover more subtle functional sequences in the genome.



Jeremiah James
Assistant Professor
Computer Science



Minghui Jiang
Assistant Professor
Computer Science



J. Dean Mathias
Lecturer
Computer Science

Paul says a challenge facing genomic biologists is the explosion of data resulting from rapidly developing technology. "We have all this data and we need to sort through it."

He acknowledges that many biologists depend on statisticians and computer scientists to bring their computational and data manipulation expertise to untangle the data jungle. "But you still have to know what questions to ask on the biological end."

Ultimately, says Paul, the ability to manage data will make biology more accessible to everyone. "Even high school students can now hop on the Web and find an amazing range of data to interpret," he says. "There have been some impressive high school projects in the past few years."

Jeremiah "Jerry" James

Bakersfield, California, native **Jeremiah "Jerry" James** has always liked math. Throughout grade school and junior high it was his favorite subject and he thought it would be the field he'd eventually pursue in college. Then came the day in high school when his best friend received a Commodore 64 for his birthday.

"I was never the same," says Jerry, who has been hooked on computers ever since.

He earned bachelor's and master's degrees in computer science from Brigham Young University and headed back to his home state to complete his doctorate, also in computer science, at the University of California, Santa Barbara. He subsequently joined the computer science faculty at the University of Kansas.

A self-described "code monkey," Jerry says he likes to delve into source code to tinker with the very support structure of the software. His current interests include operating systems programming – especially in Linux – and applying formal methods to system programming. "Here's where I return to my love of math," he says. "We can do systems programming in a mathematical way to improve the quality and integrity of software."



James Pitts
Assistant Professor
Biology



John R. Stevens
Assistant Professor
Mathematics and Statistics



Changhui Yan
Assistant Professor
Computer Science

This fall, Jerry teaches a programming languages course to introduce students to a wide range of languages. "Most computer science students are specialists in only one or two programming languages," he says. "This course broadens their horizons."

In the spring he'll teach a graduate-level concurrent programming course, which emphasizes development of multithreaded systems. "Concurrent programming brings students up to speed with the rising generation of programmers," says Jerry. "Such programming enables software to perform more than one task at a time. But it also requires precision to prevent data corruption and ensure satisfactory performance."

In the research sector, Jerry plans to write a tool to perform source code analysis to uncover common mistakes made by programmers when writing multithreaded software. "It could be called, 'When Bad Things Happen to Good Programmers' or 'Common Programming Pitfalls,'" he says.

He's also joined the Space Software Lab, headed by colleague **Scott Cannon**. The lab develops software infrastructures for space-related projects. A current lab project is focused on crafting standard software architecture to be used for construction of Department of Defense satellites. "The idea is to be able to slap together a new satellite from parts and software on hand in a matter of days or weeks instead of at the current pace, which takes years," says Jerry.

A third project involves formal analysis of distributed computing systems. "My efforts have focused on distributed shared memory, which is a way of making a bunch of distributed machines think they are sharing a chunk of memory that they all can read from and write to," he says. "They aren't really, of course, but it looks that way to applications that run on the system."

One of Jerry's spare time interests is serving on the XEmacs Review Board for an open source software program he alternately describes as "a text editor gone berserk" or "a kitchen sink editor."

When he's not in front a computer screen, Jerry enjoys reading "anything but westerns and romance novels." But the bulk of his time beyond campus is spent with his wife and four children. Jerry describes the recent challenge of assembling a backyard swing set that proved difficult even for a computer whiz. "It would help if the packing list matched the actual carton contents and the predrilled holes actually matched up," he says.

Minghui Jiang

In **Minghui Jiang's** hometown of Wuhan, China, you'll need to allow at least a half hour to cross the mighty Yangtze River Bridge on foot. If you're in a hurry, you can catch a bus on either end of the bridge to whisk you across. So you'll forgive Minghui if he smiles at the mention of the Logan River, which, even at flood stage, "is more like a creek."

But Minghui has grown fond of the mountainous beauty and relaxed pace of the Rocky Mountain West. He completed his doctorate at Bozeman's Montana State this past spring and moved to Utah State to join the Computer Science Department as an assistant professor this past summer. His research endeavors in computational geometry are a step in propelling development of cartographical applications to accurately capture the geographical nuances of Wuhan, Logan, and points beyond.

Minghui's love of complicated algorithms began in his pre-college days when he and classmates enthusiastically prepared for math and science competitions with the goal of advancing to city, regional and national levels. "It was fun solving mathematical problems," he says.

Minghui completed undergraduate studies in physics at Beijing University and wrote his bachelor's thesis on computational physics. He came to the United States in 1997 to pursue graduate studies at Purdue, where he earned master's degrees in both physics and computer science. While at Purdue he participated in a research project, still in progress, to simulate piano sounds using computer programs based on Newton's laws. The challenge,

he says, is getting just the right interaction between hammer and string. "In our initial simulation, the piano's notes sounded more like the pluck of a guitar string."

And how does a computer program emulate the emotions of a human musician? "Actually, you can vary a number of parameters – volume, timing, tempo – to translate feelings," says Minghui.

Next spring, Minghui will teach courses in algorithms and bioinformatics, while continuing research in the topic of his doctoral thesis – map labeling with circles – among other areas.

Outside the classroom, he looks forward to hiking and camping with his wife, Whayling Ng. The couple met while Minghui was living in Chicago and working for a software development firm following graduation from Purdue.

"My wife, who is from Malaysia, actually speaks more dialects of Chinese than I do," he says.

J. Dean Mathias

J. Dean Mathias is no stranger to USU's Computer Science department, having earned two degrees from the department and having taught as a temporary instructor for the past two and a half years. His position became permanent last July, and Dean looks forward to continue teaching of C++, operating systems, Java, computer graphics and more.

"Teaching isn't a zero-sum game," says Dean, who has worked as a private consultant for the past ten years. "I lose nothing when I share information with students."

Dean earned a bachelor's degree in computer science in 1992 and returned to complete a master's degree in 2004. In the late 1980s and early 90s, he worked as a student programmer for the university's Utah Water Research Lab, where he initiated his career in developing environmental applications. As a consultant, he expanded his work to include development of complex databases to store, manage, and report federally-mandated data collections. Today, his consulting clients include a variety of environmental engineering firms and other companies, including Idaho Power.

His initial foray into teaching resulted from a spur of the moment request from an electrical engineering professor who asked Dean to teach a course. "I really enjoyed the interaction with students and it challenged me personally," he says. "And I like the university environment."

Dean concedes that his undergraduate studies were difficult—an experience, he believes, makes him a better teacher.

"By the time I entered the graduate program, I had the advantage of seasoned study habits, real-world experience and personal maturity," he says. "But my undergrad struggles enable me to readily identify with the typical student."

Dean says he understands the confusion some students encounter with course material because he's experienced it himself.

"I recognize their confusion and know the pathway to help them grasp the concepts."

He reminds students that struggling to master complex information doesn't mean they're not intellectually up to the task. Sometimes sheer repetition is required, he says.

"Perseverance and experience are hugely important," says Dean. "I encourage students to keep trying."

Perhaps that's why Dean is an avid cyclist and *Tour de France* fan.

"I ride about two to three hours a day about four to five days a week," says the LOTOJA (Logan, Utah to Jackson, Wyoming) race veteran.

Dean says cycling provides an outlet completely different from both the job and hobby of computing.

"Cycling refreshes my mind and there is no feeling as sweet as the pain of an exhausting bike ride," he says. "I love both cycling and computing. I tell my cycling friends, 'the bike comes first,' and my geek friends, 'the computer comes first.'" For the true answer, Dean says, you'll have to ask him yourself.

James Pitts

Growing up in Dayton, Tennessee, **James Pitts** used to hang with his buddies on the grounds of the Rhea County Courthouse and its basement museum. "It was our after school gathering place," says James of the site of the infamous 1925 Scopes "Monkey" Trial.

Back then, James had no burning desire to study evolutionary entomology, but the irony of his childhood hangout and current profession isn't lost on him. "I just liked bugs," he shrugs.

Interestingly, biology wasn't the focus of James' initial higher ed and professional careers. After high school, he served a two-year stint as a nuclear electrician aboard a Navy sub during Desert Storm. Undergraduate studies followed at the University of Tennessee, where he majored in physics and chemistry and minored in math. He was subsequently employed as an analytical chemist in industry.

Yet James' fascination with insects was rekindled and he pursued graduate studies at the University of Georgia, where he earned his doctorate degree.

James and wife **Theresa Pitts-Singer** arrived in Logan in the summer of 2002, when Theresa, an adjunct assistant professor in Biology and also an entomologist, accepted a research post with the Bee Biology and Systematics Laboratory. After moving to Utah, James taught at Weber State before accepting a position at USU as a research professor and coordinator of the Introductory Biology Lab. The Provost's Office approached him about teaching Honors classes, which led to the offer of assistant professor.

Today, James' primary research interests are the evolution, ecology and history of Hymenoptera – that is, wasps, ants and bees. He's among a handful of entomologists worldwide specializing in the study of spider wasps and velvet ants.

James' "love of bugs" is still evident as he displays his multi-continent collection of wasp specimens and enthusiastically describes a weekend lecture he's prepared for a local biology club. He delights in grasping wasps out of the air during community demonstrations, which always elicits gasps of fright. "I know which wasps sting and which don't," he says.

John R. Stevens

John Stevens and his wife, **Heather Waddoups Stevens**, both graduates of Utah State, were thrilled when John received an offer to teach at his alma mater.

