

# Insights

college of science  
FALL 2009

## Uncovering Wyoming's Fossil STONE

USU Geologist Blair Larsen  
at Fossil Butte National  
Monument

Utah State University

14.8/1:38  
Fall 2009





If you're looking at my photo and thinking, "He looks familiar....," you're right.

After nearly nine years, I returned as dean of the College of Science in September — a position I previously held for almost 11 years. My predecessor, Mary Hubbard, was tapped to take a leadership role in the university's increased efforts in global engagement and recently stepped into the position of vice provost for international education.

I'm honored to be asked to serve in this capacity for USU, which has been my academic home for nearly 38 years. I'm fortunate to be associated with a cadre of scholars and administrators who believe we should seize opportunities to become ever better, despite the current economic climate. My task is to find ways for faculty and students to realize their personal goals while we all work to achieve university-wide objectives.

We have much to celebrate, including:

- Physics professor David Peak was recently named a 2009 Carnegie Professor of the Year, continuing USU's impressive recognition in this prestigious national competition;
- Mathematics professors Larry Cannon and Bob Heal, along with their colleagues Jim Dorward and Joel Duffin, received the 2009 Governor's Medal for Science and Technology in recognition of their efforts in the development of

the internationally acclaimed National Library of Virtual Manipulatives;

- USU Physics Day at Lagoon celebrated its 20th anniversary this past May. To date, more than 100,000 teens have taken part in this exciting event that introduces the fun of science;

- Science Unwrapped, the college's new outreach presentation series initiated by Dean Hubbard, is drawing hundreds of participants of all ages each month;

- Geologists John Shervais and Jim Evans were recently awarded \$4.9 million in Recovery Act funding to pursue a massive geothermal energy project in Idaho; and

- Three of our students are 2009 Goldwater honorees, raising the number

of College of Science awardees to an impressive 11 in recent years.

I look forward to working with colleagues, old and new, along with you, our alumni and friends, as we continue the search for excellence in teaching, research and service. These achievements have become a hallmark of this college.

While these are difficult times for higher education, I admire the optimism that prevails at USU and within our college and the bright future it promises.

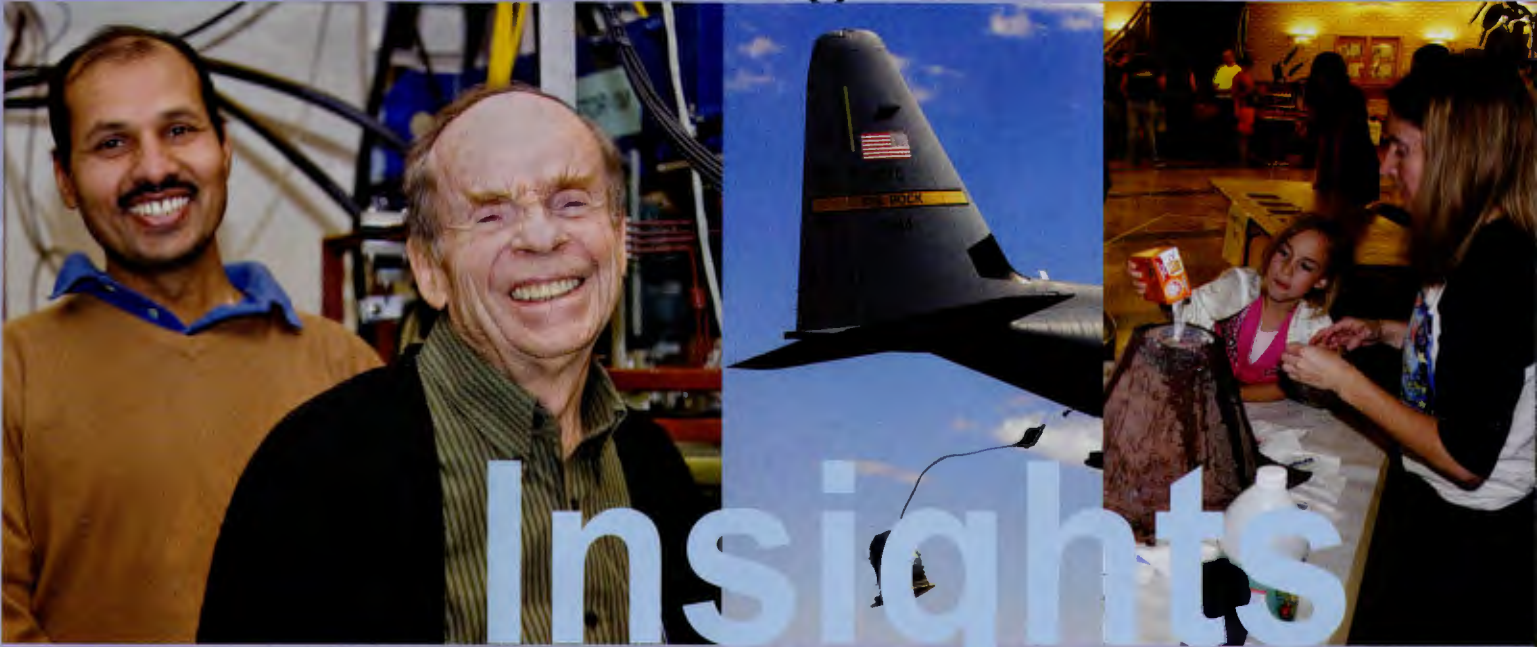
Best regards,

Jim MacMahon  
Dean, College of Science



At this past May's USU Physics Day, Nathan Johnson, right, an eighth grader at Roy, Utah's Sandridge Junior High, describes the popcorn-filled container he's designed to protect his raw egg for the event's Physics Day Sky Drop Contest to Dean Mary Hubbard. 2009 marked the 20th anniversary of USU Physics Day, held at Davis County's Lagoon amusement park.



**FALL 2009**

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*Cover photo by Donna Barry.*

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*Insights* is the alumni magazine of Utah State University's College of Science. Our mission is to inform alumni and friends of current events, research, student activities and news within the college. The magazine also provides a forum to alumni to follow the careers and professional development of colleagues.

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USU geologist Blair Larsen, right, and Arvid Aase, National Park Service paleontologist at Fossil Butte National Monument near Kemmerer, Wyoming.



Buried Treasure: Fossil Butte National Monument. Courtesy U.S. Geological Survey.

*Unlocking*

## Wyoming's Aquarium in Stone

USU geologist prepares online learning tools available to teachers, students throughout the world.

Rising from the sagelands like a lonely ocean liner, Fossil Butte reflects a rainbow of desert hues along its steep, furrowed walls. Watching wispy clouds sail past the national monument's prow, it's not so hard to imagine a vast chain of lakes teeming with varied aquatic creatures. And that's exactly how the arid, sagebrush-studded Green River Formation, of which Fossil Butte forms the center, appeared some 50 million years ago.

Today, the region generally offers blue skies, dry winds and frequent glimpses of chipmunks, squirrels and pronghorn in the high desert climate. But locked in Fossil Butte's walls is a treasure trove of fossils chronicling a progression of early life, much different from today's inhabitants, frozen in stone.

Fossil Butte offers an ideal outdoor classroom if you're lucky enough to live within a manageable driving distance of southwestern Wyoming and your school has the time and resources to provide you and your classmates with a tour. But most of the nation's middle schoolers are not so fortunate — until now.

With a grant from the National Science Foundation and assisted by the power of the Web, Utah State University geologist Blair Larsen has unlocked Wyoming's "Aquarium in Stone," as Fossil Butte is known. Students in far-flung classrooms, in regions vastly different from the Green River Formation, can now experience the wonders of Eocene life.

Larsen, who conducted the project as part of the requirements for her recently completed master's degree in Applied Environmental Geosciences, created an online learning module for the NSF and NASA-supported Earth System Science Education Alliance, better known as ESSEA. Entitled "*Analyzing Preservation Bias in Green River Formation Fish Fossils*," the module transports students and teachers to Wyoming's colossal paleontological cache.

"The modules offer secondary teachers problem-based learning activities they can use with their students," Larsen says. "Current modules include such topics as climate change, ice sheets, coral reefs, Mount Pinatubo and Hurricane Katrina."

The intent of each module's learn-





Fossil Butte National Monument is considered, in paleontology circles, a *Lagerstätten*, which is a German word that means “resting places.” The term defines fossil localities which are highly remarkable for either their diversity or quality of preservation and sometimes both. As a result, Fossil Butte National Monument represents an amazing “snapshot” in time, with preserved remains of rays, palms, bats, turtles, insects and seeds in addition to the detailed fish fossils.

—Blair Larsen, from  
“Analyzing Preservation Bias in  
Green River Formation  
Fish Fossils”

ing activities, she says, is to introduce students to a hands-on problem that they have to solve.

“The activities make science relevant,” says Larsen, who taught middle school science for 11 years.

Larsen’s module casts students in the role of paleontology interns assigned the task of analyzing actual quarry data for potential fossil preservation bias and preparing an exhibit that tells the story of mass fish fossil preservation found in the imposing monument.

