

May 2011 to August 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:

This fall we have had exceptionally nice weather and it brings out the hoards of students between classes. One has to be alert to dodging the skateboards, bikes, and scooters that weave among the students during change of classes. So far I know of few accidents, but I have had some close calls as I go to teach my class. Huh, I wonder if I am being targeted? No, I am just slow.

This between classes phenomenon is the result of an ever-increasing student population on this campus and at all of our distant campuses. There are nearly 29,000 Aggies enrolled at one or another of our campuses. 16,857 of these are on the Logan campus.

The student body is becoming more diverse both ethnically and also by their geographic origins. On our other campuses women outnumber men, while on the Logan campus women make up 48% percent of the population.

These changes are evident as one walks around and observes the students. This increased diversity of backgrounds, perspectives, and experiences is a rich source of knowledge for our students. All of us should embrace the diversity that we have access to.



— College of Science Contract & Grant Activity —

\$ Amounts (# of proposals)	May 2011	June 2011	Cumulative Totals FY10-11	July 2011	August 2011	Cumulative Totals FY11-12
Proposals Submitted	\$5,427,835 (14)	\$6,971,000 (26)	\$63,450,769 (170)	\$7,236,962 (23)	\$790,069 (7)	\$8,027,031 (30)
Awards Received	\$587,114 (12)	\$1,434,890 (12)	\$13,077,405 (105)	\$4,986,273 (13)	\$1,884,279 (21)	\$6,870,552 (34)

— Tammy Rittenour: NSF CAREER Award Recipient —



Tammy Rittenour, assistant professor in USU's Department of Geology and director of the USU Luminescence Lab, is a 2011 grant recipient of the National Science Foundation's prestigious Faculty Early Career Development (CAREER) program.

In 1883, Utah's *Deseret News* newspaper recounted chilling details of "The Great Washout," a catastrophic flood on Kanab Creek that took out water supply dams and farmland and carved a gaping, muddy gash through town. The article described chunks of earth as big as houses floating down Kanab Creek, along with livestock deaths and extensive damage to crops.

"This event, and others like it that occurred around the same time in this region, were very dramatic and disruptive," says Tammy Rittenour, assistant professor in the Department of Geology. "In one area, the creek incised 100 feet, making it difficult for ranchers to get their cattle to water or to irrigate their fields."

As in Kanab, large floods caused by spring snowmelt and thunderstorms with heavy rains sliced through mid-sized streams throughout southern Utah, leaving deep, flat-bottomed channels with steep walls of sediment known as arroyos. Kanab and neighboring communities were in the midst of the cutting phase of an arroyo cycle. It's these cycles Rittenour is investigating as a 2011 grant recipient of the National Science Foundation's prestigious Faculty Early Career Development (CAREER) program.

"An arroyo is an entrenched river, like a canyon cut into sediment," she says. "It's similar to a gully or a gulch, but much larger. You can't jump across an arroyo."

Though once-in-a-lifetime events, the arroyo-cutting episodes that took place in the American Southwest from about 1865 to 1915 aren't unique on a geologic scale. Scientists surmise that similar events have occurred for millennia, the most recent taking place between 600 to 800 years prior to the 19th and 20th century accounts. Between periods of rapid incision, arroyos appear to follow prolonged aggradation or "filling" periods. The question is: What's driving these cycles of rapid entrenchment followed by slower rates of sedimentation and infilling?

Three main hypotheses have emerged to explain this phenomenon: Some scientists point to land use changes, such as sudden population settlement with attendant grazing and farming that led to removal of native vegetation and other human-driven impacts. Others contend that climate change is the driving mechanism behind the cycles. Still others propose that arroyo cycles are simply a natural, geological occurrence. Rittenour plans to test these hypotheses with a multi-faceted approach.

"We're developing a detailed and well-dated stratigraphic record of past cut-fill cycles at six adjoining semi-arid drainages in southern Utah using optically stimulated luminescence (OSL) and radiocarbon dating," she says. "We'll also complete geomorphic mapping and GIS and hydrological analysis of these watersheds." Rittenour and her student team will investigate processes that drive aggradation by characterizing sediment production and erosion rates. The team will use hydrological tools and tree-ring chronologies to decipher the driving forces behind rapid arroyo entrenchment.

"As we examine the different arroyo sections – located near the upper Paria River, the Virgin River, Kanab Creek, and the Escalante River – we'll hold as many factors the same as possible," she says. "We want to know whether or not these incision episodes have happened synchronously. That will yield important clues about what's causing these cycles." Rittenour will use single-grain OSL dating, a specific technique that allows researchers to determine the ages of individual grains of sand. The USU Luminescence Lab, of which Rittenour serves as director, is one of the few labs in the country with this dating capability.

"Single-grain OSL dating enables more accurate age estimates and allows for more systematic sample collection than radiocarbon dating," she says. "OSL samples can be collected from nearly any sediment containing sand, while material for radiocarbon dating can be sparse in these systems." The team will employ a combination of OSL, radiocarbon and dendrochronology – tree ring counting – to obtain the most accurate ages dates possible and thus determine the timing of past arroyo cycles.

"Our study will shed a whole new light on arroyo questions by taking us thousands of years into the past," says Rittenour, who credits her success in securing funding for her project, in part, to her participation in the USU research office's NSF CAREER grant writing workshop in 2010. "It's important for us to discover what's causing these cycles, so we can predict what the future holds."

– by Mary-Ann Muffoletto

For the full story, visit <http://www.usu.edu/ust/index.cfm?article=50074>

— Mathematician USU's First National Physical Science Consortium Fellow —



Mike Rigley, a doctoral student in mathematics, is USU's first National Physical Science Consortium Fellow.

Utah State University doctoral student Michael Rigley is the university's first recipient of a National Physical Science Consortium Fellowship. A mathematics major, Rigley receives an annual stipend, which is renewable up to six years, along with paid summer internships at New Mexico's Sandia National Laboratory and ongoing mentorship by one of the lab's scientists.

Utah State joined the consortium, a partnership between government agencies and laboratories, industry and higher education aimed at increasing the number of United States citizens with graduate degrees in the physical sciences and related engineering fields, in 2011. "This is a great honor and I'm excited about this opportunity," says Rigley, who completed his first internship at Sandia this past summer. "Sandia offers a good balance of academia, research and industry. I enjoyed getting out of the classroom, experiencing the frontiers of science and learning about 'the next big things' in our field."