Leaving Purdue University, where John earned a master's in mathematical statistics and a doctorate in statistics, and returning to his hometown to join the faculty at USU is oddly reminiscent of his grandfather's experience. Utah native **Kenneth R. Stevens** returned to teach and research soil microbiology at Utah State Agricultural College, as the university was then known, after earning a doctorate at Rutgers in 1932.

While John never met his grandfather, who passed away before his grandson's birth, he says he feels honored to be able to "somewhat follow in my grandfather's footsteps."

After graduating from Sky View High School and entering Utah State, John was an aspiring high school math teacher. "Then I caught the research bug," he says, as he describes his undergraduate research project. "I have fond memories of that first project."

Under the direction of professors **Ian Anderson** and **Mark Fels**, John and his undergraduate research partner, **Adam Bowers**, worked on a classification system of Lie algebras of vector fields. Both students continued their research in graduate school. Adam is currently a doctoral candidate at the University of Connecticut.

John says he's excited about creating undergraduate research opportunities in his new position because he knows their value. "Conducting research at the undergraduate level teaches you how to deal with dead ends and how to use and create various software applications to achieve your objectives," he says. "It adds a whole other dimension to classwork and gives you a real advantage as you pursue graduate studies."

His current bioinformatics-related research focuses on using microarray technology and meta-analysis to determine levels of gene expression. "Microarray technology has been a real boon to the statistics community because of the interesting issues it presents," says John. "Using meta-analysis, you can combine results from multiple labs and account for chance variability and other differences to gain a better understanding of each gene's role."

John taught his first course at USU this past summer and says Utah State's smaller classes are a welcome change from lecturing 300 to 400 students at a time as he did at Purdue. "I really enjoy working with students and I'm pleasantly surprised at how engaged they are," he said.

He asked his summer class, comprised of students majoring in psychology; political science; elementary education;

communicative disorders; family, consumer and human development; and more, to write a short essay describing how they would use statistics in their future careers. "They really rose to the challenge," John says. "I was amazed at the interesting examples they came up with."

Time spent riding the bus to and from school at Purdue afforded John the opportunity to rediscover reading for pleasure. "I had forgotten how many great subjects are out there."

Now that he's living in Cache Valley, he's glad to be back in the mountains and pursuing outdoor activities sans Midwestern humidity.

"We took our two young daughters on their first camping trip," John says. "And I'm taking advantage of great mountain biking opportunities. But more than anything, I'm looking forward to a long and productive career here at Utah State."

Changhui Yan

For many Americans, the sport of badminton conjures images of genteel, early 20th century ladies and gentlemen gingerly tapping birdies on a rolling green lawn, while pausing for sips of mint juleps. **Changhui Yan** knows better. For him, badminton is a fast-paced, Olympic-level sport, not for the faint of heart, that's best played on a hardwood court.

While searching for badminton partners, as well as players up for a volleyball match, his other sport of choice, Changhui is settling into USU's Computer Science Department. He recently earned a doctorate from Iowa State University, where he majored in bioinformatics and computational biology as well as computer science.

Changhui's interest in bioinformatics piqued about five years ago, while pursuing graduate studies in biology at China's Beijing University. "Although bioinformatics was at its early stage, it had shown tremendous power in tackling biological problems in genomic and proteomic areas," he says.

Changhui began to research doctoral programs in the fledgling discipline and discovered Iowa State. "Iowa State University was among the rare, pioneer universities that offered a PhD degree in bioinformatics at that time. Today I am happy to see that many more universities have joined in," he says.

Iowa State's interdepartmental program draws candidates from a variety of backgrounds, says Changhui. While there, he joined other biologists learning the ropes of computer science, while working alongside computer scientists tackling courses in biology. He hopes to find the same interdisciplinary collaboration at Utah State.

"My current research focus is in protein function and structure prediction," Changhui says. "My past research involves identifying the DNA-binding sites on proteins."

His wife, **Lan Hu**, is also a computer scientist and is continuing graduate studies she started at Iowa State here at Utah State.

NEW FACULTY ENRICH COLLEGE...

Continues on page 10

AGGIE GUARDSMAN RECEIVES HERO'S WELCOME HOME

Neighbors and friends of **Erick Lund** lined the streets of his hometown and waved American flags as the Providence, Utah native returned home following military service in Iraq. Erick attended Utah State as a pre-dentistry major during the 2003-04 academic year and returned to school this fall to resume his studies.



Aggie Erick Lund poses with Defense Secretary Donald Rumsfeld. The photo was taken last December at the town hall meeting at a transit camp in Kuwait, where a soldier asked Rumsfeld, "Why do we soldiers have to dig through local landfills . . . to up-armor our vehicles?" (Photo by John Carlson)

Erick, who served with the Logan-based Utah National Guard's Bravo Battery, 1-148th Field Artillery Battalion in Kirkuk, was severely injured when two roadside bombs exploded near his unit's Humvee during a patrol on July 16. The blast killed one of his comrades, while wounding Erick and another soldier. Erick suffered shrapnel wounds to the back of his head, upper back, left leg and foot.

Erick vividly remembers the bombing. "We were traveling about 65 mph when we hit the bombs," he says. "My buddy, who was driving, was knocked unconscious and we coasted about 200 meters before the vehicle came to a stop."

Though he remained conscious, Erick said he couldn't move his arms or legs and his ears were ringing. "It was like being inside a popping balloon. I heard people yelling at us to get out because our vehicle was on fire."

Fellow soldiers pulled him to safety and loaded him on a medevac helicopter. Emergency surgery at a field hospital saved his leg, Erick says, but he still required partial amputation of his foot. He was flown first to Germany, then to Brooks Army Medical Center in San Antonio, where he spent a month undergoing further treatment and therapy.

Erick's wife, **Amanda "Mandy" Brady Lund**, a pre-nursing major at USU, joined her husband in San Antonio. "She's a trooper," says Erick. The couple had been married only four months when Erick left for Iraq.

Erick started fall semester classes just days after his return and, though he feels somewhat overwhelmed with his class load, says, "I'll never be able to look at school with a negative attitude."

"You never appreciate life as much until something devastating happens," he says. "Even walking across the quad feels good."

Amid studies, Erick and Mandy look forward to the coming ski season at Beaver Mountain. "I figure I can still manage snowboarding – even with a partially amputated foot."

Erick is the son of **Hank** and **Wyoma Lund** of Providence, Utah. Hank works in the USU Controller's Office. Erick's siblings **Andrew Lund** and **Lynsi Lund Theurer** also attend Utah State. ■

NEW FACULTY ENRICH COLLEGE...

Continued from page 9

Changhui met her during his studies in Beijing, Lan's hometown.

Lan is a "city girl," Changhui explains, while he hails from the country. He grew up in rural Litang, a city in southern China's Guangxi Zhuang Autonomous Region near the Vietnamese border. His parents make pottery.

Changhui says Litang's population is about the same as Logan's – 50,000 people – but the city covers a much smaller geographical area. "It's much more crowded than Logan and the climate is very hot and humid."

Two very different climates, perhaps, but both places where one can pursue hardwood court sports year round.

Badminton, anyone? ■

HERE COMES THE SUN

Solar flares create geomagnetic disturbances that can wreak havoc with communications on Earth, says Physics Department Head **Jan Sojka**. Scientists suspect solar wind caused the 1998 malfunction of the Galaxy IV satellite that knocked out pagers, radio and TV broadcasts, ATMs and pay-at-the-gas-pump service for millions of customers. Inclement space weather can also disrupt flight and maritime navigation systems.

DRILLING INTO EARTHQUAKES

Utah State University geologists are involved in a breakthrough drilling project that lays the groundwork for the first subterranean earthquake observatory established directly within a seismically active fault.

Geology professor **Jim Evans**, grad student **Sarah Draper**, undergrad **Kelly Mitchell** and Aggie alum **John Solum**, now with the U.S. Geological Survey, are among researchers who worked on-site this past summer with the San Andreas Fault Observatory at Depth (SAFOD) project. Launched in 2003, SAFOD is one of three major components of EarthScope, a National Science Foundation-funded initiative being carried out in collaboration with the USGS to investigate powerful geological forces that shape the North American continent.



USU geologist Jim Evans, left, and Steve Hickman of the USGS wash the last cuttings sample from the borehole (Photo courtesy EarthScope.)

Drilling personnel completed the project's 13,082 feet-long curved borehole, which penetrates an active area of the San Andreas Fault and reaches a vertical depth of about 2 miles, August 9. Located on a private ranch near Parkfield, California, about halfway between Los Angeles and San Francisco, the borehole is lined with steel and concrete in preparation for installation of a variety of instruments and sensors to provide round-the-clock measurement of temperature, fluid pressure, strain accumulation and other processes.

"We've drilled into active faults," says Jim. "For one of the first times we can look at rocks in a zone where we know earthquakes occur."

Drilling into the precise location was easier said than done. Rather than an obvious gash in the ground apparent with up and down thrust faults, much of the 800-mile long strike-slip San Andreas is barely visible to the lay observer. It consists of two roughly parallel, underground plates that slide past each other like cross-country skis. While drilling into the carefully selected site, researchers discovered different rock types than their models suggested.



At the California drill site, USU undergrad Kelly Mitchell performs heavy mineral separation on cuttings samples. (Photo courtesy EarthScope.)

"We took samples at every 100 feet of drilling depth to anticipate when we'd cross the fault and hit the active zone," says Kelly, the lone undergraduate in the multi-university 10-member student contingent of the research team.

Kelly and Sarah spent days in 100-plus degree heat scooping expelled drilling mud into buckets, washing and separating rock cuttings, and carefully analyzing the cuttings' composition.

