



Science Scene

Research Report

October 2005 to January 2006

A Publication of the College of Science, Utah State University

—The Dean's Corner—

Winter/Spring semester is well underway and the graduate student recruiting season is upon us. These last few weeks, we have been working on some changes in our graduate fellowship programs. We are pleased to announce that, effective with this spring's recruiting cycle for new graduate students, the stipends for the Willard L. Eccles Graduate Fellowship and the Science & Engineering Diversity Fellowship will be increased to \$22,000 per year. We hope that these changes will make us more competitive and allow us to recruit the best new students possible to our various graduate programs. Information on these changes has been provided to department heads, graduate coordinators, and members of the College's Research & Graduate Advisory Committee in each department.

And it's also that time of year for award nominations and many of these are research-related, such as the faculty researcher of the year, the graduate student researcher of the year (two awards: MS and PhD levels), the undergraduate researcher of the year, and the undergraduate research mentor of the year. Every department may forward one nominee for each of these categories, so please don't hesitate to nominate one of your colleagues and/or students so that we can appropriately recognize their accomplishments in research. Nominations should be forwarded to your department head or to your departmental award nominating committee.

Please send any comments or suggestions for research-related issues that you would like to see presented in *Science Scene* to me via email at don.fiesinger@usu.edu.

— COLLEGE OF SCIENCE CONTRACT & GRANT ACTIVITY —

Amounts (# of proposals)	November 2005	December 2005	Cumulative Totals for FY05-06
Proposals Submitted	\$5,279,395 (09)	\$2,503,188 (14)	\$21,536,661 (71)
Awards Received	\$ 189,888 (05)	\$ 369,826 (08)	\$ 4,069,757 (54)



— Winter/Spring Semester Calendar —

March 20-24. Science Week
 March 30-31 Jared Diamond, Ecology Center guest speaker (co-sponsored by CoS)
 April 3-7. USU Research Week (will include undergraduate and graduate events)
 April 20 College of Science Awards Presentations (3:30 - 4:30 pm Eccles Conf Center)

URCO — Undergraduate Research and Creative Opportunities Awards, Fall 2005

**— Research on Capitol Hill —
January 26, 2005**

Biology

Kevin Abernethy—Katarina Stroffekova, Faculty Mentor
 “Fluorescent Labeling of Neuronal Wild type Na⁺ Channel and its Epilepsy Causing Mutated Forms and their Interactions with CaM.”

Uyen T. Lam—Joseph K.-K. Li, Faculty Mentor
 “Detection of Whirling Disease caused by Myxobolus cerebralis through Quantitative Real-time Polymerase Chain Reaction.”

Brandon Lloyd—Katarina Stroffekova, Faculty Mentor
 “Fluorescent Labeling of Skeletal Muscle Wild Type Na⁺ Channel and its Myotonia Causing Mutant and their Interaction with CaM.”

Logan McKenna—Tim Gilbertson, Faculty Mentor
 “Expression of GPR40, 43, 120, and FAT/CD36 in Mammalian Taste Buds.”

Computer Science

Arthur W. Mahoney—Daniel W. Watson, Faculty Mentor
 “PRRRLT for Fast Communication in Discrete Networks.”

Geology

Bronson J. Barton—W. David Liddell, Faculty Mentor
 “Analysis of the Enigmatic Late Triassic Armored Reptile *Vancleavea campi*.”

Biology

Uyen Lam & Janette Starks—Joseph K.-K. Li, Faculty Mentor
 “Mechanistic Analysis of the Degradation of Bluetongue Viral mRNA by qRT-PCR.”

Amanda Mortensen—Edmund D. Brodie, Jr., Faculty Mentor
 “Antipredator Behavior in a Toxic Salamander.”

Geology

Bronson J. Barton—W. David Liddell, Faculty Mentor
 “Reanalysis of the Enigmatic Late Triassic Reptile *Vancleavea campi*.”

Daniel Barton—James Evans, Faculty Mentor
 “Structural and Lithologic Characterization of the SAFOD Pilot Hole and Phase One Main Hole.”

Isaac Westfield—W. David Liddell, Faculty Mentor
 “Middle Cambrian Microbial Communities along a Bathymetric Gradient.”

I think the saying goes “The only thing constant is change...” and that statement is clearly true in Sponsored Research.

NIH has made a major change to its grant application process. Beginning 1 December 2005, all competing research grant programs will transition—one by one—from paper submission of the PHS 398 to electronic submission through [Grants.gov](http://grants.gov) using the Standard Form 424 Research and Research Related (SF424 R&R) documents. Once a mechanism transitions (R01, R03, etc.), the change applies to all subsequent Requests for Applications and program announcements.

USU is registered with Grants.gov and eRA Commons. Principal Investigators need only register in eRA Commons. Please contact the Sponsored Programs Office for help registering. Applicants should take careful note of the transition schedule, which can be found on the NIH electronic submission at <http://era.nih.gov/ElectronicReceipt/>, to ensure they are using the appropriate mode of application transmission and application form. Each funding opportunity announcement (PA/RFA) includes an application package with an application guide. *Follow all instructions carefully!* This document is critical to submitting a complete and accurate application to NIH. NIH has provided the electronic submission at <http://era.nih.gov/ElectronicReceipt/> as their primary tool for communication.

Please be sure to include the PA/RFA number on the SP01 so the Sponsored Programs Office can assure all requirements have been met for the submission.

Another change is that the Vice President for Research Website now includes the Sponsored Programs Office. If you have questions, problems or suggestions for the SPO Web site please contact [Corey Burger at Corey.Burger@usu.edu](mailto:Corey.Burger@usu.edu).

Kellie Hedin

Kellie Hedin, Sponsored Programs Administrator, 435-797-0470, ESLC 245A

—Funding Opportunity—

Utah State University is an eligible institution for NIH R15 (AREA) - Academic Research Enhancement Awards. This program is designed to promote research at educational institutions that are not currently major recipients of NIH support. AREA awards support small-scale health-related research projects, with direct costs up to \$150,000 for three years, and are renewable. Involvement of undergraduate and graduate students in the research project is strongly encouraged, however this is not a training or fellowship program. *Notably, success rates for competing AREA applications are quite high (see link below).*

NIH R15 (AREA) program:

<http://grants.nih.gov/grants/guide/pa-files/PA-06-042.html>

Success rates:

<http://grants.nih.gov/grants/award/success/succratearea8504.htm>

*For further information, please contact
Lisa Berreau via email at berreau@cc.usu.edu.*

—CoS Undergraduate Research Funding Opportunities—

Do you know of an outstanding undergraduate student looking for a research opportunity? There are two funding initiatives available to students majoring in programs in the College of Science:

1. The College of Science Undergraduate Research Initiative or Mini-grant Program now provides three mini-grants of \$750 to each department for undergraduates working on projects of 3 to 4 months (1 semester) duration.
2. The Willard L. Eccles Undergraduate Research Fellowships provide support for ten students (at least one in each department) with stipends of \$7,500 each for a full-year research project.

Application Process:

Both programs require students to fill out an application (available online) and there must be a commitment from a Science faculty member to mentor.

Flyers on the College of Science Undergraduate Research Mini-grant Program and the W.L. Eccles Undergraduate Research Fellowships have already been distributed to departments.

Fill-in PDF applications are available at:

www.usu.edu/science/CoSMinigrant.htm
www.usu.edu/science/EcclesURF.htm

— STAFF ACTIVITIES —

Staff Presentations

Michael Piep gave a presentation titled “Globemallow (Sphaeralcea) through the Taxonomist’s Lens” at the Wildland Certified Seed Collector Workshop, Ephraim, Utah, 23 September 2005.

Shigeyuki Takahashi. “Measurement of Resistivity of Spacecraft Insulators.”

Ryan Hoffmann received an award for an “Outstanding Graduate Presentation” at the American Physical Society Four Corners Regional Meeting, the University of Colorado, Boulder, Colorado, 14 October 2005.