What happened to the ferns, crocodiles, stingrays, dog-sized horses and masses of fish captured in stone?

“The processes that lead to fossil preservation are complex and integrated with the four spheres: lithosphere, biosphere, atmosphere, hydrosphere,” reads the lesson module. “Your task is to develop an Earth System Science analysis that explains how the four spheres interact to create the mass fish mortality layers often seen in the Green River Formation.”

The students use data collected by National Park Service scientists at Fossil Butte to investigate the data set and brainstorm the possible preservation biases: size, anatomy, class and so forth. Each team member pursues research of one or more of the possible preservation biases and shares their findings with the group.

“The project offers students the opportunity to work with authentic data,” says Arvid Aase, National Park Service paleontologist at Fossil Butte National Monument, who assisted Larsen in developing the module. “It’s a real-world exercise that allows students to experience cutting-edge scientific discovery without leaving the classroom.”

“Students respond well to problem-based learning activities,” Larsen says. “They feel like they have a job to do, not just an empty exercise.”

She sees the ESSEA project as a boon to teachers who are trying to provide meaningful learning opportunities with dwindling resources.

“Teachers want to provide exciting learning opportunities for their students but they often lack the time and resources to develop them on their own,” Larsen says. “The ESSEA modules provide free resources for teachers everywhere at the touch of a keyboard.”

—Mary Ann Muffoletto



A fossil of Eocene-epoch fish *Diplomystus dentatus* devouring *Knightia eocaena*. Photo by Fossil Butte National Monument paleontologist Arvid Aase.





Edwards and his wife, Ann, were honored at a surprise banquet this past spring, celebrating his 50th anniversary at USU.

## 'Fearless Farrell' at 50 IN PHYSICS

USU Physics Department  
honors longtime  
professor  
Farrell Edwards

**U**tah State University physics professor Farrell Edwards entered a spring 2009 banquet in his honor in genuine astonishment.

"I'm overwhelmed, thrilled and thank you so very much," Edwards told nearly 200 guests who joined him at the Logan Country Club for a surprise celebration of his 50th anniversary at USU. "I wish you a pleasant 50 years to come — I'll still be here."

The 77-year-old thought he was going to a fundraiser to aid his grandchildren's choir program, said Eric Held, associate professor of physics, research colleague of Edwards and a party organizer. "Farrell's wife, Ann, helped us come up with a plan."

At the gathering — attended by Edwards' ten children and many of his grandchildren, — colleagues, former students and family members reminisced about the longtime professor's achievements and offered a generous share of good-natured roasting.

Physics department head Jan Sojka recalled an early encounter with Edwards, when the latter cavorted in his trademark orange superhero cape emblazoned with the phrase, "*Phearless Farrell the Fizisist*." The occasion was a 1978 gathering of undergraduates, to whom Edwards was demonstrating the lighter side of physics.

"He never takes himself too seriously," said his son Boyd Edwards, USU alum and Russell and Ruth Bolton Professor of Physics at West Virginia University. "He inspires students to think deeply and question authority."

The younger Edwards describes his father as an innovator and nonconform-



ist, who pursues research “not on the edges where topics are hot but in the cold, forgotten center.”

Edwards said his father counsels the same approach to life and research: “Ask deep questions, take risks, enjoy the journey and be satisfied with the result.”

Douglas Lemon, a former student of Edwards and executive vice president and director of laboratories at Utah State University Research Foundation, praised his mentor’s encouragement and inspiration.

“He made physics fun — he took the fear out of physics,” said Lemon, who first met Edwards nearly 40 years ago when the professor spoke to the then-teen and his classmates in Sky View High School’s science club.

Lemon noted that Space Dynamics Laboratory is full of Edwards’ former students, ranging from scientists and engineers who took his classes decades ago to current undergraduates.

“As I asked them about their experiences with Farrell, I heard the same things over and over,” he said. “They describe him as caring, enthusiastic and a terrific teacher.”

Lemon expressed gratitude to his former professor, who was instrumental in SDL’s early years and is contributing to research in the recently established USU Energy Dynamics Lab. Edwards’ current research on renewable energy, including investigation of plasma containment and the possible development of a fusion neutron generator, will play a key role in the USTAR-funded lab’s future, he said.

Longtime colleagues Eastman Hatch, emeritus professor of physics, and USU Vice President of Advancement Ross Peterson also spoke at the gathering.

“In five decades, Farrell’s legacy is his students,” Peterson said. “Aside from his family, his imprint is on his tre-

Edwards, left, in his trademark orange cape, with son, Dr. Boyd Edwards, Bolton Professor of Physics at West Virginia University.

mendous community of students who are making an impact throughout the world.”

In Edwards’ honor, the Physics Department announced the establishment of the Farrell and Ann Edwards Scholarship Endowment to annually recognize outstanding students pursuing degrees in physics teaching. Inaugural recipients of the award, announced at the banquet, are current USU students

Jared Gee, Justin Gudmundson, Milo Maughan, Brent Rose and Andy Spencer.

“Beyond the age when many in his profession have retired, Farrell is amazingly active as a researcher, teacher and mentor,” Held said. “He’s a role model, an inspiration and a friend.”

—Mary-Ann Muffoletto



## HONORING FARRELL

Alumni who wish to make a contribution to the Farrell and Ann Edwards Scholarship Endowment may contact development director Joseph Jenkins at [joseph.jenkins@usu.edu](mailto:joseph.jenkins@usu.edu) or 435-797-3510.

Physicist Farrell Edwards, pictured in a 1970 photo, is celebrating 50 years as a USU faculty member. An enthusiastic scientist, Edwards counsels students to ‘ask deep questions, take risks, enjoy the journey and be satisfied with the result.’







# Bottled Sun

Using a tokamak,  
USU physicists confine  
plasma to use its  
energy and neutrons.

us — warm sunshine streaming in the window, fields of crops growing in the sunlight, sunburns.

“Essentially, fusion is the source of energy in your breakfast cereal,” says Farrell Edwards, Utah State University physics professor. “Plants use light and energy from the sun to grow, and we use plants to eat. Thus, we consume the products of nuclear fusion each day.”

The results of fusion energy are all around us; however, the byproducts of fusion are not only energy, but neutrons as well. But how is the fuel, such as hydrogen in the sun, held together at the extremely high temperature required for fusion? The sun does it through gravity. Scientists on earth are trying to do it using magnetic fields.

Edwards and his colleagues are investigating a new way to use magnetic fields to confine plasma long enough to use its energy and neutrons. Plasmas are created when enough heat is applied to gas to cause its atoms to lose their electrons. The remaining ionized gas is called plasma. When enough heat is applied in this process, nuclear fusion occurs.

“The trick is to hold the stuff together at one hundred million degrees,” says Edwards.

Thus, the goal is to reach a new stable state of plasma equilibrium that will hold together long enough for it to be used. Once this state is reached, Edwards will be able to demonstrate that he can indeed bottle the sun’s energy — for a second, at least.

To complete this experiment, Edwards is using a tokamak, which is a toroidal, or donut-shaped, device that produces a magnetic field to confine plasma. The tokamak that Edwards is using is on loan from the University of Saskatchewan, USU’s partner in this research. The tokamak that he is using is called STOR-1M for “Saskatchewan Torus, model 1, Modified.”

Collaborating with Edwards are USU physics faculty members Ajay

The sun gives off enough light to equal four trillion 100-watt light bulbs and converts nearly 5,000,000 tons of matter into energy each second. All of this energy is produced in the plasma core of the sun through nuclear fusion.

We see the evidence of nuclear fusion energy in the world around





Physics faculty members Farrell Edwards, right, and Ajay Singh are using a tokamak to confine plasma.

Singh, experimentalist and director of the laboratory, and Eric Held, a theorist. The team is working to heat a gas inside the tokamak to 100 million degrees Celsius in order to sustain fusion for a fair fraction of a second. Sandia National Laboratory in New Mexico is conducting similar research and has already achieved heating plasma to 5 billion degrees and holding it together for  $10^{-8}$  seconds or .00000001 seconds — not long enough for most purposes.

There are many positive benefits that could come from this research when completed.

“If the new state is achieved, the consequences to plasma scientists would be huge and could even go commercial,” says Jan Sojka, USU physics department head.

The new plasma state could potentially explain a number of astronomical phenomena that Edwards has been studying and would bring his research full circle.

“The whole idea for this research started 20 years ago when I was studying Venus flux ropes, or magnetic loops in Venus’ ionosphere,” says Edwards. “This theory, if proven, would provide an explanation for this phenomenon.”

Results from this research would also explain phenomena such as planetary magnetotails, or plumes of the magnetic field around the earth, and coronal loops on the sun.

If successful, Edwards’ research could also pave the way for creating a neutron generator, which would produce a neutron flux much higher than any other generator currently on the market. Neutron generators are used in devices to examine luggage and detect potential airplane bombs, detect and treat cancer, and detect plastic land mines left over from war. Consequently, the Department of Homeland Security has great interest in devices such as this and earlier awarded USU a \$350,000 contract to fund the research.