Kelly said it took longer than expected to hit the telltale heavy silicates indicative of the target zone. She recounted a false alarm in late July when she and fellow students were roused in the wee hours of the morning from their drilling rig-side double-wide trailer to witness breaking developments. "We all rushed to the drilling platform," she says. "The drilling break – meaning the rate that you're penetrating the rock – suddenly increased and we thought we'd crossed the fault."



USU grad student Sarah Draper (right) and Rafael Almeida of Texas A&M scoop expelled drilling mud to collect mineral samples. (Photo courtesy EarthScope.)

The team's efforts were rewarded August 2, when the drill sped up again, hit bursts of radon, carbon dioxide and hydrocarbon gases and breached the active zone.

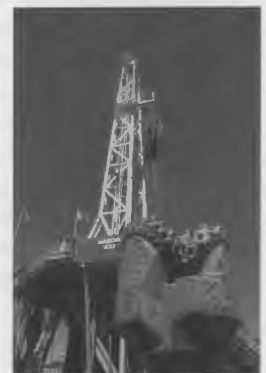
William Ellsworth, chief of the Earthquake Hazards Team at the USGS in Menlo Park, California, and a principle investigator on the project, told national media the successful borehole marks a major milestone in understanding how quakes start, how they grow into deadly tremblers and whether scientists can learn to accurately predict them.

Until now, said Jim, geologists have been limited to study of exhumed faults – that is, faults that were once at depth and have subsequently risen to the surface due to mountain building processes. "In those cases, we are never sure that the faults we look at were truly earthquake-producing," he says. "Now we're able to observe the actual earthquake machine in real-time."

Jim, Kelly, and Sarah say they are grateful for the unprecedented opportunity to participate in a project that provides a literal window into previously unseen geophysical phenomena. "This is a very cool project," says Jim.

For more information about SAFOD and Earthscope, visit earthscope.org. ■

The 2,000 HP diesel-electric rig used to drill the more than two mile-deep borehole into the San Andreas Fault. In the foreground is the drill bit used to penetrate the active fault zone. (Photo courtesy EarthScope.)



EASTMAN HATCH:

A LIFE OF LUCKY BREAKS



Eastman Hatch has the manner of a gentleman. When he reminisces about his life, he attributes every good turn of events to a “lucky break” or “good fortune.” Colleagues or family members might call his good luck by other names: vision, discipline, and simple gratitude.

His first “lucky break” was being able to attend Stanford University, where he earned a bachelor’s in physics. His second? Meeting his wife, artist Anne Clawson. “We

grew up in the same Salt Lake neighborhood,” he says, “But we hadn’t met.”

Friends arranged a blind date, which became a lifelong partnership. Eastman obtained his doctorate from Caltech in Pasadena, California; published his work in the *Physical Review*; and was offered a position at the prestigious Brookhaven National Laboratory on Long Island, contributing to the growing body of research about low-energy nuclear physics.

It wasn’t long before the U.S. Navy came knocking, asking Eastman if he would go to Germany to participate in the interrogation of captured German scientists. “At the close of World War II, the Russians pled with the Americans not to go into Berlin until they had secured the place,” Eastman says. “The Russians were our allies, and Stalin was persuasive, so the U.S. stalled the troops until the Russians took over. The first thing they did was go to the universities and research institutes and round up all the atomic scientists.”

The German scientists were ordered to work at Russian atomic labs for a period of ten years, but when their contracts expired, “99.9 percent” wanted to return to Germany. Eastman’s job was to debrief “people of interest” who had slipped back into West Germany, to assess the strength of Russian nuclear capabilities. He spent five months in 1958 concentrating on an important chemist who had abandoned all his possessions to slip, unnoticed, into West Berlin. After Eastman had spent two years in Frankfurt-Main gathering intelligence, the program had accomplished most of its goals and Eastman was ready to move on.

And then, according to Eastman, a “fortunate thing” happened. A friend of a friend invited Eastman to collaborate on nuclear physics research at the University of Heidelberg, in Germany. Eastman published his work in Germany’s most prestigious physics journal, *Zeitschrift für Physik*.

“Our children were coming up to school age about then,” he says, and he and Anne decided to return to the States. Eastman was invited to become an associate professor at Iowa State University in Ames, Iowa, skipping assistant professorship and landing immediate tenure, which caused consternation with some colleagues.

His last stop was Utah State, where Department Head **Farrell Edwards** hired him in 1969. When Farrell stepped down, Eastman took his place as department head, and threw his energy into beefing up the graduate program. “I made an effort to recruit grad students, and had three students who obtained doctorates, including our first woman physics grad student,” Eastman says. “**Glen Taggart** was the university president at the time, and he and Provost **Gaurth Hansen** brought this university into maturity. Those were fruitful years.”

The College of Science also prospered, benefiting from a summer lecture program with distinguished scientists that Eastman initiated, along with Science Dean **Ralph Johnson**. Eastman went on to become dean of the School of Graduate Studies, where he established a Student Graduate Council, which gave students a voice in the formulation of graduate school policies. “It was quite popular,” he says.

Four years later, he and Anne returned to Germany for a sabbatical at the University of Freiburg. His second sabbatical, seven years later, took them to London and the University of Cologne, on the Rhine River in Germany. Along the way, Eastman taught almost every physics class offered at USU.

Eastman hasn’t slowed down in retirement. He’s served as president of the Rotary Club, and has volunteered on community and university boards, including the Science and Humanities Council; the College of Humanities, Arts and Social Sciences; Sunshine Terrace; and the Stokes Nature Center. One of the founders (and first chairperson) of the Chamber Music Society of Logan, he has served on the board since the group’s inception 25 years ago. He also serves on the board of Musica Reservata. He and watercolor artist Anne contribute to the arts and to community causes. They also gather regularly, with their three children and six grandchildren, at a family cabin on the upper Weber River.

Eastman’s overall reflection is this: “We’ve been very lucky.” Those who have had the opportunity to know him—his students, colleagues, and friends—would say the same. ■



JOHN WOOD:

A LIFE IN THE MOUNTAINS

John Wood still walks to the office twice a week; it's hard to break the habit of a lifetime. After all, his affiliation with USU's Physics Department goes back to 1937, when the young student embarked on a lifelong passion.

He was introduced to physics at age eight when he read one of the first college physics texts ever written. The book, written by a Nobel Prize winner, "had a lot of pictures and words I could understand. And a lot I couldn't," he laughs. "That's when I knew what I wanted to do."

John worked his way through the Utah Agricultural College in the machine shop—he could make 50 cents an hour making equipment for physics experiments, as opposed to 25 cents an hour grading papers. After graduation, he took the bus across the country to Penn State, just as World War II was heating up. When the U.S. entered the war, John served on the front lines—of research—helping develop high-octane gasoline for the military. He also trained aviation students. "I had a platoon of 20 students on their way to Air School," he says. "They used to salute me!" After a brief stint at the Bausch and Lomb Optical Company, John returned to academics, and to the West, to the University of Wyoming in Laramie. He and his new wife, Margaret, packed their 1939 Ford so full of possessions they had to jack up the rear axle.

Utah State offered an invitation in 1956, and John took it, with reservations. "We had gone through three presidents in four years."

John Wood isn't the only member of his family to have enjoyed a long career with Utah State. Next year, Bob Wood, John's son, will complete 30 years of employment with the College of Science. Moreover, Bob graduated with a B.S. in computer science this past summer. "I'm certainly not the oldest USU graduate, but I may hold the record for the longest undergraduate career," he says.

Bob joined USU as an electronic technician and gradually morphed from instrumentation troubleshooter to computer technician as the Microprocessor revolution surged. "I remember using a slide rule in Math classes and chart recorders to monitor chemistry experiments," he says. "Technology has drastically changed the college learning experience and classroom interaction." Bob calls USU "a great place to work – it's one big, happy family."

According to the university archivist, the early 1950s were a period of conflict and tumult at the Agricultural College. Twelve hundred students camped out at the state capitol to protest the firing of **President Louis Madsen**, and speculation was rampant about possible decisions, made in the governor's office, which might impact the school in a far-reaching way. According to John, two of the three PhDs on the Physics staff resigned before he arrived on campus. **Darryl Chase** was appointed president the following year and, John says, an era widely acknowledged as one of the most progressive, growth-oriented periods at USU began. The school also found a friend in the new governor, **George Dewey Clyde**, a former USU engineering dean.



In 1957 *The New York Times* reported the successful launch of the Russian satellite, Sputnik. This raised a furious investigation by Congress as to how we had been outdone, says John, and led to the creation of programs that raised the scientific competence of young students. John joined the educational effort, and began teaching a grade school science program and evening courses for high school physics teachers on his own time. "They had me going till late at night," he remembers.

John gave his campus lectures in the theater in Old Main, as the Widtsoe lecture hall wouldn't accommodate the post-war boom of students entering college on the G.I. bill. "I had to haul an antiquated projector there two times every week. The other three days I gave a recitation class in World War II bunker huts."

An immediate order of business for John, an experimental physicist rather than a theorist, was to find the funds for needed equipment. Unfortunately, money was in short supply. "I was told by the controller that physicists don't need equipment; they can use pencils and paper," he says. John was eventually able to rebuild the machine shop, with the substantial, personal gift of a milling machine and lathe, made by well-known physicist **Jesse DuMond**, of Caltech, who had been a visiting professor for two summers.