— STUDENT ACTIVITIES —

Student Awards, Recognition & Grants

Biology

Biology sophomore and Presidential Scholar **Amanda Mortensen** is one of four USU students named as a Governor’s Scholar. This new award was created by Governor Jon Huntsman, Jr., who wants to recognize and encourage the “best and brightest” of Utah’s college students. Amanda also has a University Undergraduate Research Fellowship and has been conducting her research in **Butch Brodie**’s lab for the past year. She is interested in evolutionary biology and plans on getting a PhD so that she can teach and do research at a university.

Joshua Der, PhD student in **Paul Wolf**’s lab, received the 2005 Outstanding Master’s Thesis Award from the Alumni Association at Southern Illinois University at Carbondale. His thesis was titled “Molecular Phylogenetics and Classification of Santalaceae.” His research focused on the evolutionary relationships within the sandalwood family, using DNA sequence data from three genes to infer phylogenetic relationships and proposing a revised classification based on this phylogeny. Joshua participated in a university-wide competition at SIUC; his thesis has also been nominated in the Midwestern Association of Graduate Schools’ Distinguished Thesis Award competition.

Chemistry & Biochemistry

Ravi Rai received a School of Graduate Studies travel grant to attend the 230th ACS National Meeting, 28 August 2005 to 1 September 2005, Washington, DC.

Jinhua Wang and **Ravi Rai** were granted School of Graduate Studies Dissertation Fellowships for 2005.

Physics and The Center for Atmospheric & Space Sciences

Jerilyn Brunson was awarded a Rocky Mountain Space Grant Consortium Graduate Fellowship to work with **JR Dennison** for the 2005-2006 academic year.

JR Dennison and four undergraduate students presented the results of their senior research projects at the Utah State University Student Showcase, Logan, Utah, 12 April 2005:

Jonathon Abbott. “Methods for Determining Crossover Energies in Insulating Materials.”

Amanda Otterstrom. “Sky Drop: A Physics-based Activity for USU Physics Day at Lagoon.”

Jared Otterstrom. “Pulsed System for Optical Discharge of Thin-film Insulators.”

Student Publications

Biology

Karen H. Beard and **Eric M. O’Neill.** 2005. Infection of an Invasive Frog *Eleutherodactylus coqui* by the Chytrid Fungus *Batrachochytrium dendrobatidis* in Hawaii. *Biological Conservation* 126:591-595.

Mary Liz Jameson and **Katharine A. Swoboda.** 2005. Synopsis of Scarab Beetle Tribe Valgini (Coleoptera: Scarabaeidae: Cetoniinae) in the New World. *Annals of the Entomological Society of America* 98(5):658-671.

— FACULTY ACTIVITIES —

Awards & Recognition

Biology

Anne Anderson and **Charles Miller**’s research is featured in an article titled “A Taste for the Toxic” in the 2006 *Research Matters* published by USU’s Office of the Vice President for Research. The article discusses using their bioremediation research using bacteria to clean up toxic waste. Anderson and Miller collaborate on this research with **Ron Sims**, Department of Biological and Irrigation Engineering.

The research of **Tim Gilbertson** was featured in the 3 October 2005 *Utah State Today*, focusing on suppressing a person’s appetite by using nanoparticles that “fool receptors into thinking they have fat when they don’t.”

On 10 November 2005, Emeritus Associate Professor **Wilford Hanson** received a Heart and Hand Award at the Little America Hotel in Salt Lake City, along with nearly 100 other individuals throughout the State of Utah. The award was given for his tireless volunteer efforts and generous support of Biology’s USU Insect Collection. The presentation was made in celebration of Utah Philanthropy Day. The Utah Nonprofits Association and the Utah Society of Fund Raisers sponsored the luncheon event –attended by over 900 persons. Dr. Hanson (Ph.D. 1968 Kansas) was a faculty member and entomologist (since 1962) in the former Department of Zoology and then in Biology until his retirement in 1995.

Joseph K.-K. Li was featured in the 5 December 2005 issue of *Asia-Pacific Biotech* at <http://www.asiabiotech.com/readmore/vol09/0919/joseph.html>.

A response written by **Joseph K.-K. Li** to the *Science* article titled “A Glass Ceiling for Asian Scientists?” was published in the 16 December 2005 issue of *Science* at <http://www.sciencemag.org/cgi/content/full/310/5755/1767b>.

Chemistry & Biochemistry

Steve Scheiner has been appointed to the editorial boards of the *Journal of Molecular Structure*, *Theochem*, *Structural Chemistry* and the *International Journal of Quantum Chemistry*.

Computer Science

Hugo de Garis will assume a faculty position at Wuhan University in China the summer of 2006 heading up a new artificial intelligence group there.

Faculty Grants

Biology

Tim Gilbertson

International Flavors and Fragrances

1 October 2005 to 12 October 2007—\$238,362

“Fat Perception in Trigeminal Neurons –Textural Cues for Dietary Fat.”

Terry Griswold. National Park Service

31 January 2006 to 1 June 2008—\$49,980

“Fire Management Effects on Native Bee Diversity and Abundance in Relations to Endangered and Native Plant Conservation in Zion National Park.”

Chemistry & Biochemistry

Alexander I. Boldyrev

National Science Foundation

1 September to 30 November 2005—\$8,500

“Evolution of Chemical Bonding upon Fusion of Planar Aromatic Clusters into 2-D and 3-D Clusters and into 3-D Networks.” (A supplemental grant for research at Pacific Northwest National Laboratory, Richland, Washington).

Tom Chang

Fight SMA

1 July 2005 to 30 June 2006—\$5,000

“Synthesis of Aminoglycoside Derivatives and Study of Their Efficiency in Stimulating SMN Protein Levels in SMA Contexts.”

Geology

John W. Shervais

National Science Foundation

1 September 2005 to 31 August 2006—\$71,571

“Collaborative Research: Geochemical Processes in Forearc Peridotites: Depletion, Enrichment, and Melt Reactions in the Mantle Wedge.”

John W. Shervais

International Continental Drilling Program

1 September 2005 to 31 August 2006—\$49,000

“Workshop Proposal: Intermediate Depth Drilling of the Snake River Plain: Tracking the Yellowstone Hotspot Through Space and Time.”

Physics and The Center for Atmospheric & Space Sciences

JR Dennison

Subcontract for NASA Grant by Jet Propulsion Laboratory

June 2005 to January 2006—\$50,000

(Original NASA grant, “Solar Sail Propulsion Testing”)

Physics subcontract grant, “Electron Emission Testing of Solar Sail Nanocomposite Materials.”

JR Dennison

[**Jim Dyer (PI)**, **JR Dennison**, **Lee Pearson**, **Lee Davis**, **James Burns**, **Scott Hyde**, **Tina Andrus**, **Andrew Auman**, **Jeff Duce**, **Tim Nielson**, and **Rob Leishman**]

USU Space Dynamics Laboratory Enabling Technologies Program Grant
July 2005 to June 2006—\$39,500

“Development Support and Pre-Flight Analysis for SUSpECS (State of Utah Environment and Contamination Study).”

Presentations and Related Professional Activities

Biology

Anne J. Anderson gave a talk titled “Sustainable Agriculture: The Role of Induced Systemic Resistance Mechanisms” at the Sustainable Agriculture: How to Maximize Plant Yields Symposium, the University of Piracicaba, Piracicaba, Brazil, 7 October 2005.

Mary Barkworth attended a conference on “New Roots for the 21st Century,” Chambersburg, Pennsylvania, 19-23 September 2005. The US National Arboretum and the US Fish and Wildlife Service, bringing together 60 Russian and USU botanists to discuss goals for collaborative work during the next ten years, sponsored the conference. Dr. Barkworth prepared a summary on Public Education and Outreach for the meeting.

