



# Science Scene

## Research Report

May to September 2004

A Publication of the College of Science, Utah State University

### The Dean's Corner

As you see from the masthead, *Science Scene* continues to evolve as we seek a format to best present the research activities of the faculty and students in the College of Science. Last year, we added the front-page table (see below) to show data on research proposals submitted and grants received, and monthly highlights on research support services and the availability of instruments in various departments and units in the College of Science and elsewhere on campus. We will continue those features as long as data is available. If you are aware of instruments and services that other faculty might be interested in, please pass the word on to us so we can present this information in future issues.

This first issue of the new academic year is rather lengthy, as we catch up on the research activities from late spring and summer. In future issues, we will add two new sections, one to highlight the sabbatical activities of our faculty and the other to introduce visiting scholars to the college at large. Please send any comments or suggestions related to the items above to me via email at <don.fiesinger@usu.edu>.

### — COLLEGE OF SCIENCE CONTRACTS & GRANTS ACTIVITY —

Dollar Amounts (# of proposals)	May 04	June 04	Totals for FY 04
Proposals Submitted	\$1,859,943 (18)	\$3,060,166 (15)	\$49,966,022 (218)
Awards Received	\$1,608,535 (18)	\$963,392 (19)	\$14,855,670 (160)

### Focus on Facilities—Nuclear Magnetic Resonance (NMR)

Nuclear Magnetic Resonance (NMR) is a technique that enables researchers to extract detailed information about molecular structure. This technique has seen wide applications not only in chemistry, but also in biology, physics, and materials science areas. For example, the atomic structures of a number of proteins in solution have been solved by this technique, without need to crystallize the protein. The method has also revealed molecular-level detail about new nanomaterials.

The Utah State NMR facility is located in the basement of the Maeser Laboratory and it houses two high-field liquid-phase NMR spectrometers: a Bruker ARX-400 and a JEOL GSX-270, with proton resonance frequencies of 400 and 270 MHz, respectively. The Bruker instrument is usually configured with a variable temperature 5 mm broadband probe that can be used for observation of large numbers of nuclei. To increase access to the instruments, they are equipped to transfer data to remote personal computers on the Utah State campus network. The NMR facility is managed by Dr. Piotr Dobrowolski. Piotr has an extensive background in the applications of NMR and he can assist in designing and setting up non-standard NMR experiments.

The spectrometers are available for use by Utah State researchers (faculty and students) at reasonable rates. Those users who wish to operate the spectrometers can do so themselves after training by the NMR manager. Alternatively, the NMR manager will acquire and process spectra for an additional charge. Contact: Piotr Dobrowolski, ph: 797-1673; email: <http://www.chem.usu.edu/~piotr/index.php>



UTAH STATE UNIVERSITY  
COLLEGE OF SCIENCE  
(AY 2004-05)

**Faculty Senate**

[8 Representatives elected by the College of Science;  
serving for three-year terms]

Steve Aust (07)  
Jim Evans (07)  
Lance Littlejohn (07)  
Stephen Bialkowski (06)  
rep to Senate Exec Comm  
J.R. Dennison (06)  
Steve Allan (05)  
Chris Coray (05)  
Greg Podgorski (05)  
Don Fiesinger (appointed by Pres.)

**\* Educational Policies Committee (EPC)**

Richard Cutler (06)

**Academic Standards Subcommittee of EPC**

Vicki Allan

**General Education Subcommittee of EPC**

Richard Cutler  
Richard Mueller

**Curriculum Subcommittee of EPC**

Richard Mueller

**\* Professional Responsibilities and Procedures  
Committee**

Scott Cannon (07)

**Honors Advisory Board**

Jim Evans (06)  
JR Dennison (Faculty Senate rep)

**\* Academic Freedom and Tenure Committee**

Lance Seefeldt (05)

**\* Faculty Evaluation Committee**

Kathryn Turner (05)

**\* Budget and Faculty Welfare Committee**

Vicki Allan (07)  
Stephen Bialkowski (chair;  
Fac Senate rep )

**Faculty Evaluation Committee**

Kathryn Turner (05)

**Graduate Council**

Richard Cutler (07)

**Council on Teacher Education**

Richard Mueller  
Jim Cangelosi

**College of Science Undergraduate/Curriculum  
Committee**

Biology	Greg Podgorski
Chem & Biochem	David Farrelly
Computer Science	Dan Watson
Geology	Pete Kolesar
Math & Stat	Dan Coster
Physics	Mark Riffe

**College of Science Graduate Advisory Committee**

Biology	Peter Ruben
Chem & Biochem	Rick Holz
Computer Science	Nick Flann
Geology	Dave Liddell
Math & Stat	Richard Cutler
Physics	Jan Sojka

*Note: \* = one representative elected by College of Science; serving a three-year term.*

## Staff Activities

### Staff Awards & Recognition

Utah State's 11th Annual Diversity Forum will be held 2 November 2004 in the Eccles Conference Center auditorium. **Liz Allred**, Administrative Assistant in Biology, will receive a Diversity Award in the staff category for her volunteer work with the homeless in Washington, D.C., where she also helped French-speaking political refugees and émigrés; she is a literacy volunteer, working primarily with minority women to improve their English reading, writing, and speaking skills; and she has recently served as a volunteer advisor to the Utah State International Student Council, working with community organizations to create international programs and linkages with Utah State students.

### Student Activities

#### Student Awards, Recognition & Grants

##### Biology

Biology undergraduates – **Derrick Johnston, Dolly Creger, and Brian Thomas** – have been awarded an Undergraduate Research Fellowship from the American Heart Association for Summer 2004. These students received a stipend of \$4,000 for the summer. Derrick and Dolly worked in the lab of **Daryll DeWald** and Brian worked in the lab of **Brett Adams**.

**Colin Brammer and Allen Spaulding** have both received a \$5,000 Utah State Graduate Council Dissertation Fellowship for the 2004-2005 academic year. The fellowship provides additional financial support for Colin and Allen as they write their dissertations.

**Megan Kanaga**, an incoming graduate student in **Mike Pfrender's** lab, has been awarded the first Utah State Diversity Fellowship in Science and Engineering. Megan received her bachelor's degree from Whitman College and has worked for the past year as a lab technician in Dr. Pfrender's lab.

Biology undergraduate **Benson Morrill** received the first Helen B. Cannon Award for an outstanding student in the Honors program. The award will help Benson fund some of the research for his honor's senior thesis project titled "Phylogeography of the Marine Toad *Bufo marinus* Across the Eastern Extension of the Trans-Mexican Neovolcanic Belt." Honorable mentions for the award included another biology student, senior **Stephanie Chambers**.

Biology graduate **Kurtis Reed**, who worked as an undergraduate researcher in the lab of **Mike Pfrender** received a \$5,000 National Fellowship for graduate school from the Honor Society of Phi Kappa Phi (PKP). Kurtis, who graduated summa cum laude with a 4.0 GPA, was also named as the 2004 College of Science Scholar of the Year. He is attending the Mayo Clinic College of Medicine this fall.

The research of **Kevin Young** and **Butch Brodie** on the evolution of horns in the flat-tailed horned lizard was featured in the June 2004 issue of *BBC Wildlife* magazine. Author Ivo Grigorov cited their evidence that "predatory pressure is strong enough to change lizard horn length by more than ten percent in about 21-36 generations. Considering that the horned lizard lifespan is only a year, this is evolution in fast forward."

##### Chemistry & Biochemistry

**Anastassia N. Alexandrova** received a Poster Award and a Certificate of Recognition from the the American Chemical Society for a extra-ordinary contribution to the success of the 59<sup>th</sup> Northwest and 18<sup>th</sup> Rocky Mountain Regional American Chemical Society Meetings, Logan, Utah, 6-9 June 2004.