So far, Edwards and his colleagues have published their findings on the new plasma state in *Physical Review*

Letters, one of the most prestigious physics journals.

“Our research is really beginning to pick up steam,” says Edwards. “It is becoming recognized in the scientific community, and the possibilities for the future are exciting.”

Although Edwards’ theory about plasma equilibrium has not yet been proven, he feels that they are very close, expecting definite results within one or two years. He tells those who want to know the status of the research to “stay tuned.”

“I have been working in the physics department at Utah State University for 50 years, and I don’t see any reason to stop now,” says Edwards. “I am having too much fun messing around with my research, and in the end, it is just a delight to be alive.”

— Kinsey Love

## KNOW YOUR TOKAMAKS

A tokamak is a doughnut-shaped vacuum chamber surrounded by magnetic coils, says USU physicist Eric Held. A tool for controlled fusion research, the device extracts useful power from thermonuclear fusion.

The name ‘tokamak’ comes from a Russian acronym formed from words describing a toroidal chamber in which plasma, an ionized gas, is heated and confined by magnetic fields. The first tokamak was invented in the 1950s by Soviet physicists Igor Yevgenyevich Tamm and Andrei Sakharov, who were inspired by an original idea of Oleg Lavrentyev.







Chemistry professor Alex Boldyrev, second from right, and his doctoral students, from left, Dmitry Zubarev, Boris Averkiev and Alina Sergeeva, are challenging long-held ideas about the chemical bonding properties of metallic systems.

## Challenging SCIENCE, Challenging STUDENTS

USU chemists challenge  
long-held ideas about  
inorganic compounds

A team of USU chemists, led by Professor Alexander Boldyrev, is at the forefront of a discussion that's causing the scientific community to rethink long-held ideas about the nature of inorganic compounds. In the process, Boldyrev is priming his student team members for challenging and successful research careers.

"Dr. Boldyrev is absolutely passionate about science and training his students," says Dmitry Zubarev, who earned his doctorate in chemistry from USU and now holds a postdoctoral position at the University of California-Berkeley. "For him, instilling independent thinking and scientific expertise in his students is as important as the research itself."

Boldyrev, Zubarev and recent doctoral graduate Boris Averkiev and doctoral student Alina Sergeeva are investigating chemical bonding properties of metallic systems. The team asserts that characteristics believed to apply only to organic compounds can be extended to some metallic compounds. It's an idea that, until recently, was thought to be impossible.

"Our studies make people argue with us constantly as we defend our point of view," Zubarev says. "What we're discovering about certain metals is unexpected."

With colleagues at Washington State University and the Pacific Northwest National Laboratory, the USU researchers have published their findings in a number of academic journals including *Physical Chemistry Chemical Physics*, the American Chemical Society's *Journal of Physical Chemistry*, *Inorganic Chemistry*, the *Journal of Chemical Physics* and the *Journal of the American Chemical Society*. Team members have also presented their findings at national and international conferences.

To understand the Aggie team's research requires a brief history lesson. Since the 19th century, chemists have used the term "aromaticity" to describe the chemical bonding properties of organic compounds. The term is a bit misleading to the lay person, as the concept has little to do with the "aroma" associated with varied compounds.

In a nutshell, aromaticity refers to a chemical property in which atoms bond in rings to form stable organic compounds. By developing chemical-bonding models capable of explaining and predicting the structures of metallic clusters, the USU researchers are revealing that metals, too, exhibit aromaticity.

"It's a big step," Boldyrev says. "What we're discovering is that metal systems have properties that allow them to bond in ways that mimic organic materials."

Ascertaining the existence of this type of bonding is important, Boldyrev says, as it could improve scientists' understanding of the nature of catalytic activity and lead to the design of new catalysts.

"The development of chemical bonding models that display this process could have a significant impact on rational design of nanocatalysts, nanomaterials with tailored properties,





nano-scale electronic devices and more," he says. "That's our goal."

Beyond his scientific aims, Boldyrev is mentoring a new generation of scientists confidently poised to tackle new levels of thought.

"The atmosphere you work in is one of the most important keys for success," Sergeeva says. "Dr. Boldyrev inspires us to work hard every day. He's a shining example of the professor I am eager to become one day."

Averkiev says Boldyrev's support and encouragement helped him publish more than nine papers in three years and afforded him the opportunity to present his research and make career-building contacts in academic forums throughout the country.

And his support goes beyond the lab, says Averkiev, a native of Moscow, Russia, who was named USU's 2009 Graduate Student Researcher of the Year.

"Dr. Boldyrev met me at the Salt Lake airport when I first arrived in Utah and helped me get settled in my new home."

"What I admire most about Dr. Boldyrev is that he treats our research team as if we were his own family," Sergeeva says. "He's concerned about us. He feels responsible for us. He stays in touch with former team members who have graduated to offer his support."

Zubarev credits his professor with guiding and motivating him toward significant academic and research achievements during his years at Utah State. Zubarev was named USU's 2008 Graduate Student Researcher of the Year; he says the award is recognition of Boldyrev's mentoring talent and dedication.

"Dr. Boldyrev invested a lot of time in me," he says. "If I ever happen to associate myself with a school of scientific thought, it will be the 'School of Professor Boldyrev.'"

—Mary-Ann Muffoletto

## BOLDYREV RECEIVES TOP USU RESEARCH, UTAH CHEMISTRY AWARDS

Alex Boldyrev was awarded USU's most prestigious research accolade — the D. Wynne Thorne Career Research Award — in March 2009 and, in June, received the Utah Award in Chemistry from the Salt Lake and Central Utah sections of the American Chemical Society.

"Alex was recognized for his successful attempts to extend what chemists know about the most fundamental aspects of molecules: the chemical bonding that holds them together," said Steve Scheiner, professor and former head of USU's Department of Chemistry and Biochemistry.

He noted that Boldyrev's research has gained international acclaim, garnering more than 500 citations each year and longstanding support from the National Science Foundation — even in these very competitive times.

"Alex's students are active participants in his work and three of them — Boris Averkiev, Dmitry Zubarev and Anastassia Alexandrova — have been named Robins Award Graduate Research Assistants of the Year in recent years," Scheiner said.

Jack Simons, professor of chemistry at the University of Utah and a member of the award selection committee, said Boldyrev's research excellence was the primary reason for his selection.

"As a young scientist in his native Russia, Professor Boldyrev carried out theoretical studies that resulted in the prediction of a new class of molecular anions termed 'superhalogens,'" he said.

Simons noted that Boldyrev has continued to expand his research into important breakthroughs in building a theoretical framework for understanding the bonding properties of inorganic compounds and enabling chemists to predict several entirely new classes of species.

"This, of course, is much of what chemistry is about — creating new molecules and ions with novel properties," he said. "Professor Boldyrev is unique among theoretical chemists in his ability to bring this creative and predictive component to this research."



For Boldyrev, says his student Dmitry Zubarev, "instilling independent thinking and scientific expertise in his students is as important as the research itself."



# Not the Same OL' RODEO

Statistics Alum Rebecca Anderson '09

Excels at Academics, Athletics

**A**t Air Mobility Rodeo 2009, held this past July at Washington's McChord Air Force Base, more than 2,500 members of the Air Force, Air Force Reserve and allied nation forces gathered to prove their operational prowess. As the U.S. Air Force Air Mobility Command's premier readiness competition, the rodeo features air drops, aeromedical evacuation, aerial refueling, fit-to-fight evaluation and other events that rigor-

ously test teams' battle preparedness and mettle.

Precision counts and accurate scoring is key. And that's where the skills of College of Science student Rebecca Anderson were put to the test.

Anderson, who graduated from USU with a bachelor's degree in statistics in May 2009 with a 3.94 GPA, received a prestigious Science, Mathematics and Research for Transformation (SMART) scholarship to pursue her undergraduate studies. Administered by the Department of Defense, the competitive, full-tuition scholarship includes a summer internship requirement with a DoD agency. Anderson interned at Belleville, Illinois' Scott Air Force Base near St. Louis, where she was assigned the task of evaluating Air Mobility Rodeo scoring methods.

At USU, Anderson excelled both academically and on the volleyball court. A three-year letter winner, she appeared in 71 matches and earned academic all-Western Athletic Conference honors three times, including earning academic all-district honors twice. She was also named to the College Sports Information Directors Association academic all-district VII second team.

Aggie volleyball coach Grayson DuBose says Anderson's intelligence and work ethic are her strengths.

"She is so cerebral," he says. "You don't have to explain things a bunch, she just gets it off the bat. It is a fun thing in an athlete to know that she understands and sees the big picture."

Anderson has returned to Scott AFB to fulfill the scholarship's two-year work requirement. In her new position,



Recent USU graduate Rebecca Anderson received a prestigious SMART Scholarship from the Department of Defense.



