

January 2011 to April 2011

To share the research and professional development activities of our faculty and students with the College, Utah State Administrators, and the Board of Trustees.

—The Dean’s Corner—

Dear Friends:

Spring Semester is over. We are in the “betweens.” Between Spring Semester and Summer School. The Arizona visitors are arriving in town, but the numbers seem down a bit. The weather greeting them is also in the “betweens.” One day we have snow and/or rain, the next 70° temperatures and sunshine and then back to cold rain. The inclement weather is causing some grad students to initiate their field research later than usual.

This sounds pathetic doesn’t it? Well, not to worry. Looking back just a few weeks to graduation consoles us. Graduation was a great success. The College ceremonies featured the new university bagpipe and drum group. Graduates and parents were rabidly enthusiastic and rightfully so.

As I spoke to some of our graduates I was pleased to learn that they enjoyed the whole experience during their time with us. Most felt the faculty did an excellent job of teaching and mentoring and they said if they had to do it over, they would come back to USU. This is a great advertisement for our efforts.

Many folks think summer is time off for faculty. Contrary to this viewpoint, the faculty are teaching, doing research around the world, preparing new lectures or updating older material, and getting those grant proposal written and out the door.

Summer is anything but dull. It is great time to talk and reflect so if any of you are in the area, stop in for a chat.



— College of Science Contract & Grant Activity —

\$ Amounts (# of proposals)	January 2011	February 2011	March 2011	April 2011	Cumulative Totals FY10-11
Proposals Submitted	\$2,290,451 (7)	\$3,417,019 (15)	\$8,260,568 (15)	\$1,850,780 (3)	\$51,051,935 (130)
Awards Received	\$312,678 (5)	\$428,705 (12)	\$487,204 (7)	\$343,093 (5)	\$11,055,402 (81)

— Quartz Key to Tectonics says USU's Tony Lowry —

More than 40 years ago, pioneering tectonic geophysicist J. Tuzo Wilson published an article in the journal *Nature* describing how, over Earth's long history, ocean basins opened and closed along North America's eastern seaboard. His observations, dubbed "The Wilson Tectonic Cycle," suggested this process had occurred many times, most recently causing giant Pangaea to split into today's seven continents. Wilson's ideas were central to the so-called Plate Tectonic Revolution, the foundation for contemporary theories of processes underlying mountain-building and earthquakes.

Since his 1967 article, additional studies have confirmed that large-scale deformation of continents repeatedly occurs in some regions but not others, though the reasons why remain poorly understood. New findings by Utah State University geophysicist Tony Lowry and colleague Marta Pérez-Gussinyé of Royal Holloway, University of London shed surprising light on these restless rock cycles.

"It all begins with quartz," says Lowry, who published results of the team's recent study in the March 17, 2011 issue of *Nature*. In "The Role of Crustal Quartz in Controlling Cordilleran Deformation," the scientists describe a new approach to measuring properties of the deep crust that reveal quartz's key role in initiating the churning chain of events that cause the Earth's surface to crack, wrinkle, fold, and stretch into mountains, plains, and valleys.

"Earthquakes, mountain-building, and other expressions of continental tectonics depend fundamentally on how rocks flow in response to stress," says Lowry, assistant professor in USU's Department of Geology and 2010 recipient of a National Science Foundation CAREER Award. "We know that all tectonics are a response to the effects of gravity, but we know less about rock flow properties and how they change from one location to another."

Wilson's theories provide an important clue, he says, as scientists have long observed that mountain belts and rift zones have formed again and again at the same locations over long periods of time. "Over the last few decades, we've learned that high temperatures, water, and abundant quartz are all critical factors in making rocks flow more easily," Lowry says. "But until now, we haven't had the tools to measure these factors and answer long-standing questions."

Since 2002, the NSF-funded Earthscope Transportable Array of seismic stations across the western United States has provided valuable remote sensing data about the continental crust's rock properties. "We've combined the Earthscope data with other geophysical measurements of gravity and surface heat flow in an entirely new way that allows us to separate out the effects of temperature, water and quartz in the crust," Lowry says. The Earthscope measurements have enabled the team to estimate the thickness, along with the seismic velocity ratio, of continental crust in the American West. Seismic velocity describes how quickly sound waves and shear waves travel through rock, he says, offering clues to its temperature and composition. "By themselves, seismic velocities are sensitive to both temperature and rock type," Lowry says. "But if the velocities are combined as a ratio, the temperature dependence drops out. We found that the velocity ratio was especially sensitive to quartz abundance."

"If you've ever traveled westward from the Midwest's Great Plains toward the Rocky Mountains, you may have wondered why the flat plains suddenly rise into steep peaks at a particular spot," Lowry says. "It turns out that the crust beneath the plains has almost no quartz in it, whereas the Rockies are very quartz-rich. We think those belts of quartz could be the catalyst that sets the mountain-building rock cycle in motion."

— by Mary-Ann Muffoletto



USU geophysicist Tony Lowry beside a GPS receiver, part of the NSF-funded Earthscope instrument array, in Utah's Wellsville Canyon. Lowry's recent research is featured in the journal *Nature*.

For the full story, visit <https://www.usu.edu/science/htm/viscous-cycle-quartz-key-to-tectonics-says-usus-tony-lowry>

— USU Biologist Contributes to Taste Cell Study —



Tim Gilbertson, Department of Biology professor, contributed to a recent study published in the *Proceedings of the National Academy of Sciences USA*.

Your body's sugar sensors in sweet taste cells aren't just on your tongue — they're in your gut, too, says Utah State University neurobiologist Tim Gilbertson. Gilbertson contributed to a recent study that confirms your body's ability to taste sweets is delectably complex and involves more taste sensors than previously thought. He and research colleagues say these findings could be a key step in developing strategies to curb overconsumption.

"We've known for a number of years of a specific sweet receptor that allows us to taste sugars and artificial sweeteners," says Gilbertson, professor in USU's Department of Biology. "But we've now confirmed additional sensors throughout our digestive and endocrine systems that allow our bodies to detect and absorb dietary sugars." Led by Robert Margolskee of the Philadelphia-based Monell Chemical Senses Center, the study's findings appear in the March 8, 2011, issue of the *Proceedings of the National Academy of Sciences USA*.

The researchers speculate that one of the body's sugar sensors — known as the KATP channel — modulates taste cell sensitivity to sugars according to metabolic needs. For example, it may respond to hormonal signals from the intestines or pancreas to make taste cells less responsive to sweets after we've eaten a sugary treat and do not need additional energy. "Our research findings are revealing more information about the role these sensors play in controlling our food intake," Gilbertson says. "The more we know about how sugar is detected in our bodies, the more knowledge we have to come up with ways to reduce overconsumption."

For the full story, visit <http://www.usu.edu/ust/index.cfm?article=48887>

— Bumble Bees on the Decline say USU Researchers —

News stories describing the honey bee and its decline due to the mysterious Colony Collapse Disorder abound. Less has been published about its counterpart the bumble bee, but the latter's decreasing abundance is equally dramatic according to a recent study by Utah State University researchers and colleagues.

"Our findings indicate a 96 percent decline in four common North American bumble bee species in just the past few decades," says Jamie Strange, USDA-ARS research entomologist and adjunct assistant professor in USU's Biology Department. "Investigators have been unable to find some of these species in their previous homes, including the West Coast, and a fifth species may be extinct." Strange, USDA-ARS colleague Terry Griswold and USU biology graduate student Jonathan Koch are among authors of "Patterns of Widespread Decline in North American Bumble Bees" published in the Jan. 3, 2011, issue of *Proceedings of the National Academy of Sciences USA*. The article details findings from a federally funded study the scientists conducted with colleagues at the University of Illinois.



USU and USDA-ARS entomologists, from left, Jamie Strange, Jonathan Koch, and Terry Griswold are studying declines in North American bumble bee populations.

"We don't know if this is a cause or an effect of species decline," Strange says. "But the reduction means that the bees are less able to adapt to changing conditions and to fight off any new pathogens." The study required comparison of census results with museum records of bee populations. "Jon (Koch) did an incredible job of gathering data from existing collections around the country and mapping historical bee distributions," Griswold says. "The database he developed will be valuable for continued study."

For the full story, visit <http://www.usu.edu/ust/index.cfm?article=48613>

— Biology Welcomes New Department Head —



New USU biology department head Al Savitzky, renowned evolutionary biologist, shown here with a rhabdophis specimen, assumes his new post July 1, 2011.

Utah State University announces the appointment of Alan H. “Al” Savitzky as head of the university’s Department of Biology. Selected following a nationwide search, Savitzky has served on the faculty of the Department of Biological Sciences at Virginia’s Old Dominion University since 1982. He takes the helm of the College of Science’s largest department July 1.

“We are very excited to have a scientist and educator of Al Savitzky’s caliber joining our team,” says James MacMahon, dean of USU’s College of Science. “Al brings a rich background in teaching, research, and administration, as well as a genuine enthusiasm for science.”

Savitzky’s research focuses on the anatomy, evolution and conservation of amphibians and reptiles – especially snakes. He is co-author of the widely used textbook *Herpetology*, now in its third edition, and has published numerous articles in peer-reviewed journals.