Since its inception in 1989, NPSC has awarded 420 graduate fellowships. Of those fellows, 176 have completed doctoral degrees and 88 have earned master's of science degrees. Seventy-three fellows are currently enrolled. NPSC fellows receive an annual stipend of \$20,000, which may be supplemented by the national lab at which they're employed. "The number of awardees varies year to year," says Joretta Joseph, NPSC program administrator. "We normally have close to 300 applicants per year and the largest number of fellowships we've awarded in one year is 30. We're excited to have Utah State University join the consortium and we look forward to having many NPSC fellows at USU."

At Sandia, Rigley, who earned a master's degree from USU in 2009, worked at solving large linear systems of equations as part of a radiation transport application. "Many scientific applications come down to solving linear equations," he says. "The kinds of equations we're dealing with are similar to common algebra problems, except they involve huge datasets with millions and millions of variables." During his initial internship, the Ogden, Utah, native, who returns to Sandia in summer 2012, worked with emerging software tools to explore how electrons and protons move through various materials.

"While we were working on one specific application, these techniques are applicable to a broad spectrum of applications in many different scientific disciplines — in anything where you're dealing with large amounts of data," says Rigley, who is studying computational methods of solving large systems with USU faculty advisor Joseph Koebbe.

NPSC is currently accepting applications for 2012 and the deadline is November 30, 2011. Applicants must be U.S. citizens with the ability to pursue graduate work at an NPSC member institution and must complete one or two summer internships, as the sponsoring national laboratory requires. Supported fields of study include science, mathematics and engineering. For more information, visit the NPSC website at <http://www.npsc.org/index.html>.

— by Mary-Ann Muffoletto



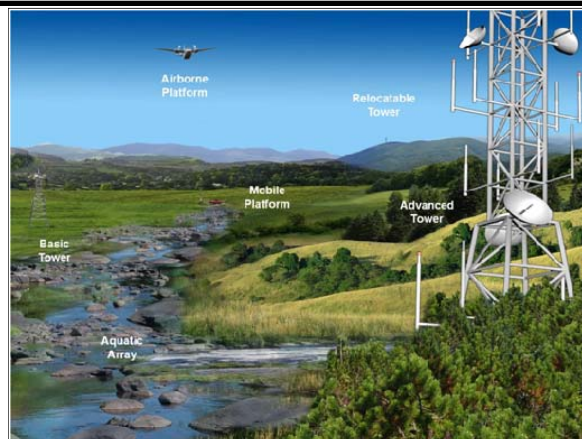
As an NPSC fellow, Rigley is interning at New Mexico's Sandia National Laboratory. The fellowships are available through a number of participating NPSC institutions. The next application deadline is Nov. 30. Photo courtesy U.S. Dept. of Energy.

— Full Steam Ahead: Construction Begins on NEON

Budget crisis notwithstanding, the massive, National Science Foundation-funded National Ecological Observatory Network – known as NEON – has secured \$18 million in fiscal year 2011 funds to move forward with construction.

“This is truly a triumph for the hundreds, really the thousands of people who have given so much of themselves to make NEON a reality,” says Jim MacMahon, dean of Utah State University’s College of Science, trustee professor of biology and chair of NEON’s board of directors. “We’re ready to bring the next generation of environmental observation to those working to understand, predict, and respond to environmental change on a grand scale.”

NEON, the nation’s first coast-to-coast ecological observatory, will gather and synthesize continental-scale environmental data over a thirty-year period. Once established, the network will allow scientists to continuously monitor thousands of environmental measurements throughout the nation. With unprecedented access, the network’s data will be available in near real-time to the public.



NEON is designed to sense the biosphere with a minimal footprint; here, its infrastructure. Graphic courtesy of CH2MHILL.

Development of the Boulder, Colorado-based project’s design plan and budget began five years ago. Estimated construction cost of the entire network, which is expected to be in place by 2017, is \$434 million. A core observatory site planned for Utah, dubbed “Onaqui-Benmore,” is located about 62 miles southwest of Salt Lake City, on land owned by the U.S. Forest Service and the Bureau of Land Management. “Each NEON domain will have one core observatory site as well as two relocatable sites to collect varied data sets,” MacMahon says. “Specially equipped vehicles and aircraft will also be used to collect very detailed analytical images of large areas.” Core observatory sites will use towers – modeled on wildfire watch towers – outfitted with sophisticated environmental and meteorological monitoring equipment. Taken together, MacMahon says, the core sites will provide a baseline for comparing ecological conditions that can be used to develop and test ecological models.

“We’ll be able to integrate a lot of different approaches to ecology and predict what we call ‘ecological thresholds,’” he says. “These thresholds are sudden environmental changes that occur in very short periods.” Past ecological thresholds of note include the Dust Bowl of the 1930s that reduced the southern Great Plains to wasted farmland and roiling dust storms. “NEON offers transformational opportunities,” MacMahon says. “It’s a great time to be involved in ecological research.”

– by Mary-Ann Muffoletto

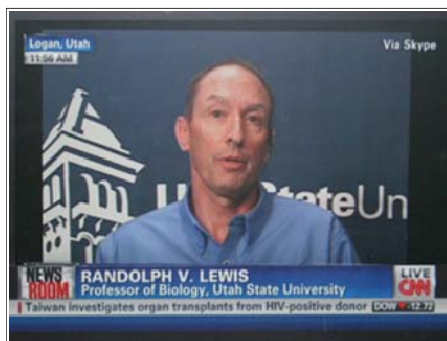
For the full story, visit <https://www.usu.edu/science/html/full-steam-ahead-construction-begins-on-neon/>

— Undergraduate Research Opportunities: Deadlines for Submissions —

*Please note deadlines as listed below (*denotes submissions through the Office of the Vice President for Research):*

National Conference on Undergraduate Research (NCUR)	http://www.weber.edu/ncur2012/	11/15/2011
Council of Undergraduate Research (CUR) Posters on the Hill	http://www.cur.org/postersession.html	10/18/2011
*Undergraduate Research & Creative Opportunities (URCO)	https://research.usu.edu/undergrad/html/funding-opportunities/urco	10/15/2011 (noon)
* Research on Capitol Hill	https://research.usu.edu/undergrad/html/sharing-your-research/research-on-capitol-hill	11/1/2011
*USU Student Showcase	http://research.usu.edu/undergrad/html/sharing-your-research/student-showcase/	3/1/2012

— Aggie USTAR Biologist Details Research on CNN —



USTAR professor Randy Lewis of USU's Synthetic Bio-Manufacturing Center is pioneering research on the manufacture of artificial spider silk.