S. K. Morgan Ernest gave a seminar titled “A Zero-sum Approach to Community Ecology? A Long-term Desert Rodent Perspective” to the Ecology, Evolutionary Biology, and Behavior Program at Michigan State University, East Lansing, Michigan, 28 September 2005.

Timothy A. Gilbertson presented a keynote lecture titled “Mechanisms Underlying the Chemoreception of Fat and their Modulation by Diet” at the 3rd International Symposium on Molecular and Neural Mechanisms of Taste and Olfactory Perception, Kyushu University, Fukuoka, Japan, 4-5 November 2005. Co-authors on the presentation were **Arian F. Baquero** and **Dane R. Hansen**.

Joseph K.-K. Li gave three invited seminars titled “Oncolytic BTV to Treat Human Cancers,” “Bluetongue Virulomics: Kinetic Analysis of BTV mRNAs, Functional Characterization of Non-structural Proteins, and Anti-BTV Drug Discovery,” and “Recent Advances in Viral Integrated Biosystems” at the Wuhan Institute of Virology, Chinese Academy of Sciences (as Honorary Professor), Life Science Division, Wuhan University; and the Institute of Virology and Cancer, School of Medicine, Wuhan University, Wuhan, People’s Republic of China, 17-19 October 2005.

Joseph K.-K. Li gave an invited keynote presentation on “Recent Advances in Viral Genomes and Virolomics” at the Annual Conference of the American Society of Human Genetics, Salt Lake City, Utah, 24-28 October 2005.

Katarina Stroffekova gave a seminar titled “Skeletal Muscle DHPR: Organization, Function, and Modulation” to the Department of Biology and INBRE group, Idaho State University, Pocatello, Idaho, 4 November 2005.

Kristal M. Watrous and **James H. Cane** presented a poster titled “Pollination Biology of the Threadstem Milkvech, *Astragalus filipes*” at the Inland Northwest Restoration Conference, Pullman, Washington, 28 October 2005.

Paul G. Wolf gave a seminar titled “RNA Editing in Plants” at Idaho State University, Pocatello, Idaho, 29 September 2005:

The following papers were given at the International Symposium on Biological Control of Aphids and Coccids, Tsuruoka, Japan, 23-30 September 2005. (At the conference, **Yukie Kajita** served on the Local Assistance Committee and **Edward W. Evans** joined a Japanese colleague in organizing and moderating the symposium session on conservation and promotion of natural enemies):

Edward W. Evans. "Habitat Displacement of Native Natural Enemies by an Introduced Ladybird: Diet as the Basis for Invasion?"

Yukie Kajita, H. Yasuda, and Edward W. Evans. "Effect of the Key Predatory Ladybird, *Harmonia axyridis* (Coleoptera, Coccinellidae) on Larval Performance of Aphidophagous Insects."

The following presentations were made at the International Symposium of Advanced Virology, Beijing, People's Republic of China, 10-13 October 2005:

Joseph K.-K. Li. Invited keynote address. "Bluetongue Viruses as Virotherapy for Human Cancers."

Joseph K.-K. Li, Garry T. Miller, Maggie K. Buccambuso, Ryan Jackson, Dale L. Barnard, and Robert W. Sidwell. (Poster). "Use of a Highly Sensitive Quantitative RT-PCR Assay for the Analytical Evaluation of the Effectiveness of Six Antiviral Agents Against Pichinde Virus That Causes Hemorrhagic Fever in Animals."

The following presentations were given at the 2005 Annual Meeting of Entomological Society of America, Ft. Lauderdale, Florida, 14-18 December 2005:

James Pitts, Erik Pilgrim, and Carol D. von Dohlen. (Poster). "The Brady (nobaenidae) Bunch: A Valid Taxon or a Grab Bag of Misfits."

Teresa L. Pitts-Singer and Rosalind R. James. "Alfalfa Leafcutting Bee Emergence Success and Sex Ratio in Commercial Populations."

Chemistry & Biochemistry

Lisa M. Berreau presented an invited talk titled "Coordination Chemistry of Mononuclear Ni(II) Complexes of Relevance to Acireductone Dioxygenase" at the 2005 International Chemical Congress of Pacific Basin Societies (Pacifichem 2005), Honolulu, Hawaii, 15-20 December 2005.

Alexander I. Boldyrev presented an invited talk titled, "Aromaticity and Antiaromaticity in Clusters" at the 230th American Chemical Society National Meeting, Washington DC, 28 August to 1 September 2005.

Alexander I. Boldyrev presented a seminar titled "Aromaticity and Antiaromaticity in Metal Systems," at Binghamton University, Binghamton, New York, 23 September 2005.

Alexander I. Boldyrev presented a seminar titled "Sigma-Aromaticity, π -Aromaticity and Multiple Aromaticity: Beyond Organic Chemistry" at University of Notre Dame, Notre Dame, Indiana, 7 October 2005.

Alexander I. Boldyrev presented a seminar titled "Structure of Clusters" at Pacific Northwest National Laboratory, Richland, Washington, 16 November 2005.

Alvan Hengge presented a talk titled "The Effect of Metal Ions on Phosphoryl Transfer Reactions," at the 8th Latin American Conference on Physical Organic Chemistry, Florianopolis, Brazil, 9-14 October 2005.

The following posters were presented at the 230th American Chemical Society National Meeting, Washington, DC, 28 August 2005 to 1 September 2005:

Ravi Rai and Cheng-Wei Tom Chang. "Design and Synthesis of Novel Pyranmycins with Activity Against Modifying Enzymes."

Ravi Rai and Cheng-Wei Tom Chang. "Reviving the Clinical Efficacy of Kanamycin-B: Design and Synthesis of Novel Kanamycin Analogs and Studies of Their Antibacterial Activity against Aminoglycoside Resistant Bacteria."

Computer Science

Nick Flann and Greg Podgorski presented a paper titled "Biological Development of Cell Patterns: Characterizing the Space of Cell Chemistry Genetic Regulatory Networks" at the Eighth European Conference on Artificial Life, Canterbury, United Kingdom, 5-9 September 2005.

Geology

The following abstracts, papers, and field trips were made at the 2005 Annual Meeting of the Geological Society of America, Salt Lake City, Utah, 16-19 October 2005:

Andy Brehm and Carol M. Dehler. "Reevaluation of the Neoproterozoic Jesse Ewing Canyon Formation, Eastern Uinta Mountain Group, Northeastern Utah."

Carlton Brett, Michael K. Desantis, Peter Allison, and W. David Liddell. "Sequence Stratigraphy and Lagerstätten in the Middle Cambrian, Great Basin, Utah."

Carol M. Dehler. (Field Trip). "Neoproterozoic Uinta Mountain Group of Northeastern Utah: Pre-Sturtian Geographic, Tectonic, and Biologic Evolution."

Carol M. Dehler, Paul K. Link, C. Mark Fanning, and Laura Degrey. "Mid-Neoproterozoic Strata of Northern Utah and Southern Idaho: Dating and Correlation of Uinta Mountain Group and Pocatello Formation."

Ben D. Dejong, Joel L. Pederson, and Tammy M. Rittenour. "Testing the Signature of Climate Change on Sedimentation and Geomorphology in Eastern Grand Canyons Tributaries."

Rebecca J. Dorsey, Amy Fluette, Kristin McDougall, Bernard Housen, and Susanne U. Janecke. "Terminal Miocene Arrival of Colorado River Sand in the Salton through Southern California: Implications for Initiation of the Lower Colorado River Drainage."

James P. Evans. "Faults and Fluid Flow in the Crust: Advances Yet to be Made."

C. Mark Fanning and Carol M. Dehler. "Constraining Depositional Ages for Neoproterozoic Siliciclastic Sequences Through Detrital Zircon Ages: A CA. 770 MA Maximum Age for the Lower Uinta Mountain Group."