**Anastassia N. Alexandrova and Ben M. Elliott** received the Summer Research Institute Fellowships in Interfacial and Condensed Phase Chemical Physics (Battelle Memorial Institute, operator of the Pacific Northwest National Laboratory for the U.S. Department of Energy) Richland, Washington, 1-31 July 2004.

**Undergraduate Research Award for 2004.** The Utah State College of Science Undergraduate Research Initiative provided financial assistance for the Chemistry & Biochemistry Department Undergraduate Summer 2004 Research Awards to **Rex Watkins, Kelly Doyle, Zahraa Al-Lawati,** and **Darin Humphreys**.

##### Physics & the Center for Atmospheric & Space Sciences (CASS)

**Jonathon Abbott** received a Utah State College of Science Undergraduate Research Initiative in the amount of \$1,500 for the period of April 2004 to December 2004 for his research titled "Electron Emission Measurements of Insulators."

**Jerilyn Brunson** received a NASA Rocky Mountain Space Grant Consortium Graduate Fellowship in the amount of \$18,000 for the period of September 2004 to August 2006. "Charge Storage and Decay Properties of Insulating Materials Applicable to Spacecraft Charging."

### Student Presentations

##### Biology

**Amanada Bakian** gave a talk titled "Looking Beyond the Corridor: The Use of Non-breeding Habitat Types by Willow Flycatchers at Fish Creek, Utah" at the Cooper Ornithological Society Annual Meeting, La Crosse, Wisconsin, 6 May 2004.

**Christelle Guedot** gave a talk titled "Effect of 3-Dimensional and Color Contrast Patterns on Nest Location of Two Solitary Bees (Hymenoptera: Megachilidae)" at the 85<sup>th</sup> Annual Meeting of the American Association for the Advancement of Science (AAAS) Pacific Division, Logan, Utah, 13-17 June 2004. Christelle also won first place in the student competition for the Biological Sciences section and 2<sup>nd</sup> place in the students' PhD category (see Faculty Presentations and Related Professional Activities).

**Drauzio E. N. Rangel** presented a poster with USU faculty at the 85<sup>th</sup> Annual Meeting of the American Association for the Advancement of Science (AAAS) Pacific Division, Logan, Utah, 13-17 June 2004. (See Faculty Presentations and Related Professional Activities). He also won the Geraldine K. Lindsay Award for Excellence in the Natural Sciences.

**Melissa Weber** presented a poster with USU faculty at 85<sup>th</sup> Annual Meeting of the American Association for the Advancement of Science (AAAS) Pacific Division, Logan, Utah, 13-17 June 2004. ). (See Faculty Presentations and Related Professional Activities). She also won 2<sup>nd</sup> place in the student competition for the Ecology and Environmental Science section.

**Jevin West** gave a talk titled "Comparing the Dynamics of Stomatal Networks to the Problem-solving Dynamics of Cellular Computers" at the 2004 International Conference on Complex Systems, Boston, Massachusetts, 16 May 2004.

The following presentations were made at the annual Uintah Basin Research Conference, Vernal, Utah, 23 April 2004:

**Clint McKee** (undergraduate). Talk. "Investigating Coral Health and Reef Ecology Using Coral Reef Aquaria."

**Kevin Woodward** (undergraduate). Poster. "Applications for Digital Microscopy."

The following presentations were made at the Annual Meeting of the North American Benthological Society, Vancouver, British Columbia, 6-10 June 2004:

**Maura Bozeman.** Talk. "The Importance of Metabolism in Understanding Nutrient Spiraling."

**Glen de Guzman.** Poster. "The Effects of Benthic Algae Communities on Nutrient Uptake in a Mountain Stream."

**Lara Rozzell.** Poster. "How to Build a Database for Lake-Stream Ecosystem Studies."

### Physics & the Center for Atmospheric & Space Sciences (CASS)

On 25 August 2004, eight students—**Andrew Auman, Jeanette Briggs, Jeff Duce, Joel Ellsworth, Lee Gardner, LeAnn Moody, Tim Neilsen, and LaLine Ray**—from the Utah State Get Away Special Research Team, presented a 14-month old project titled "The ISO-CRATE " to NASA Administrators in Washington, D.C. The purpose of the presentation was to convince NASA to use ISO-CRATE as a tool for teaching science and math to students in grades K-12 across the nation.

The following papers were presented at the Utah State University Student Showcase, Logan, Utah, 8 April 2004:

**Gregory Nath and J. R. Dennison,** "Measurement of Charge Storage Decay Time and Resistivity of Spacecraft Insulators."

**Michael Nay and J. R. Dennison,** "Health Effects of Low-Level Radiation and the Validity of the Linear No Threshold Hypothesis (LNTH)."

**Sterling Smith and J. R. Dennison,** "Ring Statistics Determined with the Embedded Ring Approach: Anneal Graphitic Amorphous Carbon."

### Student Publications

#### Biology

**Kristin A. Bakkegard and Craig Guyer.** 2004. Sexual Size Dimorphism in the Red Hills Salamander, *Phaeognathus hubrichti* (Caudata: Plethodontidae: Desmognathinae). *Journal of Herpetology* 38:8-15.

**Teresa E. Koper, Amal F. El-Sheikh, Jeanette M. Norton, and Martin G. Klotz.** 2004. Urease Encoding Genes in Ammonia-Oxidizing Bacteria. *Applied and Environmental Microbiology* 70(4):2342-2348.

### Faculty Activities

#### Faculty Awards & Recognition

#### Biology

**Timothy A. Gilbertson** has been named Vice Chair of the Health and Scientific Advisory Board of the Brita Water Research Institute of Pleasanton, California. His term begins 1 October 2004.

**Joseph K.-K. Li** is currently serving as the Executive Director of the Society of Chinese Bioscientists in America (SCBA). He was recently featured in the *The Scientist* (30 August 2004) in an article discussing the West's interest in developing greater scientific ties with China.

### Mathematics & Statistics

**Larry Cannon and Bob Heal's** web site <http://matti.usu.edu/nlvm/nav/index.html> was chosen to be included in the July 2004 "Digital Dozen," a list of exemplary web sites for educators selected by the Eisenhower National Clearinghouse (ENC). The list is published each month at ENC Online (enc.org).

### Faculty Grants

#### Biology

##### **Mary E. Barkworth**

U.S. Department of Agriculture  
12 May 2004 to 30 June 2006—\$359,234.  
"Completion of Second of Two Volumes on Grasses of North America."

##### **Timothy A. Gilbertson**

Eli Lilly Corporation  
1 October 2004 to 30 September 2006—\$128,197  
"Olanzapine (Zyprexa): Taste and Feeding Study."

##### **James W. Haefner**

Bureau of Reclamation  
1 July 2004 to 30 June 2005—\$38,000  
"Validation and Extension of the Behavioral Components of a Fish Swimming Model."

##### **Keith A. Mott**

National Science Foundation  
1 September 2004 to 31 August 2007—\$450,417  
"QEIB: Collaborative Research: Unifying Mechanistic and Dynamic Mathematical Models of Stomatal Behavior and Photosynthesis."

##### **Kristina A. Spray (post-doc)**

National Institutes of Health-NRSA  
1 September 2004 to 31 August 2007—\$146,000  
"The Role of Aquaporins in the Taste System."

##### **Jon Y. Takemoto**

SynVax, Inc. NIH SBIR  
1 February 2004 to 30 January 2005—\$19,337  
"Development of Antifungals of Clinical Importance."