In addition to his tenure at ODU, Savitzky served as program director for the National Science Foundation’s Division of Biological Infrastructure in the Directorate for Biological Sciences from 2008 to 2010. His professional service includes terms as president of the American Society of Ichthyologists and Herpetologists and the Society for the Study of Amphibians and Reptiles.

Savitzky was honored with the 2007 Robert K. Johnson Award for Excellence in Service by the ASIH. In 2002, he received ODU’s Gene W. Hirschfeld Faculty Excellence Award in recognition of his exemplary service as an educator, mentor and researcher.

A native of Connecticut, Savitzky earned a bachelor’s degree from the University of Colorado in 1972. He completed a master’s degree in 1974 and a doctorate in 1979, both from the University of Kansas.

“It is a great privilege to be invited to lead such a dedicated and dynamic team of faculty and staff,” Savitzky says. “Though the department faces such challenges as accommodating increasing enrollments and presenting the rapidly expanding body of biological knowledge, our goals include expanding opportunities for our undergraduates and graduate students to engage with their global peers, and reaching out to a broader constituency to increase the diversity of future biologists.”

— Save the Date: Faculty Retreat —

The College of Science Faculty Retreat will be held on August 17, 2011,
from 1:00 p.m. to 4:00 p.m. in ESLC 046.

For more information, contact Jan Miller at 797-2488 or janice.miller@usu.edu.

— USU Alum Jim Elwell Gives Space Science Students a Boost —

Utah State University alumnus Jim Elwell '82 remembers life as a struggling student, toiling night after night in a lab and putting his heart and soul into a project that, odds on, could crash and burn in dismal failure. "Although a lot can be learned from classes and textbooks, it takes real-world experience to become a productive engineer," said Elwell, a member of USU's initial Get Away Special Team from 1977 to 1981. "Working with the GAS team gave me that experience — the inevitable trial-and-error that goes into taking ideas from paper to reality."

Elwell gathered with fellow GAS alumni at an April 8 reunion banquet, where participants reminisced about the team's accomplishments over the past 35 years: 11 experimental payloads sent into space on NASA space shuttles, three trips made and experiments conducted on NASA 'Vomit Comet' microgravity flights, experiments sent to the International Space Station and thousands of K-12 students reached through Aggie-led science presentations. The team is largely responsible for one of the university's best known achievements: USU has sent more student-built experiments into space than any other university in the world. At the banquet, Elwell and his wife, Diane, announced their gift of \$100,000 to establish the Elwell Get Away Special Program Assistance Fund for Utah State University. The successful engineer and entrepreneur urged his peers to "pass it on."



USU alum Jim Elwell, center, with GAS Team founder Gil Moore, left, and Physics Department Head Jan Sojka, right. Elwell holds a 1982 GAS lab photo of himself and Moore.

"Those of us who benefited from the GAS program need to help the program give similar opportunities to current and future students," said Elwell, who, with his brother John Elwell MS'95, now a program manager with USU's Space Dynamics Laboratory, founded Salt Lake City-based QSI Corporation in 1983. Elwell sold QSI to Sweden-based Beijer Electronics AB in 2010. "Our gift is a tribute to the integrity and life's work of L. Rex Megill and R. Gilbert 'Gil' Moore, who stepped up to provide students at USU and beyond with extraordinary learning opportunities," he said.

Megill and Moore, both former USU faculty members, founded Utah State's chapter of the NASA-initiated self-contained payload program. Megill, who passed away in 1998, was an enthusiastic supporter of USU's GAS program and mentor to GAS students, including Elwell. Moore, who attended the April 8 banquet, famously stood during an October 1976 professional conference presentation, as a NASA representative was announcing the new program, and offered a personal check to cover the cost of USU's first payload reservation.

"USU students designed and built experiments that flew in the very first GAS canister in the cargo bay of Space Shuttle Columbia during its ST-4 mission from June 27 to July 4, 1982," said Moore, director and founder of Colorado-based Project Starshine. "This June, members of that initial group of students and I will attend the final shuttle launch — the launch of Space Shuttle Atlantis — as guests of NASA Administrator Charles Bolden, Jr." Elwell and fellow alum David Yoel MS'83 are among the former GAS students who'll attend the launch. "It will be bittersweet watching the shuttle program draw to a close," said Yoel, founder and CEO of American Aerospace Advisors, a Pennsylvania-based technology firm that develops applications in space technologies, airborne remote sensing and unmanned aviation. "But it's time to move on to new technologies and increased commercial space travel." Yoel, who served as the first GAS team coordinator, praised Megill and Moore for their mentorship, along with USU Department of Physics head Jan Sojka "who has shepherded USU's program for all these years."

"The GAS program is a remarkable hands-on experience for students," he said. "I don't think any university can match USU's record. We, as alumni, need to find ways to help USU students continue to get their experiments into space." Last year, the GAS team won a competitive slot in NASA's 2010 Microgravity University and flew a successful heat transfer experiment on one of the agency's 'Vomit Comet' microgravity jets. The team submitted a second successful proposal for the 2011 program and will return to Houston's Johnson Space Center for another flight this June.

— by Mary-Ann Muffoletto

For the full story, visit <http://www.usu.edu/ust/index.cfm?article=49410>

— USU Computer Science Grad Student Named Lawrence Scholar —



USU doctoral student Steena Monteiro was recently selected for Lawrence Livermore National Lab's prestigious Lawrence Scholars Program.

Utah State University doctoral student Steena Monteiro, recently selected for the Lawrence Livermore National Laboratory's prestigious Lawrence Scholars Program, is researching techniques to analyze and manage information systems on par with the world's fastest computers. How fast? IBM's Sequoia supercomputer, set to launch this year at the California-based lab, is expected to deliver a scorching 20 petaFLOPs.

What the heck does that mean?

"FLOPS stands for 'floating point operations per second,'" says Monteiro, who conducts research with faculty mentor Renee Bryce in USU's Department of Computer Science. "FLOPS is a unit for measuring a computer's processing speed. One PetaFLOPS is equal to a quadrillion FLOPS." A quadrillion? Looks like this: 1,000,000,000,000,000.

China's Tianhe-1 supercomputer, currently the world's speediest computer, clips along at a brisk 2.507 petaFLOPS. The U.S. Department of Energy's Cray XT5 Jaguar at Tennessee's Oak Ridge National Lab clocks in at a not-too-shabby 1.75 petaFLOPS. So, 20 petaFLOPS? That's roughly 20,000,000,000,000,000 calculations per second. Smokin'!

As a Lawrence Scholar, Monteiro will receive a fellowship of \$53,000 per year for four years. Her proposed project, "*Modeling and Detecting Performance Faults in Event-and Data-Driven Applications*," which she'll pursue with LLNL scientists Greg Bronevetsky and Marc Casas-Guix, will form the basis of her dissertation. "Steena is a wonderful student," says Bryce, assistant professor of computer science. "We are grateful that Lawrence Livermore National Lab has acknowledged the potential of her research by selecting her for this prestigious fellowship."

For the full story, visit <http://www.usu.edu/ust/index.cfm?article=48772>

— A Utah State University Best: Four Aggies are 2011 Goldwater Honorees —

Three Utah State University students are 2011 Goldwater Scholars and one Aggie received honorable mention in a prestigious national competition that recognizes outstanding undergraduate achievements in science and mathematics. USU leads the state in the number of 2011 awardees and this year's competition marks the most Utah State students to receive the honor in one year. Linsey Johnson, Brooke Siler and Brian Tracy are recipients of the award, which is administered by the Barry M. Goldwater Scholarship and Excellence in Education Foundation, and Karen Nielson received honorable mention. With this year's honorees, USU boasts 18 Goldwater Scholars and seven honorable mention recipients since 1998.



Utah State University's 2011 Goldwater honorees: from left, Karen Nielson, honorable mention, and scholars Brooke Siler, Brian Tracy, and Linsey Johnson.

"The Goldwater Scholarship rewards students who have a strong record of undergraduate research," said Christie Fox, director of USU's Honors Program. "Our students' fantastic showing in this year's competition demonstrates the commitment of our faculty to give students exceptional opportunities to get involved in hands-on research very early in their academic careers." Each year, USU may submit up to four nominations for the award; a process coordinated by the USU Honors program that begins in November. Scholarship award recipients receive up to \$7,500 toward annual tuition and expenses.

USU's 2011 honorees, who represent the university's College of Science and College of Engineering, are members of the USU Honors Program and actively involved in undergraduate research. All also volunteer their time to community outreach in science education.

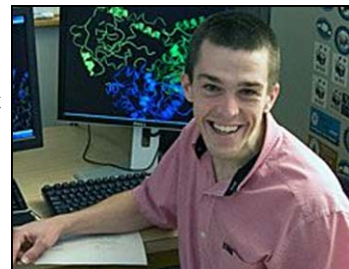
For the full story, visit <http://www.usu.edu/ust/index.cfm?article=49019>

— Four Aggies Honored with NSF Graduate Research Fellowships —

Four Utah State University Aggies received *2011 Graduate Research Fellowships* from the National Science Foundation and three more received honorable mentions in a renowned competition that rewards academic excellence in science, technology, engineering and mathematics disciplines.