At the Air Mobility Rodeo, a C-130J Hercules from the 314th Airlift Wing at Little Rock Air Force Base, Ark., competes in the air drop competition by dropping pallets on targets. The event is a readiness competition for U.S. and international mobility air forces. Photo by Staff Sgt. Richard Rose, courtesy of the U.S. Air Force.

she's involved in long-range planning for the Air Force.

Anderson credits her father, Ian Anderson, a USU professor of mathematics and statistics, with sparking her interest in statistics.

—Mary-Ann Muffoletto

A middle blocker on USU's volleyball team, Anderson ranked first in total blocks during the 2008 season and set two single-game school records. Photo by Meegan M. Reid, courtesy of *The Herald Journal*.





In Search of Bugs: Faculty mentor Renee Bryce, far right, and computer science undergrads, from left, Nare Hayrapetyan, Elise Derr and Alison Cooley, received a grant to create 'Bug Theatre' learning materials to help budding programmers.

## Undergrad Computer Scientists Develop **'BUG THEATRE'**

Faculty mentor Renee  
Bryce guides project to aid  
undergrad programmers

**A**sk undergraduate computer scientists about their most vexing programming challenge and they'll sum it up in one word: bugs.

Utah State University computer science majors Alison Cooley, Elise Derr and Nare Hayrapetyan have "been there, done that."

"It's so frustrating when you know the code you've written should work but it doesn't," says Hayrapetyan, a third-year USU Huntsman Scholar from Armenia.

"Then, you'll often discover that it's just one character — maybe a semicolon is missing — that's causing the problem," sophomore Derr says. "There have been times when I've looked for a problem for hours."

"There's not just one right way to implement a solution to a programming assignment," says Cooley, a third-year student. "And sometimes it's hard to find a correct path."

Budding programmers who follow in the trio's footsteps are in luck because the team, with faculty mentor Renee Bryce, was awarded a grant this past June to research the causes of student programming bugs and to develop learning materials to ease the exasperating obstacles that often discourage fledgling learners.

Bryce, who joined USU's Department of Computer Science in August 2008 as an assistant professor, learned June 9 that she and her students received a Collaborative Research Experience for Undergraduates grant from the Computer Research Association's Committee on the Status of Women in Computing Research. According to the committee's Web site, the "action-oriented organization dedicated to increasing the number of women participating in Computer Science and Engineering (CSE) research and education at all levels."

research and education at all levels."

The award provides each of the three undergraduates a \$3,000 stipend for the 2009-10 academic year, a \$4,000 stipend for summer 2010, funds for supplies and travel funds to attend the 2010 Utah Conference on Undergraduate Research in Cedar City and the 2010 Grace Hopper Celebration of Women in Computing conference.

"This is a great opportunity for these students," Bryce says. "They'll learn a lot through this experience and be a good role model for future students."

The team's proposal calls for the development of "Bug Theatre," a program using online videos and Web-based tutorials to identify common bugs and offer advice and software tools to avoid them. The students have selected a movie motif to keep the subject humorous, entertaining and non-threatening.

"The students have great ideas and will create movie posters and tickets that will advertise the finished program," Bryce says. "Over the course of the next year, they'll develop online movies about bugs that will benefit not just USU students but will be available over the Web to users everywhere."

Computer bugs are not only a headache for students but a significant bane for the computing industry.

"The National Institute for Standards and Technology estimates that computer bugs cost our economy \$59 billion a year," she says. "Bugs are usually annoyances but they can potentially cost lives."

Cooley, who hopes to pursue a career with the FBI, looks forward to the research challenge and developing movies for her fellow students.

"I wish I'd had something like 'Bug Theatre' to help me out," she says.

—Mary-Ann Muffoletto



## Science

## Unwrapped

New Presentation Series 'Unwraps' the Mystery,

## FUN OF SCIENCE

Monthly 'Science Unwrapped' series attracts inquiring minds of all ages

wrapped,' a free, monthly presentation series for inquiring minds of all ages.

The program opened in February 2009 with its inaugural "Mind and Body" series and the monthly presentations have been a hit ever since. Each gathering has attracted several hundred participants with attendees ranging in age from 4 to 80. Participants have learned about heady topics ranging from food cravings, epidemics and the human heart to rockets, stars and cosmic volcanoes.

"Our aim is to provide a relaxed, family friendly event that introduces people to the wonders of science and gets them asking questions," says Shane Larson, assistant professor of physics and chair of the Science Unwrapped committee. "At the same time, we want to give the community a glimpse of exciting research conducted right here at USU."

A young participant presents his "mystery rock" for identification by USU geology student Nathan Giles, right, following September's Science Unwrapped presentation. USU geophysicist Tony Lowry, an assistant professor in the Department of Geology, presented "Fire, Ice and Explosions: Volcanoes in Our Solar System."

**A**mong the goals on Mary Hubbard's mind when she became dean of USU's College of Science in July 2007 was to reach beyond the college's labs, classrooms and walls to expand outreach to the local community.

"Many people find science intimidating and confusing and that's too bad," says Hubbard, who now serves as vice provost for international education. "Science is fascinating and not just for geeks, nerds and geniuses."

To introduce the excitement of science to the USU campus and surrounding community, Hubbard assembled a team of Aggie scientists to produce 'Science Un-



◀ More than 500 attendees showed up at Science Unwrapped's August 2009 presentation to hear USU alum Robert Wardle of ATK Launch Systems explain 'how to get your ride into the sky' and view rocket launches on the Quad.

▶ Take cover! Graduate student Heather Smith, right, helps youngsters at Science Unwrapped create their own volcanic eruption with baking soda and vinegar.





Attendees of February's "Why We Crave Junk Food" presentation sample healthy snacks and view displays staffed by USU dietetics students.



Pre-dental student Benjamin Christensen, center, guides two middle schoolers through their pig heart dissection following April's popular "Matters of the Heart" presentation. More than 100 Science Unwrapped attendees opted to try their hand at dissection.



Attendees don diffraction glasses to view the spectral components (colors) of various light sources following May's Science Unwrapped presentation "The Superhero's Universe: Observing the Cosmos with X-ray Vision and Beyond."

At each presentation, attendees hear a lecture by a USU or visiting scientist, then enjoy free refreshments and hands-on learning activities.

For 2010, the Science Unwrapped committee plans a new series entitled, "Origins." For more information and a schedule of upcoming presentations, visit [www.usu.edu/science/unwrapped](http://www.usu.edu/science/unwrapped) and join our group on Facebook,

"Science Unwrapped at USU."

—Mary-Ann Muffoletto

"MANY PEOPLE FIND SCIENCE INTIMIDATING AND  
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AND GENIUSES."

—MARY HUBBARD

VICE PROVOST FOR INTERNATIONAL EDUCATION







# HAIRY TUMORS AND THE RARE 17TH CENTURY TEXT



**The Student:**  
Chuck Oughton,  
the budding philologist.

**The Professor:**  
Dr. Mark Damen,  
the Latin Master.

**The Alumnus:**  
Dr. Willy Lensch,  
the research luminary.

## The Bizarre Common Ground of a USU Professor, His Star Student and a College of Science Alumnus on the Brink of Discovery

Without wanting to jinx him, let's just say that College of Science alum Dr. M. William Lensch '91 is the "type of guy" who "could win" a Nobel Prize someday. Could. He deftly navigates circles wherein reside the planet's brightest minds. He presents papers and anchors symposia around the world, advises mega-foundations as to where their paradigm-shattering seed money might best be spent and – for fun – offers historical tidbits and insights into the lives of physiology's or medicine's Laureates. He even hosts the annual Nobel Nostradamus pool, a sort of NCAA-Final-Four-like prognosticator of the soon-to-meet King Carl XVI Gustaf of Sweden list.

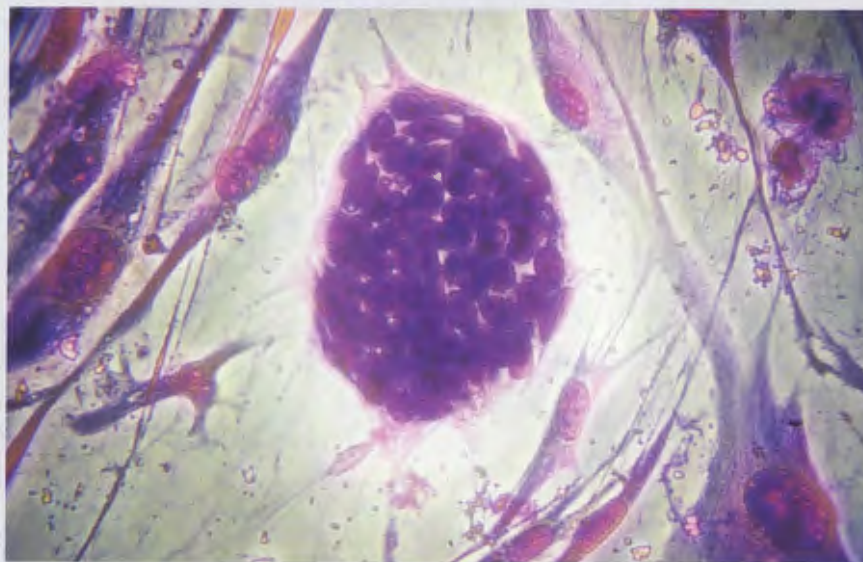
As instructor in pediatrics at Harvard Medical School and senior scientist at the George Q. Daley Laboratory at Children's Hospital in Boston, "Willy" (yes, he has a life outside of the lab) Lensch is at the epicenter of groundbreaking research into the body's intricate hematopoietic (blood) system. Expounding upon his background in genetics he gets closer and closer every day to "understanding what genes are involved in blood cell production, how that happens at the earliest stages when the first blood cell is made from its non-blood precursor, and how the entire process goes astray in disease." Suffice it to say, Willy knows his way around human embryonic stem cells, yet still marvels at their "incredible developmental plasticity," that – someday – may just obliterate the bar of understanding in hematology and oncology.