One of the high points of John's career was a sabbatical spent in Sweden, working with Kai Siegbahn (who later won the 1981 Nobel Prize in Physics). John helped develop an X-ray spectrometer that measured energy levels of electrons. After his return from Sweden, John immersed himself in research with the Nuclear Reactor Testing Laboratory in Idaho, where he measured

JOHN WOOD...
Continues on page 28

The following letter was written in response to the article, "Naturalist Sows Seeds of Knowledge," which appeared in the Spring 2005 issue of *Insights*. The article was a personal account of the life and career of USU Emeritus Professor **Richard Shaw**, told by USU alum and retired College of Science staff member **Linda Finchum**.

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

May 12, 2005

Don Fiesinger, Dean
College of Science
Utah State University
Logan, UT 84332-0305

College of Agriculture
Department of Entomology
3222 Science II
Ames, Iowa 50011-3222
515 294-7400
FAX 515 294-5957

Dean Fiesinger:

Thank you and the editors of "Insights" for the delightful article about Professor Richard Shaw. I had the good fortune to be a student in Dr. Shaw's three quarter botany series as a undergraduate in 1959. I was also an undergraduate teaching assistant in Dr. Shaw's spring 1960 Plant Taxonomy course. I remember with clarity leading students on field trips in Logan Canyon. That was one of the most rewarding and profound experiences of my life. After that, I knew that I had to be a university professor.

I recently retired after 37 years of teaching freshman biology, and undergraduate and graduate courses at Iowa State University. Dr. Shaw was one of two truly outstanding professors that I had the good fortune of knowing and taking classes from during almost nine years of university study. The late Professor Austin Haws, also at USU, was the other. The article in "Insights" brought back a flood of memories as I reflected on Dr. Shaw and the experiences I had in his courses. I modeled my teaching style after experiences I had in classrooms at USU. I tried to emulate Austin Haws, Richard Shaw, and Eldon Gardner by providing undergraduate students as many laboratory and field experiences as possible.

In the 1950s and 60s, USU was blessed with a plethora of truly outstanding professors in the biological sciences. In addition to Drs. Shaw and Haws, Eldon Gardner, Datus Hammond, Sid Boyle, and others gave USU a world-class faculty. I truly hope that USU still has professors the caliber of these men. If it does, it continues to be one of the best universities in the world.

My wife and I are both USU alumni and count our time in Logan as among the best years of our lives.

Sincerely,

Wayne A. Rowley, Professor Emeritus
Department of Entomology and Department of Veterinary
Microbiology and Preventive Medicine
Iowa State University
Ames, IA 50011



JIM EVANS TAPPED FOR LAST LECTURE

What would you say if you were uttering your last words? That's what Utah State students want to know when they ask their favorite professor to give the "Last Lecture" each April. The task, according to nominee **Jim Evans**, was a bit daunting, so he just launched into some of his favorite themes with a talk titled *"Utah 2050: Of Oil, Milk and Water in a Land of Plenty (of People)."*

When the geology professor taught his first Planet Earth honors course, it drew all of three students. The honors section now has 60 students, more than 300 take the Planet Earth class each semester, and now, of course, natural resources and sustainability are hot topics. Population growth along the Wasatch Front will make them even hotter, Jim says. Five and a half million people will be crowded into northern and southwestern Utah by 2050, almost double the current population. But the news isn't all bad, he said. "The challenge will provide numerous opportunities for creative solutions."

And in case we're tempted to complain too loudly, Jim reminded the audience that there are two billion people on our planet who

live in conditions so abject they would do anything to have our problems.

"The Wasatch Front, like most places in the U.S., grows by sprawl," Jim said, "And that sprawl is projected to extend along a 170-mile-long corridor from Richmond in the north to Santaquin in the south, with the back valleys connected to the metroplex."

That means that people who move to outlying areas to escape the crowds won't escape them for long. The squeeze, he said, leads to poor planning. "We grow by pushing the limits of nature."

People with homes in floodplains are waking up to water in the basement or homes washed into rivers, and those on unstable mountain slopes find mudslides at their doorstep. "More people means we'll need more power, more oil, more water, and more land," Jim said.

That will mean retrofitting existing power plants, expanding generation capacity, and looking at nonrenewable resources. These issues are difficult to negotiate because there are always people involved, and environmental costs. "The discussion about two new coal plants in south central Utah is in the newspaper almost every day now," Jim said.

**"Every decision we make has an environmental impact," Jim said.
"There's no free lunch."**

And the seemingly obvious solutions are not without complications. "Wind farms are not as environmentally-friendly as you might think; they have a serious impact on bird migration." These challenges will necessitate a long, hard look at energy conservation.

As for oil, "The rest of the world is getting very thirsty for hydrocarbons." Jim believes that the global competition for oil will change the international geopolitical landscape. "We are setting ourselves up for competition for those resources in ways we don't realize," he said.

Regionally, the competition will center around water. "Who's growing? The dry states." A doubling of the population in Utah—the second driest state—will necessitate new dam projects,



"FAVORITE PROFESSOR" A HIT IN LOCAL COMMUNITY

Jim Evans has mentored hundreds of Utah State University students, but he has also worked quietly in the local community, helping individuals from less privileged backgrounds achieve humbler goals: learning to sound out words and understand their meaning, and gaining enough literacy skills to hang onto blue collar jobs.

Jim grew up working a succession of rural logging, mining, and sawmill jobs, giving him empathy for adults who work the local assembly lines for six dollars an hour. The passion and dedication that made Jim a favorite professor on campus are the same skills that made him a favorite tutor at Bridgerland Literacy, a local volunteer program.

Once a week, for many years, Jim put aside his college texts and research papers, and waded into fifth-grade reading levels—stories about cowboys, mining towns, and Indians. He mentored one young man all the way into trade school, and helped unleash creativity in another man, who bought his first computer and began composing stories about local cowboy legends. (Did you hear the one about the "Old Cowboy" who roped a bobcat and was buried with a shot of whiskey in his coffin?) Jim's patience and enthusiasm opened up a new world for his students: one of words, newfound understanding, and self-respect.

JIM EVANS TAPPED FOR LAST LECTURE...

Continues on page 25



(Left to Right) College of Science Scholarship Recipients: Lindy A. Dimond, Daniel Christopher Housley, John Timothy Fisher, Jr., Kathryn Lynn DuHadway, Justin N. Thorpe, Timothy R. Jessop, and Carol Ann Christensen (not present).



(Left to Right) Willard L. Eccles Undergraduate Research Fellows: Rebecca Bennion Mitchell, Isaac Thomas Westfield, Rochelle Gainer Echols, Kelly Jean Mitchell, Michael G. Yurth, Sandra Cove Viera, Joseph Andrew Spencer, Kathryn Lynn DuHadway, Jonathan D. Abbott, and Tyce Jeffrey Keel (not present).

Not Just Your Average College Student



Perhaps no one was more deserving of a university diploma last spring than statistics student Matthew Maw. True, he learned how to figure out a calculation in his head faster than most students can punch numbers into their calculators, but he had some obstacles. He couldn't use a calculator, turn on a computer, or open a book without assistance. Mostly paralyzed from the neck down, Matt came to campus every day, every year, in a wheelchair. "When trials come, you can work through them," he says, "whether you have a disability or not."

His statistics professors accommodated him as much as possible, but in the end it was a fierce determination that propelled him up the commencement aisle. Matt has regained limited use of his arms, and is looking for a job. He hopes to return for a master's degree.



Teacher of the Year Alvan Hengge; Valedictorian Rex Watkins; and Associate Dean Lisa Berreau, Escort.



(Left to Right) Ryan Wilcox, (Pre-Med) Cord for AED; and Jace Beattie (Pre-Med)

2005 AWARD'S PROGRAM



(Left to Right) Scholarship Recipients: Newell Tyler Elison, Seely-Hinckley Scholarship; Kody R. Crowell, Seely-Hinckley Scholarship; Dixon Grant, Sorenson Scholarship; Brian T. Lee, Seely-Hinckley Scholarship; Ryan D. Warner, Seely-Hinckley Scholarship; Dallin S. Pabst, Cooley Scholarship; Keith B. Rimington, Questar Scholarship, and Sara A. Jensen, Burton Scholarship (not present).

2005 SPRING GRADUATION



(Left to Right) Alan Hidy (Geology & Physics); Matt Pluta (Geology); Hiroyuki Nakayama (Geology); Kevin Randall (Geology); and Joe Otterstrom (Business).



Dean Fiesinger awards a diploma.



Trustee Professor Jim MacMahon, Graduate Student Hooding

Awards Program, Scholar's Day, and Welcome Week
Photos taken by Associate Dean Richard Mueller
Graduation Photos taken by Dean Don Fiesinger and University Photographer Donna Barry
Family Day Photos taken by Associate Dean Lisa Berreau

SCHOLAR'S DAY 2005



Dean Don Fiesinger visits with students at 2005 Scholar's Day



College of Science Ambassadors and Science Senator talk with students at 2005 Scholar's Day

AGGIE FAMILY DAY 2005



WELCOME WEEK

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DEPARTMENTS LAUDED FOR EXCELLENCE IN TEACHING

USU President **Stan Albrecht** presented the 2005 Department Teaching Excellence Awards to the **Department of Chemistry & Biochemistry** and the **Department of Physics**, recognizing their go-the-extra-mile attitude toward mentoring and teaching students.

President Albrecht offered congratulations and said, "Thanks for the wonderful work you do for the students." The honor comes with an additional \$15,000 to each department's operating budget. The awards selection committee included faculty, students, administrators, and a member of the Board of Trustees.