In the segment, Lewis and Dutch artist Jalila Essaidi discussed a recent project in which Essaidi used the genetically engineered spider silk in a lattice of human cells in an attempt to create bulletproof skin. Though the manufactured skin failed to repel bullets fired at normal speed from a .22 caliber rifle, the scientists are encouraged by the results. "It's a start and it's exciting to have opportunities to share our findings with a broad audience," says Lewis, a member of USU's Synthetic Bio-Manufacturing Center team. During the past 20 years, Lewis has pioneered methods of mass producing artificial spider silk. By transferring silk-producing genes from spiders to silkworms, along with goats, E.coli bacteria and alfalfa, the molecular biologist and his team have developed "factories" capable of producing super-strong, lightweight fiber.

Future applications for the manufactured silk could include artificial tendons and ligaments, artificial skin to treat victims of severe burns, and improved vehicle airbags, along with more effective and comfortable bulletproof clothing. Lewis is slated to offer a public presentation of his research on USU's Logan campus Friday, Nov. 4, as a featured speaker in Science Unwrapped's 'Modern Scientific Marvels' series. His talk, at 7 p.m. in the Eccles Science Learning Center Emert Auditorium, Room 130, is free and open to all.

— by Mary-Ann Muffoletto

For the full story, visit <https://www.usu.edu/science/htm/aggie-ustar-biologist-details-research-on-cnn/>

Utah State University scientist Randy Lewis is getting a workout on the media circuit as news of his innovative spider silk research reaches all corners of the globe. The USTAR professor, who joined USU's Department of Biology this past summer, was featured on CNN Newsroom's The Big I – ideas, innovation, imagination – segment today (30 Aug 2011) via a live Skype interview from USU's Logan campus. [View a video of the interview.](#)



Lewis feeds a goat at USU's research farm. The goats were bred with two spider genes to produce two key proteins used to make spider silk. Those proteins are then harvested through the goat's milk.

— NSF Graduate Research Fellowship Deadline —

The National Science Foundation (NSF) is accepting applications for the Graduate Research Fellowship Program (GRFP) for FY 12; **application deadlines cluster around mid-November 2011** and vary by field. GRFs provide three years of "early-stage" support for graduate students seeking research-based master's or doctoral degrees in science, technology, engineering and math (STEM) disciplines, including the social sciences. Funding levels are expected to be \$42,000 per year for each fellow, including \$12,000 for tuition, reflecting an increase to the cost-of-education allowance from its previous level of \$10,500. The program expects to award 2,000 new fellowships in FY 12. Eligibility is limited to U.S. citizens, nationals, or permanent residents. According to the announcement, "A high priority for NSF and GRFP is increasing the diversity of the science and engineering workforce, including geographic distribution and the participation of women, minorities, persons with disabilities, and veterans."

More information is available at: http://www.nsf.gov/pubs/2011/nsf11582/nsf11582.htm?WT.mc_id=USNSF_25&WT.mc_ev=click>

— A New Twist on an Old Fuel Source —



In recent years, USU biochemistry professor Lance Seefeldt has identified key steps involved in nitrogen fixation, the process by which nitrogen is converted to ammonia.

While studying bacterial enzymes, known as nitrogenases, used in nitrogen reduction, Utah State University biochemists Zhi-Yong Yang and Lance Seefeldt, along with colleague Dennis Dean of Virginia Tech, discovered a molybdenum nitrogenase capable of converting carbon monoxide into usable hydrocarbons. The reaction is similar, they say, to Fischer-Tropsch synthesis, developed by Nazi Germany.

“This is pretty profound,” says Seefeldt, professor in USU’s Department of Chemistry and Biochemistry. “Understanding this process paves the way for developing better ways of converting carbon monoxide, a

toxic waste product of combustion, into transportation fuel and precursors for plastics – without the time and energy required for conventional extraction of fossil fuels.”

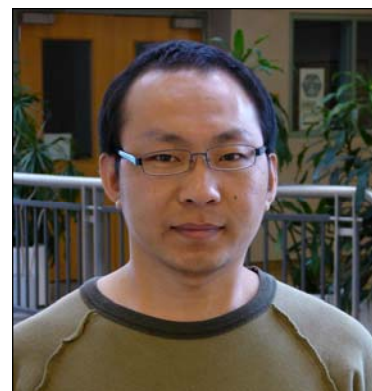
The scientists’ findings appear in the article “Molybdenum Nitrogenase Catalyzes the Reduction and Coupling of CO to Form Hydrocarbons,” in the June 3, 2011 issue (and May 27 online issue) of *Journal of Biological Chemistry*. The paper was selected as “Paper of the Week” by the journal’s editorial board, an honor bestowed on the top one percent of more than 6,600 manuscripts reviewed annually by the publication’s editors. In the “Paper of the Week” feature, Yang, a doctoral candidate mentored by Seefeldt, is highlighted as an up-and-coming researcher. “There’s tremendous interest in converting various kinds of waste into fuel and, especially, in finding cost-effective and environmentally clean ways to do it,” says Yang, who earned his first doctorate in organic chemistry at China’s Nankai University.

Unlike coal, Fischer and Tropsch’s original source for synthetic fuels, carbon monoxide produces hydrocarbons with much less pollution. The substance provides an added benefit: it allows scientists to produce longer chain, double and triple-bond hydrocarbons, which provides a richer feedstock for production of refined transportation fuels. “Like many waste-to-energy processes, we’ve found we can produce such hydrocarbons as propane and butane from carbon monoxide,” Yang says. “But using this process, we may have the potential to produce such transportation fuels as diesel and gasoline that are readily adaptable to today’s vehicles.”