Kevin Hadder and Joel L. Pederson. "Quaternary Stratigraphy and Geochronology Associated with the Green River in the Uinta Mountains: Incision in the Headwaters of the Colorado River."

Alan J. Hidy, Joel L. Pederson, W. Scott Cragun, and John Gosse. "Cosmogenic 10BE Exposure Dating of Colorado River Terraces at Lees Ferry, Arizona."

Susanne U. Janecke, Stefan Kirby, Victoria Landenheim, Alexander N. Steely, Rebecca J. Dorsey, Bernard Hausen, and Andrew Lutz. “High Geologic Slip Rates on the San Jacinto Fault Zone in the SW Salton through a Possible Near-Surface Slip Deficit in Sedimentary Basins.”

Susanne U. Janecke, Alexander N. Steely, Stephanie M. Carney, and Sean Long. “The Evolution of Fold—Prone Supradetachment Basins: Examples of Translation and Breakup from Montana and SE Idaho.”

Peter T. Kolesar, James P. Evans, Michael Gooseff, Thomas E. Lachmar, and Rob Payn. “A Tale of Two (Or More) Karsts, Bear River Range, Cache National Forest, Utah.”

W. David Liddell. “Spatial Competition in Marine Hard Substrate Communities: An Overview.”

Sean P. Long, Paul K. Link, Susanne U. Janecke, Michael E. Perkins, and C. Mark Fanning. “Multiple Phases of Tertiary Extension and Synextensional Deposition in an Evolving Superdetachment Basin, Malad Range, Southeast Idaho.”

Kelly J. Mitchell, Rob D. Mackley, and Joel L. Pederson. “Quantifying Bedrock Strength with Respect to Fluvial Erodibility Along the Colorado River: Comparing in Situ and Laboratory Methods.”

Jeffrey Munroe, Joel L. Pederson, Benjamin Laabs, and Eric Carson. (Field Trip). “From Cirques to Canyon Cutting: New Quaternary Research in the Uinta Mountains.”

Caroline Myer, Chris Merriman, Bonnie Pitblado, and Carol M. Dehler. “Petrographic and Geochemical Sourcing of Culturally Modified Quartzite in the Gunnison Basin, Colorado.”

Robert Q. Oaks, Jr., Susanne U. Janecke, Victoria Landenheim, and Joseph M. Kruger. “Insights into Geometry and Evolutions of Extensional Basins along the Wasatch Fault and East and West Cache Fault Zones, Utah and Idaho, USA.”

Joel L. Pederson. “The Last-Standing Hypothesis about the Path and Integration of the Late Miocene Colorado River Off the Colorado Plateau.”

Richard J. Phillips, Warren D. Sharp, Joel L. Pederson, and Janice L. Boettinger. “Uranium-Series Dating of Pedogenic Carbonate From the Provo Shoreline, Lake Bonneville, Utah, USA.”

Tammy M. Rittenour, Warren D. Sharp, Joel L. Pederson and Karl Karlstrom. “Luminescence Geochronology and Correlations of Terrace Deposits of Colorado River Tributaries within the Grand Canyon and Grand Wash through Northwestern Arizona.”

John W. Shervais, Dennis Geist, Scott Hughes, Michael J. Branney, Barry Hanan, Scott Vetter, Douglas Williams, and Alexander Prokopenko. (Abstract & Paper). “The Snake River Plain Scientific Drilling Project (SRP-SDP): Tracking the Yellowstone Hotspot through Space and Time.”

John W. Shervais, John Kauffman, Kurt Othberg, and Virginia Gillerman. (Field Trip). “Basaltic Volcanism of the Central and Western Snake River Plain and its Relation to the Yellowstone Plume.”

John W. Shervais, Scott K. Vetter, and Barry B. Hanan. (Abstract & Paper). “Basaltic Volcanism of The Snake River Plain and Its Relation to the Yellowstone Hotspot: An Overview.”

Alexander N. Steely, Susanne U. Janecke, Gary Axen, and Rebecca J. Dorsey. “Pleistocene (~1 MA) Transition from West Salton Detachment Faulting to Cross-Cutting Dextral Strike-Slip Faults in the SW Salton Trough.”

Alexander N. Steely, Susanne U. Janecke, Stephanie M. Carney, Sean Long, and Robert Q. Oaks Jr. (Field Trip). “Evolution of a Miocene-Pliocene Supradetachment Basin, Northeastern Great Basin.”

Scott Vetter, John W. Shervais, and Meghan Zarnetske. (Abstract & Paper). “Basaltic Volcanism in the Western Snake River Plain and Boise River Valley: Ferrobasalts, Flotation Cumulates, and the Change to K-Rich Ocean Island Basalts 750,000 Years Ago.”

Marilyn B. Vogel, J. Michael Moldowan, Linda L. Jahnke, David J. Marais, and Carol M. Dehler. “Biomarkers from the Neoproterozoic Red Pine Shale, Uinta Mountain Group, Utah.”

Peter Vrolijk, Zoe K. Shipton, Rod Myers, James P. Evans, and Mike Sweet. (Field Trip). “Anatomy of Reservoir-Scale Normal Faults in Central Utah: Stratigraphic Controls and Implications for Fault Zone Evolution and Fluid Flow.”

Isaac T. Westfield, W. David Liddell and Carlton Brett. “Middle Cambrian Microbial Communities along a Bathymetric Gradient.”

The following presentations were made at the American Geophysical Union Meeting, San Francisco, California, 5-9 December 2005:

D. Corey Barton, Kelly K. Bradbury, John Solum, and James P. Evans. (Poster). “Structural and Lithologic Characterization of the SAFOD Pilot Hole and Phase One Main Hole.”

Sarah D. Draper, Naomi Boness, and James P. Evans. “Source and Significance of the Sedimentary Rocks in the SAFOD Borehole: Preliminary Analysis.”

James P. Evans, Diane Moore, David L. Kirschner, and John Solum. (Poster). “Lithologic Characterization of the Deep Portion of the SAFOD Drillhole.”

David L. Kirschner, James P. Evans, Judith Chester, Fred Chester, John Solum, and Diane Moore. (Poster). “Elemental and Stable Isotope Chemistry of Cuttings and Core Samples From SAFOD Drill Hole.”

Mathematics & Statistics

LeRoy B. Beasley presented a colloquium titled “Primitive and 2- Primitive Matrices” at Moscow State University (Lomonosov University), Moscow, Russia, 8 November 2005.

LeRoy B. Beasley presented a plenary talk titled “Cycle Extendibility” at a Computer Algebra and Informatics Conference at the 30th Anniversary of the Center for Computing Conference, Moscow State University (Lomonosov University), Moscow, Russia, 10 November 2005.

Zhi-Qiang Wang gave a plenary lecture titled “Invariant Sets, Minimax Methods, and Applications to Nodal Solutions of Nonlinear Elliptic PDEs” at the International Symposium on Variational Methods and Nonlinear Differential Equations, Rome, Italy, 10-14 January 2005 and a talk with this same title at the Chinese University of Hong Kong, Shatin, Hong Kong, 24 January 2005.

Zhi-Qiang Wang gave a presentation titled “Weighted Hardy-Sobolev Inequalities” at the following places: the University of Minnesota, Minneapolis, Minnesota, 1 December 2004; the University of Hong Kong, Shatin, Hong Kong, 7 March 2005; the University of Köln, Köln Germany, 13 June 2005; the Oberwolfach Mathematical Institute, Oberwolfach, Germany, 27 June - 2 July 2005; the University of Giessen, Giessen, Germany, 8 July 2005; the Morningside Center of Mathematics, Beijing, China, 25 July 2005; the Jilin University, Changchun, China, 31 July 2005.

Zhi-Qiang Wang gave an invited talk titled “Hardy Inequalities with Remainder Terms,” at the University of Germany, Mainz, Germany, 16-19 June 2005.