An impassioned scientist, Lensch is also a tireless student, plowing into anything and everything that may provide illumination. But he is also a son of what he calls "a cancer family," as if the immediacy and meaning of his work needed to be any more profound.

So when Lensch caught wind of a rare 17th-century text that just might be the first dedicated thesis on teratomas – a bizarre, attention-grabbing pathology, sometimes referred to as "hairy tumors," that mainly occur in areas of the body where germ cells, egg and sperm, and/or their progenitor cells migrate or come to rest during development – he knew it was time to reprioritize his leisure-time reading list.

"Teratomas are the result of geneti-





A Wrights/Giemsa stained human embryonic stem cell (hESC) colony on murine embryonic fibroblast feeder cells. The colony contains roughly 50-70 individual hESCs. Photo by Willy Lensch, courtesy Children's Hospital Boston.

cally abnormal, yet very developmentally potent cells trying to make a body in the wrong place, at the wrong time, and absent some very important instructions," Lensch says.

The tumors are so strange, "they're fantastically difficult to confuse with other pathologies," they contain hair, various types of tissues and glands, even teeth, "all jumbled together in disarray," Lensch says.

For centuries, teratomas were explained away through purely religious belief or superstition. They belonged in the realm of demons and monsters alongside other ghastly, inexplicable occurrences.

But in 1658, Johann Sculteto penned a medical treatise entitled *Trichiasis Admiranda*, which serves as a window into the refinement of medical thought and the renaissance that was taking place in many fields, including anatomy. Lensch discovered that there are only five copies of Sculteto's book known to exist in the world, one – as luck would have it – tucked away across the street in the rare books room at Harvard Medical School's Countway Library. He wondered what it might de-

scribe. He wondered if it really could be the "first dedicated thesis on teratoma ever published." Even at Harvard, with resources aplenty, he wondered how he was going to get through the Latin. But he wondered only for a second.

"The text is in Latin, and when I think of Latin, I think of my college Latin professor, Dr. Mark Damen," says Lensch. "There's simply no one I'd rather work with on such a project than Mark and no matter at what 'lofty' institution I might find myself."

Damen, a 1998 Carnegie Professor of the Year who shares appointments in USU's history department and in theatre arts, says he wasn't necessarily surprised to hear from Lensch, with whom he has had only "casual, intermittent contact, over the years."

But while he's pleased at the thought of one of USU's graduates pushing the boundaries of human understanding, he also admits to being more captivated by this "kind of generational passing of knowledge that happens haphazardly academically."

"Willy was my student in beginning Latin, that's it. He never went beyond that, he didn't take other classes,"

Damen says, "but we just grooved." Still, diving alone into hairy tumors and 17th-century medical jargon would be "very lonely, scary work," says Damen.

Like Lensch, the professor knew exactly to whom he could turn. Chuck Oughton is an aspiring philologist and, when the call arrives, one of Damen's star undergrads at USU. Translating the Sculteto text would be a fine senior project for Chuck and by sharing the work, the project should move along splendidly. "Boy, was that a miscalculation!" Damen says. Oughton laughs.

As it turns out, the student and the professor encounter translation challenges that rival the level of difficulty Lensch is used to seeing in his genetic research. There are grammatical and syntactic errors, typos, puzzling abbreviations and ligatures. Rather than simply being able to stick to their beloved Latin, Oughton and Damen soon find themselves taking on roles of author and printer, wondering how quirks in Sculteto's handwriting might have been interpreted by printer Michael Ender, and how Ender's printing limitations might have produced the author's obviously unproofed book.





USU student Chuck Oughten transcribes the tiny Sculteto text (on stand) at Harvard Medical School's Courtway Library.

Working from Oughton's own transcription of the text (an invaluable first step since Countway wasn't about to release the Sculteto book to just anyone) the team sets up a basic model by which to function. If something doesn't seem to gel in Latin, they return to the physical text and look for some sort of diacritical mark, propose what it could possibly mean, and then seek confirmation elsewhere, since patterns of errors are more convincing to sell than postulations of single-occurrence goofs. Working a few lines at a time individually, Damen and Oughton regularly reconvene over the ensuing months to bounce ideas off of each other and to maintain sanity.

"It was only with that collaboration that we were even able to propose solutions," Oughton says. "We'd hit something and we'd stick with it for a while and all the sudden a light bulb would come on, or someone would say some-

thing that hit a chord in the other's mind and we'd go, 'I wonder if it's that?'"

During the journey, Oughton learns more about the medieval printing process than he ever wanted to know and Damen is forced to dust off procedures and tools he left behind in a previous life when he studied how to read ancient manuscripts in graduate school. Each becomes genuinely grateful for at least having wet their academic feet in the sciences. "The fact is that the divisions between academic disciplines are much more permeable than most people would think," Damen says, "and the reality is that when little opportunities like this come up, your background in something else, as minimal as it may be, comes back into play."

The Sculteto translation is not going to produce a cure for cancer, nor will it, by itself, secure a Nobel Prize for Willy Lensch. It does, however, seem to

activate an important tipping point in the history of medical thinking, away from witchcraft and demons and toward case studies, the power of observation and the fruits of enlightenment. And that is precisely the sort of thing a classics professor, his star student and a rising USU alum can appreciate, agree and collaborate on—even if it gets a little hairy.

—Jared Thayne '99

*Office of USU Vice President for Advancement*

(This article was originally published in the Summer 2008 issue of *Utah State* magazine and is reprinted with permission.)





## Alum Willy Lensch Mentors Science Goldwater Scholar



Goldwater Scholar Cody Tramp was named a Utah Governor's Scholar by former Gov. Jon Huntsman, Jr. in 2008. The undergraduate, who is majoring in molecular biology and biochemistry, served as a summer intern at the Harvard Stem Cell Institute.

College of Science undergraduate Cody Tramp was so eager to start his summer internship he arrived on the East Coast almost a month early to complete his security clearance and get a jump on his research. Selected for the 2009 Harvard Stem Cell Institute Internship Program, the dual molecular biology and biochemistry major spent 12 weeks working in the lab of researcher Niels Geijsen at the Massachusetts General Hospital Center for Regenerative Medicine.

"Before starting the internship, I contacted my mentor and read up on his research and lab techniques," says Tramp, who was named a 2009 Goldwater Scholar. "I wanted to get as much out of this program as possible, so I arranged with Dr. Geijsen to start early."

Selected from a pool of more than 300 applicants, Tramp was one of about 30 students participating in the competitive undergraduate research program. He received word of his selection in April 2009 from USU alum Willy Lensch, a faculty member in pediatrics at Harvard Medical School.

During his internship, Tramp participated in a twice-weekly seminar series led by Lensch that's designed to acquaint the interns with specific scientific questions and advances in the stem cell field.

"Dr. Lensch has an amazing depth of knowledge and is a very enthusiastic teacher," Tramp says. "We covered historical highlights in medical research ranging from the 1600s to current legislation and its impact on stem cell research."

In Geijsen's lab, Tramp studied spermatogonial stem cell development.

"We investigated the DAZL protein, which is lost from chromosomes in many cases of male infertility," he says. "The protein may regulate RNA processing in male germ cells."

With faculty mentor Dennis Welker, who also mentored Lensch, Tramp is investigating a lactic acid bacterium commonly used as a probiotic and in the production of fermented dairy products. He'll present his findings, the basis of his Honors thesis, during USU's Student Showcase in Spring 2010.

Among the accomplishments Tramp can list as he prepares applications for graduate school is the publication of a paper in the journal *Plasmid* – a crowning achievement in the undergrad's stellar academic career.

—Mary-Ann Muffoletto

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LEGISLATION AND ITS IMPACT  
ON STEM CELL RESEARCH."

—CODY TRAMP





Some 36 years after leaving campus as an undergraduate, Richard Spillman, right, founder of Spillman Technologies, receives his bachelor's degree from Computer Science Department Head Donald Cooley. In the photo, Spillman is returning a copy of the computer science textbook "Intel 8080" that Dr. Cooley loaned to him in 1975. Written inside the book is "Return this to Cooley or you won't graduate."

million-dollar company with more than 200 employees, received his USU bachelor's degree in December 2008.