The Chemistry and Biochemistry Department's culture of teaching centers on the idea that to truly *learn* science, one must *do* science. Department faculty and leaders believe that undergraduate and graduate students mature into true scientists through the creative inquiry processes embodied in research. The research experience is the cornerstone of the department's instructional philosophy.



The Department of Physics was recognized for its excellence in maintaining high-quality degree programs at all levels. Instruction in physics is guided by the principle that "Research is teaching," and collaborative discovery is an especially effective form of teaching. Department faculty personally mentor their students, resulting in an unparalleled record of student success. In the past five years physics students have landed prestigious fellowships from the Rhodes, Marshall, Goldwater, and National Science Foundations.

Heritage Society

The Heritage Society was established to recognize individuals who have made bequests or other planned gifts to Utah State University. Such generosity and commitment honors the rich heritage of Utah State and helps create a brighter future. Partnerships in philanthropy are increasingly vital to the future of Utah State as it fulfills its vision of becoming one of the nation's leading research and teaching universities. We invite you to join the Heritage Society.

If you would like more information about including Utah State and the College of Science in your will, or if you would like to make a planned gift, please contact Development Director Chris Tallackson at (435) 797-3510 or Chris.Tallackson@usu.edu

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GIVING BACK

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

As a new arrival in the College of Science, it is quickly apparent how well this statement guides the culture of teaching and learning here. USU students enjoy a rare opportunity to work closely with faculty who not only teach, but often mentor students toward academic success.

Partnerships at many levels, including support from alumni, friends, and parents, are an essential part of ensuring the future of this educational experience. Thank you for your support, which truly makes the difference for talented students in need of scholarship assistance, providing access to challenging research, and responding to the need to focus on new bodies of knowledge. I hope the stories in this issue of *Insights* reinforce your decision to invest in our students and faculty who are so dedicated to learning and discovery.

*If you have questions about ways to support the College of Science, perhaps through a scholarship, research fund, or plan for USU in your estate, please contact me in the Dean's Office at (435) 797-3510. I would enjoy discussing your ideas and ways you can make a difference for the College of Science at Utah State University.
Thank you again for your support!*

STUDENT PHON-A-THON NOVEMBER 21 - DECEMBER 3

Please pick up your phone when you see USU AGGIE FUND on your caller ID and enjoy the opportunity to visit with a fellow Aggie. USU students will be calling to request your support in providing crucial resources for financial aid, special projects, and enriched classrooms and labs.

Please support College of Science students and help USU continue to keep academics first.

If you have any questions or concerns about our annual campaign, Please contact Development Director Chris Tallackson at (435) 797-3510 Or email him at chris.tallackson@usu.edu.

"SOMETHING STRANGE IS HAPPENING"

USU SCIENTIST TACKLES GLOBAL EPIDEMIC

When USU neuroimmunologist **Vijendra Singh** began to suggest, 15 years ago, that a weakened immune system might play a role in Alzheimer's disease and other brain disorders, he was ignored or dismissed. Sometimes ridiculed.

Not anymore. His pioneering research has helped health practitioners around the world make a 180-degree shift, and the stakes have never been higher. The World Health Organization recently announced that neurological disorders—including Alzheimer's, multiple sclerosis, autism, depression, obsessive-compulsive disorder, Tourette's syndrome, and schizophrenia—are the most serious health problems faced by the global community. The financial burden, not to mention the personal toll on families and individuals, is staggering. The cost of treating brain disorders surpasses that of cancer and heart disease.

In recent years Vijendra has concentrated his research on brain disorders and mental illness, especially autism. The numbers show why he is alarmed: Until recently, only four or five individuals in 10,000 were afflicted with autism. Now, one child in 166 is affected, and the numbers are rising exponentially. It's the fastest growing developmental disability in children, Vijendra says. In Utah alone, autism rates have jumped 750 percent during the past ten years. "You see this everywhere you go," he says, "in the U.S., Canada, Mexico, Europe, India, China, and Australia. Something very strange is happening."

Vijendra first took notice fifteen years ago. "Many families told me that their child was normal until 14 to 20 months of age. Then their child regressed in development, losing language skills and behaviors. If you hear so many stories over and over, you begin to pay attention."

Heartbroken parents would watch as their children returned to wearing diapers, sucking on pacifiers, or speaking only a handful of words. Some infants began to rock back and forth. And because autism is a broad disorder with many manifestations, some children developed the ability to instantly memorize enough information to fill a computer hard drive. Many suffered from aggression, tantrums, and seizures, and were unable to express emotion—even to make eye contact. The disorder takes its toll financially; parents can rack up tens of thousands of dollars in medical expenses, and hard-pressed public schools pick up a tab of nearly \$20,000 annually to educate each autistic child.

"Understanding what triggers nervous system diseases became the goal of my scientific career," Vijendra says. In his doctoral thesis, he speculated that brain diseases and mental illness might be caused by exposure to environmental factors, such as viruses. He also had a hunch that the nervous system and immune system are interconnected. Although it was a scientific leap at the time, his hunch paid off, with most of his hypotheses now verified by research. Although ten percent of autistic children get the gene



USU researcher Vijendra Singh (left) works in the lab with pre-med student Wyatt Rivas.

from their parents, his work shows that others pick up their disorder from environmental factors. "As our understanding increases we begin to understand more about the nervous system, and the immune system has taken on a central role," Vijendra says. "It took step-by-step research to arrive at these conclusions. It didn't happen overnight."

In epidemiological studies, the neuroimmunologist noticed a startling association between measles vaccinations and autism. Many children went in for a measles-mumps-rubella (MMR) shot, and shortly thereafter began exhibiting autistic behavior. Vijendra's initial speculation was that minute amounts of mercury in vaccines were causing the problem, but although mercury is a clear threat to human health, his research didn't indicate that mercury is related to autoimmunity in autism. "There may be other mechanisms where mercury may be involved. At this point, no one knows."

Vijendra went back to the lab, analyzing other immune parameters. His surprising finding? "The measles antibodies to the MMR vaccine seems to be linked to autoimmunity in autism," he says. "The level of measles antibody is elevated in many autistic children, which could be a sign of a present infection, a past infection, or an immune reaction to the measles vaccine."

His research was the first to pinpoint the linkage. Now researchers across the globe are finding evidence of inflammation and immune activation in autistic children, corroborating Vijendra's findings.

"Our federal agencies and pharmaceutical companies are in a difficult spot," says Vijendra. "I'm not an anti-vaccine person. To me, vaccines are the best preventative medicine for combating infectious diseases due to viruses and bacteria. But I do believe that vaccines can lead to adverse reactions—like autism—in a small but significant part of the population."

Vijendra was invited to present his findings before the U.S. Congress, the Institute of Medicine, and the Centers for Disease Control and Prevention (CDC), where he recommended a change in vaccination policy. "Right now," Vijendra says, "when a child comes into a clinic, the doctor can give five—or ten—shots, all at the same time, to one child. Six months later, the child may return for another vaccination. I made the recommendation that we test for immunity before giving vaccinations."

The problem, of course, is the cost. Testing could add almost \$100 to the bill. "Parents like the idea, but the CDC feels it is cost prohibitive," he says. "However, if we tested, we could identify immune problems and also find allergies, which are now found in every second child."

Vijendra's work in the Center for Integrated BioSystems isn't confined to the lab anymore. Over the years, he's received thousands of phone calls and emails from around the world, from distraught families looking for answers. Even as he continues his research to link autoimmunity to brain disorders and mental illnesses, he is—like the parents he works with—looking for answers. "Many patients afflicted with neurological disorders show positive outcomes to treatment with immune modulation therapy," Vijendra says.

Parents often try conventional medicine, including prescription drugs and steroids, while others are finding relief through alternative medicine, including nutritional supplements that are free from the side effects of pharmaceuticals. "Immunoglobulin and glutathione therapy produce significant improvement in language, communication, social interaction, and attention span," he says. "I want to develop a program where I can document the results of neutraceutical therapy."

So far, the evidence for the effectiveness of nutritional supplements is anecdotal. There's the nurse from Connecticut, for instance, whose severely impaired autistic son was given supplements. He's now a straight-A student at an Ivy League school. "Hundreds of children are now able to say 'Mommy,' or 'Daddy,'" Vijendra says. "This is a great thing, when a son hugs a father for the first time."

The College of Science researcher believes there's no one right answer for all children. "It requires a tailor-made therapy," he says. "The bad news is: It's an autoimmune problem. The good news is: We can help these children with immune therapy."

"There's a lot of research still to be done—years and years of research. What's good is that other researchers are now looking into the autoimmune mechanism; they're finding confirmation. These are novel and exciting times for families with autism, and researchers are embracing new ideas. So we'll make more progress."

SCIENCE IN SOCIETY CLASSES CHALLENGE STUDENTS

Students in Associate Professor **Pete Kolesar's** Science and Society class say they're ready to tackle the "real world." Required for all secondary science education majors, the class challenges students to take social action on a scientific topic. This past year, students examined skyrocketing rates of autism, a condition many blame on the FDA-approved vaccine additive, thimerosal.

After thorough research and intense classroom discussions, the students elected to send letters to the FDA and Utah senators Orrin Hatch and Bob Bennett voicing their conclusions. So impressed with the students' letter, the FDA representative William Egan held a conference call with the entire class. "It's not every day that I get this type of letter," said Egan.

"I feel like I am a better informed individual," said student **Brittany Webb** of her experience in the class. Webb, who is now a senior with a double major in chemistry and physics, said the class greatly enriched her undergraduate career.