In recent years, Seefeldt has identified key steps involved in nitrogen fixation, the process by which nitrogen is converted to ammonia. The findings contribute to research that could enable an alternative, clean method of producing ammonia.

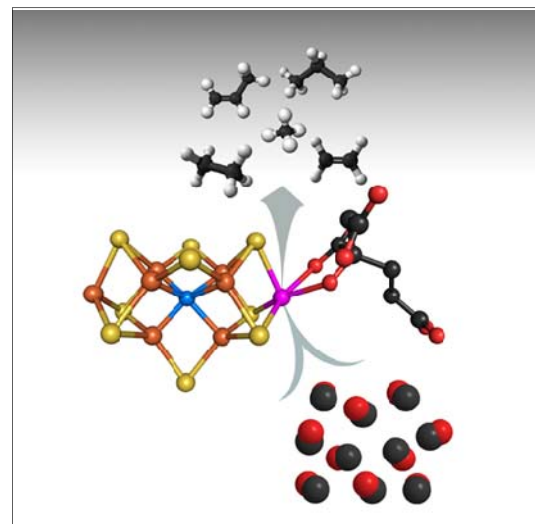
– by Mary-Ann Muffoletto

For the full story, visit <https://www.usu.edu/science/htm/usu-biochemists-reveal-new-twist-on-old-fuel-source/>



Zhi-Yong Yang, a doctoral student in the Dept. of Chemistry and Biochemistry, is highlighted in the June 3, 2011, issue of Journal of Biological Chemistry for his research on nitrogen fixation.

“Understanding this process paves the way for developing better ways of converting carbon monoxide, a



USU researchers demonstrated that molybdenum nitrogenase (center), which normally catalyzes the reduction of nitrogen to ammonia, also promotes the reduction and coupling of carbon monoxide molecules (bottom), forming a range of small hydrocarbons (top) including methane, ethane, ethylene, propane, and propene.

— STUDENT ACTIVITIES —

Student Awards, Recognition & Grants

undergraduate* graduate**

Chemistry & Biochemistry

Alina P. Sergeeva** received the American Chemical Society Physical Chemistry Division Outstanding Student Poster Award at the 242nd National American Chemical Society Meeting, Denver, CO, 28 August - 1 September 2011. Faculty mentor: **Alexander I. Boldyrev**

Alina P. Sergeeva** had an article titled “Unraveling Phenomenon of Internal Rotation in B₁₃⁺ Through Chemical Bonding Analysis” featured on the cover of *Chemical Communications* 2011, volume 47, issue 22. Faculty mentor: **Alexander I. Boldyrev**

Geology

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

Eric Allen** received a \$1,500 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 titled “Highly Prospective Hydrocarbon Accumulations: Southwest Barents Sea”, 22 January 2011. Faculty mentor: **James P. Evans**

Student Presentations

undergraduate* graduate**

Chemistry & Biochemistry

The following posters were presented at the 242nd National American Chemical Society Meeting, Denver, CO, 28 August - 1 September 2011:

Alina P. Sergeeva**, Gerardo Martinez-Guajardo, **Alexander I. Boldyrev**, Thomas Heine, Jesus M. Ugalde, and Gabriel Merino. “Rationalizing Chemical Bonding in Molecular Wankel Motors”.

Timur R. Galeev**, **Alexander S. Ivanov****, Constantin Romanescu, Wei-Li Li, Konstantin V. Bozhenko, Lai-Sheng Wang, and **Alexander I. Boldyrev**. “Novel Molecular Structural Transition: Wheel to Monocyclic Ring Transition in Boron-Carbon Mixed Clusters C₂B₆⁻ and C₃B₅⁻.”

Caleb J. Allpress**, Atta M. Arif, and **Lisa M. Berreau**. “Studies toward Modeling the Active Site Chemistry of Fe-ARD.”

Megi Rexhapaj* presented a talk titled “Structural Insight into RNA Binding Proteins Involved in RNA Processing” at the American Heart Association Utah Student Research Roundtable, Salt Lake City, UT, 9 August 2011. Faculty mentor: **Sean J. Johnson**

Ryan Jackson** and **Sean Johnson** presented a poster titled “Structural Characterization of the RNA Helicase Mtr4 and the Role of Accessory Domains in Ski2-like RNA Helicases” at the FASEB summer research conference on Helicases and Nucleic Acid Translocases, Steamboat Springs, CO, 31 July - 5 August 2011. Faculty mentor: **Sean J. Johnson**

Geology

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

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

Kyle Andreasen**, **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** and **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**, **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** and **Carol M. Dehler**. “A New Locality of Neoproterozoic Tube Structures in Northern Utah: Insight into Genesis and Age of a Cap Carbonate.”

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

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

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

Anne Hayden** and **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** and **John W. Shervais**. “New Insights from LA-ICP-MS Analyses of Coast Range Ophiolite Refractory Peridotite.”

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

Katherine E. Potter, **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** and **Tammy M. Rittenour**. “Quaternary Alluvial History of the Golo River, Corsica, France: Using OSL to Change a Paradigm.”

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

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

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

James A. Kessler**, **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** and **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 Center for Atmospheric & Space Sciences

Levan Lomidze ** presented a talk titled “Overview of Ionospheric Models” at the 2011 Joint CEDAR-GEM Workshop held in Santa Fe, NM, 26 June - 1 July 2011.

The following posters were presented at the 2011 Joint CEDAR-GEM Workshop, Santa Fe, NM, 26 June - 1 July 2011:

Narayan P. Chapagain**, Michael J. Taylor, and J. Vincent Eccles. “Ionospheric Plasma Depletion Comparison from Two Longitudinal Sectors Measured by Airglow Emissions.”

Neal Criddle**. “Seasonal Variability and Dynamics of Mesospheric Gravity Waves Over the Andes Mountains.”

Chad S. Fish**, **Jan J. Sojka**, **Michael J. Taylor**, N. Mitchell, and Frank T. Berkey. “Long-term Observations of Winds and Waves over Bear Lake Observatory.”