Zhi-Qiang Wang gave a seminar titled “Standing Waves of a Critical Frequency for Nonlinear Schrodinger Equations” at Peking University, Beijing, China, 4 August 2005, and the Chinese Academy of Sciences, Beijing, China, 18 August 2005.

Physics and The Center for Atmospheric & Space Sciences

Jerilyn Brunson and **JR Dennison** presented a paper titled “Comparison of Methods for Resistivity Measurements of Insulators,” at the 10th Rocky Mountain NASA Space Grant Consortium Symposium, Salt Lake City, Utah, 9 May 2005.

JR Dennison, Jerilyn Brunson, Ryan Hoffman, Jonathon Abbott, Clint Thomson and **Alec Sim** presented a paper titled “Measurements of Electrical and Electron Emission Properties of Highly Insulating Materials,” at the Air Force Office of Scientific Research Workshop On Multifunctional Materials, Keystone III Workshop 2005, Keystone, Colorado, 21–26 August 2005.

Jeff Duce, Joshua Hodge, Jacob Geddes, Andrew Auman, Sarah Barton, JR Dennison, Clint Thomson, Lee Pearson, Lee Davis, Jim W. Burns, R. Scott. Hyde, and **James Dyer** presented a paper titled “SUSpECS-State of Utah Space Environment & Contamination Study-MISSE-6” at the Inland Northwest Space Alliance-Space Policy Institute 2005, Big Sky, Montana, 21 August 2005.

Mark Riffe chaired the Saturday afternoon Session on Condensed Matter Physics and was handed the gavel as rising Chair of the APS Four Corners Section at the Executive Committee Meeting at the University of Colorado, Boulder, Colorado, 14-15 October 2005. (The USU Physics Department will host the next Four Corners Regional Meeting scheduled for 6-7 October 2006).

Robert W. Schunk presented a paper titled “A Data Assimilation Model of the Ionosphere” at the American Meteorological Society Meeting, Atlanta, Georgia, 29 January-2 February 2006.

T.-C. Shen presented a seminar titled “An Epitaxial Approach to Nanoscale Electronics in Silicon” at the Coordinated Science Laboratory, University of Illinois, Urbana-Champaign, Illinois, 1 November 2005.

The following papers were presented at and published in the *Proceedings of the 9th Spacecraft Charging Technology Conference*, Epochal, Tsukuba, Japan 4-8 April 2005:

Sébastien Clerc and **JR Dennison**, “Importance of Accurate Computation of Secondary Electron Emission for Modeling Spacecraft Charging.”

JR Dennison, Lee Pearson, Lee Davis, Jim W. Burns, R. Scott. Hyde, James S. Dyer, Tina Andrus, Andrew Auman, Jeff Duce, Tim Neilsen, and **Rob Leishman**. “State of Utah Space Environment & Contamination Study (SUSpECS) MISSE-6 Payload to Investigate Their Effects on Electron Emission and Resistivity of Spacecraft Materials.”

JR Dennison, Prasanna Swaminathan, Randy Jost, Jerilyn Brunson, Nelson Green and **A. Robb Frederickson**. “Proposed Modifications to Engineering Design Guidelines Related to Resistivity Measurements and Spacecraft Charging.”

Nelson W. Green, A. Robb Frederickson and **JR Dennison**. “Charge Storage Measurements of Resistivity for Dielectric Samples from the CRRES Internal Discharge Monitor.”

Alec Sim, JR Dennison and **Clint Thomson**. “Evolution of the Electron Yield Curves of Insulators as a Function of Impinging Electron Fluence and Energy.”

The following presentations were given at the American Physical Society Four Corners Regional Meeting, the University of Colorado, Boulder, Colorado, 14-15 October 2005:

Jonathan Abbott, Ryan C. Hoffman, JR Dennison and **Sarah Barton**. “Comparison of Methods for Determining Crossover Energies in Insulators.”

Michael Addae-Kagyah and **Eric D. Held**. “Simulation of Plasma Wave Damping using Two Physical Models of the Ion Stress Tensor.”

Jerilyn Brunson and **JR Dennison**. “Measuring Resistivity of Extreme Insulators.”

Kathryn DuHadway and **David Peak**. “Nano-computation in Noisy and Imperfect Cellular Networks.”

Robert T. Franckowiak, Neal D. Shinn, Bongsoo Kim, K. J. Kim, T. H. Kang, and **D. Mark Riffe**. “Surface Core-level Shifts of W (110) and W (320) with Increasing Coverages of Ni.”

Ryan C. Hoffman, Jonathon Abbot, JR Dennison, and **Sarah Barton**. “The Effects of Electron Dose on Electron Emission and Charging in Insulators.”

John W. James and **Eric D. Held**. “Temperature Evolution in Fusion Plasmas.”

Kripa Nidhan and **D. Mark Riffe**. “Real Time Measurement of Semiconductor Dielectric Functions using Femtosecond Ellipsometry.”

Stephen Robinson and **T.-C. Shen**. “A Low-temperature Transport Study of Ga-implanted Wires in Si.”

Mukta Sharma, D. Mark Riffe, Neal D. Shinn, Bongsoo Kim, K. J. Kim, and T. H. Kang. “Epitaxial Growth of Au on W (110): Analysis of Core Level Shifts and Line Shapes.”

Andy Spencer and James Wheeler. “Biconformal Yang-Mills Gravity.”

The following presentations were made at the American Geophysical Meeting, San Francisco, California, 5-9 December 2005:

Hamed Bekerat, Robert W. Schunk, and Ludger Scherliess. (Poster). “Estimation of the High-Latitude Topside Heat Flux Using DMSP In Situ Plasma Densities.”

Steven A. Cummer, Nicolas C. Jaugey, Walter A. Lyons, Thomas E. Nelson, Elizabeth A. Gerken, Michael J. Taylor, Dominique Pautet, and Matthew Bailey. “Submillisecond Video and Electromagnetic Observations of Sprite Development and Structure.”

Michael David, Jan J. Sojka, and Robert W. Schunk. (Poster). “The Longitudinal Dependence of the Mid-Latitude Ionospheric Effect of Large Geomagnetic Storms.”

Howard G. Demars and Robert W. Schunk. (Poster). “Thermospheric Response to Ion Heating in the Dayside Cusp.”

Vince Eccles, Hein Vo, Sixto Gonzalez, Tim Fuller-Rowell, and Jan J. Sojka. “Ionospheric Model Assessment Using the Arecibo Ionospheric Database.”

Bela G. Fejer and Takashi Kikuchi. “Low Latitude Ionospheric Electric Fields during Large Magnetic Storms.”

Larry C. Gardner and Robert W. Schunk. “Three-Dimensional Simulation of High-Latitude Ionospheric Neutral and Ion Outflows during Magnetic Storm Conditions, and Northward Turnings of the Interplanetary Magnetic Field.”

Agnieszka Jach, Piotr Kokoszka, Lie Zhu, and Jan J. Sojka. (Poster). “Can Wavelet Analysis Provide an Automated Technique to Create the Dst Index?”

Geonhwa Jee, Wenbin Wang, Alan G. Burns, Stanley Solomon, Robert W. Schunk, Ludger Scherliess, Donald C. Thompson, and Jan J. Sojka. (Poster). “Initializing the TING Model with the GAIM Electron Densities During a Geomagnetic Storm.”

Inga Maslova, Piotr Kokoszka, Lie Zhu, and Jan J. Sojka. (Poster). “Probability Distributions of Wavelet Coefficients of the Ground-Based Magnetometer Data for Storm and Quiet Times.”

Kim Nielsen, Michael J. Taylor, Poul F. Jensen, Richard L. Collins, Li Guo Su, Brentha Thurairajah, Jason G. McDonald, and J. Zachary Marlow. (Poster). “Coordinated Imaging and Lidar Measurements of Noctilucent Cloud Dynamics Over Poker Flat, Alaska, August 2005.”