Vijendra thinks large. His next goal is to secure a private donation, which would allow him to develop a worldwide plan for brain disorders in children. "When you help a child today," he says, "you write the history of tomorrow." ■

FRELOADIN' KINFOLK

Some species of wasps move into nests of similar species and feed on the accompanying food supply intended for the host's offspring, says Assistant Professor **James Pitts**. Exhibiting what's known as cleptoparasitic behavior, the wasps are called "cuckoo wasps," referring to the Cuckoo bird that lays its eggs in the nests of other birds.

A TASTE FOR POISON:

BIOLOGY TEAM DISCOVERS EVOLUTION IN PROGRESS

Japanese chefs who dissect pufferfish for sushi walk a fine line between life and death. Flesh from the slimy, scale-less fish makes lips tingle and gives diners an intoxicating buzz. But if diners ingest flesh from the fish's liver, they'll die within hours, asphyxiated by a neurotoxin 500 times deadlier than cyanide.

For garter snakes along the Pacific Northwest coast, dining is more a matter of survival than gourmet adventures. What's on the menu is *Taricha*, a newt that contains tetrodotoxin (TTX), the deadly toxin found in pufferfish. Just as discriminating sushi diners find certified chefs, the garter snakes have found their own way to survive, and the evolutionary mechanism has made headlines in both *Science* and *Nature*.

Most snakes that swallow a *Taricha* newt crawl to a permanent stop—their heart, gut and lungs paralyzed. Not *Thamnophis sirtalis*. Garter snakes found in certain geographic pockets have evolved resistance to the neurotoxin through small genetic changes that alter the ability of TTX to bind to the pores of sodium channels, which are responsible for electrical signal transmission in the nerves that initiate muscle contraction.

"We cloned and sequenced a sodium channel from the snake's skeletal muscles to analyze changes in the gene that encoded the protein," said principal author and biology doctoral student **Shana Geffeney**. "Changes appear to have arisen independently in different populations."

"Sodium channels are so critical to the functioning of organisms that there is not a great deal of variation in the protein among different animal species, but here we see differences evolving among populations within the same species," says Shana.

"It's not often that big evolutionary questions get answered at this level of detail," says co-author and biophysicist **Peter Ruben**. "We have the whole story here—behavior, evolution, molecular biology, electro-physiology. It's unusual that all these facets of a story can be connected at once."

According to Peter, the findings have both evolutionary and medical implications. "At the end of the day, there's not all that much difference between sodium channels in snakes and sodium channels in you and me," says Peter. "We can relate this to all animal life. It's a wonderful example of natural selection and adaptation, and those mechanisms that form the basis of evolution. It's kind of a snapshot of the process by which species evolve. When species accumulate enough small differences at the molecular level, that's evolution."

The research, which grew out of biology professor **Butch Brodie's** studies of interactions between the two species, incorporates biophysics, neurobiology, cardiac physiology, and herpetology. Shana says, "This is an example of integrated biology—what can

be accomplished when people from really different fields talk to each other."

Shana, Peter, and Butch co-authored the paper with **Esther Fujimoto**, a former Utah State laboratory technician now with the Neurobiology and Anatomy Department at the University of Utah, and **Edmund Brodie, III**, with the Biology Department at Indiana University. The research was featured on the National Science Foundation's web homepage, in the June issue of *Natural History*, in newspapers from the *Deseret Morning News* to *The New York Times*, on KSL and ABC television, and in Canada on CBC's radio show, "Quirks and Quarks." ■

YOU SAY YOU WANT AN EVOLUTION (OR LONG LIVE THE LONGHORNS)

Utah State grad student **Kevin Young** and biology professor **Butch Brodie** discovered they could measure the natural selection of the flat-tailed horned lizard by comparing the horn length of dead and live lizards. These natives of the Southwest often fall prey to a bird called the loggerhead shrike. Surviving lizards have longer horns, which apparently enable them to better defend themselves. In turn, they produce long-horned offspring.



SCIENCE STUDENTS SHOWCASE RESEARCH (AND BLUE TONGUES!) AT NCUR 2005

When **Ryan Jackson** (BS 2005 Biology) is asked to stick out his tongue, it's because people are interested in his research on Blue Tongue Virus, a project he shared with 2,000 participants at the National Conference on Undergraduate Research (NCUR) in Lexington, Virginia, last April. Fortunately, Ryan explains, Blue Tongue Virus is found only in sheep and cattle at the moment. Ryan is a member of **Joseph Li's** lab, where researchers are testing the effectiveness of antiviral agents against the virus.



(Left to Right) Danica Francom, Vice Provost Joyce Kinkead, Honors Director David Lancy, Tyce Kearl, Diana Lewis (NFS), Ryan Jackson, and Glen de Guzman.

How did Ryan become a member of Professor Li's team? "I was set to graduate, but I took this great class in immunology, and it really sparked my interest," Ryan says. "I discovered I have a passion for research in immunology, and Dr. Li has a great way with students. When I started my project I really wanted him to just direct me, but instead, he provided the support that let me find my own way."

Ryan was one of five USU students sharing their research expertise. NCUR encourages awareness of undergraduate research in a broad

array of disciplines. Participants come from more than 300 colleges and universities, representing almost every state in the nation.

Danica Daly Francom, from Centerville, Utah, had her transfer papers filled out until the Vice Provost **Joyce Kinkead** linked her with a biology lab and a faculty mentor—**Carol von Dohlen**. "I never looked back," Danica says. "Utah State has been a great place for me because I got connected as a freshman."

Tyce Kearl of Spanish Fork found that research helped his application to medical school; Tyce, who received an URCO grant and a USU Undergraduate Research Grant, works on cardiac research with mentor **Peter Ruben**.

Glen de Guzman, biology major from Idaho, presented *Candida albicans* research undertaken while on a summer fellowship at Tufts University in Boston. He received an American Heart Association Undergraduate Research Fellowship, and will be conducting his research in **Daryll DeWald's** lab.

Participating students are exposed to research related to their field of study, Joyce says. "And of course, faculty from other institutions are trolling for the best prospective graduate students, so it's a wonderful opportunity for Utah State students to be in the spotlight. One of NCUR's goals is to foster a multidisciplinary and multicultural community of researchers, scholars, and artists linked by a common enthusiasm for learning." Since its inception in 1987, NCUR has become a major annual event, drawing more than 2,000 undergraduates, faculty, and administrators. See www.ncur.org for more information. ■

JIM EVANS TAPPED FOR LAST LECTURE...

Continued from page 15

conversion of agricultural lands to urban use and, perhaps most importantly, a serious discussion about conservation. "We live in a desert," Jim said. "Deserts have droughts, and Earth systems are variable." Last fall, he pointed out, the boat ramp at Hite Marina on Lake Powell was surrounded by dried, cracked mud.

And the "milk" Jim mentioned? Milk is an allegory for land, he said. "If we like open space we need to do something about it. But we need to take into consideration the people who inhabit that land," using creative zoning and smart growth tools.

As we seek to balance our growing regional and global population with the reality of diminishing resources, we need to act with care. "Every decision we make has an environmental impact," Jim said. "There's no free lunch. As we grow those costs increase, and they may have consequences we don't yet understand."

Some of those consequences, in fact, have become all-too-apparent to residents of Cache Valley. The area has traditionally been one of the most beautiful valleys in the West, but its tranquil setting is seriously threatened by heavy winter inversions. "We live in a closed valley. We have a lot of cows, and we drive cars. We can approach this challenge with a 'management by sand' method—that is, with our heads in the sand—or follow the proactive lead of many local citizens and leaders who are demonstrating intelligent, thoughtful leadership," Jim said. "In a state that votes red, we need to remember that 'conservation' has the same root as 'conservative.'"

"There are lots of opportunities for citizens. We'll need college-educated people; that's where you come in," he told students. "We'll need to be creative across many disciplines."

Utah State—with her intellectual capacity, her students, and her faculty—has the intellectual firepower to contribute and to educate. ■

COLLEGE HONORS OUTSTANDING SCHOLARS

Valedictorian Rex Watkins was attracted to chemistry because he likes to see how the micro-scale affects the macro-scale. "Smaller processes govern everything around us daily—in larger processes." He's been looking at synthetic molecules that mimic the structure of enzymes necessary for humans. The hope is that eventually chemists (maybe even Utah State chemists!) will be able to design molecules that perform the same function as enzymes, or molecules that would inhibit enzymes.

Rex is headed off to the University of Wisconsin at Madison for a PhD, and he credits his acceptance there to Associate Professor **Lisa Berreau**. "One of the most fortunate opportunities I've had here was to be able to work with her," Rex says of the professor he co-authored several papers with. "She's energetic, helpful—a hands-on professor." As for being a valedictorian, the good natured and articulate chemist said, "I think my job is to hold the flag. I think I can handle it!"

Scholar of the Year Ashley Ellsworth was "dead set on not pursuing chemistry," lacking a sense of direction and listing her major as "undeclared." So when she fell in love with chemistry it took her by surprise. The variety in chemistry—from biology to physical chemistry to math—hooked her. She worked in Professor **Scott Ensign's** research lab, looking at how bacteria might help clean up environmental toxins, while picking up straight A's in every single university course.

As if that weren't enough to keep her busy, she volunteered with Special Olympics and taught local children to read. She also spent a summer in Ecuador, where she taught indigenous children at a rural preschool, and bathed, fed, clothed, and played with physically and mentally challenged orphans. The experience changed her life. It also set her sights on medical school. Upon graduation, the idealistic, Spanish-speaking student hopes to spend a few weeks or more practicing international medicine each year.