David B. Hansen**, **Jennifer Meehan****, **W. Kent Tobiska**, **Robert W. Schunk**, **Herb Carlson**, **Vince Eccles**, **Don Rice**, **Jared Fulgham***, **Landry Heaton***, **Larry Gardner**, **Ludger Scherliess**, **Lie Zhu**, Chris Tschan, Dave Bouwer, and Rian Shelley. “New Space Weather Products for HF Radio, GPS Navigation, and Aviation.”

Levan Lomidze** and **Ludger Scherliess**. “Observations, Modeling and Causes of the Weddell Sea Anomaly.”

Jennifer Meehan**, **W. Kent Tobiska**, **Robert W. Schunk**, **Jan J. Sojka**, **Herb Carlson**, **Vince Eccles**, **Don Rice**, **Jared Fulgham***, **Landry Heaton***, **Larry Gardner**, **Ludger Scherliess**, **Lie Zhu**, Chris Tschan, Dave Bouwer, and Rian Shelley. “New Space Weather Products for HF Radio, GPS Navigation, and Aviation.”

Michael E. Olson**, **Bela G. Fejer**, and J. L. Chau. “Equatorial Zonal Plasma Drift Effects During Sudden Stratospheric Warming Events.”

Jonathan R. Pugmire**, **Michael J. Taylor**, and **Yucheng Zhao**. “Mesospheric Temperature Variability over the Andes Mountains.”

Leda Sox**, **Vincent Wickwar**, Joshua P. Herron, **Marcus J. Bingham***, and **Lance W. Peterson***. “The World’s Most Sensitive Rayleigh-Scatter Lidar.”

Brian D. Tracy*, **Bela G. Fejer**, and J. L. Chau. “Lunar Tidal Effects of the Equatorial Vertical Drifts over Jicamarca.”

— FACULTY ACTIVITIES —

Faculty Grants

Biology

Cory A. Stanley

Specialty Crop Block Grant

“Brown Marmorated Stink Bug (*Halyomorpha halys*) Survey”

1 January 2012 - 31 December 2013

\$25,727

Cory A. Stanley

Specialty Crop Block Grant

“Synergistic Effects of Fungicides and Adjuvants on Learning in the Blue Orchard Bee (*Osmia lignaria*)”

1 January 2012 - 31 December 2013

\$17,462

Geology

Anthony R. Lowry

National Science Foundation (Earth Sciences-Geophysics)

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

1 July 2011 - 30 June 2013

\$111,271

Mathematics & Statistics

John R. Stevens

Utah Agricultural Experiment Station

“Reproductive Performance in Domestic Ruminants”

July 2011 - June 2012

\$18,500

Faculty Presentations & Professional Activities

undergraduate* graduate**

Biology

The following talks were presented at the joint meeting of the Botanical Society of America, the Society for Economic Botany, American Fern Society, and the American Society of Plant Taxonomists, St. Louis, MO, 9-13 July 2011:

Mary E. Barkworth and B. Shaun Bushman. “North American *Meliceae* (*Poaceae*): Morphology, Geography, and Phylogeny.”

Mary E. Barkworth and E. Gilbert. “SYMBIOTA: Providing Tools for Public Engagement with Collection Information.”

Mary E. Barkworth presented a talk titled “Online Interactive Pathway (Directed) Keys: an Effective Tool for Serving Today's Students While Building Resources for Tomorrow's Students” at the International Botanical Congress, Melbourne, Australia, 16 July 2011.

The following presentations were given at the annual meeting of the Ecological Society of America, Austin, TX, 8-12 August 2011:

S.K. Morgan Ernest, Thomas J. Valone, James H. Brown. “Multi-decadal Climates Cycles and the Dynamics of a Chihuahuan Desert Ecosystem.” (poster)

Sarah R. Supp**, **Xiao Xiao****, **S.K. Morgan Ernest**, **Ethan P. White**. “Experimentally Altering Biotic Interactions has Different Effects on Static and Dynamics Macroecological Patterns.” (talk)

Chemistry & Biochemistry

Lisa M. Berreau presented an invited talk titled “Photoinduced Oxidative Carbon-Carbon Bond Cleavage Reactivity in Metal Flavonolate and Enolate Complexes” at the Fifty Years of Inorganic Chemistry Symposium at the American Chemical Society Fall 2011 National Meeting, Denver, CO, 28 Aug - 1 Sept 2011.

Alexander I. Boldyrev presented an invited talk titled “Deciphering Delocalized Bonding in Chemical Species” at the Ninth Triennial Congress of the World Association of Theoretical and Computational Chemists, Santiago de Compostela, Spain, 17-22 July 2011.

Computer Science

Ming Li presented a paper titled “Authorized Private Keyword Search over Encrypted Data in Cloud Computing” at the 31st IEEE International Conference on Distributed Computing Systems (ICDCS), Minneapolis, MN, 21-24 June 2011.

Geology

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

Carol M. Dehler, 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 and **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 and **Heidi R. Pearce****. “Dune Activity in the Idaho Falls Dune Field on the Snake River Plain, Southeastern Idaho.”

John Shervais, 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.”

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.

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.

The Center for Atmospheric & Space Sciences

The following talks were presented at the 91st American Meteorological Society Annual Meeting, Seattle, WA, 24-27 January 2011:

W. Bagby, R. Prochaska, **Robert W. Schunk**, **Ludger Scherliess**, K. Kandis, and D. Kim. “GPS Radio Occultation Data Use in Operational Ionospheric Models.”

Robert W. Schunk, **Ludger Scherliess**, **Jan J. Sojka**, Donald C Thompson, and **Lie Zhu**. “Data Assimilation Models for Ionosphere Specifications and Forecasts.”

Kent Tobiska, **Herb Carlson**, **Robert W. Schunk**, **Jan J. Sojka**, **Ludger Scherliess**, **Lie Zhu**, and **Larry C. Gardner**. “Global, Real-Time Ionosphere Specification for End-User Communication and Navigation Products.”

The following talks were presented at the Space Weather Workshop, Boulder, CO, 26-29 April 2011:

W. Bagby, R. Prochaska, **Robert W. Schunk**, **Ludger Scherliess**, K. Landis, and D. Kim. “GPS Radio Occultation Data Use in Operational Ionospheric Models.”

Larry C. Gardner and **Robert W. Schunk**. “Charge Exchange in the Mid- to Low-Latitude Ionosphere and its Impact on the Thermosphere.”