Based in Salt Lake City, Spillman's company, Spillman Technologies, Inc., provides a full range of integrated software solutions for public safety agencies, including Records Management, Computer-Aided Dispatch, Mobile Communications, Corrections Management, Fire/EMS Management, Resource Management, and Data Sharing. The company provides software, training, support and services for more than 800 agencies and nearly 50,000 public safety professionals in 35 states.

Spillman Technologies received a Work/Life Award from the Utah Department of Workforce Services as one of "Utah's Best Places to Work" in 2009. In 2008 and 2009, it was named one of the nation's fastest growing private companies by *Inc.* magazine.

## NEVER TOO LATE

Successful Utah Entrepreneur Receives Degree from USU

While an undergraduate, computer science student Richard Spillman left USU in 1972 before completing his degree to pursue a software development project with Utah's Cache County. Some 36 years later, Spillman, a longtime Utah State supporter who's built a multi-

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Kenneth R. Rees, Jr.  
David J. Remondini  
John Rice  
Dr. Karen C. Rice  
Weldon T. & Jackie Richardson  
Donald W. & Mae Roberts  
Myrna N. Robertson  
Daniel & Vivian Rogers  
Mitch Rogers  
Christopher & Kriste Rose  
Eric & Brenda Rowley  
Wayne & Anette Rowley  
Roy\* & Karin Rushing  
Joseph A. Russin  
Kent A. & Diana Sargent  
Joseph Savola & Marianne  
Hossner  
Scott Welo Sawby

Timothy B. & Emily F. Schmidt  
Maury & Joan Schooff  
Warren J. Schulingkamp, II  
Daniel N. & Dianna M. Scofield  
Margaret Seamons  
Clinton K. Searle  
Rodney & Jeanette Seeley  
Jeremy K. Selley  
Matthew S. Serfustini  
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Deano Ray Smith  
Kenneth C. Smith  
Sterling P. Smith  
Jan Josef Sojka  
John E. R. & Doreen E. Solum  
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Jerry Springer  
Jennifer Marie Stafford  
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For details about support scholarships, programs and faculty in the College of Science, please contact Joseph Jenkins, director of development, at 435-797-3510 or [joseph.jenkins@usu.edu](mailto:joseph.jenkins@usu.edu).

Individuals who have made more than one gift are listed once. Every attempt is made to cite donors accurately. If an error or omission has occurred, please contact Joseph Jenkins at 435-797-3510 or [joseph.jenkins@usu.edu](mailto:joseph.jenkins@usu.edu). This list includes donations made from January 1, 2008 through December 31, 2008. Please let us know if you prefer your name to appear in another way.





Faculty from USU's Biology Department gathered following the surprise announcement to celebrate the university award that honors exemplary teaching by an entire department.

## *Teaching Excellence: Biology Department* **Fosters Learning, Discovery**

**IF YOU ASK FACULTY MEMBERS** in Utah State University's Department of Biology why Aggie graduates' acceptance rates to medical school, dental school and other competitive graduate programs consistently exceed national averages, the answers are similar and succinct.

"We get to know our students early and we get to know them well," says Andy Anderson, pre-health advisor and principal lecturer in human anatomy and dissection, physiology, bioethics and microbiology.

The department's personalized approach to teaching was rewarded with a surprise visit to faculty members March 24 as they gathered for their regular meeting. They were greeted by USU President Stan Albrecht, Raymond Coward, provost and executive vice president, and departmental award selection committee members, who presented the educators with Utah State's 2009 Department Teaching Excellence Award.

"On behalf of the university, I present this award with sincere congratulations," Albrecht said. "This is a well-deserved honor in recognition of the department's devotion to student success."

In a written citation, Biology faculty members were praised for reaching beyond traditional classroom experiences to excite students through engagement in the process of scientific exploration in the laboratory and in the field.

"Whether a student's desire is medical school or they are taking that one life science course in their college career, the Utah State University Department of Biology treats them equally, that is, with respect and a strong commitment to make biology learning an exciting journey of discovery," the citation read.

Biology students concur with the award committee's findings.

"One of the most valuable things my biology professors have done is to constantly add cutting edge research data to their lectures," says recent graduate Luke

Peterson, who entered Missouri's Kirksville College of Osteopathic Medicine this fall. "We're always hearing about the latest and greatest news in our field. That really gave me an edge in medical school interviews."

Peterson says he's grateful for the research experiences he gained during his undergraduate career, including work he performed with faculty mentor Joseph Li that involves inhibiting the expression of specific genes from viruses — findings that could aid cancer treatment.

"I never dreamed I'd have the opportunity to perform research of this caliber as an undergrad," he says.

The Department of Biology offers bachelor's degree programs in biology, composite teaching-biological science and public health; master's degree programs in biology and ecology and doctoral programs in biology and ecology. Master's and doctoral degree programs in toxicology are offered through the Interdepartmental Program in Toxicology. Minors are offered in biology, biomathematics and public health. In cooperation with the department, Weber State University offers an associate's degree in nursing on USU's Logan campus.

The department's advising center assists students of all majors throughout the university in preparing for admission to medical and dental schools and other graduate programs in health and biological sciences. Efforts coordinated by the center include guiding students to undergraduate research and internship opportunities, offering mock admissions interviews and admissions test study preparation as well as writing letters of recommendation — all critical components of successful professional and graduate school admissions.

—Mary-Ann Muffoletto





## Keeping the World Safe from Storms in Space

### USTAR Funds New Space Weather Forecasting Center at USU

#### IN THE COURSE OF TODAY'S ACTIVITIES

you might send a text message, pay at the pump for your gasoline or use your car's GPS system. You'll likely depend on electricity supplied by a power grid, natural gas from a pipeline, products delivered by long-haul trucks, trains or planes and your Internet connection. All of these activities are dependent on satellites, which makes all of them vulnerable to unpredictable forces miles beyond Earth's atmosphere: the volatile manifestations of space weather.

"Space weather disturbances can wreak havoc on human systems and operations," says Robert Schunk, physics professor and director of USU's new International Center for Space Weather Forecasting. "As society becomes more dependent on sophisticated space-borne and ground-based technological systems, forecasting space weather becomes crucial to our economy, safety and security."

USU's longtime research on space weather forecasting recently received a boost with the approval of Utah Science Technology and Research Initiative — USTAR — funding to establish the new center and build on the university's expertise in developing forecast models for Earth's upper atmosphere and ionosphere.

"Regions beyond Earth's atmosphere display highly variable and turbulent densities, temperatures and winds," Schunk says. "These space weather disturbances are particularly severe during geomagnetic storms when bursts of hot plasma from the Sun interact with the Earth's magnetic field."

The resultant surges in radiation levels and tornado-force cosmic wind gusts disrupt over-the-horizon radars, high frequency communications, global positioning navigation systems, military

surveillance operations, worldwide pipelines, NASA's deep space tracking network and Federal Aviation Authority tracking systems. Space weather is an ever present hazard for the International Space Station, shuttle flights and the ever growing legion of satellites rotating the Earth.

"Economists estimate that space weather costs the global economy from \$200 to 400 million each year," Schunk says. "With regard to security, the U.S. military relies on space weather warnings to protect satellites and ground-based systems that support our armed forces. System failures can cost lives."

As part of a U.S. Department of Defense-funded research program, USU has developed two physics-based data assimilation models for the upper atmosphere and ionosphere in an effort called Global Assimilation of Ionospheric Measurements or GAIM.

The GAIM team, which consists of Schunk and Physics Department colleagues Jan Sojka, Ludger Scherliess, Donald Thompson and Lie Zhu, along with USU students, created the models to provide specifications and forecasts for global, regional and local distributions of upper atmosphere/ionosphere densities, temperatures and winds.

"These models have garnered worldwide attention and are commercially viable," Schunk says. "With the USTAR funding, we plan to provide real-time specifications and forecasts of upper atmosphere and ionosphere weather and have customers subscribe to the service."

USTAR will provide multi-year funding to establish the USU center, which will be housed in the USU Physics Department's existing Center for Atmospheric and Space Sciences.

—Mary-Ann Muffoletto



USU's Space Weather group recently received USTAR funding. Team members are, from left, Lie Zhu, Jan Sojka, Ludger Scherliess, Donald Thompson and Robert Schunk, director.



# Making the **GRADE,** Making a **DIFFERENCE**



Merissa Cunningham

## Merissa Swainston Cunningham

Valedictorian, Fall 2008

### AT A TIME WHEN MOST OF HER UNDERGRADUATE PEERS

were seeking instruction and academic guidance, Utah State University composite mathematics/statistics teaching major Merissa Swainston Cunningham was serving as a peer advisor, helping students seeking assistance in her department's academic advising office and working to implement the university's new math placement exam. For four semesters she also taught business statistics recitation sections.

"It was intimidating at first to be teaching statistics and advising students — many much older than I," says the 2005 graduate of Idaho's Preston High School. "But I'm grateful for the experience and proud of what I accomplished."