Cesar Noguera, Jan J. Sojka, Donald C. Thompson, and Robert W. Schunk. (Poster). “Ionospheric Indices Based on GPS TEC.”

Fernanda Sao Sabbas, David C. Fritts, Michael J. Taylor, Jennifer Haase, Steven A. Cummer, Hisao Takahashi, Eurico de Paula, Inez S. Batista, Mangalathayil A. Abdu, Paulo P. Batista, Osmar Pinto Jr., Bela G. Fejer, Dominique Pautet, Sharon Vadas, Delano Gobbi, Jose H. Sobral, Amauri F. Medeiros, Marcelo M. Saba, Ricardo A. Costa, Eric Calais, Thomas Dautermann, Joao Leandro Ferreira, and Marcos R. Michels. “DEELUMINOS: Electromagnetic Energy Deposition in the Upper Atmosphere Signaled by Sprites and Other Transient Luminous Events.”

Ludger Scherliess, Robert W. Schunk, Jan J. Sojka, Donald C. Thompson, Lie Zhu, Patrick Dandenault, Scott A. Budzien, and Stefan E. Thonnard. (Poster). “Comparison of Nighttime UV Radiances Obtained From the USU GAIM Data Assimilation Model with Limb Scan Observations From the LORAAS and SSULI Instruments.”

Robert W. Schunk. “Mesoscale Ionosphere-Thermosphere Structures and Consequences for the Magnetosphere.”

Robert W. Schunk, Ludger Scherliess, Jan J. Sojka, Donald C. Thompson, and Lie Zhu. “Aeronomy: Challenges of Data Assimilation.”

Jan J. Sojka and Rod Heelis. (Poster). “Mid-Latitude Thermosphere-Ionosphere Storm Response: An Aeronomy Frontier.”

Michael Taylor, Dominique Pautet, Matthew Bailey, Walter A. Lyons, Thomas E. Nelson, Steve Cummer, Nicholas Jaugey, and Elizabeth Gerken. “Infrared Imaging of Transient Luminous Events (1 -1.5 micron) Over the Mid-Western US and comparison with Their Visible Wavelength Signatures.”

Hein Vo, Sixto Gonzalez, Michael Sulzer, Nestor Aponte, Vince Eccles, and Jan J. Sojka. (Poster). “Ionospheric D and E Region Plasma Density Enhancements Caused by X17-class Solar Flare on September 7, 2005 — An Arecibo Perspective.”

Hein Vo, Sixto Gonzalez, Michael Sulzer, Nestor Aponte, Vince Eccles, and Jan J. Sojka. (Poster). “Large Solar Flare and the Ionospheric D and E Region Enhancement - An Arecibo Perspective.”

Jeremy R. Winick, Peter P. Wintersteiner, Richard H. Picard, Michael J. Taylor, Dorin Baker, M. G. Mylnczak, James M. Russell, and Larry L. Gordley. (Poster). “Global Statistics of OH Layer Heights and Double Layers From SABER Limb Measurements of OH Meinel Emission at 1.6 and 2.0 μm .”

Lie Zhu, Robert W. Schunk, and Jan J. Sojka. “Active Roles of the Ionosphere in the Electrodynamical M-I Coupling.”

Faculty Publications

Biology

Diane G. Alston, Drauzio E.N. Rangel, Lawrence A. Lacy, Hernani G. Golez, Jeong Jun Kim, and Donald W. Roberts. 2005. Evaluation of Novel Fungal and Nematode Isolates for Control of *Conotrachelus nenuphar* (Coleoptera: Curculionidae) Larvae. *Biological Control* 35(2):163-171.

Thomas N. Buckley. 2005. Tansley Review: The Control of Stomata by Water Balance. *New Phytologist* 168:275-292.

Thomas N. Buckley and David W. Roberts. 2005. DESPOT: A Process-based Tree Growth Model that Allocates Carbon to Maximize Carbon Gain. *Tree Physiology* 26:129-144.

Thomas N. Buckley and David W. Roberts. 2005. How Should Leaf Area, Sapwood Area and Stomatal Conductance Vary with Tree Height to Maximize Growth? *Tree Physiology* 26:145-157.

James H. Cane. 2005. Bees, Pollination, and the Challenges of Sprawl. *Nature in Fragments: The Legacy of Sprawl*, p. 109-124.

James H. Cane. 2005. Pollination Promise of the Bee *Osmia aglaia* for Cultivated Raspberries and Blackberries (Rubus: Rosaceae). *HortScience* 40:1705-1708.

James H. Cane and Sedonia Sipes. 2006. Floral Specialization by Bees: Analytical Methods and a Revised Lexicon for Oligolecty. *Specialization and Generalization in Plant-Pollinator Interactions*, p. 99-122.

Timothy A. Gilbertson, Lidong Liu, Insook Kim, Catherine A. Burks, and Dane R. Hansen. 2005. Fatty Acid Responses in Taste Cells from Obesity-prone and Obesity-resistant Rats. *Physiology & Behavior* 86:681-690.

Inge Grgurina, Mekki Bensaci, Gabriella Pocsfalvi, Luisa Mannina, Oscar Cruciani, Alberto Fiore, Vincenzo Fogliano, Kevin N. Sorensen, and Jon Y. Takemoto. 2005. Novel Cyclic Lipopeptide from *Pseudomonas syringae* pv. Lachrymans Strain 508 and Syringopeptin Antimicrobial Activities. *Antimicrobial Agents and Chemotherapy* 49:5037-5045.

Rosalind R. James and Jeffery S. Skinner. 2005. Diagnostic Methods for *Ascosphaera* Infections in Bees. *Journal of Invertebrate Pathology* 90:98-103.

Yuri A. Kaulin, Jon Y. Takemoto, Ludmilla V. Schagina, Olga S. Ostroumova, Rungrach Wangspa, John H. Teeter, and Joseph G. Brand. 2005. Sphingolipids Influence the Sensitivity of Lipid Bilayers to Fungicide Syringomycin E. *Journal of Bioenergetics and Biomembranes* 37:339-348.

Karen R. Lips, Patricia A. Burrowes, Joseph R. Mendelson III, and Gabriela Parra-Olea. 2005. Amphibian Declines in Latin America: A Synthesis. *Biotropica* 37:222-226.

Karen R. Lips, Patricia A. Burrowes, Joseph R. Mendelson III, and Gabriela Parra-Olea. 2005. Amphibian Declines in Latin America: Widespread Population Declines, Extinctions and Impacts. *Biotropica* 37:163-165.

Lidong Liu, Dane R. Hansen, Insook Kim, and Timothy A. Gilbertson. 2005. Expression and Characterization of Delayed Rectifying K⁺ Channels in Anterior Rat Taste Buds. *American Journal of Physiology* 289:C868-C880.

G. Bhat Meenakshi, Raymond M. Jordt, M. Amin Khan, Christine E. Foley, and Timothy A. Gilbertson. 2005. Validation of a Rat Behavioral Avoidance Model from a Drug Delivery Perspective. *International Journal of Pharmaceutics* 303:31-36.

Joseph R. Mendelson III. 2005. Species Account: Coastal-plain Toad (*Bufo nebulifer*). *Status and Conservation of US Amphibians*, p. 424-427.

Joseph R. Mendelson III. 2005. Species Account: Gulf-Coast Toad (*Bufo valliceps*). *Status and Conservation of US Amphibians*, page 438.

Joseph R. Mendelson III, Edmund D. Brodie, Jr., John M. Malone, Manuel E. Acevedo, Michelle Baker, Neal J. Smatresk, and Jonathan A. Campbell. 2004. (Published in 2005). Investigation of Factors Associated with Catastrophic Decline of a Cloudforest Frog Fauna in Guatemala. *Revista Biologia Tropical* 52:991-1000.