W. Kent Tobiska. “New Space Weather Products for HF Radio, GPS Navigation and Aviation.”

W. Kent Tobiska, **Robert W. Schunk**, and **Herbert C. Carlson**. “Commercial Space Weather Effects: Data, Products, Services.”

Jan J. Sojka, **Robert W. Schunk**, Tom Woods, and Frank Eparvier presented a poster titled “Ionospheric Flare Modeling: a New Paradigm” at the AGU Chapman Conference on Modeling the Ionosphere/Thermosphere System, Charleston, SC, 9-12 May 2011.

The following talks were presented at the AGU Chapman Conference on Modeling the Ionosphere/Thermosphere System, Charleston, SC, 9-12 May 2011:

Ludger Scherliess and **Robert W. Schunk**. “Data Assimilation Techniques and Their Use for Ionospheric Science and Applications.”

Robert W. Schunk. “Ionosphere-Thermosphere Physics: Current Status and Problems.”

J. Shim, M. Kuznetsova, L. Rastatter, M. Hesse, D. Bilitza, M. Codrescu, B. Emery, B. Foster, T. Fuller-Rowell, J. Huba, A. Ridley, **Robert W. Schunk**, D. Thompson, D. Weimer, D. Anderson, J. Chau, J. M. Forbes, **Jan J. Sojka**, E. Sutton, and B. Rideout. “Systematic Assessment of Ionosphere/Thermosphere Models Using Metrics.”

Jan J. Sojka, **Michael David**, **Robert W. Schunk**, Anthony P. van Eyken, Mihail Codrescu, Tim Fuller-Rowell, Mariangel Fedrizzi, Tim Spain, Alan Aylward, Aaron Ridley, David Pawlowski, Pierre-Louis Blelly, Geoff Crowley, Ruiyuan Liu, and Beichen Zhang. “EISCAT Svalbard Radar (ESR) Year Long IPY Observations: a Model Climate Variability Study.”

The following talks were presented at the 13th International Ionospheric Effects Symposium, Alexandria, VA, 17-19 May 2011:

Herbert C. Carlson. “Sharpening our Thinking About Patch Morphology, Research and Mitigation Measures.”

Vince Eccles, **Robert W. Schunk**, **Ludger Scherliess**, **Kent Tobiska**, and **Lie Zhu**. “HF Propagation in a Real-Time GAIM Ionosphere.”

Larry Gardner and **Robert W. Schunk**. “Wave Interactions in the Thermosphere/Ionosphere.”

V. E. Kunitsyn, E. D. Tereshchenko, E. C. Andreeva, E. A. Leontyeva, **Robert W. Schunk**, **Ludger Scherliess**, **Lie Zhu**, and **Larry C. Gardner**. “The Ionosphere Over Northeast Russia and Alaska Around the Halloween Storm Radio Tomography Versus GAIM-GM Model.”

Ludger Scherliess and **Robert W. Schunk**. “Ionospheric Dynamics at Low- to Mid-Latitudes: Specifications Using a Physics-Based Data Assimilation Model.”

Robert W. Schunk, **Larry Gardner**, **Ludger Scherliess**, and **Lie Zhu**. “Long-Term Ionosphere-Thermosphere Forecasting: Problems Associated with Uncertain Parameters and Missing Physics.”

Lie Zhu, **Robert W. Schunk**, **Ludger Scherliess**, and **Vince Eccles**. “A Physics-Based Data Assimilation Model for the High-Latitude Ionosphere: Importance of Data Assimilation Technique in Determining the Model Drivers.”

Jan J. Sojka, **Robert W. Schunk**, and **Michael David** presented a talk titled “The Altitude Dependence of the Earth’s Ionosphere on the Solar Extreme Ultraviolet Spectrum” at the LWS/SDO Workshop, Resort at Squaw Creek, Squaw Valley, CA, 1-5 May 2011.

Kent Tobiska presented an invited talk titled “Space Weather Forecasts: Aiding in Disaster Recovery” at the Sunrise Sessions, Salt Lake City, UT, 24 June 2011.

Herbert C. Carlson was a Co-chair for a joint CEDAR-GEM Session: Dayside Field Aligned Currents and Energy Deposition (FED), Joint CEDAR-GEM Workshop, Santa Fe, NM, 26 June - 1 July 2011.

The following talks were presented at the 2011 Joint CEDAR-GEM Workshop, Santa Fe, NM, 26 June - 1 July 2011.

Herbert C. Carlson. “Opportunities to Compare Ground Based with Satellite Signatures of: Magnetic Reconnection; Down Going Energy; Ion Outflows.”

Ludger Scherliess. (invited lecture). “Data Assimilation Techniques 101 (and Their Use for Ionospheric Science and Applications).”

Ludger Scherliess, **Robert W. Schunk**, **Larry C. Gardner**, **Jan J. Sojka**, **J. Vince Eccles**, and **Lie Zhu** (invited talk). “USU Data Assimilation Models for Space Weather Science and Applications.”

Ludger Scherliess, **Levan Lomidze****, **Robert W. Schunk**, and **Rod Heelis**. “Assimilation of COSMIC DATA into GAIM-Physics-Based Data Assimilation Model (GAIM-FP).”

Tao Yuan, **Takuya D. Kawahara**, **C.-Y. She**, and **D. A. Drueger**. “Monthly-Mean Tidal Perturbations of Na Density and Vertical Wind Based on Full-Diurnal-Cycle Na Lidar Observations of 2002-2008.”

The following posters were presented at the 2011 Joint CEDAR-GEM Workshop, Santa Fe, NM, 26 June - 1 July 2011.

Alan Sheng Xi Li, Sigrid Close, Scott Palo, and **Ludger Scherliess**. “Multi-Point, In-Situ, Long-Duration Lower Thermosphere Research.”

Kim Nielsen, **Michael J. Taylor**, and Richard Collins. “Airglow Imaging of Polar Atmospheric Gravity Waves Over Poker Flat, Alaska.”

Kim Nielsen, David Broutman, David Siskind, Karl Hoppel, and **Michael J. Taylor**. “Fourier Ray Tracing of Atmospheric Gravity Waves Utilizing a Numerical Weather Prediction System.”