USU's 2011 NSF Graduate Research Fellows are undergraduate seniors Sarah Isert and Justin Koeln, both mechanical and aerospace engineering majors; 2009 USU biochemistry graduate Bradley Hintze, who is currently pursuing doctoral studies in structural biology at Duke University; and Zachary Portman, a 2009 graduate of New York's Union College who will begin graduate studies in insect taxonomy at USU this fall. "NSF Graduate Research Fellowships are the nation's most prestigious graduate awards in science and engineering," said USU President Stan Albrecht. "The fact that seven Aggies are among this year's honorees is a solid testament to the outstanding quality of our university's academic and research programs, as well as the high caliber of our students and faculty."

Bradley Hintze, Biochemistry and Structural Biology - Building on X-ray crystallography techniques and biochemical analysis skills he honed with faculty mentor Sean Johnson at USU, Hintze continues research in deciphering minute biological structures and mechanisms. "The only way we can get a 'picture' of important large biological molecules, such as DNA and proteins is through X-ray crystallography," says Hintze, who received USU's *Legacy of Utah State Award* in 2008. "Unfortunately, these large molecules typically yield low-resolution data, which makes structure determination difficult. My goal is to take what's been learned about molecular structure determination over the past 50 years and apply it to low-resolution data." In addition to his NSF accolade, Hintze is a finalist for a National Institutes of Health *Ruth L. Kirschstein National Research Service Award*.



Bradley Hintze, biochemistry and structural biology



Justin Koeln, mechanical and aerospace engineering

Justin Koeln, Mechanical and Aerospace Engineering - Yep, that was Koeln you saw floating in microgravity and hoisting a "We Puke for Science" sign as a member of USU's Get Away Special team that flew a successful heat transfer experiment aboard NASA's 'Vomit Comet' last summer. The Maryland native was the team's experiment leader and is a key mentor to a new team returning to NASA this June. Koeln's list of academic achievements and awards is long and impressive. The 2010 *Goldwater Scholar* was named *2010-11 Outstanding Senior* for USU's MAE Department and was the department's *Undergraduate Researcher of the Year* for 2009-10. Walk into the basement labs of USU's Science Engineering Research building and you'll understand why: Koeln can be found toiling away most evenings and weekends. His father, says Koeln, follows a family motto: "All things cometh to he who waiteth, if he worketh like hell while he waiteth."

Sarah Isert, Mechanical and Aerospace Engineering - The Honors fellow was appointed chief engineer for her department's Lunar and Planetary Surface Landing Research Vehicle senior design project. Off campus, she's served as a technical intern for Northrop Grumman since 2009, where she's studied Minuteman missile guidance systems and propulsion stage rocket engines. "At USU, I led 26 students in designing, building and testing a small-scale lunar land vehicle prototype," Isert says. "Because of this and my internship, I had the opportunity to participate as a research assistant in the summer 2010 NASA Propulsion Academy at Alabama's Marshall Flight Center." "My ultimate goal is to become an astronaut," says Isert, an alumna of USU's GAS team and a private pilot. "Until then, I want to be a propulsion engineer."



Sarah Isert, mechanical and aerospace engineering



Zach Portman, biology

Zachary Portman, Biology - News stories describing the honey bee and its decline due to the mysterious Colony Collapse Disorder and other factors abound. Implications are chilling, as an estimated third of the human food supply is dependent on pollination by honey bees and other pollinating insects. "There's a lot of fear and misinformation about the collapse of honey bees and other pollinators, and while this certainly is a danger and something to be concerned about, it's stunning how little is known about pollinators," says Portman, who received Union College's 2009 *Loughry Prize* for the best senior research project. At USU, he'll study the taxonomy and systematics of bees. "My future advisor Terry Griswold is an extremely talented scientist and my other advisor, Carol von Dohlen, will provide expertise on the modern genetic methods that are becoming so important in modern-day taxonomic research," Portman says.

This year's honorees join 23 Aggies who have received fellowships and 25 USU students who have received honorable mentions since 1999. NSF GRFP recipients receive a three-year annual stipend of \$30,000, along with a \$10,500 cost-of-education allowance for tuition and fees, a one-time \$1,000 international travel allowance and the freedom to conduct their own research at any accredited U.S. or foreign institution of graduate education they choose.

— College Faculty Research Awards 2011 —

Name	Award	Department
Joanie Hevel	Undergraduate Researcher Mentor of the Year	Chemistry & Biochemistry
James Pitts	Faculty Researcher of the Year	Biology

— College Student Research Awards 2011 —

Name of Student	Award	Department
Clayton Gunnell	Undergraduate Researcher of the Year	Biology
Robert W. Call	Scholar of the Year	Physics
Jonathan Koch	Graduate (MS) Researcher of the Year	Biology
Katarzyna Grubel	Graduate (PhD) Researcher of the Year	Chemistry & Biochemistry

— College of Science Minigrant Recipients 2011 —

The College of Science awards minigrants of \$750 to qualified sophomores, juniors, and seniors. These funds are matched by a departmental contribution of \$250. Awards are intended to encourage students to become involved in their first mentored research experience. Minigrant recipients for 2011 are:

Name of Student	Department	Mentor
Marcus Bingham	Physics	Vince Wickwar
Christine Dhiman	Biology	Claudia Nischwitz
Makda Gebre	Chemistry & Biochemistry	Sean Johnson
Maria Goller	Biology	Susannah French
Malea Moody	Physics	Shane Larson
Sarah Mousley	Mathematics & Statistics	David Brown
Brooke J. Siler	Chemistry & Biochemistry	Joanie Hevel
Joel Smith	Biology	Ted Evans
Kristina Sorensen	Mathematics & Statistics	Timothy Doyle
Jesse Spinner	Chemistry & Biochemistry	Brad Davidson
Lynsey Talbot	Physics	Lance Seefeldt
Rachel Ward	Physics	Mike Taylor

— Willard L. Eccles Summer Undergraduate Research Fellows —

This prestigious fellowship, established by the Willard L. Eccles Foundation, awards \$4000 for 10 weeks of summer research to outstanding undergraduate science majors wishing to pursue a research project under the supervision of a science faculty mentor.

Name of Student	Department	Faculty mentor
Bailee J. Binks	Biology	Tim Gilbertson
Amy D. Crandall	Chemistry & Biochemistry	Sean Johnson
Sean M. Hunt	Physics	David Peak
Gavin S. Johnson	Biology	Rosalind James
Linsey Johnson	Physics	Shane Larson
Mark Noble	Chemistry & Biochemistry	Lisa M. Berreau
Charles C. Sim	Physics	JR Dennison
Brian D. Tracy	Physics	Bela Fejer

— VPR Seed Grants Selected for Funding July 1, 2011 —

Research Catalyst (RC) seed grants awarded to the College of Science:

- **Dr. Susannah French** (PI), Asst. Prof., Biology; **Dr. Dale DeNardo** (Assoc. Prof., Biology, AZ State Univ.); and **Dr. Bobby Fokidis** (Res. Assoc., Psych, Univ. British Columbia). “The Effects of Human Disturbance on Health and Susceptibility of Galapagos Marine Iguanas”. \$19,800.
- **Dr. Xiaojun Qi** (PI), Assoc. Prof., Computer Science; and **Dr. Anhong Zhao**, Assoc. Prof., Biological Engineering (CoE). “Exploring Novel Data Processing and Analysis Techniques for Extracting Spectral Biomarker Information of Human Cancer Cells”. \$20,000.

Several refinements are being made to the SPARC, RC, and GEM programs and new RFA's will be posted on the site below by

July 1, 2011: http://research.usu.edu/htm/faculty-funding-and-startup/grants_funding

Fall 2011 Deadline: Submit applications to the College of Science Dean's Office no later than **3 October 2011**.

Questions? Contact Lisa M. Berreau at 797-3509 or lisa.berreau@usu.edu.

— Utah Conference on Undergraduate Research - UCUR 2011 —

The fourth annual Utah Conference on Undergraduate Research (UCUR), hosted by Weber State University this year, was on February 18, 2011. The purpose of UCUR is to give Utah college and university students the opportunity to share the results of their undergraduate research with students and faculty members in the state, as well as with the community at large. Participants from the College of Science:

Name of Student	Title of Project	Department	Mentor
Amy D. Crandall	Crystallization of the N-terminus of Ski2	Chemistry & Biochemistry	Sean Johnson
Semerjyan Vardan	Proportional Integral Derivative (PID) Temperature Control and Data Acquisition System for Faraday Filter Based Sodium Spectrometer	CASS	Tao Yuan
Morgan Summers	Critical Issues in Middle and Secondary Mathematics Placement: A Case Study	Mathematics & Statistics	Brynja Kohler

— Intermountain Graduate Research Symposium March 31 - April 1, 2011 —

The Intermountain Graduate Research Symposium is a student-organized conference focusing on graduate research and projects throughout the Intermountain West. The symposium encourages graduate students within the region to share their research findings in presentation or poster format, network with fellow graduate students from USU and other universities, and gain professionalism through the conference experience.