##### **Jon Y. Takemoto**

Frontier Scientific  
19 May 2004 to 18 May 2005—\$6,553  
"Microbiological Production of Q10."

### Chemistry & Biochemistry

##### **Alexander I. Boldyrev**

National Science Foundation  
1 June 2004 to 31 May 2007—\$240,000  
"Evolution of Chemical Bonding upon Fusion of Planar Aromatic Clusters into 2-D and 3-D Clusters and into 3-D Networks."

##### **Cheng-Wei Tom Chang**

National Institutes of Health  
1 March 2004 to 28 February 2009—\$525,000  
"Novel Ribostamycins and SAR Study of Their Ring III Aminosugar."

##### **Alvan C. Hengge**

National Institutes of Health  
1 September 2004 to 31 August 2008—\$987,700

“Mechanisms of Acyl, Phosphoryl and Sulfuryl Transfer.”

#### Computer Science

##### **Stephen Clyde**

Multimedia Data Services Corporation  
1 July 2004 to 31 May 2006—\$353,860

“Information Systems Development and Support for the National Scenic Byways Program.”

##### **Stephen Clyde**

U.S. Forest Service  
1 July 2004 to 30 September 2004—\$31,411

“Adding National Forest Byways to the FHWA National Scenic Byways Website.”

#### Mathematics & Statistics

##### **Robert Heal, Larry Cannon, Joel Duffin, Jim Cangelosi, and Jim Dorward**

National Science Foundation  
1 May 2004 to 30 April 2006—\$777,525

“Extending and Enhancing the National Library of Virtual Manipulatives as a Resource for K-12 Teachers.”

##### **Eric Rowley**

Utah State Office of Education –  
No Child Left Behind Mathematics and Science Partnership Funds  
31 March 2004 to 31 March 2005—\$209,224  
“CORE Academy Mathematics and Science Partnership.”

#### Physics & the Center for Atmospheric & Space Sciences (CASS)

##### **T. C. Shen**

National Science Foundation  
1 August 2004 to 31 July 2008—\$1,300,000  
“NIRT: Atom-scale Silicon Integrated Circuits for Quantum Computation.”

##### **Jan J. Sojka, Lie Zhu, and Piotr Kokoszka**

National Science Foundation  
1 September 2004 to 1 September 2008—\$679,155  
“Statistical Wavelet Analysis and Indices Development of the Magnetosphere-Ionosphere Current System Observed by the Terrestrial Magnetometers.”

##### **Haeyeon Yang**

National Science Foundation  
May 2004 to April 2005—\$100,000  
“NUE: Development of Nanotechnology Curriculum at Utah State University.”

#### Faculty Presentations & Related Professional Activities

##### Biology

**Michelle A. Baker** gave a talk titled “The Importance of Nitrification to the Nitrate Budget of Hydrologically Connected Streams and Lakes” at the Annual Meeting of the North American Benthological Society, Vancouver, British Columbia, 6-10 June 2004.

**Timothy A. Gilbertston** presented lectures titled “Chemosensory Cues for Fat and Dietary Fat Preference” at the Symposium of Fat Perception and “Saliva and Taste: The Importance of Stimulus Environment on Taste Function” at the Saliva and Food Sensory Properties Perception Symposium at the Nestlé Research Center, Lausanne, Switzerland, 9-10 September 2004.

**Timothy A. Gilbertston, Arian Baquero, and Kristina A. Spray** presented a talk titled “The Taste of Water and Its Health Implications” at the Brita Water Research Institute Symposium of Health and Water, San Francisco, California, 27-30 June 2004.

**Christelle Guedot, Theresa L. Pitts-Singer, James Buckner, Jordi Bosch, and William P. Kemp** presented a talk titled “Use of Olfactory Cues for Nest Recognition: Behavioral and Chemical Evidence” at the 85<sup>th</sup> Meeting of the Entomological Society of America Pacific Division, Bozeman, Montana, 20-23 June 2004. Christelle also won 2<sup>nd</sup> place in the PhD students’ category.

**Garry Miller, Karen Buccambuso, Yi-Chen Lee, and Joseph K.-K. Li** gave a presentation titled “A Kinetic Analysis of Bluetongue Virus mRNA Using Real-Time PCR” at the 85<sup>th</sup> Annual Meeting of the American Association for the Advancement of Science (AAAS) Pacific Division, Logan, Utah, 13-17 June 2004.

**Eric M. O’Neill and Joseph Mendelson** gave an invited paper titled “Use of a PCR-based Assay to Detect Chytrid Fungi” at the Annual Meeting of the Research and Analysis Network for Neotropical Amphibians (RANA) at the Universidad de Puerto Rico, Rio Piedras, San Juan, Puerto Rico, 5 June 2004.

**Drauzio E. N. Rangel, Anne J. Anderson, and Donald W. Roberts** presented a poster titled “Stress Inducing Cross Protection to UV-B Radiation and Heat of *Metarhizium anisopliae Conidia*” at the 85<sup>th</sup> Annual Meeting of the American Association for the Advancement of Science (AAAS) Pacific Division, Logan, Utah, 13-17 June 2004.

**Lorin E. Squires** presented a paper titled “A Discussion of Foundation Guidelines for Concurrent Enrollment” at the Annual Conference of the Utah Academy of Sciences, Arts & Letters, Southern Utah University, Cedar City, Utah, 16 April 2004.

**Kimberly A. Sullivan** gave a talk titled “Natal Dispersal in Yellow-eyed Juncos” at the Cooper Ornithological Society Annual Meeting, La Crosse, Wisconsin, 6 May 2004.

**Melissa Weber, Morgan Yost, James Cane, and Dale Gardner** presented a poster titled “Alkaloids and Old Lace: Pollen Toxins Exclude Generalist Pollinators from Death Camas (*Toxicoscordion [=Zigadenus] paniculatum*) (Melanthiaceae)” at the 85<sup>th</sup> Annual Meeting of the American Association for the Advancement of Science (AAAS) Pacific Division, Logan, Utah, 13-17 June 2004.

**Paul G. Wolf, Carol A. Rowe, S.A. Kelehner, and Mitsuyasu Hasebe** presented a paper titled “RNS Editing and Intron Splicing in Transcripts from a Fern Chloroplast Genome” at the International Pteridophyte Symposium, 11-19 July 2004, Edinburgh, Scotland.

The following presentations were made at the annual Uintah Basin Research Conference, Vernal, Utah, 23 April 2004:

**Lianna Hatfield-Etchberger.** Talk. “Investigating Plague in the Wild: Fleas and Their Small Mammal Hosts in a Prairie Dog Colony.”

**Lorin E. Squires.** Talk. “The Element of Choice in Higher Education: Comparing Utah and Middle Eastern University Programs.”

The following presentations were given at the joint meeting of the American Society of Ichthyologists and Herpetologists, the Herpetologists' League, and the Society for the Study of Amphibians and Reptiles, the University of Oklahoma, Norman, Oklahoma, 30 May 2004:

**Benson H. Morrill, Daniel B. Mulcahy, and Joseph R. Mendelson III.** Poster. "Biogeography of Lowland Species of *Bufo* Across the Eastern End of the Trans-Mexican Neovolcanic Belt."

**Daniel G. Mulcahy, Allen W. Spaulding, Joseph R. Mendelson III, and Edmund D. Brodie, Jr.** Paper. "Systematics and Genetics of the Horned Lizard *Phrynosoma mcallii* and *P. platyrhinos* in the Colorado Subregion of the Sonoran Desert."