The following talks were presented at the Heliophysics V Summer School, Boulder, CO, 27 July - 3 August 2011.

Jan J. Sojka. “Long-Term Evolution of the Geospace Climate.”

Jan J. Sojka. “Ionosphere-Thermosphere.”

Faculty Publications

undergraduate* graduate**

Biology

Frank J. Messina and **Jake C. Jones***. 2011. Inheritance of Traits Mediating a Major Host Shift by a Seed Beetle, *Callosobruchus maculatus* (Coleoptera: Chrysomelidae: Bruchinae). *Annals of the Entomological Society of America* 104: 808-815.

Frank J. Messina and Charles W. Fox. 2011. Egg-Dumping Behavior Is Not Correlated with Wider Host Acceptance in the Seed Beetle *Callosobruchus maculatus* (Coleoptera: Chrysomelidae: Bruchinae). *Annals of the Entomological Society of America* 104: 850-856.

John P. McCutcheon and **Carol D. von Dohlen**. 2011. An Interdependent Metabolic Patchwork in the Nested Symbiosis of Mealybugs. *Current Biology* 21(16): 1366-1372.

Jody A. Banks, Tomoaki Nishiyama, Mitsuyasu Hasebe, John L. Bowman, Michael Gribskov, Claude W. dePamphilis, and **Paul G. Wolf**. 2011. The Selaginella Genome Identifies Changes in Gene Content Associated with the Evolution of Vascular Plants. *Science* 332: 960-963.

Joe Wilson** and **James Pitts**. 2011. Pleistocene Connection between the Nearctic Mediterranean and Desert Regions in the *Sphaerophthalma unicolor* Species-Complex (Hymenoptera: Mutillidae). *Insect Conservation and Diversity* 4: 222-234. UAES no. 8174.

David Tanner, Jorge Gonzalez, Robert Matthews, Brad Vinson, and **James Pitts**. 2011. Evolution of the Courtship Display of *Melittobia* (Hymenoptera: Eulophidae). *Molecular Phylogenetics and Evolution* 60: 219-227. UAES no. 8206.

Kevin Williams**, Donald Manley, **Erik Pilgrim****, **Carol von Dohlen**, and **James Pitts**. 2011. Multifaceted Assessment of Species Validity in the *D. bioculata* Species-Group (Hymenoptera: Mutillidae). *Systematic Entomology* 36: 180-191. UAES no. 8203.

Joshua P. Der**, Michael S. Barker, Norman J. Wickett, Claude W. dePamphilis, and **Paul G. Wolf**. 2011. De novo Characterization of the Gametophyte Transcriptome in Bracken Fern, *Pteridium aquilinum*. *BMC Genomics* 12: 99.

Paul G. Wolf, **Joshua P Der****, **Aaron M. Duffy****, **Jacob B. Davidson****, Amanda L. Grusz, and Kathleen M. Pryer. 2011. The Evolution of Chloroplast Genes and Genomes in Ferns. *Plant Molecular Biology* 76: 251-261.

Jonna B. Westover, **Thayne L. Sweeten**, Michael Benson, Patricia Bray-Ward and Anthony R. Torres. 2011. Immune Dysfunction in Autism Spectrum Disorder, Autism - A Neurodevelopmental Journey from Genes to Behaviour, Valsamma Eapen (Ed.). ISBN: 978-953-307-493-1, InTech, Available from: <http://www.intechopen.com/articles/show/title/immune-dysfunction-in-autism-spectrum-disorder>

Cory A. Stanley, **Theresa L. Pitts-Singer**, and **Jordi Bosch**. 2011. Influence of Rough Handling on *Osmia lignaria* (Hymenoptera: Megachilidae) Nest Establishment in Commercial Orchards. *Journal of Economic Entomology* 104(3): 750-752.

Cory A. Stanley and **Theresa L. Pitts-Singer**. 2011. Attraction to Old Nest Cues during Nest Selection by the Solitary Bee *Megachile rotundata* (Hymenoptera: Megachilidae). *Journal of Apicultural Research* 50(3): 227-234.

Jeff R. Broadbent, Hui Cai, Rebecca L. Larsen, **Joanne E. Hughes**, **Dennis L. Welker**, Vanessa G. De Carvalho, Thomas A. Tompkins, Ylva Ardo, Finn Vogensen, Angela De Lorentiis, Monica Gatti, Erasmo Neviani, and James L. Steele. 2011. Genetic Diversity in Proteolytic Enzymes and Amino Acid Metabolism among *Lactobacillus helveticus* Strains. *J. Dairy Sci.* 94: 4313-4328.

Angie D. Cefalo**, Jeff R. Broadbent, and **Dennis L. Welker**. 2011. Protein-Protein Interactions among the Components of the Biosynthetic Machinery Responsible for Exopolysaccharide Production in *Streptococcus thermophilus* MR-1C. *J. Appl. Microbiol.* 110(3): 801-812.

James H. Cane. 2011. Specialist *Osmia* Bees Forage Indiscriminately among Hybridizing *Balsamorhiza* Floral Hosts. *Oecologia* 167(1): 107-116.

James H. Cane, Blair J. Sampson, and Stephanie A. Miller. 2011. Pollination Value of Male Bees: the Specialist Bee *Peponapis pruinosa* (Apidae) at Cultivated Summer Squash (*Cucurbita pepo*). *Environ. Entomol.* 40(3): 614-62

James H. Cane, Dale Gardner, and Phil Harrison. 2011. Nectar and Pollen Sugars Constituting Larval Provisions of the Alfalfa Leaf-Cutting Bee (*Megachile rotundata*) (Hymenoptera: Apiformes: Megachilidae). *Apidologie* 42: 401-408.

James H. Cane. 2011. Meeting Wild Bees' Needs on Rangelands. *Rangelands* 33(3): 27-32.

Kristal Watrous** and **James H. Cane**. 2011. Breeding Biology of the Threadstalk Milkvetch, *Astragalus filipes* (Fabaceae), with a Review of the Genus. *Amer. Midl. Natur.* 165: 225-240.