Presentations were given by the following College of Science graduate students:

Lecture presentations

Name of Student	Title	Department	Mentor
Eric Addison	Busting at the Seams! More Binary - Black Hole Interactions	Physics	Shane Larson
Elita Baldridge	Testing a Pattern of Community Assembly: Assumptions of the Nested Subset Pattern	Biology	Ethan White
Virginia Bolshakova	Varying Impacts with Elevation from a Parasitoid Guild of a Montane Moth, the Sagebrush Defoliator <i>Aroga Websteri</i>	Biology	Ted Evans
Zachary Brym	Environmental and Biotic Controls on the Invasion of the Exotic Shrub <i>Elaeagnus Umbellata</i> in a Michigan Forest	Biology	Morgan Ernest
Narayan Chapagain	Ionospheric Plasma Bubble Propagation from Spread F Experiment Campaigns	Physics	Mike Taylor
Sarah Clark	Pollen Load Analysis from Pollinators of <i>Physaria Congesta</i> and <i>Physaria Obcordata</i> (Brassicaceae) in the Piceance Basin, Colorado	Biology	James Pitts
Kyle Feuz	Pedestrian Leadership and Egress Assistance Simulation Environment	Computer Science	Vicki Allan
Oleksandr Gromenko	Estimation and Testing for Spatially Distributed Curves with Application to Ionospheric and Magnetic Field Trends	Mathematics & Statistics	Piotr Kokoszka
Shanying Gui	Insights into the Molecular Origins of PRMT1 Product Specificity: A Tale of Two Conserved Met Residues	Chemistry and Biochemistry	Joanie Hevel
David Hansen	Analysis of Two Computer Models that Are Used to Describe the Earth's Polar Ionosphere	Physics	Robert W. Schunk
Vern Hart	Tomography of Limited-Angle Projection Data	Physics	Timothy E. Doyle
Jeffrey Hazboun	Gravitational Gauge Theory and Quantum Gravity	Physics	James Wheeler
Ellen Klinger	Multi-gene Phylogeny of <i>Ascosphaera</i> Fungi, the Causative Agent of Chalkbrood Disease in Bees	Biology	Rosalind James, Dennis Welker
Jonathan Koch	The Decline and Conservation Status of North American Bumble Bees	Biology	James P. Strange
Juanita Rodriguez	Historical Biogeography of the Spider Wasp Tribe <i>Aporini</i> (Hymenoptera:Pompilidae)	Biology	James Pitts
Aliasgar Kutiyawala	Shopmobile II: Toward an Assistive Shopping System for the Visually Impaired	Computer Science	Vladimir Kulyukin
Levan Lomidze	Observations, Modeling, and Causes of the Weddell Sea Anomaly	Physics	Ludger Scherliess
Monika Maier	Not Just a Walk in the Park: Clark's Nutcracker in Declining Habitat	Biology	Kimberly A. Sullivan

— Intermountain Graduate Research Symposium (cont.) —

Lecture presentations (cont.)

Name of Student	Title	Department	Mentor
Michael Olson	Equatorial Electrodynamic Responses during Equinox Sudden Stratospheric Warming Events	Physics	Bela G. Fejer
Juan Shan	An Automatic Segmentation Method for Breast Ultrasound Images	Computer Science	Heng-Da Cheng
Rushun Tian	Multiple Solitary Wave Solutions of Nonlinear Schrodinger Systems	Mathematics & Statistics	Zhi-Qiang Wang
Juan Trujillo	Towards a More Complete Theory of Gravity	Physics	James Wheeler
Cecilia Waichert	Testing the Monophyly of Ageniellini Genera (Hymenoptera: Pompilidae) with a Molecular Phylogeny, and the Search for Diagnostic Morphological Characters	Biology	James Pitts
Kevin Williams	Investigations of Dual Sex-Limited Mimicry in the Thistledown Velvet Ant (Hymenoptera: Mutillidae)	Biology	James Pitts
Zhonghua Xu	Study of Geomagnetic Disturbances and Ring Current Variability During Storm and Quiet Times Using Wavelet Analysis and Ground-Based Magnetic Data from Multiple Stations	Physics	Lie Zhu
Xi Zhang	Empirical Properties of Forecasts with the Functional Autoregressive model	Mathematics & Statistics	Piotr Kokoszka

Poster presentations

Name	Title	Department	Mentor
Ryan Jackson	Structural Studies of Ski2-like RNA Helicases that Regulate RNA Surveillance Pathways	Chemistry & Biochemistry	Sean Johnson
Tasha Prettyman	Nutrient Cycling Changes in Soils Due to Diminishing Snowpack in a Sagebrush-Steppe Ecosystem	Biology	John Stark
Addison Everett	A Time-of-Flight Mass Spectrometer for Upper Atmospheric Measurements	Physics	Mike Taylor
Jennifer Meehan	Space Weather and Technological Impacts	Physics	Robert Schunk
Karthik Iyer	Extendable Software Architecture for Massively Parallel Biological Simulation	Computer Science	Nicholas Flann

— Keep in Touch on the Web —

Everyone is encouraged to bookmark and visit the College of Science web site, www.usu.edu/science, frequently for news and information updates, as well as the college's Facebook page, "USU College of Science."



— 2011 Undergraduate Research Day on Capitol Hill —

College of Science student researchers ascended Salt Lake City's Capitol Hill on January 26, 2011, to share their efforts and discoveries with Utah legislators and visitors. Stationed with their posters in the Capitol rotunda, Aggies honed their presentation skills and served as ambassadors for the college and the university. Students representing the College of Science were:

Name of Student	Title	Department	Mentor
Ka Yee (Isabella) Chan	Antibacterial Mode of Action Studies for Novel Class of Cationic Anthraquinone Analogs	Chemistry & Biochemistry	Cheng-Wei Tom Chang
Amy Crandall	Structure and Function Characterization of the N-Terminus of the RNA Helicase Ski2	Chemistry & Biochemistry	Sean Johnson
David Ingram	Selection of RNA Aptamers that Bind Asymmetric Dimethylated Arginine ADMA	Chemistry & Biochemistry	Joanie Hevel, Laurel Gui
Morgan E. Summers	Critical Issues in Middle and Secondary Mathematics Placement: A Case Study	Mathematics & Statistics	Brynja Kohler, Jim Cangelosi
Lynsey Talbot	In Vivo Biodiesel Production Using Modified Enzymes in <i>Marinobacter aquaeolei</i> VT8	Chemistry & Biochemistry	Lance Seefeldt
Heather Jean Tarbet	Understanding Molecular Recognition of PRMT Using Truncation Mutants	Chemistry & Biochemistry	Joanie Hevel

— — URCO Recipients Spring 2011 — —

URCO (Undergraduate Research & Creative Opportunities) grants, given by the Vice President for Research Office, award up to \$500 for students' funded proposals. The students' sponsoring academic department also matches the award. "URCO grants are a catalyst for undergraduate research," says Joyce Kinkead, Associate Vice President for research. "They give students an opportunity to move beyond the classroom and really get their hands on research." College of Science recipients:

Name of Student	Title	Department	Mentor
Christine Dhiman	Location of Streptomycin Resistance in <i>Erwinia Amylovora</i> in Utah	Biology	Claudia Nischwitz
Colby Kearn	Development of a Genetic Marker of the Internal Transcribed Spacer (ITS) Region for <i>Pulex Irritans</i> and <i>Pulex Simulans</i>	Biology	Scott Bernhardt
Matthew Petersen	Genetic Variation and Convergence Among <i>Bartonella</i> Genotypes in Fleas Collected from Rodents in Utah	Biology	Scott Bernhardt
Tarissa Warr, Ian Matheson	Video Measurements of Micrometer-Scale Vapor Bubble Jets in Microgravity	Mechanical & Aerospace Engineering	JR Dennison, Heng Ban
Jenica Sparrow	The Effect of Acceleration on Nucleate Boiling and Bubble Departure Dynamics in Microgravity	Mechanical & Aerospace Engineering	JR Dennison, Heng Ban
Ryan Martineau	Development of Optimal Bubble-Seeding Microheaters to Study Nucleate Boiling Heat Transfer in Microgravity	Mechanical & Aerospace Engineering	JR Dennison, Heng Ban

— Celebrating Undergraduate Research at the Student Showcase —

Student Showcase, a celebration of undergraduate research, scholarship and creative activity, was the highlight of USU's Undergraduate Research Day held on March 29, 2011. Undergraduate researchers from all disciplines presented their research at the Student Showcase and gave one-on-one information to interested observers passing through the TSC International Lounge. College of Science participants are listed below:

Name of Student	Title of Project	Department	Mentor
Kirsten Bahr, Nathan S. Giles, Heather D. Smith	Structural and Lithologic Influences on Karst Systems in the Tony Grove Area, Northern Utah	Geology	W. David Liddell
Doug Ball	Electron Induced Luminescence of Insulating Polymeric Materials	Physics	JR Dennison
Cameron Bartlett	The High Cost of Cheap Coal: Why Can't We Move to Renewable Energy	Biology	John Flores, Daniel Holland (BUS)
Marcus Bingham	First Observations of the Middle Atmosphere with an Improved Rayleigh-Scatter Lidar	Physics	Vincent Wickwar
Benjamin Brown	Hyper-methylation of Zinc Finger Genes on 19q13 in Oropharyngeal Cancer	Chemistry & Biochemistry	Thomas J. Belbin (Albert Einstein College of Medicine)
Robert Call	Carbon Nanotube Growth by a Spray Pyrolysis Method	Physics	T.C. Shen
Ka Yee (Isabella) Chan	Antibacterial Mode of Action Studies for Novel Class of Cationic Anthraquinone Analogs	Chemistry & Biochemistry	Cheng-Wei Tom Chang
Nathan Giles	The Effects of CO ₂ Flow within Proposed Sequestration Lithologies	Geology	James P. Evans
Amy Hansen	An Empirical Study of Student Programming Bugs	Computer Science	Renee Bryce
David Ingram	Selection of RNA Aptamers that Bind Asymmetric Dimethylated Arginine	Chemistry & Biochemistry	Joanie Hevel
Joseph B. Jensen	11 to 14 Day Forecast of the Sun's Effect on Heating in the Upper Atmosphere	Physics	Jan J. Sojka
Lindsey Lott	The Role of the Mtr4 loop in RNA Surveillance	Chemistry & Biochemistry	Sean Johnson
Tamra Luke	Greater Sage-Grouse Populations on Horn Mountain and Wildcat Knoll Emery County, Utah	Biology	Terry Messmer (Wildland Resources)
Milo Maughan	Investigating Mesospheric Temperature Variability at Mid-Latitudes	Physics	Mike Taylor
Gregory Wilson	Approximation of Range in Materials as a Function of Incident Electron Energy	Physics	JR Dennison
Brian Dell Wood	Color Determination of Dark Wort and Beer Samples by Spectrometer Readings	Physics	Mark Riffe
Damon Nizel	Molecular Recognition in a PRMT1: Substrate Complex	Chemistry & Biochemistry	Joanie Hevel

— Undergraduate Research at the Student Showcase (cont.) —

Name of Student	Title of Project	Department	Mentor
Lance Petersen	Early Observations of the Middle Atmosphere Above USU with the World's Most Sensitive Rayleigh Lidar	Physics	Vincent Wickwar
Stephanie Peterson	Smartphones as Integrated Kinematic and Dynamic Sensors for Amusement Park Physics Applications	Physics	JR Dennison
Jacob Martin Schliesser	Core-level Photoemission Spectroscopy of the Ag/W(110) and Cu/W(110) Bimetallic Interfaces	Physics, Chemistry & Biochemistry	Mark Riffe
Sara Scott	Teaching Science Outreach	Physics	Tonya Triplett
Charles Sim	Temperature and Endurance Time of Electrostatic Field Strengths of Polymeric Spacecraft Insulators	Physics	JR Dennison
Michael Stewart	Short-distance Forces Investigated by an Atomic Force Microscope	Physics	T.C. Shen
Morgan Summers	Critical Issues in Middle and Secondary Mathematics Placement: A Case Study	Mathematics & Statistics	Brynja Kohler
Bryant Svedin	SABER OH Mesospheric Airglow	Physics	Doran Baker (ECE)

— Utah State Students Present Research at NCUR 2011 —

The 25th National Conferences on Undergraduate Research (NCUR) was held 31 March - 2 April 2011 at Ithaca College. Established in 1987, NCUR is dedicated to promoting undergraduate research, scholarship, and creative activity in all fields of study by sponsoring an annual conference for students. Through this annual conference, NCUR creates a unique environment for the celebration and promotion of undergraduate student achievement, provides models of exemplary research and scholarship, and helps to improve the state of undergraduate education. College of Science presenters are listed below:

Name of Student	Title of Project	Department	Mentor
Ryan Berry	Elucidation of Promiscuous Catalytic Activity of <i>Pseudomonas aeruginosa</i> Sulfatase	Chemistry & Biochemistry	Alvan Hengge
Bailee Binks	The Regulation of TRPM5 Channels in Bitter and Fatty Acid Signaling in Enteroendocrine Cells	Biology	Tim Gilbertson
Kelby Bosshardt	Structural Characterization of Exosome Cofactors Rrp47 and Rrp6	Chemistry & Biochemistry	Sean Johnson
Amy Crandall	Structure and Function Characterization of the N-Terminus of the RNA Helicase Ski2	Chemistry & Biochemistry	Sean Johnson
Lance Petersen	Early Observations of the Middle Atmosphere above USU with the World's most Sensitive Rayleigh Lidar	Physics	Vincent B. Wickwar, Joshua P. Herron

— STUDENT ACTIVITIES —

Student Awards, Recognition & Grants

undergraduate* graduate**

Chemistry & Biochemistry

The following students received \$6500 summer undergraduate research fellowships from the American Heart Association:

Kelby Bosshardt* and **Megi Rexhepaj***

Faculty mentor: **Sean Johnson**

Heather Tarbet*, **Russ Butler***, and **Drake Smith***

Faculty mentor: **Joanie Hevel**

Laurel Gui* received a \$21,500 pre-doctoral fellowship from the American Heart Association for 2011-2012. This fellowship includes an \$18,500 stipend and \$3000 for project support. Laurel is a fourth year graduate student working with faculty mentor **Joanie Hevel**.

Geology

Eric Allen** received a \$3,500 Utah State University Ecology Graduate Research Support Award for 2011.

Eric Allen** received a \$1,500 2011 Graduate Student Research Grant from the Geological Society of America.

Lisa Seunarine**, **Dave Richey****, **Elizabeth Petrie****, **Mitch Prante****, **Ryan Sonntag****, and **Rhead Cannon*** received the American Association of Petroleum Geologists Rocky Mountain Section's Imperial Barrel Award of \$3,000 for their presentation "Highly Prospective Hydrocarbon Accumulations: Southwest Barents Sea", 22 January 2011. Faculty mentor: **James P. Evans**

Student Presentations

undergraduate* graduate**

Biology

The following posters were presented at the Biology Undergraduate Research Symposium, Department of Biology, Utah State University, 26 April 2011:

Cameron Bartlett*. "The High Cost of Cheap Coal: Why Can't We Move to Renewable Energy." Faculty mentors: **John Flores** and **Daniel Holland** (BUS)

Travis Bunderson*. "Identification of Root-Knot Nematode Species." Faculty mentor: **Claudia Nischwitz**

Skyler Burrows*. "Maternal Cannibalism in Ladybird Beetles." Faculty mentor: **Ted Evans**

Tanner Hunsaker*. "Attention Restorative Effects of Differing Environments." Faculty mentor: **Kerry Jordan** (PSYC)

Gavin Johnson*. "Examining the Competitive Abilities of Fungal Species Associated with the Alfalfa Leafcutting Bee." Faculty mentor: **Rosalind James** (USDA)

Heather Jones*. "Development of an Assay to Detect Influenza Virus RNA Polymerase Activity in Cell Culture." Faculty mentor: **Bart Tarbet** (IAR)

Sujuan Ma*. "Growth of HFL-1 Cells in Hollow Fiber Bioreactors: Method Development." Faculty mentor: **Kamal Rashid** (CIB)

Brandon Martin*. "Purification and Characterization of an Oseltamivir-Resistant Influenza A (H1N1) Virus." Faculty mentor: **Bart Tarbet** (IAR)

Nathan Nelson*. "Finding an Alternative Way of Growing HPAIV in Cell Culture." Faculty mentor: **Dale Barnard** (ADVS)

Matthew Petersen*. "The Role of TRPM5 Channels in Fatty Acid Signaling in Enteroendocrine Cells." Faculty mentor: **Tim Gilbertson**

Sam Sherwood*. "Negative Effects of UV-B Radiation on Virulence of Insect Pathogenic *Metarhizium* spp. Fungi." Faculty mentor: **Don Roberts**

Eric Sims*. "Prevalence of Malarial Infection (*Plasmodium mexicanum*) in Side-Blotched Lizard Populations (*Uta stansburiana*) of Southern Utah." Faculty mentor: **Susannah French**

Amelia Hodges*. "Cloning the CFA Gene from Lactic Acid Bacteria." Faculty mentors: **Joanne Hughes** and **Dennis L. Welker**

Chemistry & Biochemistry

The following posters were awarded an honorable mention in graduate student poster competition at the West Coast Protein Crystallography Workshop in Monterey, CA, 20-23 March 2011:

Jeremy Bakelar**. "The Structural Basis for Stereospecificity Displayed in (S)-hydroxypropyl-Coenzyme M Dehydrogenase."

Anna Lytle**. "Structures of CsyB, a Fungal Type III polyketide Synthase."

Caleb J. Allpress**, **Atta M. Arif**, and **Lisa M. Berreau** presented a poster titled "The Photoreactivity of Chlorodiketonate Ni(II) Complexes" at the Inorganic Reaction Mechanisms Gordon Research Conference, Galveston, TX, 6-11 March 2011.