The following presentations were made at Botany 2004 annual meeting of the Botanical Society of America and the American Society of Plant Taxonomists, Snowbird and Alta, Utah, 31 July – 5 August 2004:

**Laurel Anderton and Mary E. Barkworth.** Paper. "*Glyceria occidentalis* (Poaceae), *G. declinata*, *G. fluitans*, and *G. notata*: Are They Really Different?"

**Mary E. Barkworth.** Paper. "Reflections on Twenty-six Years of Herbarium Databasing." [Corrected to 18 years when given]

**Mary E. Barkworth, Michael B. Piep, Charles Lapham, Ronald Jones, and Russell Ogilvie.** Poster. "Adapting Index Kentuckiensis for Use in the Intermountain Herbarium."

**Lee Bjerregaard and Paul G. Wolf.** Paper. "Highly Structured Populations of a Narrow Endemic Primrose."

**James Cane.** Talk. "Refining Estimates of Pollinator Efficiencies Calculated Using Delivered Stigmatic Loads: A Cranberry Model."

**James Cane, Melissa Weber, Morgan Yost, and Dale Gardner.** Poster. "Alkaloids and Old Lace: Pollen Toxins Exclude Generalist Pollinators from Death Camas."

**Dean Kelch, Brent D. Mishler, Amy Driskell, and Paul G. Wolf.** Paper. "Inferring Phylogeny Using Genomic Characters: A Case Study Using Land Plant Plastomes."

**Brent D. Mishler and Paul G. Wolf.** Paper. "Resolving the Green Branch of Life: Current Progress and Future Challenges: Introduction."

**Richard J. Mueller.** Talk. "Ask the Plant, Investigating and Teaching Plant Structure."

**Michael B. Piep, Mary E. Barkworth, and Phil Dittberner.** Poster. "Building on Data Being Acquired for Plant Information Network II."

**Paul G. Wolf, Jennifer Kuehl, Brent D. Mishler, Dina F. Mandoli, K. Arumuganathan, Richard G. Olmstead, Karen Renzaglia, Ash.** Paper. "The Complete Chloroplast Genome Sequence of the Lycopod, *Huperzia lucidula* (Lycopodiaceae): Implications for Land Plant Phylogeny."

**Paul G. Wolf, Carol A. Rowe, and Mitsuyasu Hasebe.** Paper. "RNA Editing in a Fern Chloroplast Genome."

## Chemistry & Biochemistry

**Lisa M. Berreau** presented a talk titled "Metal Alkoxide Chemistry of Nitrogen/Sulfur Ligands: Relevance to Liver Alcohol Dehydrogenase" at the Inorganic Chemistry Gordon Conference, Salve Regina University, Newport, Rhode Island, 18-23 July 2004.

**Lisa M. Berreau** presented a talk titled "Metal Alkoxide Chemistry of Chelate Ligands having Internal Hydrogen Bond Donors: Bioinorganic and Catalytic Chemistry" at the University of Rochester, Rochester, New York; Syracuse University, Syracuse, New York; and the University of Buffalo, Buffalo, New York; 26-28 April 2004.

**Alexander I. Boldyrev** presented an invited seminar titled "Could Clusters, the Peculiar Intermediates Between Atoms and Solids, be used as Building Blocks of New Materials?" at the Southern Adventists University, Collegedale, Tennessee, 29 April 2004.

**Alexander I. Boldyrev** presented an invited talk titled "Multiple Aromaticity - A New Tool in Deciphering Chemical Bonding in Clusters," at the joint ACS 59<sup>th</sup> Northwest and 18<sup>th</sup> Rocky Mountain Regional Meeting, Logan, Utah, 8 June 2004.

**Cheng-Wei Tom Chang** presented a talk titled "Glycodiversification for the Development of Novel Aminoglycoside Antibiotics" at the Department of Chemistry, the University of Toledo, Toledo, Ohio, 22 February 2004; the Department of Chemistry, University of Montana, Missoula, Montana, 23 February 2004; the Department of Chemistry, Case Western Reserve University, Cleveland, Ohio, 23 March 2004; the Department of Chemistry, West Virginia University, Morgantown, West Virginia, 24 March 2004; and the Department of Chemistry and Biochemistry, the University of Texas, Austin, Texas, 8 April 2004.

**Cheng-Wei Tom Chang** presented a talk titled "Development of General Antibiotics Against Known and Unknown Pathogens" at the DARPA Pathogen Countermeasures/Accelerated Anthrax Meeting, Napa, California, 11-13 May 2004.

**Cheng-Wei Tom Chang, Jinhua Wang, Jie Li, Ravi Rai, John Wennergren, Huiwen Chang, Przemyslaw Greg Czyryca** presented a talk titled "Glycodiversification for New Drug Development" at the joint ACS 59<sup>th</sup> Northwest and 18<sup>th</sup> Rocky Mountain Regional Meeting, Logan, Utah, 6-9 June 2004; at the Gordon Conference, Natural Product Division, Tilton, New Hampshire, 25-30 July 2004; at the Gordon Conference, Medicinal Chemistry Division, New London, New Hampshire, 1-6 August 2004; and at the 228<sup>th</sup> ACS National Meeting, Philadelphia, Pennsylvania, 22-26 August 2004.

**Huiwen Chang, Cheng-Wei Tom Chang** presented a poster titled "Expedient Synthesis and Antibacterial Evaluation of a Library of Kanamycin B Analogs" at the DIA 40<sup>th</sup> Annual Meeting, Washington, D.C. 12-16 June 2004.

**Ewa Szajna, Piotr Dobrowolski, Amy L. Fuller, Atta M. Arif, and Lisa M. Berreau** presented a poster titled "Paramagnetic <sup>1</sup>H NMR Studies of Mononuclear Octahedral Nickel Complexes of Tris (2-pyridyl) methyl) amine-type Ligands: Relevance to Acireductone Dioxygenase" at the Inorganic Chemistry Gordon Conference, Newport, Rhode Island, 18-23 July 2004.

The following posters were presented at the 20<sup>th</sup> Symposium on Molecular Structure, Austin, Texas, 26 March 2004:

**Anastassia N. Alexandrova, Alexander I. Boldyrev, Hau-Jin Zhai, Lai-Sheng Wang.** "Multiply Aromatic Small Boron Clusters as New Inorganic Ligands."

**Ben Elliott, Anastassia N. Alexandrova, Alexander I. Boldyrev, Hau-Jin Zhai, Xin Yang, Xue-Bin Wang, Lai-Sheng Wang.** "Designing Oxygen-Rich Species: Combining Ab Initio Calculations and Experiment."

The following posters were presented at the 227<sup>th</sup> American Chemical Society National Meeting and Exposition, Anaheim, California, 28 March-1 April 2004:

**Anastassia N. Alexandrova, Alexander I. Boldyrev, Hau-Jin Zhai, Lai-Sheng Wang.** "sg-Aromaticity and sg-Antiaromaticity in Small Clusters of Boron, Lithium and Magnesium."

**Magdalena M. Makowska-Grzyska, Chad C. Wasden, Gajendrasingh Ingle, John C. Price, Deborah C. Bebout, Ewa Szajna, Atta M. Arif, and Lisa M. Berreau.** "Amide Alcoholysis reactivity of Group 12 Metal Complexes of Amide-appended Chelate Ligands."

**Kyle J. Tubbs, Ewa Szajna, Brian Bennett, Atta M. Arif, Rex W. Watkins, Jason A. Halfen, and Lisa M. Berreau.** "Synthesis, Structural, and Spectroscopic Studies of Mononuclear N<sub>3</sub>S-ligated Co(II) Methoxide and Hydroxide Complexes."