Joseph R. Mendelson III, Becky L. Williams, Christopher A. Sheil, and Daniel G. Mulcahy. 2005. Systematics of the *Bufo coccifer* Complex (Anura: Bufonidae) of Mesoamerica. *Scientific Papers, Natural History Museum, University of Kansas* 38:1-27.

Mark P. Miller. 2005. Alleles in Space: Computer Software for the Joint Analysis of Interindividual Spatial and Genetic Information. *Journal of Heredity* 96:722-724.

Mark P. Miller, M. Renee Bellinger, Eric R. Forsman, and Susan M. Haig. 2006. Effects of Historical Climate Change, Habitat Connectivity, and Vicariance on Genetic Structure and Diversity across the Range of the Red Tree Vole (*Phenacomys longicaudus*) in the Pacific Northwestern United States. *Molecular Ecology* 15:145-159.

Olga S. Ostroumova, Valerie V. Malev, Yuri A. Kaulin, Philip A. Gurnew, Jon Y. Takemoto, and Ludmilla V. Schagina. 2005. Voltage-dependent Synchronization of Gating of Syringomycin E Ion Channels. *FEBS Letters* 579:5676-5679.

Teresa L. Pitts-Singer and Rosalind R. James. 2005. Emergence Success and Sex Ratio of Commercial Alfalfa Leafcutting Bees, *Megachile rotundata* Say, from the United States and Canada. *Journal of Economic Entomology* 98(6):1785-1790.

Drauzio E. N. Rangel, Gilberto U. L. Braga, Anne J. Anderson, and Donald W. Roberts. 2005. Influence of Growth Environment on Tolerance to UV-B Radiation, Germination Speed, and Morphology of *Metarhizium anisopliae* var. *acridum* Conidia. *Journal of Invertebrate Pathology* 90(1):55-58.

Donal G. Sinex, Hongzhe Li, and David Velenovsky. 2005. Prevalence of Stereotypical Responses to Mistuned Complex Tones in the Inferior Colliculus. *Journal of Neurophysiology* 94:3523-3537.

Vijendra K. Singh. 2005. Autoimmunity in Brain Disorders and Mental Illnesses. *Tics and Tourettes: Breakthrough Discoveries in Natural Treatment*, p. 163-169.

Vijendra K. Singh and Jeff Hanson. 2005. Assessment of Metallothionein and Antibodies to Metallothionein in Normal and Autistic Children Having Exposure to Vaccine-derived Thimerosal. *Pediatric Allergy & Immunology* 16:670-675.

Ethan P. White and James H. Brown. 2005. The Template: Patterns and Processes of Spatial Variation. *Ecosystem Function in Heterogeneous Landscapes*, p. 31-47.

Chemistry & Biochemistry

Anastassia N. Alexandrova and Alexander I. Boldyrev. 2005. Search for the $\text{Li}_n^{0/+1/-1}$ ($n=5-7$) Lowest-Energy Structures Using the Ab Initio Gradient Embedded Genetic Algorithm (GEGA). Elucidation of the Chemical Bonding in Lithium Clusters. *Journal of Chemical Theory and Computation* 1:566-580.

Anastassia N. Alexandrova, Alexander I. Boldyrev, Hua-Jin Zhai, and Lai-Sheng Wang. 2005. Cu_3C_4^- : A New Sandwich Molecule with Two Revolving C_2^{2-} Units. *Journal of Physical Chemistry A* 109:562-570.

Anastassia N. Alexandrova, Alexander I. Boldyrev, Hua-Jin Zhai, and Lai-Sheng Wang. 2005. Photoelectron Spectroscopy and Ab Initio Study of the Doubly Antiaromatic B_6^{2-} Dianion in the LiB_6^- Cluster. *Journal of Chemical Physics* 122: 054313-1-054313-8.

Lisa M. Berreau, Jinyuan Chen, and L. Keith Woo. 2005. Imidomolybdenum(IV) Porphyrin Complexes: Synthesis, Characterization, and Intermetal Imido Transfer Reactivity. *Inorganic Chemistry* 44:7304-7306.

Lisa M. Berreau, Amrita Saha, and Atta M. Arif. 2006. Thioester Hydrolysis Reactivity of Zinc Hydroxide Complexes: Investigating Reactivity Relevant to Glyoxalase II Enzymes. *Dalton Transactions* 1:183-192.

Alexander I. Boldyrev and Lai-Sheng Wang. 2005. All-Metal Aromaticity and Antiaromaticity (Review). *Chemical Reviews* 105:3716-3757.

Ben M. Elliott and Alexander I. Boldyrev. 2005. The Oxygen-Rich Carboxide Series: CO_n ($n=3,4,5,6,7$, or 8). *Journal of Physical Chemistry A* 109:3722-3727.

Ben M. Elliott and Alexander I. Boldyrev. 2005. Ab Initio Probing of the Aromatic Oxygen Cluster O_4^{2+} . *Journal of Physical Chemistry A* 109:236-239.

Alvan C. Hengge. 2005. Mechanistic Studies on Enzyme-Catalyzed Phosphoryl Transfer. *Advances in Physical Organic Chemistry* 40:49-108.

Alvan C. Hengge. 2005. Secondary Isotope Effects. *Isotope Effects in Chemistry and Biology* 39:955-974.

Yehia Ibrahim, Michael Meot-Ner, Edreese H. Alshraeh, M. Samy El-Shall, and Steve Scheiner. 2005. Stepwise Hydration of Ionized Aromatics. Energies and Structures of the Hydrated Benzene Cation, and the Mechanism of Deprotonation Reactions. *Journal of the American Chemical Society* 127:7053-7064.

Stephen T. Lee, Russell J. Molyneux, Kip E. Panter, Cheng-Wei Tom Chang, Dale R. Gardner, James A. Pfister, and Massoud Garrossian. 2005. Ammodendrine and N-Methylammodendrine Enantiomers: Isolation, Optical Rotation, and Toxicity. *Journal of Natural Products* 68:681-685.

Jie Li, Hsiao-Nung Chen, Huiwen Chang, Jinhua Wang, and Cheng-Wei Tom Chang. 2005. Tuning the Regioselectivity of Staudinger Reaction for the Facile Synthesis of Kanamycin and Neomycin Class Antibiotics with N-1 Modification. *Organic Letters* 7:3061-3064.

Meng-Sheng Liao, John D. Watts, Ming-Ju Huang, Sergiu M. Gorun, Tapas Kar, and Steve Scheiner. 2005. Effects of Peripheral Substituents

on the Electronic Structure and Properties of Unligated and Ligated Metal Phthalocyanines, Metal = Fe, Co, Zn. *Journal of Chemical Theory Computations* 1:1201-1210.

Ravi Rai, Huiwen Chang, Hsiao-Nung Chen, and Cheng-Wei Tom Chang. 2005. Novel Method for the Synthesis of 3',4'-Dideoxygenated Pyranmycin and Kanamycin Compounds, and Studies of Their Antibacterial Activity against Aminoglycoside Resistant Bacteria. *Journal of Carbohydrate Chemistry* 24:131-143.

Ravi Rai, Ian McAlexander, and Cheng-Wei Tom Chang. 2005. Synthetic Glycodiversification: from Aminosugars to Aminoglycoside Antibiotics. *Organic Preparations and Procedures International* 37:337-375.

Jamie Purcell and Alvan C. Hengge. 2005. The Thermodynamics of Phosphate versus Phosphorothioate Ester Hydrolysis. *Journal of Organic Chemistry* 70 (21):8437-8442.

Katarzyna Rudzka, Atta M. Arif, and Lisa M. Berreau. 2005. Chemistry of a Ni(II) Acetohydroxamic Acid Complex: Formation, Reactivity with Water, and Attempted Preparation of Zinc and Cobalt Analogs. *Inorganic Chemistry* 44:7234-7242.

Steve Scheiner. 2005. The CH—O Hydrogen Bond. A Historical Account. *Theory and Applications of Computational Chemistry: The First 40 Years*, pp. 831-857.