Katarzyna Grubel** gave an invited short talk titled "CO-release Chemistry of Metal-flavonolate Complexes" at the Bioinorganic Chemistry Gordon Research Seminar, Ventura, CA, 4 Feb 2011. Advisor: **Lisa M. Berreau**

The following presentations were made at the 241st American Chemical Society National Meeting in Anaheim, CA, 27-31 March 2011:

Carlos Read*, **Robert Severinsen***, **Elisabeth Pound***, **Mikalla Loosli***, **James J. Danford****, Atta M. Arif, and **Lisa M. Berreau**. “Ligand Lability in Mononuclear Ni(II) Complexes.”

Shayne A. Sorenson*, Atta M. Arif, and **Lisa M. Berreau**. “Simple Zinc Flavonolate Complex: Synthesis, Characterization, and CO Release Reactivity.”

Mark E. Noble*, **Katarzyna Grubel****, **Brooks C. Marshall***, Dylan T. Houghton, Mark P. Mehn, Atta M. Arif, and **Lisa M. Berreau**. “Influence of the Ligand Secondary Environment of the CO-release Chemistry of Zinc Flavonolate Complexes.”

Geology

Eric Allen** with **Tammy Rittenour** and Justin R. Derose presented a poster titled “Spring Runoff: Application for Tree-Ring Data from the Bear River Range, Northern Utah to Reconstruct Drought Variability” at the Spring Runoff Conference, Logan, UT, 29 March 2011.

Eric Allen** presented a poster titled “Seeing the Patterns Through the Trees: Climate from Tree-Rings” at Science Unwrapped, Utah State University, Logan, UT, 25 February 2011.

The following posters were presented at the Geological Society of America Rocky Mountain-Cordilleran Section Meeting, Logan, Utah, 17-20 May 2011:

Eric Allen** with **Tammy Rittenour**, and Justin R. Derose. “Spring Runoff: Application for Tree-Ring Data from the Bear River Range, Northern Utah to Reconstruct Drought Variability.”

Kirsten Bahr** with **W. David Liddell**, **Nathan Giles***, and **Heather D. Smith****. “Structural and Lithologic Influences on Karst Systems in the Tony Grove Area, Northern Utah.”

Kevin J. Thomas, **Paul C. Inkenbrandt****, and **Robert Q. Oaks, Jr.** “Identification and Evaluation of Potential Aquifer Storage and Recovery Sites in Cache Valley, Utah.”

Paul C. Inkenbrandt** with Janae Wallace and Mike Lowe. “Ground Water Quality Classification for the Basin-Fill Aquifer, East Shore Area, Davis County, Utah.”

James A. Kessler** with **James P. Evans** and Douglas R. Schmitt. “Rock Property Descriptions Interpreted from Borehole Geophysical Data Collected in Slimholes Drilled for Project Hotspot: The Snake River Geothermal Drilling Project.”

Robin Nagy** with **Carol M. Dehler**. “New and Unexpected Cryogenian Microfossil Findings from Southeastern Idaho and the Death Valley Region of California.”

Brennan W. Young*. “Kinematic Structural Analysis of the Cloverly and Fort Union Formations of the Eastern Bighorn Basin, Wyoming.”

The following talks were presented at the Geological Society of America Rocky Mountain-Cordilleran Section Meeting, Logan, UT, 17-20 May 2011:

Kyle Andreassen** with **John W. Shervais** and Robert Buchwaldt. “Geochemistry and Geologic Relations of Meta-Basalts and Meta-Komatiites of the Farmington Canyon Complex, Wasatch Mountains, Utah.”

D. Corey Barton** with **James P. Evans**. “Estimating the Storage Capacity of a Potential CO₂ Reservoir Through Analysis of Paleo-Migration of CO₂ in an Exposed Analog.”

Eric Beard** with **Anthony R. Lowry**, and **J. R. Hoggan***. “A New Method for Picking Shoreline Height Variations from Elevation Profiles Applied to Pleistocene Lake Bonneville.”

Dawn S. Hayes** with **Carol M. Dehler**. “A New Locality of Neoproterozoic Tube Structures in Northern Utah: Insight Into Genesis and Age of a Cap Carbonate.”

Elizabeth Petrie** with **Tamara Jeppson*** and **James P. Evans**. “Use of Wireline Logs for Identification of Rock Strength Variability in Cap-Rock Lithologies.”

Dave Richey** with **Dawn S. Hayes**** and **Carol M. Dehler**. “Maximum Depositional Age and Provenance of Neoproterozoic Diamictite Units in Central Utah.”

Lisa Seunarine** with **Anthony R. Lowry**. “Loading and Flexural Strength of the Lithosphere: A New Map of Effective Elastic Thickness for the Western United States.”

Anne Hayden** with **Tammy M. Rittenour**. “Linking the Holocene Fluvial History of the Upper Escalante River, S. Utah to Regional Records Using OSL and Radiocarbon.”

Marlon M. Jean** with **John W. Shervais**. “New Insights from LA-ICP-MS Analyses of Coast Range Ophiolite Refractory Peridotite.”

Eva Lyon** with **W. David Liddell**, Val Gunther, Glade Gunther, and Paul Jamison. “The Sequence Stratigraphy and Biostratigraphy of the Middle Cambrian Spence Shale.”

Katherine E. Potter with **John W. Shervais**, **Christopher J. Sant****, and Eric H. Christiansen.
“Project Hotspot: Insight Into the Subsurface Stratigraphy and Petrologic Evolution of the Snake River Plain.”

Emilee Skyles** with **Tammy M. Rittenour**.
“Quaternary Alluvial History of the Golo River, Corsica, France: Using OSL to Change a Paradigm.”

Ryan Sonntag** with Paul LaPointe, **Meagan R. DeRaps****, Hope Sisley, and **Dave Richey****.
“Sedimentologic Controls on the Fracture Distribution and Network Development in Mesaverde Group Sandstone Lithofacies, Uinta Basin, Utah.”

Michelle Summa Nelson** with **Tammy M. Rittenour**.
“Investigating Arroyo Cut-Fill Cycles and Their Link to Holocene Climate Change Along Kanab Creek, Southern Utah.”

Mathematics & Statistics

The following talks were presented at the Regional Mathematical Association of America Conference, Southern Utah University, Cedar City, UT, 8-9 April 2011. Faculty mentor: **David E. Brown**

Scott Roy*. “Boolean Rank as Arc Coloring.”

Brittin Bennett*. “Boolean Rank of Doubly Regular Tournaments.”

Sarah Mousley*. “Tropical Linear Algebra.”

Aaron Andersen**. “Graph Shop: Graph Theory Software for Research and Teaching.”

Sebrina Cropper**. “Posets of Tournaments.”

Aaron Andersen** presented a talk titled “Graph Shop: Graph Theory Software for Research and Teaching” at the Southeastern International Conference on Graph Theory, Combinatorics and Computing, Florida Atlantic University, 5-10 March 2011. Faculty mentor: **David E. Brown**

Physics

Jeffrey B. Goodrich*, **Hemang Patel****, **Timothy E. Doyle**, and **Soonjo Kwon** presented a talk titled “Ultrasonic Differentiation of Malignant and Normal Breast Cells in Culture” at the Indo - US Workshop on Nano-Ultrasonics 2011, International Conference on Nanotechnology and Ultrasonics, Tiruchirappalli, India, 12-14 January 2011.

— FACULTY ACTIVITIES —

Awards & Recognition

Biology

Dr. David York has been appointed as Editor-in-Chief of the journal *Obesity Reviews*. This is a monthly journal of the International Association for the Study of Obesity. It is published by Wiley-Blackwell and has an impact factor of over 5, which is the second highest impact factor for journals in nutrition and obesity. It is published monthly and covers all aspects of obesity including prevalence, etiology, complications, behavior, molecular and genetic determinants and associated comorbidities.

Faculty Grants

Biology

Marion Murray

“Determining Incidence of Three Diseases in Utah Stone Fruit Orchards – Year 2”
USDA Specialty Crops Block Grant
1 January 2010 - 31 December 2011
\$7,179

Marion Murray, Diane Alston, Dan Drost

“Survey to Assess IPM Implementation in Utah Vegetable Crops”
Western IPM Center/USDA NIFA
1 January 2010 - 31 December 2011
\$9,476

Marion Murray, Jobie Carlisle (Utah Climate Center), Diane Alston

“Enhancing Tree Fruit Pest Management Outreach through Weather Stations and Online Tools”
USDA Specialty Crops Block Grant
1 January 2010 - 31 December 2012
\$44,000

Marion Murray and Claudia Nischwitz

“Establishing a Grower-Operated Fire Blight Detection Lab”
USDA Specialty Crops Block Grant
1 January 2010 - 31 December 2011
\$15,277

Marion Murray and Diane Alston

“Evaluation of Puffer Mating Disruption to Manage Codling Moth”
USDA Specialty Crops Block Grant
1 January 2012 - 31 December 2012
\$12,199

Claudia Nischwitz

“Identification and Distribution of *Erwinia Amylovora* Strains Resistant to Streptomycin in Apple and Pear Orchards in Utah”
Specialty Crop Block Grant
1 January 2011 - 30 December 2011
\$11,020

Chemistry & Biochemistry

Alexander I. Boldyrev

“Advancement of the Adaptive Natural Density Partitioning Method towards Applications to Open-Shell Systems, Reaction Mechanisms, Biomolecules, and Solids”

National Science Foundation

2011 - 2014

\$323,400

Computer Science

Renee Bryce

“Test Case Selection and Statistical Modeling of the Behavior of the Ceph Parallel File System”

Lawrence Livermore National Lab

1 November 2010 - 31 August 2011

\$24,377

Geology

Anthony R. Lowry

“Collaborative Research: Deformation Processes in the Andaman-Nicobar Islands”

National Science Foundation (Earth Sciences-Geophysics)

1 July 2011 - 30 June 2013

\$111,271

Faculty Presentations & Professional Activities

undergraduate* graduate**

Biology

The following papers were presented at the Plant and Animal Genome Conference, San Diego, CA, 15-19 January 2011:

Hardeep S. Rai, Paul G. Wolf, Bryce Richardson, Rich Cronn, and Karen E. Mock. “Aspen Transcriptomes.”