The following posters were presented at the joint American Chemical Society 59<sup>th</sup> Northwest and 18<sup>th</sup> Rocky Mountain Regional Meeting, Logan, Utah, 6-9 June 2004:

**Anastassia N. Alexandrova and Alexander I. Boldyrev.** "The Genetic Algorithm Based Elucidation of the Structure of the sg-Aromatic and sg-Antiaromaticity in Small Clusters of Main Group Elements."

**Ben Elliott and Alexander I. Boldyrev.** "Ozonic Acid and Its Derivatives: Stabilizing the O<sub>4</sub><sup>2-</sup> Dianion."

**Jie Li, Jinhua Wang, Przemyslaw Greg Czyryca, Huiwen Chang and Cheng-Wei Tom Chang.** "Expedient Synthesis and Antibacterial Evaluation of a Library of Kanamycin B. Analogs."

**Jamie Purcell and Alvan C. Hengge.** "Kinetic and Spectroscopic Investigations of Phosphate and Thiophosphate Esters."

**Kerensa Sorensen-Stowell and Alvan C. Hengge.** "Use of 180 Isotopic Shifts in 31P NMR for Determination of P-O Bond Order of various Phosphate Esters in Water."

**Jarod M. Younker and Alvan C. Hengge.** "Mechanistic Study of Aryl Sulfate Diesters."

The following posters were presented at the AAAS Pacific Division, Logan, Utah, 15 June 2004:

**Anastassia N. Alexandrova and Alexander I. Boldyrev.** "The Genetic Algorithm Based Elucidation of the Structure of the sg-Aromatic and sg-Antiaromaticity in Small Clusters of Main Group Elements."

**Ben Elliott and Alexander I. Boldyrev.** "Ozonic Acid and Ionic Salts of the O<sub>4</sub><sup>2-</sup> Dianion."

The following posters were presented at the 228<sup>th</sup> American Chemical Society National Meeting, Philadelphia, Pennsylvania, 22-26 August 2004:

**Jie Li, Jinhua Wang, Przemyslaw Greg Czyryca, Huiwen Chang and Cheng-Wei Tom Chang.** "Expedient Synthesis and Antibacterial Evaluation of a Library of Kanamycin B. Analogs."

**Jinhua Wang, Jie Li, and Cheng-Wei Tom Chang.** "Studies of L-pyranoses on Ring III of Pyranmycins."

### Geology

**Bradley Ritts** presented a paper titled "Tertiary to Recent Evolution of the Altyn Tagh Fault System and Relationships to Strike-Slip and Contractional Deformation Throughout the Tibetan Plateau," at the China University of Geosciences, Beijing, China, 10 June 2004; the Chinese Academy of Geological Sciences, Beijing, China, 6 August 2004; and the 32<sup>nd</sup> International Geological Congress, Florence, Italy, 23 August 2004.

### Mathematics & Statistics

**LeRoy B. Beasley** gave a plenary talk titled "Linear Preservers of Extremes of Rank Inequalities over Semirings: Term Rank and Zero Term Rank" at the International Algebraic Conference on the Occasion of the 250<sup>th</sup> Anniversary of Moscow State University and the 75<sup>th</sup> anniversary of the Department of Algebra, Moscow, Russia, 25 May - 2 June, 2004.

**LeRoy B. Beasley** gave a talk titled "Tournaments Primitivity and Preservers" at the Big Sky Discrete Mathematics Conference, University of Montana, Missoula, Montana, 9 September 2004.

**Piotr Kokoszka** gave an invited talk titled "Discriminating Between Change Points and Long-range Dependence Statistical Models for Financial Data, at the International Conference, Graz, Austria, 21 May 2004.

**Xiaofeng Ren** gave a seminar talk titled "Density Functional Theory of Block Copolymer Morphology" at the University of Sydney, Sydney, Australia, 28 April 2004.

**Xiaofeng Ren** gave a talk titled "Nucleation in the FitzHugh-Nagumo System and the Diblock Copolymer System" at the SIAM Conference on Mathematical Aspects of Materials Science, Los Angeles, California, 25 May 2004.

**Xiaofeng Ren** gave a talk titled "Spot and Ring Solutions of the Diblock Copolymer Equation" at the Banff International Research Station, Workshop on New Developments in Variational Methods and their Applications, Banff, Calgary, Canada, 27 May 2004.

**Xiaofeng Ren** gave a seminar titled "The Gamma-convergence Theory Versus the Lyapunov-Schmidt Reduction Theory" at the Humboldt Univerisitat zu Berlin Conference, Berlin, Germany, 2 June, 30 June, 6 July 2004.

**Xiaofeng Ren** gave a talk titled "The Mathematical Aspects of the Ohta-Kawasaki Diblock Copolymer Theory" at the Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany, 23 June 2004.

**Xiaofeng Ren** gave a talk titled "The Ohta-Kawasaki Theory of Diblock Copolymers" at the Max Planck Institute for Mathematics in the Sciences Conference, Leipzig, Germany, 13 July 2004.

**Juergen Symanzik** gave an invited talk titled "Visualization, Web-Access, and Simulation of West Nile Virus Data - From the Regional to the National Level" at the Interface 2004 Conference Baltimore, Maryland, 28-29 May 2004.

## Physics & the Center for Atmospheric & Space Sciences (CASS)

**J. R. Dennison** presented a paper titled “Interaction of the Space Environment with Spacecraft Materials,” invited seminar, Alcatel Space Facility, Cannes, France, 2 July 2004.

**J. R. Dennison**, gave an invited seminar titled “Electron Emission of Insulating Spacecraft Materials” at the Space Environment Department (DESP) at ONERA (Office National d’Etudes et de Recherches Aérospatiales), Toulouse, France, 2 July 2004.

**J. R. Dennison, C. D. Thomson, and Alec Sim**, made a presentation titled “The Effect of Low-Energy Electron and UV/VIS Radiation Aging on the Electron Emission Properties and Breakdown of Thin-Film Dielectrics” at the 8<sup>th</sup> IEEE Dielectrics and Electrical Insulation Society (DEIS) International Conference on Solid Dielectrics (ICSD), Toulouse, France, 5-9 July 2004.

**J. R. Dennison** presented a paper titled “Electron Emission from Insulating Materials” at the Instituto de Ciencia de Materiales de Madrid in the Departamento de Física e Ingeniería de Superficies at the University of Madrid, Madrid, Spain, 12 July 2004.

**Bela C. Fejer, Antonio E. Costa, and Antonio S. Soares** presented a paper titled “Lower Atmospheric Effects in the Equatorial Ionosphere,” at the IAGA/ICMA Workshop on Vertical Coupling in the Atmosphere-Ionosphere System, Bath, UK, 12-14 July 2004.

**David Peak** presented a paper titled “Stomachonomics: Emergent Computation in Plants,” at the Santa Fe Institute, Santa Fe, New Mexico, 16 April 2004.

**D. Mark Riffe and Ali Sabbah**, presented a paper titled “Carrier and Coherent Lattice Dynamics of Si Probed with Ultrafast Spectroscopy,” at the International Conference on the Physics of Semiconductors, Flagstaff, Arizona, 26-30 July 2004.

**Robert W. Schunk, Ludger Scherliess, Jan J. Sojka, Donald C. Thompson, David N. Anderson, Mihail Codrescu, Cliff Minter, Timothy J. Fuller-Rowell, Roderick A. Heelis, Marc Hairston, and Bruce M. Howe** presented a talk titled “Global Assimilation of Ionospheric Measurements: USU GAIM” at Space Weather Week, Boulder, Colorado, 13-16 April 2004.

