



# Science Scene

## Research Report

June to September 2005

A Publication of the College of Science, Utah State University

### —The Dean's Corner—

Fall semester is well underway and we've already seen fresh snow on the peaks behind campus. We are looking forward to another year of research successes, but it will clearly be in an environment of intense competition for limited research funding. As you will see in the first table below, the annual number of proposals and awards has declined, though the dollar value of research awards has increased. It is difficult to determine the reasons behind these numbers, but possibilities include increased collaborations and larger interdisciplinary projects; receipt of fewer, but larger grants (quality versus quantity); increased selectivity in submitting proposals; and perhaps, a reflection of a cyclical pattern of large multi-year grant awards. Regardless, we need to remember that we are increasingly dependent on external funding and overhead (F&A) return to support our research efforts and our graduate programs, and to meet other unit needs.

An important part of our collective success involves the successful mentoring of our new faculty in the research funding process. This is a responsibility we all share – especially senior faculty, department heads and the Dean's office. **Lisa Berreau**, our associate dean for faculty development and research, will work with junior faculty throughout the year, assisting them with the “ins and outs” of the contract and grant process. The Vice President for Research and the CIB are scheduling grant writing workshops this year that will be available to all faculty and graduate students. With all of us working together, we can look forward to another successful year.

One of the ways in which USU has distinguished itself as a research university is its support of undergraduate research opportunities. As you may recall, this past spring we awarded the first ten Willard L. Eccles Undergraduate Research Fellowships for 2005-06. Because of increasing student interest in these fellowships and the impact opportunities like this will have on recruiting outstanding high school students, **Chris Tallackson**, our new college development officer, and I will be seeking corporate and alumni donations to help support additional fellowships for 2006-07. Please let us know if you have former students now working in industry or if you are aware of alumni in the corporate world whom we might visit in this effort. Your support can make a difference.

Please send me your comments or suggestions related to the items above via email at [don.fiesinger@usu.edu](mailto:don.fiesinger@usu.edu). Also, please advise me of research-related issues you would like to see presented in *Science Scene*.

### — COLLEGE OF SCIENCE CONTRACT & GRANT ACTIVITY —

Amounts (# of proposals)	Cumulative Totals for FY03-04	Cumulative Totals for FY04-05
Proposals Submitted	\$41,675,587 (202)	\$36,279,479 (146)
Awards Received	\$ 9,253,402 (142)	\$ 9,892,319 (113)

Amounts (# of proposals)	July 2005	August 2005	Cumulative Totals for FY05-06
Proposals Submitted	\$3,302,577 (13)	\$1,993,257 (10)	\$5,295,834 (23)
Awards Received	\$1,120,265 (8)	\$ 480,372 (11)	\$1,600,637 (19)



## Faculty Please Note!

Your *Science Scene* submissions are compiled for the Board of Trustees' Report

*Science Scene*, the College of Science faculty research newsletter, is published every three months (October, January, April, and July) and the contents are used in our required reports to the Board of Trustees. It is critical that you submit your information in a timely manner to ensure that the research productivity of the College of Science is accurately reported. Submissions of presentations more than five months older than the date of newsletter publication may be deleted.

## —Visiting Scholar Profile—

### Ikenna Onyido

**Home Institution:** Professor of Chemistry & Dean, College of Natural & Applied Sciences, Bells University of Technology, Ota, Ogun State, Nigeria

**Research Project or interests:** Mechanisms of the hydrolysis of phosphinothioates and related substrates

**Name of USU Collaborator:** Alvan C. Hengge

**Length of Visit:** September – December 2005

Dr. Onyido is visiting Dr. Hengge's lab in the Department of Chemistry and Biochemistry and will engage in studies aimed at elucidating the transition state structures and mechanistic details of phosphinoyl group transfer and related reactions by using LFER and heavy atom KIE techniques.

## —Kellie's Korner—

The Sponsored Programs Office is pleased to offer Grant Editing Services. Jerilyn Hansen, Sponsored Programs Administrator, will be providing this service to new faculty (within 2 years of employment) and faculty who may need help with preparing a proposal for review in English. Jerilyn will provide editing and guidance for grammar, flow and readability. A minimum lead time of one week will be necessary. Please contact Jerilyn at 797-3437 or [Jerilyn.Hansen@usu.edu](mailto:Jerilyn.Hansen@usu.edu) to schedule an appointment.