Undergraduate Researcher of the Year Dustin Keele spent last summer in northwestern China, near Mongolia, analyzing Permian-era rocks in petroleum reservoirs. "The area, close to the Gobi Desert, is extremely remote and desolate, with little vegetation," he says. His fieldwork allowed for no days off, and workdays—with a Chinese crew and a translator—consisted of ten or 11-hour shifts. In spite of the crushing schedule and the heat, Dustin loved being immersed in a different culture, with a different set of logistical problems. After the dust settled (literally), Dustin co-authored a paper on his findings with Assistant Professor **Brad Ritts**.

Originally from Vernal, Utah, Dustin grew up working on drilling rigs. He studied engineering for two years, took a year off to rethink his direction, and applied for admission to Utah State. "USU's geology department is small and personable," he says. Dustin plans to study for a master's with Professor **Jim Evans** and eventually land a job in the oil industry.

MS Graduate Student Researcher of the Year Alexander Steely has a great gig. "How often do you get paid to camp out in the desert?" Every year he leaves Cache Valley as the snow starts to fly and heads for California's Salton Desert, where he analyzes ancient rock formations to better understanding how plate boundaries have evolved over time and how the Pacific tectonic plate is moving in relation to the rest of the continent. "Major faults can totally reorganize the landscape very quickly," he says. "Lakes can become mountains in less than 500,000 years." Using computer technology, Alex, who works with Associate Professor **Susanne Janecke**, fills in missing pieces of previously undiscovered faults and rock formations on U.S. Geological Survey topographic maps.

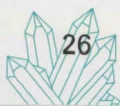
"Geology is something everyone should know," says Alex, "Especially if you live in Cache Valley, which continues to form by faulting today. To me, geology is the most basic of all sciences because it brings every science to bear on the question of how our world works."

PhD Graduate Student Researcher of the Year Anastassia Alexandrova was accepted into her PhD program through the back door. Rather than looking for a school, "I looked for the person I wanted to work with." The Russian chemistry student wrote to Professor **Alex Boldyrev** at Utah State and asked, "Would you like a new graduate student?" He wrote back, asking, "What are your grades?" She replied, "4.0," and he answered, "Okay, come."

Anastassia balances twin passions in her research into boron clusters: chemistry and physics. "We don't use any assumptions or data, but only basic physical constants. We use physics to look at chemical bonding, to develop building blocks for nanotechnology." She says that awards are good, "but the most important result is what you get in the lab. That's the biggest joy." After graduation, Anastassia headed to Yale for post doc studies.

Graduate Student Teacher of the Year Janeen Ardito thinks college teaching is a snap. That's probably because she started her teaching career in inner-city schools in Utah, where class distractions weren't coeds reading *The Statesman*, but drugs, gangs, and trouble at home. One of her supervisors said, "We handpick every student just for you. They're the ones no one else wants." Now teaching at USU, the biggest problem Janeen encounters is math phobia. "You can develop a phobia of any subject, but math phobia is—dare I say it?—trendy. It's okay to say 'I don't do math,' but it's not okay to say you can't spell." So she bends over backwards to make sure her students get it. "I try to review often and build students up. Every question is an important question."

Planning for a PhD in statistics, Janeen was waylaid by macular degeneration, which blurs the long formulas across her computer screen. Undeterred, she's heading for a teaching career in math at Snow College in Ephraim, Utah, with her two biggest cheerleaders in tow. "My daughters screamed the loudest when I got the Robins Award for teaching," she laughed.



Faculty Teacher of the Year Alvan Hengge also honed his teaching skills the hard way: teaching inner-city teens from Cincinnati housing projects. Skills ranged from third grade reading levels to college levels, and home support was often lacking. "I couldn't stand in front of the room and just lecture. The classroom would descend into chaos. I had to learn to teach using dialogue." After seven years, Alvan headed back to the classroom himself, getting a doctorate.

As for his teaching at Utah State, "Everything since has been easy by comparison. Although organic chemistry has a reputation as being a killer course, and an undeserved reputation as a memorization course, it doesn't have to be. I try to teach fundamental concepts, so students can reason their way through to answers." Alvan feels humbled to receive a teaching award, and credits his former students, whose course evaluation suggestions he judiciously incorporates. "They're the ones who know how you can reach them," he says.

Undergraduate Research Mentor of the Year David Peak was enlightened as a junior in college, when he had the opportunity to do research. "It was such a different experience from going to the classroom and doing homework," he says. Although physics was not a field that readily accommodated undergraduate student research—"The traditional attitude was that undergraduates needed to know more math"—David has since been a strong advocate for undergraduate research. David's advocacy has not only benefited the Physics Department at USU—research opportunities have lured topnotch students, doubling the number of undergraduates—but has had a national impact. For many years David provided leadership to the National Conference on Undergraduate Research. "The projects are not just glorified science fair projects; they're the real thing. Many are as good as PhD projects." The conference engages students from all disciplines and all types of institutions. "It gets students and faculty talking to each other in collegial ways."

The only downside? "It's heartbreaking to see students leave," says David. But his strong mentoring ensures there will be new faces, and new experiences, next year.

Faculty Researcher of the Year Alex Boldyrev was walking through the drab gray of Moscow when he noticed the city's first brightly decorated building. When the Siberian native found out it was Moscow's first private restaurant, "I decided Communism was dying." He wrote to the German professor who had offered him a research fellowship—he hadn't been allowed to leave the Iron Curtain when it was initially offered—and the invitation was again extended. Communism collapsed while he was in Germany, and research money dried up too, so Alex immigrated to the University of Utah on a visiting professorship. When USU offered him a permanent position in 1999, he settled in Logan.

"In my eyes, the success of any research group is 50 percent the professor and 50 percent the students," Alex says. "I share this award—it wouldn't be possible without my brilliant students." His research team attempts to solve theoretical chemical problems with the help of computers. "We try to understand how atoms interact with each other when they form molecules." His team's research in chemical bonding theory has been featured in major chemistry journals, including *Journal of Physical Chemistry*, *Inorganic Chemistry*, *Journal of the American Chemical Society*, and *Structural Chemistry*, among others, as well as numerous newspapers. ■



(Left to Right) Janeen Greer Ardito, Graduate Student Teacher of the Year; Alison G. Scoville, Zobel Graduate Scholarship; Anastassia N. Alexandrova, Graduate Student Researcher of the Year (PhD); Robert D. Child, Piette Graduate Scholarship (not pictured); Alex N. Steely, Graduate Student Researcher of the Year (MS) (not present).

(Left to Right) College of Science Faculty Awards: Alexander I. Boldyrev, Researcher of the Year; David Peak, Undergraduate Research Mentor of the Year; and Alvan C. Hengge, Teacher of the Year.



(Left to Right) Christopher L. Berentzen, Dean's Scholar; Rex W. Watkins, Spring 2005 Valedictorian; Ashley Ellsworth, Scholar of the Year; Cody Snow Olsen, Dean's Scholar; David R. Hatch, Dean's Scholar (not pictured).

JOHN WOOD...

Continued from page 13

X-ray wavelengths, and with NASA's Jet Propulsion Laboratory, where he developed spectrometers to measure X-rays. "That was the time when people were going to the moon," John says. "We gathered in the lunchroom and watched the astronauts on TV."

When he wasn't exploring the mysteries of physics, John explored the local canyons. He revised and rewrote the popular *Cache Trails* hiking guide for many years. "In those days I had to get all my information from forestry maps," he says. Now the guide is updated using GIS positioning tools.

"I left Cache Valley in 1941 to cross the eastern mountains and see what was beyond," says John. Fifteen years later, the mountains drew him back, to a struggling academic program. "The physics program is vigorous now, and the Bear River Range and Logan Canyon—the scenes I missed the most—are still the most picturesque sights of all." ■



(Left to Right) 2004-05 Science Ambassadors: Ashley Liddell, Math & Stat; Ryan Wilcox, Biology; Ashley Turner, Physics; Ryan Warner, Math & Stat; Ross Young, Computer Science; John Fisher, Jr., Chem & Biochem; Jace Beattie, Biology; Dustin Koele, Geology.
Not Present — Mike Southam, Biology; Glen de Guzman, Biology; and Matt Wheatley, Chem & Biochem.

TINY FIX FOR WEIGHTY PROBLEM

Associate Professor **Tim Gilbertson** and colleagues are developing nanoparticles designed to trick our bodies into eating less fat. The plan is for the microscopic medical devices to deliver highly targeted drug treatments directly to fat receptors throughout the body to curb cravings. The technology won't cure obesity but could be a future tool in battling a global epidemic.

MUGGLES, MALLARDS AND M-THEORY...

Continued from page 3

Anderson believes encouraging young girls to pursue math and physics would alleviate the imbalance. During the past year, she's ventured off campus to share her love of science with primary and secondary students. "We talk about black holes, quantum physics and other interesting stuff."

She's also been tapped to teach undergraduates. Rather than large lecture classes, students at Oxford receive the bulk of their instruction through small group meetings of roughly four students and a professor called tutorials. "It's an interesting arrangement and affords valuable, in-depth discussions," she says.

Despite a demanding schedule at Oxford, Anderson has taken advantage of numerous travel opportunities. "This past March, I traveled to a physics conference in Trieste, Italy — a large gathering of fellow nerds," she says. "I've also visited Scotland, Germany and France."

This fall, Anderson heads to South Africa as a United States delegate to a United Nations-funded conference aimed at strengthening international ties among physics educators and developing research collaborations between developed and developing countries.

"It's a very interesting time to be an American abroad — both culturally and politically," says Anderson.