**Robert W. Schunk, Ludger Scherliess, Don Thompson, Jan Sojka, and Lie Zhu** presented a talk entitled “USU GAIM: A Global Ionospheric Data Assimilation Model” at the joint Asia Oceania Geosciences Society (AGOS) 1<sup>st</sup> Annual Meeting – Asia Pacific Association of Hydrology and Water Resources (APHW) 2<sup>nd</sup> Conference, Singapore, 5-9 July 2004.

**T. C. Shen** presented a paper titled “Atom-scale Electronics Based on Dopant Patterns in Silicon” at The 48<sup>th</sup> International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication, San Diego, California, 4 June 2004.

**T. C. Shen** presented a paper titled “Two-Dimensional Dopant Patterns as the Building Blocks for Nanoelectronics,” the joint ACS 59<sup>th</sup> Northwest & 18<sup>th</sup> Rocky Mountain Regional Meeting at Utah State University, Logan, Utah, 7 June 2004.

**T.C. Shen** presented a paper titled “Surface Effects Induced by B and as Impurities in Si,” at the 64<sup>th</sup> Physical Electronics Conference at University of California, Davis, California, 23 June 2004.

**Jan Sojka** participated as a working group leader at the U.S. planning meeting for the International Heliophysical Year (IHY) 2007. The interdisciplinary workshop was held at Sunspot, New Mexico, 19-22 April 2004.

**Jan J. Sojka** presented an invited talk, “The Get Away Special Program at USU” at the 85<sup>th</sup> Annual Meeting of the American Association for the Advancement of Science, Pacific Division, Utah State University, Logan, Utah, 14 June 2004.

**Charles Torre** chaired the session on Classical Gravitation and presented a paper titled “Cosmology, Cohomology and Compactification” at the American Physical Society April Meeting, Denver, Colorado, 1-4 May 2004.

**Lie Zhu** presented invited lectures on magnetosphere-ionosphere coupling at the Polar Research Institute of China and the University of Science and Technology of China, July 2004.

The following papers were presented at the Spring American Geophysical Union (AGU) 2004 Joint Assembly, Montreal, Canada, 17-21 May 2004:

**Abdallah R. Barakat, and Robert W. Schunk.** “3-D Dynamic Behavior of the Generalized Polar Wind With Low-Altitude Auroral Ion Energization.”

**Bela G. Fejer, Eduardo Costa, A. E. Paschoareli, A. S. Soares.** “Variability of Equatorial Electrodynamical Processes.”

**Robert W. Schunk, Ludger Scherliess, Jan J. Sojka, and Donald C. Thompson.** “Data Assimilation Studies of the Equatorial Ionosphere Using the USU GAIM Model.”

The following talks were presented at the CEDAR Workshop, Santa Fe, New Mexico, 28-30 June —1 July 2004:

**Jan J. Sojka**, Mid-Latitude Plasma Structures (MLPS): An Ionospheric Theory/Model Perspective.

**Jan J. Sojka, Lie Zhu, Michael David, and Robert W. Schunk**, TDIM Model Studies for the October-November 2002 HLPS Campaign.

The following presentations were made at the Committee on Space Research (COSPAR) Meeting, Paris, France, 18-25 July 2004:

**Abdallah R. Barakat, and Nagendra Singh.** Paper. “The Dynamics of a Double-Layer Along an Auroral Field Line: A Unified Model.”

**Imad A. Barthouthi and Abdallah R. Barakat.** Paper. “Monte Carlo Calculations of F-Region Incoherent Radar Spectra at High Latitudes: The Effect of  $O^+ - O^+$  Coulomb Collisions.”

**Imad A. Barthouthi and Abdallah R. Barakat.** Paper. “Monte Carlo Study of a Generalized Coulomb Milne Problem.”

**J. Diettrich, P. Espy, G. Nott, X. Chu, C. Gardner, Michael J. Taylor.** Paper. “High-Frequency Atmospheric Gravity Wave Observations by Fe-Lidar and OH-Imager.”

**Larry C. Gardner and Robert W. Schunk.** Paper. “The Neutral Polar Wind.”

**P. D. Pautet, Michael J. Taylor, Christial L. Olsen, Robert A. Vincent, S. Kovalam, A. Z. Liu and G. R. Swenson.** Paper. "Investigating Strong Convection as Source of Gravity Waves During the DAWEX Campaign."

**R. H. Picard, E. Cohen, E. M. Dewan, J. R. Winick, Michael J. Taylor, C. Y. She.** Paper. "New Numerical Model of Mesospheric Bores: Observational Implications."

**Ludger Scherliess, Robert W. Schunk, Jan J. Sojka, and Donald C. Thompson.** Paper. "Specification of the Global Ionosphere Using the USU GAIM Data Assimilation Model."

**Robert W. Schunk, Howard G. Demars, and Jan J. Sojka.** Paper. "Propagating Polar Wind Jets."

**Robert W. Schunk, Ludger Scherliess, Jan J. Sojka, and Donald C. Thompson.** Paper. "USU GAIM: A Global Ionospheric Data Assimilation Model."

**Jan J. Sojka, Christopher G. Smithro, and Robert W. Schunk.** Paper. "Recent Developments in Ionosphere-Thermosphere Modeling with an Emphasis on Solar Variability."

**Jan J. Sojka, Tony Van Eyken, Ray Greenwald, John Holt, and Rod Heelis.** Paper. "Coordinated Month-Long Ionospheric Observations of Multiple Ionospheric Parameters."

**Jan J. Sojka and Lie Zhu.** Paper. "Multiple Arcs: Evidence for an Active Ionospheric Role in M-I Coupling?"

**Alok K. Taori, Michael J. Taylor, David R. Hatch.** Paper. "Characteristics of Wave-Induced Oscillations in Mesospheric O<sub>2</sub> Emission Intensity and Temperatures."

**Michael J. Taylor, Peter Jenniskens, Kim Nielsen.** Paper. "Novel Near Infrared Spectra of a Leonid Meteor."

**Michael J. Taylor, Alok K. Taori, David R. Hatch, Han Li Liu and Robert G. Roble.** Paper. "Characterization of the Semi-Annual-Oscillation in Mesospheric Temperatures at Low Latitudes."

**Michael J. Taylor, Yucheng Zhao, C. Von Savigny, K. U. Eichmann, E. J. Llewellyn.** Poster. "Remote Sensing Mesospheric Temperatures by SCIAMACHY (on ENVISAT) and Ground-based Mesospheric Temperature Mapper: An Initial Comparison."

**C. M. Wrasse, Hisao Takahashi, Takuji Nakamura, Dilano Gobbi, Michael J. Taylor, A. F. Medeiros.** Paper. "Searching for Gravity Wave Sources in the Equatorial and Low Middle Latitude Regions over Brazil."

**Yucheng Zhao, Michael J. Taylor, X. Chu, C. J. Mertens, J. M. Russell.** Paper. "Investigating Tidal Effects on Mesospheric Temperature Variability and Airglow Emission Altitudes."

## **Faculty Publications**

### **Biology**

**Diane G. Alston and Sherman V. Thomson.** 2004. Effects of Fungicide Residues on the Survival, Fecundity, and Predation of the Mites *Tetranychus urticae* (Acari: Tetranychidae) and *Galendromus occidentalis* (Acari: Phytoseiidae). *Journal of Economic Entomology* 97(3):950-956.

**Steven J. Arnold and Michael E Prender.** 2004. Stabilizing Selection on Behavior and Morphology Masks Positive Selection on the Signal in a Salamander Pheromone Signaling Complex. *Molecular Biology and Evolution* 21:1032-1041.