Chemistry & Biochemistry

Alina P. Sergeeva**, Boris B. Averkiev, Hua-Jin Zhai, **Alexander I. Boldyrev**, and Lai-Sheng Wang. 2011. All-Boron Analogues of Aromatic Hydrocarbons: B₁₇⁻ and B₁₈⁻. *The Journal of Chemical Physics* 134:224304 1-11.

Jared K. Olson** and **Alexander I. Boldyrev**. 2011. Ab Initio Characterization of the Flexural B₃H₈⁻ Anion Found in the Reversible Dehydrogenation. *Computational and Theoretical Chemistry* 967: 1-4.

Timur R. Galeev**, Qiang Chen, Jin-Chang Guo, Hui Bai, Chang-Qing Miao, Hai-Gang Lu, **Alina P. Sergeeva****, Si-Dian Li, and **Alexander I. Boldyrev**. 2011. Deciphering the Mystery of Hexagon Holes in an All-Boron Graphene α -sheet. *Physical Chemistry Chemical Physics* 13: 11575-11578.

Constantin Romanescu, **Alina P. Sergeeva****, Wei-Li Li, **Alexander I. Boldyrev**, and Lai-Sheng Wang. 2011. Planarization of B₇⁻ and B₁₂⁻ Clusters by Isoelectronic Substitution: AlB₆⁻ and AlB₁₁⁻. *Journal of the American Chemical Society* 133: 8646-8653.

Timur R. Galeev** and **Alexander I. Boldyrev**. 2011. Recent Advances in Aromaticity and Antiaromaticity in Transition-metal Systems. Annual Reports Section "C" *Physical Chemistry* 107: 124-147.

Gerardo Martínez-Guajardo, **Alina P. Sergeeva****, **Alexander I. Boldyrev**, Thomas Heine, Jesus M. Ugalde, and Gabriel Merino. 2011. Unravelling Phenomenon of Internal Rotation in B₁₃⁺ Through Chemical Bonding Analysis. *Chemical Communications* 47: 6242-6244.

Katarzyna Grubel**, Brynna J. Laughlin, Thora R. Maltais, Rhett C. Smith, Atta M. Arif, and **Lisa M. Berreau**. 2011. Photochemically-induced Dioxygenase-type CO-Release Reactivity of Group 12 Metal Flavonolate Complexes. *Chemical Communications* 47: 10431-10433.

Shanying Gui**, Whitney L. Wooderchak, Michael P. Daly, Paula J. Porter, **Sean J. Johnson**, and **Joan M. Hevel**. 2011. Investigation of the Molecular Origins of Protein-Arginine Methyltransferase I (PRMT1) Product Specificity Reveals a Role for Two Conserved Methionine Residues. *Journal of Biological Chemistry* 286(33): 29118-26.

Computer Science

Kai Zeng, Wenjing Lou, and **Ming Li**. 2011. Multihop Wireless Networks: Opportunistic Routing. Wiley, ISBN:978-0-470-66617-3.

Geology

Anthony R. Lowry and M. Perez-Gussinye. 2011. The Role of Crustal Quartz in Controlling Cordilleran Deformation. *Nature* 471: 7338.

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. Anandkrishman. 2011. The Scientific Value of High-Rate, Low-Latency GPS Data. *Eos Transactions of the American Geophysical Union* 92(15): 125-126.

Mathematics and Statistics

Nghiem Nguyen, Min Chen, and Shu-ming Sun. 2011. Existence of Traveling-Wave Solutions to Boussinesq Systems. *Differential and Integral Equations* 24(9-10): 896-908.

Nghiem Nguyen. 2011. On the Orbital Stability of Solitary Waves for the 2-Coupled Conlinear Schrödinger System. *Communications in Mathematical Sciences* 9(4): 997-1012.

Nghiem Nguyen and **Zhi Qiang Wang**. 2011. Orbital Stability of Solitary Waves for a Nonlinear Schrödinger System. *Advances in Differential Equations* 16(9-10): 977-1000.

The Center for Atmospheric & Space Sciences

Ariel O. Acebal and **Jan J. Sojka**. 2011. A Flare Sensitive 3 h Solar Flux Radio Index for Space Weather Applications. *Space Weather* 9: S07004.

Vince Eccles, Donald D. Rice, **Jan J. Sojka**, Cesar E. Valladares, Terence Bullett, and Jorge L. Chau. 2011. Lunar Atmospheric Tidal Effects in the Plasma Drifts Observed by the Low-Latitude Ionospheric Sensor Network. *Journal of Geophysical Research* 116 (A7): A07309.

Larry Gardner and **Robert W. Schunk**. 2011. Large-Scale Gravity Wave Characteristics Simulated with a High-Resolution Global Thermosphere-Ionosphere Model. *Journal of Geophysical Research* 116: A06303.

Jan J. Sojka, Michael Nicolls, Anthony van Eyken, Craig Heinselman, and Dieter Bilitza. 2011. 24/7 Solar Minimum Polar Cap and Auroral Ion Temperature Observations. *Advances in Space Research* 48: 1-11.

Ludger Scherliess, **Donald C. Thompson**, and **Robert W. Schunk**. 2011. Data Assimilation Models: A "New" Tool for Ionospheric Science and Applications. In *The Dynamic Magnetosphere*, W. Liu and M. Fuimoto (eds.), IAGA Special Sopron Book Series 3, DOI: 10.1007/978-94-007-0501-2_18, Springer Science + Business Media, pp. 329-339.

Science Scene is an internal newsletter sent to the
Utah State Board of Trustees, Utah State Administration, and the College of Science faculty and staff.
It is published regularly throughout the school year.
Its purpose is to inform the Board of Trustees and the College of the research activities of our faculty and students,
also providing a forum for peers to follow one another's careers and professional development.

Editor & Layout—Jan Miller (797-2488).
A special thanks to Dean James A. MacMahon and Associate Dean Lisa M. Berreau
for editorial support,
and to our departmental newsletter representatives –
Nancy Kay Harrison, Biology; Geri Child, Chemistry and Biochemistry; Vicki Anderson, Computer Science;
Marsha Hunt, Geology; Meredith Purinton, Mathematics & Statistics; Sharon Pappas, Physics; and
Melanie Oldroyd, The Center for Atmospheric & Space Sciences (CASS).



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

[ADDRESS SERVICES REQUESTED](#)