Steve Scheiner. 2005. Relative Strengths of NH..O and CH..O Hydrogen Bonds between Polypeptide Chain Segments. *Journal of Physical Chemistry B* 109:16132-16141.

Steve Scheiner and Tapas Kar. 2005. Effect of Solvent upon CH..O Hydrogen Bonds with Implications for Protein Folding. *Journal of Physical Chemistry B* 109:3681-3689.

Mohammad Solimannejad and Steve Scheiner. 2005. Theoretical Investigation of the Dihydrogen Bond Linking MH_2 with HCCRgF ($\text{M}=\text{Zn},\text{Cd}$; $\text{Rg}=\text{Ar},\text{Kr}$). *Journal of Physical Chemistry A* 109:11933-11935.

Mohammad Solimannejad and Steve Scheiner. 2005. Theoretical Investigation of the Weakly Dihydrogen Bonded Complexes FArCCH..HBeX ($\text{X} = \text{H}, \text{F}, \text{Cl}, \text{Br}$). *Journal of Physical Chemistry A (Letter)* 109:6137-6139.

Kerensa Sorensen-Stowell and Alvan C. Hengge. 2005. Probing Potential Medium Effects on Phosphate Ester Bonds Using ^{18}O Isotope Shifts on ^{31}P NMR. *Journal of Organic Chemistry* 70 (21):8303-8308.

Ewa Szajna, Atta M. Arif, and Lisa M. Berreau. 2005. Aliphatic Carbon-Carbon Bond Cleavage Reactivity of a Mononuclear Ni(II) Cis-b-Keto Enolate Complex in the Presence of Base and O_2 : A Model Reaction for Acireductone Dioxygenase. *Journal of the American Chemical Society* 127:17186-17187.

Jinhua Wang, Jie Li, Hsiao-Nung Chen, Huiwen Chang, Christabel T. Tanifum, Hsiu-Hsiang Liu, Greg P. Czyryca, and Cheng-Wei T. Chang. Glycodiversification for Optimization of the Kanamycin Class Aminoglycosides. *Journal of Medicinal Chemistry* 48:6271-6285.

Dmitry Yu. Zubarev and Alexander I. Boldyrev. 2005. Appraisal of the Performance of Nonhybrid Density Functional Methods in Characterization of the Al_4C Molecule. *Journal of Chemical Physics* 122:144322-1-144322-7.

Geology

John W. Shervais, John D. Kauffman, Virginia S. Gillerman, Kurt L. Othberg, Scott K. Vetter, Vinita Ruth Hobson, Meghan Zarnetske, Matthew F. Cooke, Scott H. Matthews, and Barry B. Hanan. 2005. Basaltic Volcanism of the Central and Western Snake River Plain: A Guide to Field Relations Between Twin Falls and Mountain Home, Idaho; in **Joel L. Pederson and Carol M. Dehler**, *Guide to Field trips in the Western United States*, Field Guide volume 6, Geological Society of America, Boulder Colorado, 26 pages.

John W. Shervais, Peter Kolesar, and Kyle K. Andreassen. 2005. Field and Chemical Study of Serpentinization – Stonyford, California: Chemical Fluxes and Mass Balance. *International Geology Review* 47:1-23.

John W. Shervais, Benita Murchey, David L. Kimbrough, Paul Renne, and Barry B. Hanan. 2005. Radioisotopic and Biostratigraphic Age Relations in the Coast Range Ophiolite, Northern California: Implications for the Tectonic Evolution of the Western Cordillera. *Geological Society of America Bulletin* 117(5/6):633-653.

John W. Shervais, Marchell M. Zoglman-Schuman, and Barry B. Hanan. 2005. The Stonyford Volcanic Complex: A Forearc Seamount in the Northern California Coast Ranges. *Journal of Petrology* doi:10.1093/ptrology/egi048, 46(10):2091-2128.

Mathematics & Statistics

Antonio Ambrosetti and Zhi-Qiang Wang. 2005. Nonlinear Schrodinger Equations with Vanishing and Decaying Potentials. *Differential Integral Equations* 18:1321-1332.

T. Bartsch, M. Willem and Zhi-Qiang Wang. 2005. The Dirichlet Problem for Superlinear Elliptic Equations, Handbook of Differential Equations — Stationary Partial. *Differential Equations* 2:1-55.

LeRoy B. Beasley. 2005. Linear Preservers of Extremes of Rank Inequalities over Semirings. The Factor Rank. *Journal of Mathematical Sciences* 131:5919-5938.

Jaeyoung Byeon and Zhi-Qiang Wang. 2005. On the Henon Equation: Asymptotic Profile and Symmetry of Ground States II, *Journal of Differential Equations with Vanishing and Decaying Potentials* 216:78-108.

David Costa and Zhi-Qiang Wang. 2005. Multiplicity Results for a Class of Superlinear Elliptic Problems *Proceedings of the American Mathematical Society* 133:787-794.

Peg Howland, Jianlin Wang and Haesun Park. 2006. Solving the Small Sample Size Problem in Face Recognition Using Generalized Discriminant Analysis. *Pattern Recognition* 39:277-287.

Zhoali Liu, Francois Van Heerden and Zhi-Qiang Wang. 2005. Nodal Type Bound States of Schrodinger Equations Via Invariant Set and Minimax Methods. *Journal of Differential Equations* 214:358-390.

Zhoali Liu and Zhi-Qiang Wang. 2005. Multi-bump, Nodal Solutions having a Prescribed Number of Nodal Domains I. *Annales De l'Institut Henri Poincare- Analyse Non Lineaire* 22:597-608.

Zhoali Liu and Zhi-Qiang Wang. 2005. Multi-bump, Nodal Solutions having a Prescribed Number of Nodal Domains II. *Annales De l'Institut Henri Poincare- Analyse Non Lineaire* 22:609-631.

Zhaoli Liu and Zhi-Qiang Wang. 2005. On an Elliptic Equation on \mathbb{R}^N with Concave and Convex Nonlinearities. *Zeitschrift Angewandte Mathematik und Physik* 56:609-629.

Byung Soo Moon and Russell C. Thompson. 2006. A Solution of the Ornstein-Uhlenbeck Equation. *Journal of the Applied Mathematics and Computing* 20:445-454.

Xiaofeng Ren and Juncheng Wei. 2005. Wiggled Lamellar Solutions and their Stability in the Diblock Copolymer Problem. *SIAM Journal on Mathematical Analysis* 37:445-489.

Zhi-Qiang Wang. 2005. Minimax Methods, Invariant Sets, and Applications to Nodal Solutions of Nonlinear Elliptic Problems. Proceedings of EquaDiff 03. *Journal on Differential Equations*, p. 561-566.

Zhi-Qiang Wang and Jianxin Zhou. 2005. A Local Minimax-Newton's Method for Finding Critical Points with Symmetries *SIAM. Journal on Numerical Analysis* 42:1745-1759.

Physics and The Center for Atmospheric & Space Sciences

Imad A. Barghouthi and Abdallah R. Barakat. 2005. A Monte Carlo Study of the Generalized Coulomb Milne Problem. *Journal of Atmospheric and Solar-Terrestrial Physics* 67:1504-1518.

Jerilyn Brunson and JR Dennison. 2005. Comparison of Methods for Resistivity Measurements of Insulators. *Proceedings of the 10th Rocky Mountain NASA Space Grant Consortium NASA Fellowship Symposium*, 8 pp.

Christopher G. Smithro and Jan J. Sojka. 2005. Behavior of the Ionosphere and Thermosphere Subject to Extreme Solar Cycle Conditions. *Journal of Geophysical Research* 110:A08306, doi:10.1029/2004JA010782.

Christopher G. Smithro and Jan J. Sojka. 2005. A New Global Average Model of the Coupled Thermosphere and Ionosphere. *Journal of Geophysical Research* 110:A08305, doi:10.1029/2004JA010781.

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