**Roger A. Bannister, Ulises Meza, and Brett A. Adams.** 2004. Phosphorylation-Dependent Regulation of Voltage-Gated Ca<sup>2+</sup> Channels. In *Channels Voltage-gated Calcium*, edited by Gerald Zamponi, Landes Bioscience, Georgetown, Texas. Available online at <http://www.eurekah.com/abstract.php?chapid=1947&bookid=87&catid=16>.

**James S. Buckner, William P. Kemp, and Jordi Bosch.** 2004. Characterization of Triacylglycerols from Overwintering Prepupae of the Alfalfa Pollinator *Megachile rotundata* (Hymenoptera: Megachilidae). *Archives of Insect Biochemistry and Physiology* 57:1-14.

**Margaret Dice, Jennifer Abbruzzese, James Wheeler, James Groome, Esther Fujimoto, and Peter C. Ruben.** 2004. Temperature-sensitive Defects in Paramyotonia Congenita Mutants R1448C and T1313M. *Muscle and Nerve* 30:277-288.

**Charles W. Fox, R. Craig Stillwell, Angela R. Amarillo-S., Mary Ellen Czesak, and Frank J. Messina.** 2004. Genetic Architecture of Population Differences in Oviposition Behaviour of the Seed Beetle *Callosobruchus maculatus*. *Journal of Evolutionary Biology* 17:1141-1151.

**Stephanie A. Gardner and Joseph R. Mendelson III.** 2004. Taxonomy and Geographic Variation in the Leaf-nosed Snake *Phyllorhynchus decurtatus* (Squamata: Colubridae). *Journal of Herpetology* 38:187-196.

**Bradley R. Kropp and P. Brandon Matheny.** 2004. Basidiospore Homoplasy and Variation in the *Inocybe chelanensis* Group in North America. *Mycologia* 96:295-309.

**Karen R. Lips, Joseph R. Mendelson III, Antonio Munoz-Alonso, Luis Canseco-Marquez, and Daniel G. Mulcahy.** 2004. Amphibian Population Declines in Montane Southern Mexico: Resurveys of Historical Localities. *Biological Conservation* 119:555-564.

**Frank J. Messina.** 2004. How Labile Are the Egg-laying Preferences of Seed Beetles? *Ecological Entomology* 29:318-326.

**Tomoaki Nishiyama, Masanori Kugita, Robert B. Sinclair, Mamori Sugita, Chika Sugiura, Tatsuya Wakasugi, Paul G. Wolf, Kyoji Yamada, Koichi Yoshinaga, and Mitsuyasu Hasebe.** 2004. Bryophytes are Monophyletic and Land Plants Comprise Two Extant Lineages. *Molecular Biology and Evolution* 21(10):1-7.

**Theresa L. Pitts-Singer.** 2004. Examination of 'Pollen Balls' in Nests of the Alfalfa Leafcutting Bee, *Megachile rotunda*. *Journal of Apicultural Research* 43(2):40-46.

**Kathleen M. Pryer, Eric Schuettpelz, Paul G. Wolf, Harald Schneider, Alan R. Smith, and Raymond Cranfill.** 2004. Phylogeny and Evolution of Ferns (Monilophytes) with a Focus on the Early Leptosporangiate Divergences. *American Journal of Botany* 91:1557-1581.

**Kristina J. Spray and Ilene L. Bernstein.** 2004. Afferent and Efferent Connections of the Parvicellular Subdivisions of iNTS: Defining a Circuit Involved in Taste Aversion Learning. *Behavioural Brain Research* 154:85-97.

**Vincent J. Tepedino and Susanna M. Messinger.** 2004. *Cymopterus bekkii*, A Rare Protogynous Umbellifer (Apiaceae) of Capitol Reef National Park, Central Utah. *Madrono* 51(3):271-274.

**Francisco M. Vazquez and Mary E. Barkworth.** 2004. Resurrection and Emendation of *Macrochloa* (Gramineae: Stipeae). *Botanical Journal of the Linnean Society* 144:483-495.

**Richard A. Watts, Catherine A. Palmer, Richard C. Feldhoff, Pamela W. Feldhoff, Lynne D. Houck, Adam G. Jones, Michael E. Pfrender, Stephanie Rollman, and Steven J. Arnold.** 2004. Stabilizing Selection on Behavior and Morphology Masks Positive Selection on the Signal in a Salamander Pheromone Signaling Complex. *Molecular Biology and Evolution* 21:1032-1041.

**Paul G. Wolf, Bernard Doche, Ludociv Gielly, and Pierre Taberlet.** 2004. Genetic Structure of *Rhododendron ferrugineum* at a Wide Range of Spatial Scales. *Journal of Heredity* 95:301-308.

**Paul G. Wolf, Carol A. Rowe, and Mitsuyasu Hasebe.** 2004. High Levels of RNA Editing in a Vascular Plant Chloroplast Genome: Analysis of Transcripts from the Fern *Adiantum capillus-veneris*. *Gene* 339:89-97.

### Chemistry & Biochemistry

**Anatassia N. Alexandrova and Alexander I. Boldyrev.** 2004. Arochno, Nido, and Closo Aromatic Isomers of the  $\text{Li}_6\text{B}_6\text{H}_6$  Molecule. *Inorganic Chemistry* 43:3588-3592.

**Anatassia N. Alexandrova, Alexander I. Boldyrev, Hau-Jin Zhai, Lai-Sheng Wang.** 2004. Electronic Structure, Isomerism, and Chemical Bonding in  $\text{B}_7^-$  and  $\text{B}_7$ . *Journal of Physical Chemistry A* 108:3509-3517.

**Anastassia N. Alexandrova, Hau-Jin Zhai, Lai-Sheng Wang, Alexander I. Boldyrev.** 2004. Molecular Wheel  $\text{B}_8^{2-}$  as a New Inorganic Ligand. Photoelectron Spectroscopy and Ab Initio Characterization of  $\text{LiB}_8^-$ . *Inorganic Chemistry* 43:3552-3554.

**Brian Elchert, Jie Lie, Jinhua Wang, Yu Hui, Ravi Rai, Roger Ptak, Priscilla Ward, Jon Y. Takemoto, Mekki Bensaci, and Cheng-Wei Tom Chang.** 2004. Application of the Synthetic Aminosugars for Glycodiversification: Synthesis and Antimicrobial Studies of Pyranmycin. *Journal of Organic Chemistry* 69:1513-1523.

**Ben M. Elliot and Alexander I. Boldyrev.** 2004. Ozonic Acid and Its Ionic Salts: Ab Initio Probing of the  $\text{O}_4^{2-}$  Dianion. *Inorganic Chemistry* 43:4109-4111.

**Stuart G. Gibby, Jarod M. Younker, and Alvan C. Hengge.** 2004. An Investigation of the Sulfuryl Transfer Step from Substrate to Enzyme by Aryl Sulfatases. *Journal of Physical Organic Chemistry* 17(6-7):541-547; invited paper, special issue dedicated to William P. Jencks.

**Douglas B. Grotjahn, Justin M. Hoerter, and John L. Hubbard.** 2004. Double C-H Activation During Functionalization of Phenyl (methyl) Ketene on Iridium (I) Using Alkynes. Synthesis of 1,4-Dien-3-ones. *Journal of American Chemical Society* 126(29):8866-8867.

**Piotr K. Grzyska, Youngjoo Kim, Michael D. Jackson, Alvan C. Hengge, and John M. Denu.** 2004. Probing the Transition-State Structure of Dual-Specificity Protein Phosphatases Using a Physiological Substrate Mimic. *Biochemistry* 43:8807-8814.