Joshua P. Der* and **Paul G. Wolf.** “Fern Transcriptomes.”

The following oral presentations were given at the 95th Pacific Branch of the Entomological Society of America annual meeting, Waikoloa, HI, 27-30 March 2011:

Andrew Tebeau** and **Diane Alston.** “Phenology and Functional Roles of the European Earwig in Organic and Conventional Peach Orchards.”

Diane G. Alston and **Brent Black.** “A Major Caneboring Pest of Raspberry in the Intermountain West, Raspberry Horntail, *Hartigia cressoni* (Hymenoptera: Cephidae).”

Aaron M. Duffy**, **Todd Campbell**, and **Paul G. Wolf** presented a workshop titled “The Virtual Population Genetics (VPG) Simulation System: An Example of Learning ‘with’ Cyber-enabled Technologies in Science Classrooms” at the National Science Teachers Association Research Dissemination Conference, San Francisco, CA, 12 March 2011.

Todd Campbell and **Aaron M. Duffy**** presented a hands-on demo titled “OpenSim as an Example of Cyber-enabled Technologies for Facilitating Science as Inquiry” at the Cyberlearning Tools for STEM Education Conference, Berkeley, CA, 8-12 March 2011.

Chemistry & Biochemistry

Katarzyna Grubel**, Thora R. Maltais, Rhett C. Smith, Atta M. Arif, and **Lisa M. Berreau** presented a poster titled, “Photochemical CO-release from Divalent Metal Flavonolate Complexes,” at the Metals in Biology Gordon Research Conference, Ventura, CA, 30 January - 3 February 2011.

Lisa M. Berreau, Tomasz Borowski, **Katarzyna Grubel****, **Caleb J. Allpress****, Jeffrey P. Wickstrom, Meaghan E. Germain, Elena V. Rybak-Akimova, and David L. Tierney presented a poster titled, “Mechanistic Studies of the O₂-Dependent Aliphatic Carbon-Carbon Bond Cleavage Reactivity of a Nickel Enolate Complex,” at the Inorganic Reaction Mechanisms Gordon Research Conference, Galveston, TX, 6-11 March 2011.

Lisa M. Berreau presented an invited lecture titled, “Photochemical CO-release from Divalent Metal Flavonolate Complexes,” at Cal State Chico, 4 February 2011 and at Western Washington University, 29 April 2011.

Computer Science

Renee Bryce presented “Bug Stomp” in USU’s Old Main. 59 high-school, undergraduate, and graduate students competed to see who could find the most bugs in a short time. The students celebrated after the event with 3-foot-wide pizzas, snacks, drinks, and prizes. 26 March 2011.

R. Bryce and **V. H. Allan** presented a talk titled “Mystery Bug Theater” at *Conference on Software Engineering Education and Training*, 22-24 May 2011, Honolulu, Hawaii.

R. Lasisi** and **V. H. Allan** presented a talk titled “Annexations and Merging in Weighted Voting Games—The Extent of Susceptibility of Power Indices” at *ICAART*, Rome, Italy, January 2011.

U. Weerakoon** and **V. H. Allan** presented a poster titled “Influence of Neighborhood and Reorganization in Networked Agent Simulation, proceedings at *ICAART*, Rome, Italy, January 2011.

Geology

The following talks were presented at the Geological Society of America Rocky Mountain-Cordilleran Section Meeting, Logan, UT, 17-20 May 2011:

Carol M. Dehler with Laura J. Crossey, Kathryn E.K. Fletcher, Karl E. Karlstrom, M.L. Williams, Michael Jercinovic, G. Gehrels, Mark Pecha and Matthew Heizler. “ChUMP Connection (CHUAR-Uinta Mountain-Pahrump): Geochronologic Constraints for Correlating CA 750 MA Neoproterozoic Successions of Southwestern Laurentia.”

Paul K. Link, **Carol M. Dehler**, Adolph Yonkee and Joshua A. Keeley. “Systematic Regional Patterns in Detrital-Zircon Populations from Cryogenian, Ediacaran and Cambrian Sandstones, Brigham Group and Tintic Quartzite, Northern Utah Thrust Belt.”

Susanne U. Janecke and **Robert Q. Oaks, Jr.** (emeritus). “New Insights Into the Outlet Conditions of Pleistocene Lake Bonneville Southeastern Idaho, USA.”

Joel L. Pederson with **Jesse King***. “New Constraints on the Integration of the Bear River and Cutting of Oneida Narrows Canyon - Implications for the Bonneville Record.”

Tammy M. Rittenour with **Heidi R. Pearce****. “Dune Activity in the Idaho Falls Dune Field on the Snake River Plain, Southeastern Idaho.”

John Shervais with **James P. Evans**, **Thomas E. Lachmar**, Eric J. Christiansen, Douglas R. Schmitt, **James E. Kessler****, **Katherine E. Potter****, **Marlon M. Jean****, **Christopher J. Sant****, and **Thomas G. Freeman****. “Project Hotspot - The Snake River Scientific Drilling Project: A Progress Report.”

John W. Shervais presented a talk titled “Plume Tales... Chasing the Yellowstone Plume Through Space and Time” at the EarthScope Workshop for Interpretive Specialists, Teton Science Center, Jackson, WY, 12 September 2010.

John W. Shervais presented a talk titled “Plume Tales... Chasing the Yellowstone Plume Through Space and Time” at the National Association of Geoscience Teachers - NW Chapter, College of Southern Idaho, Twin Falls, ID, 22 June 2010.

John W. Shervais presented a talk titled “The Snake River Geothermal Drilling Project: Innovative Approaches to Geothermal Exploration” at the ICDP-DOSECC Town Hall at the American Geophysical Union Annual Meeting, San Francisco, CA, 13 December 2010.

John W. Shervais presented a talk titled “Geothermal Exploration in the Snake River Plain Volcanic Province” at the Nevada Geological Society, Elko, NV, 20 January 2011.

John W. Shervais presented a talk titled “The Snake River Geothermal Drilling Project: Innovative Approaches to Geothermal Exploration” at the University of Idaho Research Center and USDA Research Center, Kimberly, ID, 15 April 2011.

Anthony R. Lowry and M. Perez-Gussinye presented a talk titled “Crustal Quartz Plays a Surprising Role in Controlling Cordilleran Deformation” at the EarthScope Science Meeting, Austin, TX, 17-20 May 2011.

Mathematics and Statistics

David E. Brown presented a talk titled “Graph Theory Applied: Applications of Intersection Graphs” at the Regional Mathematical Association of America Conference, Southern Utah University, Cedar City, UT, 8-9 April 2011.

David E. Brown presented a talk titled “Cycle Extendability in Graphs and Digraphs” at the Southeastern International Conference on Graph Theory, Combinatorics and Computing, Florida Atlantic University, 5-10 March 2011.

David E. Brown presented a talk titled “Boolean Rank, Intersection Numbers, and Dot Product Dimension” at the Discrete Seminar, University of Colorado, Denver, CO, 18 May 2011.

The following talks were presented at the SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, 22-26 May 2011:

James A. Powell. “Recent Applications of Dynamical Systems in Ecology” and “The Timing of Insect Developmental and Trajectory of Bark Beetle Outbreak.”

Ian Anderson. “Darboux Integrability-A Historical Survey.”

Nathan Geer presented a talk “Generalized Kashaev and Turaev-Viro 3-manifold Invariants” at Georgia Tech University, Atlanta, GA, 11 April 2011.

Nathan Geer presented a talk “The Turaev-Viro Invariant and Some Of Its Relatives” at the Spring School in Geometry and Quantum Topology, Les Diablerets, Switzerland, 24 March 2011.

Nghiem Nguyen presented a talk “On The Orbital Stability of Solitary Waves for the 2-coupled Nonlinear Schrodinger System” at IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athena, GA, 4 April 2011.