**24 INSIGHTS | FALL 2009**

With encouragement from mentor Linda Skabelund, academic advisor for USU's Department of Mathematics and Statistics, Cunningham says she gained confidence in interacting with students and parents. It's a skill that will serve her well as Cunningham pursues a career in teaching, a profession she's aspired to since her teen years.

She credits her high school teacher Daniel Baird, a USU alum, with fueling her interest in higher math.

"After we had completed calculus, Mr. Baird gave up his prep hour to teach a small group of us statistics,"

### "STUDENTS NEED TO

UNDERSTAND THAT TEACHERS

GENUINELY WANT THEM TO

SUCCEED."

she says. "He really wanted to help us excel."

As a student teacher, Cunningham completed clinicals at the high school level and taught middle school students. Coupled with her teaching experiences at the college level, she learned the distinctive nuances of the varied age groups.

"Classroom management is not really an issue with college students — they have to take responsibility for themselves, but younger students need adult direction," she says.

A favorite teaching experience was with eighth and ninth grade students at Cache Valley's South Cache Center. "I felt like I could actually make a difference in those student's lives," she says.

During her undergraduate career, Cunningham worked with faculty mentor Jim Cangelosi on the Utah Mathematics Endorsement Project. The state and federally funded continuing education project helps Utah's K-12 teachers elevate their endorsements in mathematics education.

Her broad experiences as a student, advisor and teacher give Cunningham a unique vantage point in the classroom.

"Students need to understand that teachers genuinely want them to succeed," she says. "To new college students I say, 'Meet with your advisor and professors early and often and take the initiative to form study groups with your classmates. Getting to know them will enhance your college experience.'"

*Cunningham is the daughter of Kay B. and Lorie Flint Swainston of Preston, Ida. She is married to USU computer science alum Zachary Cunningham.*

## Jake C. Jones

Valedictorian,  
Spring 2009

### IN SEEKING A COLLEGE DESTINATION,

Utah native Jake Jones looked for a school where he could pursue research, get to know his professors and study in his home state. At Utah State, he found an environment that met each of his requirements.

"I loved studying science in high school so I chose cellular and molecular biology as my major," says the aspiring physician, who graduated from Castle Dale, Utah's Emery High School in 2005.

Early in his undergraduate career, Jones began conducting research with biology professor Frank Messina to





Jake C. Jones

determine how insects adapt to novel food plants. With faculty mentor Lee Rickord, Jones conducted stem cell research. The undergraduate was awarded a Willard L. Eccles Undergraduate Research Fellowship and an Undergraduate Center for Integrated BioSystems Research Grant to pursue his research endeavors.

"As I got involved in research I began to appreciate the patience and persistence needed to advance scientific knowledge," he says. "These experiences taught me to think critically and develop problem-solving skills."

With Dr. Messina, Jones has published three research papers in peer-reviewed research journals.

Beyond the lab, the young scientist served as a supplemental biology instructor, earned basic certification as an emergency medical technician, completed more than 100 observation hours with local physicians and volunteered with a local hospital and hospice.

Following the recommendation of faculty mentor Greg Podgorski, Jones applied and was accepted into a competitive National Institutes of Health graduate partnership program at Johns Hopkins University – one of only five applicants accepted each year.

"I returned from the interview on a Friday and, the next morning, received an offer by email," he says.

"THE FACULTY HERE HAVE  
MADE A HUGE DIFFERENCE  
AT EACH STEP OF MY  
UNDERGRADUATE CAREER,"  
HE SAYS.

"MY EDUCATION HAS BEEN  
PHENOMENAL — ESPECIALLY  
THE MENTORSHIP OF  
PROFESSORS.

The biomedical research program will enable Jones to earn both doctoral and medical degrees and prepare him for varied career pursuits.

"I'm considering surgery and clinical trials," he says. "These would allow me to be involved in both research and direct patient care."

Jones credits his research experiences and preparation with USU mentors in helping him secure his spot with Johns Hopkins, along with other medical school acceptances.

"The faculty here have made a huge difference at each step of my undergraduate career," he says. "My education has been phenomenal – especially the mentorship of professors. They've not only guided me in research, study and my chosen career path, they've offered hours of discussion on questions of science, philosophy and life."

*Jones is the son of Cindy Jones of Logan, Utah.*

—Mary-Ann Muffoletto

## SPRING 2009 HONORS

**Scholar of the Year,**  
**Robins Award USU Scholar of the Year**  
Jennifer Albretsen Roth, Physics

**Honors Graduates**  
Jodie Barker-Tvedtnes, Physics  
Randy Bowen, Biology  
Tamara Jeppson, Geology and Physics  
Arthur Mahoney, Computer Science  
and Mathematics  
Bryce Osborne, Biology  
Jennifer Albretsen Roth, Physics  
Alison Taylor, Biology

**Peak Prize Undergraduate Researcher  
of the Year**  
Sydney Chamberlin, Mathematics  
and Physics

**Undergraduate Teaching Fellow of the Year**  
Braden Parker, Biology

**Graduate Student (MS) Researcher  
of the Year**  
Rebecca Atkins, Mathematics and Statistics

**Graduate Student (PhD) Researcher  
of the Year,**  
**Robins Award USU Graduate Research  
Assistant of the Year**  
Boris Averkiev, Chemistry and Biochemistry

**Graduate Student Teacher of the Year**  
Brittany Allred, Mathematics and Statistics

**Undergraduate Research Mentor  
of the Year**  
J.R. Dennison, Physics

**Faculty Researcher of the Year**  
Tim Gilbertson, Biology

**Faculty Teacher of the Year**  
John Stevens, Mathematics and Statistics

**D. Wynne Thorne Research Award**  
Alexander Boldyrev, Chemistry  
and Biochemistry

**USU Outstanding New Professional  
Advisor Award**  
Yvonne Kobe, Biology

**USU Department Teaching Excellence  
Award**  
Biology Department





USU's 2009 Goldwater Honorees. From left, Honorable Mention awardee B.J. Myers and Goldwater Scholars Taren McKenna and Cody Tramp.

## Striking Gold: Three Aggies Named 2009 Goldwater Honorees

**TAREN MCKENNA AND CODY TRAMP** were named 2009 Goldwater Scholars by the Barry M. Goldwater Scholarship and Excellence in Education Foundation. Brian "B.J." Myers was awarded an honorable mention in the national competition.

The 2009 honorees, all College of Science students, are members of USU's Honors program and actively involved in undergraduate research projects. In addition to this year's award recipients, Utah State boasts 11 Goldwater Scholars and four honorable mention recipients from previous years.

"The number of USU students who have been honored by the Goldwater Foundation through the years is not only a testimony of the quality of student who come to Utah State but also a reflection of the quality of instruction and mentoring our students receive from faculty members," says former College of Science Dean Mary Hubbard. "This is a wonderful honor for the students and the university."

McKenna, a 2007 graduate of Utah's Sky View High School, is a sophomore majoring in physics and mathematics. With faculty mentors Joe Koebbe and Farrell Edwards, she is exploring technical applications of small plasma systems.

McKenna received a USU Presidential Scholarship and a College of Science Research Mini-Grant and was among the first recipients of the Space Dynamics Laboratory Women in Science Scholarship. She was awarded the 2008 Math Department Outstanding First-Year Student Award and the 2008 O. Harry Otteson Award for Excellence in Introductory Physics. She plans to pursue graduate studies, conduct research in thermonuclear energy generation and teach at the university level.

McKenna and her older brother, Logan, who was named a Goldwater Scholar in 2006, are the first pair of siblings at USU to receive the prestigious award. Logan is

currently a doctoral student at Washington University in St. Louis, Mo.

Wyoming native Tramp is a junior majoring in cellular and molecular biology and biochemistry. The USU Undergraduate Research Fellow is pursuing multiple research projects, including investigation of a lactic acid bacterium commonly used in the production of fermented dairy products.

A 2006 graduate of Lander Valley High School, Tramp received a Goldwater honorable mention in 2008. The same year, he was named a Utah Governor's Scholar and a Koch Scholar. He is the recipient of a USU Presidential Scholarship, a College of Science Research Mini-Grant and a USU Undergraduate Research and Creative Opportunities Grant.

Tramp's goals include earning a doctorate and pursuing research to investigate genetic and molecular cues triggering stem cell differentiation with the ultimate aim of creating organs or tissue for transplant recipients.

Bountiful, Utah, native Myers is a junior majoring in physics and computer science. With faculty mentor David Peak, Myers is conducting research on error correction using distributed computation in dynamical systems.

A 2006 graduate of Woods Cross High School, Myers entered USU as a National Merit Scholar and received a USU Presidential Scholarship. He is a Willard L. Eccles Undergraduate Fellow, a recipient of an Otteson Award and is a member of the Sigma Pi Sigma Physics Honor Society.

Myers plans to pursue graduate studies in physics.

USU's 2009 honorees are among 278 award recipients selected from a field of 1,097 math, science and engineering students nominated by colleges and universities nationwide. The scholar award includes a two-year scholarship of up to \$7,500 per year.