**Alvan C. Hengge and Ross L. Stein.** 2004. Role of Protein Conformational Mobility in Enzyme Catalysis-Acylation of  $\alpha$ -Chymotrypsin by Specific Peptide Substrates. *Biochemistry* 43(3):742-747.

**Aleksey Kuznetsov and Alexander I. Boldyrev.** 2004. A Single p-Bond Captures 3, 4 and 5 Atoms. *Chemical Physics Letters* 388:452-456.

**Jie Li, Jinhua Wang, Przemyslaw Greg Czyryca, Huiwen Chang, Thomas Orsak, Richard Evanson, Cheng-Wei Tom Chang.** 2004. Application of Glycodiversification: Expedient Synthesis and Antibacterial Evaluation of a Library of Kanamycin B. Analogs. *Organic Letters* 6:1381-1384.

**Daniel F. McCain, Piotr K. Grzyska, Li Wu, Alvan C. Hengge, and Zhong-Yin Zhang.** 2004. Mechanistic Studies of Protein Tyrosine Phosphatases YopH and Cdc25A with *m*-Nitrobenzyl Phosphate. *Biochemistry* 43:8256-8264.

**Ewa Szajna, Piotr Dobrowolski, Amy L. Fuller, Atta M. Arif, and Lisa M. Berreau.** 2004. NMR Studies of Mononuclear Octahedral Ni(II) complexes of Tris ((2-pyridyl)methyl)amine-type Ligands. *Inorganic Chemistry* 43:3988-3997.

**Kyle J. Tubbs, Ewa Szajna, Brian Bennett, Jason A. Halfen, Rex W. Watkins, Atta M. Arif, and Lisa M. Berreau.** 2004. Mononuclear Nitrogen/sulfur-Ligated Cobalt(II) Methoxide Complexes: Structural, EPR, Paramagnetic  $^1\text{H}$  NMR, and Electrochemical Investigations. *Dalton Transactions* 2398-2399.

**Jinhua Wang, Jie Li, Przemyslaw Greg Czyryca, Huiwen Chang, J. Kao, and Cheng-Wei Tom Chang.** 2004. Synthesis of an Unusual Branched-chain Sugar, 5-C-methyl-L-idopyranose for SAR Studies of Pyranmycins: Implications for the Future Design of Aminoglycoside Antibiotics. *Bioorganic and Medicinal Chemistry Letters* 4:4389-4393.

### Computer Science

**SeungJin Lim and Yiu-Kai Ng.** 2004. Change Discovery of Hierarchically Structured, Order-Sensitive Data in HTML/XML Documents. *Conference Proceedings for the International Symposium on Applications and the Internet (SAINT 2004)*: pp 178-187.

### Geology

**Bradley Ritts, Andrew Hanson, Brian Darby, Lynde Nanson, and Adrian Berry,** 2004. Triassic Intraplate Extension in North China: Evidence from the Nonmarine NW Ordos Basin. *Tectonophysics* 386:177-202.

### Mathematics & Statistics

**LeRoy B. Beasley.** 2004. Zero-term Rank of Real Matrices and their Preservers. *Czechoslovak Mathematical Journal* 54(129):183-188.

**Istvan Berkes, Edit Gombay, Lajos Horvath and Piotr Kokoszka.** 2004. Sequential Change-point Detection in GARCH(p,q) Models. *Econometric Theory* 20:1140-1167.

**D. Richard Cutler, Christopher D. Corcoran, Jianjun Zhang, and Nancy E. Sassano.** 2004. Dietary Protein Intake and Risk of Osteoporotic Hip Fracture in Elderly Residents of Utah by Hiedi J. Wengren, Ronald G. Munger, Nancy West. *Journal of Bone and Mineral Research* 19 4:537-545.

**D. Richard Cutler, Thomas C. Edwards, Jr., Linda Geiser, Jim Alegria, Dan McKenzie.** 2004. Assessing Rarity of Species with Low Detectability: Lichens in the Pacific Northwest Forests. *Ecological Applications* 14(2):414-424.

**Lajos Horvath, Piotr Kokoszka and Gilles Teysiere.** 2004. Bootstrap Misspecification Tests for ARCH based on the Empirical Process of Squared Residuals. *Journal of Statistical Computation and Simulation* 74:469-485.

**Piotr Kokoszka and Andrejus Parfionovas** 2004. Bootstrap Unit Root Rests for Heavy-tailed Time Series. *Handbook of Computational and Numerical Methods in Finance* 175-197.

**Physics & the Center for Atmospheric and Space Sciences (CASS)**

**T. E. Burns, J. R. Dennison and Jason Kite**. 2004. Extended BEG Model of Monhalogenated Methanes Physisorbed on Ionic Crystals. *Surface Science* 554:211-221.

**William B. Cade III, Jan J. Sojka, Lie Zhu, and Yohsuke Kamide**. 2004. A Wavelet Analysis of Storm-Substorm Relationships. *Disturbances in Geospace: The Storm-Substorm Relationship Geophysical Monograph 142*, 10.1029/142GM14, 159.

**J. R. Dennison, C. D. Thomson, and Alec Sim**. 2004. The Effect of Low Energy Electron and UV/VIS Radiation Aging on the Electron Emission Properties and Breakdown of Thin-Film Dielectrics. *Proceedings of the 8<sup>th</sup> IEEE Dielectrics and Electrical Insulation Society (DEIS) International Conference on Solid Dielectrics (ICSD)*, 967-971.

**Geonhwa Jee, Robert W. Schunk, and Ludger Scherliess**. 2004. Analysis of TEC Data From the TOPEX/Poseidon Mission. *Journal of Geophysical Research* 109(A01301):1-17.

**Robert W. Schunk, Ludger Scherliess, Jan J. Sojka, Donald C. Thompson, David N. Anderson, Mihail Codrescu, Cliff Minter, Timothy J. Fuller-Rowell, Roderick A. Heelis, Marc Hairston, and Bruce M. Howe**. 2004. Global Assimilation of Ionospheric Measurements (GAIM). *Radio Science* 39(RS1S02):1-11.

**Jan J. Sojka, Michael David, Robert W. Schunk, John C. Foster, and H. B. Vo**. 2004. A Modeling Study of the F-Region Response to SAPS. *Journal of Atmospheric and Solar-Terrestrial Physics* 66:415-423.

**Jan J. Sojka, J. Vince Eccles, Robert W. Schunk, Sarah McDonald, Stephan Thonnard, Ken Dymond, and Robert P. McCoy**. 2004. Ionospheric Assimilation Techniques for ARGOS Low-Resolution Airglow and Aurora Spectrograph (LORAAS) Tomographically Reconstructed Equatorial Electron Density Profiles. *Radio Science* 39(RS1S07):1-8.

**Charles Torre**. 2004. Cosmology, Cohomology and Compactification. *Classical and Quantum Gravity* 21:L73-L77.

**Bruce Tsurutani, Anthony Mannucci, Bron Iijima, Mangalathayil Ali Abdu, Jose Humberto A. Sobral, Water Gonzalez, Fernando Guarnieri, Toshitaka Tsuda, Akinori Saito, Kiyohumi Yumoto, Bela Fejer, Timothy J. Fuller-Rowell, Janet Kozyra, John C. Foster, Anthea Coster, and Vytnis M. Vasiliunas**. 2004. Global Dayside Ionospheric Uplift and Enhancement Associated with Interplanetary Electric Fields. *Journal of Geophysical Research* 109:A08302-A08317.

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College of Science

Office of the Dean

0305 Old Main Hill

Logan, UT 84322-0305

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