She notes that Americans are somewhat isolated geographically, whereas Europeans, in smaller countries "have to care what's happening with their neighbors." She says the experience of living abroad is causing her to "think more from a global perspective."

Anderson adds that, living in England, she feels a deeper sense of history. "I think that influences Europeans' world outlook as well. They have a much broader collective memory and sense of time."

She looks forward to her remaining two to three years at Oxford and is already planning her next adventure. "I hope to pursue postdoctoral research in high energy particle physics," she says.

Among her favored destinations are a number of universities in the U.S., including Princeton, Harvard, University of Chicago and Caltech, Oxford or Cambridge in England, or CERN in Geneva, Switzerland.

"It's incredibly competitive," says Anderson of postdoctoral opportunities in her chosen field.

Her former Aggie professors are confident she's in the running. ■

ALUMNI AWARDS & RECOGNITION

Wardle Receives Alumni Achievement Award



The Department of Chemistry and Biochemistry Alumni Achievement Award was presented to **Robert D. Wardle** at the department's spring awards gathering held April 21, 2005. This award is given to a USU alumnus who has made significant contributions in Chemistry and Biochemistry.

Robert was born in 1958 in Ames, Iowa. He attended USU during which time he engaged in undergraduate research with **Richard Olsen**, exploring naturally occurring compounds that showed potential anti-cancer activity. After receiving his BS in

chemistry in 1981, as Valedictorian in the College of Science, he moved on to Caltech, where he earned a PhD in organic chemistry in 1986 developing a method to synthesize an antibiotic. He joined Thiokol as Senior Chemist in 1986, moving on to several capacities, including Associate Scientist, Supervisor, Senior Staff Scientist, Manager, and finally to Director of Research and Development Laboratories in 2001 where he directs a group of 275 scientists, engineers, and technicians. He has served as a principal investigator on 22 contracted programs with an aggregate value of more than \$30 million, and holds 37 patents. He was a member of the National Research Council Advisory Board and the National Academy of Engineering Board, and received an ACS Industrial Innovation Award in 2004. Robert and his wife Christine have four children; his favorite activities are soccer and skiing. ■

FACULTY AWARDS & RECOGNITION

Biology

Diane Alston received the 2005 E.G. Peterson Extension Award, 10 March 2005, at the Extension Annual Awards Conference. This award was established to honor an Extension professional who has given outstanding service to the State of Utah. Diane was cited for her professional expertise, innovative approach, effectiveness, her caring attitude, and her support of the goals and mission of USU Extension.

Jay Karren received an award for his dedicated service on the committee for the past three years at the Western Region Cooperative Agricultural Pest Survey Committee meeting, Fort Collins, Colorado, 8-10 February 2005.

MacMahon Receives National Award, Named Director of USU's Ecology Center



Biology Trustee Professor **James A. "Jim" MacMahon** received the Ecological Society of America's Distinguished Service Citation at the society's 2005 annual meeting in Montréal. The award acknowledged his "long and distinguished service to the

ESA, to the larger scientific community, and to the larger purpose of ecology in the public welfare."

Jim, who has served in a number of academic and administrative posts at Utah State, was named director of the university's Ecology Center July 1. Administered by the university's colleges of Agriculture, Natural Resources and Science, the center supports and coordinates ecological research and graduate education in

ecology, while providing a central resource for decision makers considering actions that affect the environment.

In addition to his new role, Jim continues to teach biology courses and supervise graduate students. Rounding out his endeavors is his involvement as chair of the science committee of the NSF-funded team working to form the National Ecological Observatory Network (NEON) and as organizer of the Intermountain Regional Observatory Network (IRON), one of the proposed NEON monitoring systems.

Chemistry & Biochemistry

Steven D. Aust was named the 2004 recipient of the Kenneth A. Spencer Award by the American Chemical Society, 24 February 2005, in Kansas City, Missouri. The award is given to individuals who have made commendable contributions to agriculture and food chemistry.



Stephen Bialkowski on a bike tour in southern France last year. He took 4th place in his Category V group in the 2005 LOTOJA bike race.

Stephen E. Bialkowski received a Fulbright Scholar grant to research and lecture at Nova Gorica Polytechnic in Slovenia, beginning in January 2006. He and colleague Mladen Franko, a professor at the institute, are designing a more rapid and cost-effective means of organophosphate pesticide detection in humans using photothermal and surface acoustic wave spectrometry.

Vernon D. Parker was named the 2005 recipient of USU's D. Wynne Thorne Research Award. This award, named after the university's first vice president of research, is the most prestigious research commendation annually given to an outstanding university researcher.



Computer Science

Robotic Guide for the Blind Goes Global

If you read our spring issue of *Insights*, you were introduced to robotics inventor **Vladimir Kulyukin**. His robotic guide for the visually impaired – a “robot guide dog” as it’s termed by the media, has been featured in *USA Today*, *PC Magazine*, *South China Morning Post*, *Electronic Engineering Times*, and in other newspapers, broadcasts and publications in the U.S., Asia, Italy,

Germany, Poland, Greece, and Scotland. Web sites, including *eWeek.com*, *itnews.com*, *CIOinsight.com*, and *extremetech.com*, have also picked up the story, as has the *BBC News*.

The robotic guide is meant to complement, rather than replace, guide dogs, says Vladimir. The guide serves the visually impaired in crowded, unfamiliar environments such as airports and shopping centers, where the skills of personal guide dogs are limited. ■

USU College of Science

0305 Old Main Hill • Logan, Utah 84322-0305
Phone: 435.797.2478

scido@cc.usu.edu www.usu.edu/science/

DEPARTMENT OF BIOLOGY

435.797.2485 www.biology.usu.edu

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

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TRANSITIONS

25 YEARS OF SERVICE

Biology—Anne J. Anderson
Mathematics & Statistics—Ian M. Anderson

30 YEARS OF SERVICE

Biology—Jon Y. Takemoto
Geology—Peter T. Kolesar

45 YEARS OF SERVICE

Physics—W. Farrell Edwards

RETIRING FACULTY & STAFF

Office of the Dean—Karen O. Bindrup
Biology—Jay B. Karren
Chemistry & Biochemistry—Glen J. Thornley
Computer Science—Kendra S. Dinerstein,
Nelson T. Dinerstein, Mary V. Kolesar
Physics & CASS—W. John Raitt

TENURE & PROMOTION

Biology—Michelle B. Baker
Geology—Joel L. Pederson
Mathematics & Statistics—Christopher Corcoran,
Jurgen Symanzik
Physics—Eric D. Held, Michael J. Taylor

PROMOTION

Biology—Diane G. Alston, Eric Rowley (to Principal Lecturer), John M. Stark, David Wallace (to Sr. Lecturer), Paul G. Wolf
Chemistry & Biochemistry—Alexander I. Boldyrev

IN MEMORIAM

Biology—Fred Post, John Skujins

FIGHTING STUBBORN BUGS

Bacterial infections kill millions of people each year. New drugs are urgently needed to combat antibiotic-resistant bacteria, yet they too will likely lose effectiveness as bacteria evolve. Professor **Richard Holz** and others are targeting new bacterial-specific pathways, less capable of developing resistance, to combat deadly infections.

KEEPING IN TOUCH

1950s

Thomas D. Cottle (BS 1951, Physiology), Portland, Oregon. Thomas completed an Air Force Commission in the early '50s, and obtained a DDS in 1958 from Marquette University. He is a member of the Omicron Kappa Upsilon National Honorary Dental Society, and is active in state and city government. Thomas and his wife have eight children, 37 grandchildren, and four great-grandchildren. He has published a number of LDS books, and has served five missions for his church.

G. Preston Taylor (BS 1952, Entomology Forestry), Thousand Oaks, California. Preston has worked as a Field Community Administrator with the Hunt-Wesson Foodservice, a division of ConAgra Food Service Company for 31 years.

1960s

Steven R. Davis (BS 1966, Geology), Sussex, New Jersey. Steven was named president of American International Ventures, Inc. September 21, 2005. He is a precious metals geologist with more than 35 years of experience in the minerals industry.

1970s

John Perez (PhD 1972, Public Health and Bacteriology), Kingsland, Texas. John was named one of the 50 most important Hispanics in technology and business by *Hispanic Engineer & Information Technology* magazine, and was previously named one of the 100 most influential Hispanics in America by *Hispanic Business* magazine. He has been with Texas A&M for 30 years and currently supervises research at the university's Natural Toxins Research Center, which focuses on medically important toxins in snake venom. Through funded research, he has established facilities for investigations on bioinstrumentation, monoclonal antibodies, and live animal studies. John was named the Texas Academy of Science's Distinguished Scientist in 2004.

1980s

Al Jones (BS 1989/MS 1995, Geology), Logan, Utah. Al was recently featured in *The Herald Journal* newspaper as the proud owner of a low-speed electric car. He is a staff scientist with GEO-HAZ Consulting.

1990s

Katie Bench (BS 1998, Statistics), Canton, Michigan. Katie earned an MBA in 2005 from Brigham Young University. She is employed with Ford Motor Company.

2000s

Keri Murch (MS 2003, Geology), Petaluma, California. Keri is a Senior Staff Geologist at Environmental Resolutions, Inc.

Kelvin Wurston (BA 2004, Statistics), Lake Forest, Illinois. Kelvin is an actuary with Trustmark Insurance Company.



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ABOUT YOURSELF _____

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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UtahState
UNIVERSITY

College of Science
Office of the Dean
0305 Old Main Hill
Logan, UT 84322-0305



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