The Goldwater Scholar program was established by Congress in 1986 to foster academic excellence in science and mathematics in the nation's universities.

—Mary-Ann Muffoletto



## *USU Introduces* **Alumni Nonresident Legacy Scholarship**

**IT IS MY PLEASURE TO SERVE** as the new development director for the College of Science. Prior to this assignment I served in the same capacity in the College of Engineering. I enjoy working at USU and find helping students achieve their educational goals and dreams to be very gratifying.

USU is excited to offer a new opportunity for alumni to keep the Aggie tradition alive. If you graduated from USU and live in a U.S. state outside of Utah, you can send your child to USU and their out-of-state tuition will be waived. This saves close to \$4,500 per semester.

This scholarship allows students to pay resident tuition the entire time they attend USU without having to go through the hassle of attaining resident status. Rather than living in Utah for 12 months, acquiring a Utah driver's license and not being claimed as the parents' dependent, the student can provide their parent's graduation information and be eligible for the scholarship about two weeks after completing the application.

To be eligible for the Alumni Legacy Nonresident Scholarship, your child must be admitted to USU, have at least one

parent who has earned an associate degree or higher from USU and enroll at USU as a first-time student to the Utah system of higher education. Other restrictions may apply. To take advantage of this amazing new scholarship opportunity, please call the USU Admissions Office at 800.488.8108 or visit [www.usu.edu/admissions/legacy](http://www.usu.edu/admissions/legacy).

The College of Science welcomes your questions about giving to help our students. For information on how you can give a cash gift, stock, real estate or a portion of your estate through a planned gift, please contact me at 435-797-3510 or [joseph.jenkins@usu.edu](mailto:joseph.jenkins@usu.edu).

Kind regards,

Joseph Jenkins  
Development Director



## **PHYSICS UNVEILS NEW OBSERVATORY**

Many alumni will recall USU's old observatory near Romney Stadium that rotated on golf balls. It often competed unsuccessfully with bright stadium lights to offer a view of the night sky. No more.

USU's Physics Department recently unveiled a new observatory atop the Science Engineering Research "SER" building that features upgraded features, including a location with a much-improved view and a wall to block campus lighting.

Thanks to its efficient and under-budget construction by USU Facilities, the new observatory will soon be equipped with a new 21-inch telescope. The new facility will provide a valuable resource for student researchers as well as the general public.

The College of Science seeks funding to develop outreach programs for the new observatory. For information, contact Joseph Jenkins at 435-797-3510 or [joseph.jenkins@usu.edu](mailto:joseph.jenkins@usu.edu).

The Physics Department's new observatory is located atop the Science Engineering Research "SER" building.





# IN MEMORIAM

## 1930s

George Piranian (BS 1936, MS 1938 Botany), Ann Arbor, Michigan. Piranian passed away Aug. 31, 2009, at the age of 95. Born in Switzerland, Piranian moved with his family to Utah in 1929. He was awarded a Rhodes Scholarship and studied mathematics at Oxford University. He earned a PhD from Rice University in 1943 and subsequently joined the faculty of the University of Michigan, where he enjoyed a successful teaching and research career. He is survived by his wife, Louise Mills Piranian, five daughters, grandchildren, great-grandchildren and a great-great-grandson.

## 1940s

Jack M. Simmonds (BS 1941, Physiology), Bountiful, Utah. Simmonds passed away Nov. 29, 2008, at the age of 90. An accomplished athlete, Simmonds served as a teacher and coach for more than 40 years, first at Utah's Bear River High School, then at Bountiful Junior High School. He served in the U.S. Army from 1940 until 1945, when he received an honorable discharge with the rank of Captain. Simmonds is survived by his wife, Connie Johnson Simmonds, three children, 10 grandchildren and 10 great-grandchildren.

## 1950s

LeGrande Clark Ellis (BS 1954, MS 1956, Physiology), Logan, Utah. Ellis passed away Nov. 29, 2008, at the age of 76. After completing his degrees at USU, he earned a Ph.D. in physiology from Oklahoma State University and completed a postdoctoral fellowship at the University of Utah. During his 35-tenure as a professor of physiology at Utah State, he earned the admiration and respect of many students by making their success his priority. Dr. Ellis is survived by his wife, Marilyn Ellis, six children, 23 grandchildren and three great-grandchildren.

## 1990s

Randy L. Wilde (BS 1995, Environmental Health and Chemistry), Perry, Utah. Wilde passed away Aug. 3, 2009, at the age of 41. He was employed with the Bear River Health Department for 15 years, where he coordinated mosquito abatement and methamphetamine containment efforts. Health department executive director Lloyd Berentzen described Wilde as "a man of great integrity and an outstanding worker in his field." Wilde is survived by his wife, Holly Smith Wilde, and four daughters.

## 2000s

Erik Randall Jorgensen (pre-pharmacy major), Paradise, Utah. Jorgensen passed away Dec. 24, 2008, at the age of 22. A senior at Utah State, he received an invitation to join the USU chapter of the Golden Key International Honor Society. He is survived by his wife, Casey Murray Jorgensen.



Professor Daniel Coster

## Promotions

**Daniel Coster**, professor, Mathematics and Statistics

## New Faculty

**Suzanne French**, assistant professor, Biology

**Jessica Habashi**, lecturer, Biology

**Thayne Sweeten**, lecturer, Biology (Brigham City campus)

## college of science

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### DEPARTMENT OF PHYSICS

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www.physics.usu.edu



## 1960s

**Ellis Devere Miner, Jr. (BS 1961, Physics)**, Lake View Terrace, California. Miner served as a space scientist for NASA's Jet Propulsion Laboratory from 1965-2005. He earned a doctorate in astrophysics, with a spectroscopy minor, from Brigham Young University in 1965. Miner received the NASA Medal for Exceptional Scientific Achievement in 1981 and 1986, and the NASA Medal for Outstanding Leadership in 1990. He is the author or co-author of a number of books including *Planetary Ring Systems* (2007); *Neptune: The Planet, Rings and Satellites* (2002); *Uranus: The Planet, Rings and Satellites* (1990, 1998) and *Uranus* (1991).



David W. Young '67

**David W. Young (BS 1967, Pre-Dental)**, Corvallis, Montana. A retired dentist, Young is president and owner, along with his wife, Cheryl Young, of Perigee Learning LLC, [www.perigee-learning.com](http://www.perigee-learning.com). The pair authored seven books on outdoor activities, available in nine languages in a virtual reference collection, and will add six books to the collection this year. The avid photography enthusiasts recently released a DVD series entitled, *"Fly Fishing: A Lifetime Sport."*

## 1970s

**David Richardson (PhD 1973, Organic Chemistry)**, Salt Lake City, Utah. Richardson received the 2009 Salt Lake Community College Martin Luther King Award. He recently retired from SLCC, where he served as vice president of academic affairs.

## 1980s

**David Bagley (B.S. 1982, Biology)**, San Diego, California. Bagley was named president of Histogen, Inc., a regenerative medical company developing solutions based on products of newborn fibroblasts, on January 14, 2009. Bagley, who has more than 20 years of cell biology and tissue engineering industry experience, previously served as vice president and general manager of Allergan Medical, Inc.



Annemarie Moseley '82 PhD

**Annemarie Moseley (PhD 1982, Physiology and Biochemistry)**, Palo Alto, California. Moseley was appointed to the Sernova Business Corporation's Business Advisory Board Aug. 6. Moseley, who earned an M.D. from Baylor College of Medicine, serves as chairman and CEO of REPAIR

Technologies, Inc., a

startup biotech company focused on enhancing repair and regeneration of injured tissue.



Tyler L. Christensen '00

## 2000s

**Tyler L. Christensen (B.S. 2000, Biology)**, Ogden, Utah. Christensen recently joined the Ogden Clinic as a urologist. He is a graduate of the University of Utah School of Medicine.

We welcome news from College of Science alumni.

Please contact editor

Mary-Ann Muffoletto at [maryann.muffoletto@usu.edu](mailto:maryann.muffoletto@usu.edu)  
or 435-797-3517.





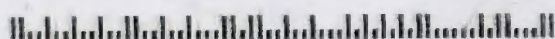
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## ALUMNET

# ALUMNET

Dear College of Science Alumni and Friends,

We'd like to hear from you! We hope you'll take a moment to use this form to drop us a line. You can also email information to [maryann.muffoletto@usu.edu](mailto:maryann.muffoletto@usu.edu) or fax us at 435.797.3378.

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USU Degree(s), Year(s), Major(s) \_\_\_\_\_ Year(s) \_\_\_\_\_ Major(s) \_\_\_\_\_

Other Degrees, Year(s), Major(s) \_\_\_\_\_ Year(s) \_\_\_\_\_ School(s) \_\_\_\_\_

Profession/Employer \_\_\_\_\_

Professional/Personal Awards \_\_\_\_\_

Books Published \_\_\_\_\_

About Yourself \_\_\_\_\_

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