Physics

Timothy E. Doyle presented a talk titled “Simulating Ultrasound in Heterogeneous Materials for Industrial and Medical Applications” at the Indo - US Workshop on Nano-Ultrasonics 2011, International Conference on Nanotechnology and Ultrasonics, Tiruchirappalli, India, 12-14 January 2011.

The Center for Atmospheric & Space Sciences

Herbert C. Carlson presented a talk titled “Space Weather Forecast Improvements for Better Operations” at the Seminar on Space Weather held at the Air Force Institute Technology (AFIT), Colorado Springs, CO, 29 March 2011.

Robert W. Schunk gave an invited talk titled “Commercial Space Weather Products for Real-Time and Forecast Applications” at the Space Weather Workshop held in Boulder, CO, 26-29 April 2011.

Faculty Publications

undergraduate* graduate**

Biology

Yuho Kim**, **MieJung Park**, **Stéphan Boghossian**, and **David A. York**. 2010. Three Weeks Voluntary Running Wheel Exercise Increases Endoplasmic Reticulum Stress in the Brain of Mice. *Brain Res.* 1317: 13-23. PMID 20045396.

David A. York, Lihong Teng, and **MieJung Park**. 2010. Effects of Dietary Fat and Enterostatin on Dopamine and 5-hydroxytryptamine Release from Rat Striatal Slices. *Brain Res.* 1349: 48-55. PMID 20599830.

Olha Ilnytska, Adrian M. Stütz, **MieJung Park-York**, **David A. York**, David M. Ribnicky, Aamir Zuberi, William T. Cefalu, and George Argyropoulos. 2011. Molecular Mechanisms for Activation of the Agouti-related Protein and Stimulation of Appetite. *Diabetes* 60: 97-106.

David A. York, **Stéphan Boghossian**, and **MieJung Park-York**. 2011. Melanocortin Activity In the Amygdala Influences Alcohol Intake. *Pharmacol. Biochem. Behav.* 98: 112-119.

Yohichi Kumaki, Jane Ennis, Ramtin Rahbar, Jeffrey D. Turner, Miles K. Wandersee, Aaron J. Smith, Kevin W. Bailey, Zachary C. Vest, Jason R. Madsen, **Joseph K.-K. Li**, and **Dale L. Barnard**. 2011. Single-dose Intranasal Administration with mDEF201 (Adenovirus Vected Mouse Interferon-alpha) Confers Protection from Mortality in a Lethal SARS-CoV BALB/c Mouse. *Model. Antiviral Research.* 89: 75-82.

Joseph K.-K. Li, and **Dale L. Barnard**. 2011. Invited Commentary on Epstein-Barr Virus, the Immune System, and Associated Diseases. *Frontiers in Microbiology* 2: 28, doi: 10.3389/fmicb.2011.00028.

Joseph K.-K. Li. 2011. Oncolytic Bluetongue Viruses: Promise, Progress and Perspectives. *Frontiers in Microbiology* 2: 1-13, doi:10.3389/fmicb.2011.00046.

Erin W. Hodgson, **Theresa L. Pitts-Singer**, and James D. Barbour. 2011. Effects of the Insect Growth Regulator, Novaluron on Immature Alfalfa Leafcutting Bees, *Megachile rotundata*. *Journal of Insect Science* 11:43.

Yohichi Kumaki, Miles K. Wandersee, Aaron J. Smith, Yanchen Zhou, Graham Simmons, Nathan M. Nelson, Kevin W. Bailey, Zachary C. Vest, **Joseph K.-K. Li**, Paul Kay-Sheung Chan, Donald F. Smee, and **Dale L. Barnard**. 2011. Inhibition of Severe Acute-respiratory Syndrome Coronavirus Replication in a Lethal SARS-CoV BALB/C Mouse Model by Stinging Nettle Lectin, Urtica Dioica Agglutinin. *Antiviral Research* 90: 22-32, doi: 10.1016/J.ANTIVIRAL.2011.02.003.

Charles W. Fox, James D. Wagner, Sara Cline, Frances Ann Thomas, and **Frank J. Messina**. 2011. Rapid Evolution of Lifespan in a Novel Environment: Sex-specific Responses and Underlying Genetic Architecture. *Evolutionary Biology* 38:182-196.

Teresa J. Lorenz**, **Kimberly A. Sullivan**, **Amanda V. Bakian****, and Carol A. Aubry. 2011. Cache-Site Selection in Clark’s Nutcracker (*Nucifraga Columbiana*). *The Auk* 128: 237-247.

Chemistry & Biochemistry

Anastassia N. Alexandrova, **Alexander I. Boldyrev**, Xiang Li, Harry W. Sarkas, Jay H. Hendricks, Susan T. Arnold, and Kit H. Bowen. 2011. Lithium Cluster Anions: Photoelectron Spectroscopy and ab initio Calculations. *Journal of Chem. Phys.* 134: 044322.

Oluwatosin O. Dada and **Stephen E. Bialkowski**. 2011. A Compact Pulsed Infrared Laser Excited Photothermal Deflection Spectrometer. *Applied Spectroscopy* 65: 201.

Timur R. Galeev**, Alexander S. Ivanov, Constantin Romanescu, Wei-Li Li, Konstantin V. Bozhenko, Lai-Sheng Wang, and **Alexander I. Boldyrev**. 2011. Molecular Wheel to Monocyclic Ring Transition in Boron-carbon Mixed Clusters $C_2B_6^-$ and $C_3B_5^-$. *Physical Chemistry Chemical Physics* 13: 8805-8810.

M. Machado, **Tapas Kar**, and P. Piquini. 2011. The Influence of the Stacking Orientation of C and BN Stripes in the Structure, Energetics, and Electronic Properties of BC_2N Nanotubes. *Nanotechnology* 22: 205706.

Jared K. Olson and **Alexander I. Boldyrev**. 2011. Ab Initio Search for Global Minimum Structures of Neutral and Anionic B_4H_4 Clusters. *Chemical Physics* 379: 1-5.

Konstantin Pokhodnya, Christopher Olson, Xuliang Dai, Douglas L. Schilz, Philip Boudjouk, **Alina P. Sergeeva****, and **Alexander I. Boldyrev**. 2011. Flattening a Puckered Cyclohexasilane Ring by Suppression of the Pseudo-Jahn-Teller Effect. *Journal of Chemical Physics* 134: 014105.

Philippe F. Weck, **Alina P. Sergeeva****, Eunja Kim, **Alexander I. Boldyrev**, and Kenneth R. Czerwinski. 2011. Chemical Bonding and Aromaticity in Trinuclear Transition-Metal Halide Clusters. *Inorganic Chemistry* 50: 1039-1046.

Lisa M. Berreau, Tomasz Borowski, **Katarzyna Grubel****, **Caleb J. Allpress****, Jeffrey P. Wickstrom, Meaghan E. Germain, Elena V. Rybak-Akimova, and David L. Tierney. 2011. Mechanistic Studies of the O₂-Dependent Aliphatic Carbon-Carbon Bond Cleavage Reactivity of a Nickel Enolate Complex. *Inorganic Chemistry* 50: 1047-1057.

Computer Science

D. Bryce, W. Cushing, and S. Kambhampati. 2011. State Agnostic Planning Graphs: Deterministic, Non-Deterministic, and Probabilistic Planning. *Artificial Intelligence* 175:848-889.

R. Bryce, S. Sampath, A. Memon. 2011. Developing a Single Model and Test Prioritization Strategies for Event-Driven Software. *Transactions on Software Engineering* 37:48-64.

Geology

Anthony R. Lowry and M. Perez-Gussinye. 2011. The Role of Crustal Quartz in Controlling Cordilleran Deformation. *Nature*, 471: 312-313, doi:10.1038/nature09912.

A.J. Hidy, J.C. Gosse, **Joel L. Pederson**, J.P. Mattern, and R.C. Finkel. 2010. A Geologically Constrained Monte Carlo Approach to Modeling Exposure Ages from Profiles of Cosmogenic Nuclides: An Example from Lee's Ferry, AZ. *Geochemistry, Geophysics, Geosystems* (G3) 11. doi: 10.1029/2010GC003084.

W.C. Hammond, B.A. Brooks, R. Burgmann, T. Heaton, M. Jackson, **Anthony R. Lowry**, and S. Anandakrishnan. 2011. The Scientific Value of High-Rate, Low-Latency GPS Data. *Eos Transactions of the American Geophysical Union* 92: 125-126.

Mathematics and Statistics

David E. Brown, J. R. Lundgren. 2010. Several Characterizations of Unit Interval Bigraphs. *Congressus Numerantium* 206: 5-17.

David E. Brown, A. H. Busch, G. Isaak. 2010. Linear Time Recognition Algorithms and Structure Theorems for Bipartite Tolerance Graphs and Bipartite Probe Interval Graphs. *Discrete Math. Theor. Comput. Sci.* 12: 63-82.

The Center for Atmospheric & Space Sciences

S. Patra**, Edward Spencer, W. Horton, and **Jan J. Sojka**. 2011. Study of *Dst* / Ring Current Recovery Times Using the WINDMI Model. *Journal of Geophysical Research* 116, A02212, doi:10.10292010JA015824.

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