A Grant Writing Workshop will be held October 26th and 27th. If interested, please contact the main office at 797-1226. More information will follow.

In an effort to better utilize USU's existing resources, we are compiling a list of all equipment and/or services that are available to any USU faculty member. After developing the list, we will post it on the web to assist PIs to develop more effective proposals and reduce project costs by better utilizing the significant resources USU already has, instead of forcing them to automatically seek external sources to meet their needs. While this service will benefit individual researchers, we also believe it will benefit your departments as well, since the services and equipment each college and department has to offer will be publicized to more potential users. If you have any resources you would like included please contact David Paul at 797-8321 or [David.Paul@usu.edu](mailto:David.Paul@usu.edu).

As always, please let me know if I can be of service. My phone number is 797-0470 or email [Kellie.Hedin@usu.edu](mailto:Kellie.Hedin@usu.edu).

*Kellie Hedin*

UTAH STATE UNIVERSITY  
COLLEGE OF SCIENCE  
(AY 2005-06)

**Faculty Senate**

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

Steve Allan (08)  
Greg Jones (08)  
Will Pependorf (08)  
Steve Aust (07)  
Jim Evans (07)  
Lance Littlejohn (07)  
Stephen Bialkowski (06)  
rep to Senate Exec Comm  
J.R. Dennison (06)  
Don Fiesinger (appointed by Pres.)

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

Richard Cutler (06)

**Academic Standards Subcommittee of EPC**

Kathryn Turner

**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**

Susanne Janecke (08)

**\* Faculty Evaluation Committee**

Greg Podgorski (08)

**\* Budget and Faculty Welfare Committee**

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

**Graduate Council**

Richard Cutler (07)

**Council on Teacher Education**

Richard Mueller  
Jim Cangelosi

**COS Curriculum & Undergraduate Advisory  
Committee**

Chair	Richard Mueller, Assoc. Dean
Biology	Greg Podgorski
Chem & Biochem	David Farrelly
Computer Science	Dan Watson
Geology	Pete Kolesar
Math & Stat	Dan Coster
Physics	Mark Riffe

**COS Research & Graduate Advisory Committee**

Chair	Lisa Berreau, Assoc. Dean
Biology	Peter Ruben
Chem & Biochem	Stephen Bialkowski (Rick Holz, substitute)
Computer Science	Nick Flann
Geology	Dave Liddell
Math & Stat	Richard Cutler (COS rep on Grad Council)
Physics	Vince Wickwar

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

## — International Graduate Student & Scholar Insurance — 2005-2006

Health insurance for international students and scholars may be purchased through PSI Service, Inc. for a significantly lower rate than USU student insurance. The PSI insurance plan has been approved by the USU health service for use on the campus. For the PSI insurance, for the 2005-2006 academic year, the cost for an international student/scholar under the age of 30 is \$803 whereas the USU policy for the same time period is a minimum \$2136.

To purchase the PSI insurance policy, on the left side of the PSI webpage ([www.psiservice.com](http://www.psiservice.com)), under the heading School Website, fill in [www.usu.edu](http://www.usu.edu). This will bring you to the cost listing for Plan III. This is the only PSI plan available for international students/scholars on the USU campus.

Several students in the Department of Chemistry and Biochemistry have had PSI insurance over the past few years with no significant problems.

## —Student Activities—

### Student Awards, Recognition & Grants

#### Biology

At the 38<sup>th</sup> Annual Meeting of the Society for Invertebrate Pathology, **Drauzio E.N. Rangel**, PhD student in the lab of **Don Roberts**, received a travel award for presenting a paper titled “*Metarhizium anisopliae* Conidia Produced under Environmental and Nutritional Stresses Exhibit Increased Virulence and Tolerance to UV-B Radiation and Heat.” His coauthors were **Anne Anderson** and **Don Roberts**.

#### Chemistry & Biochemistry

##### Visiting Research Fellow

**Trina Sudweeks**, an undergraduate at the University of Utah, spent ten weeks during the summer as an American Heart Association Research Fellow in the lab of **Joanie Hevel**. Trina worked on an American Heart Association sponsored project trying to understand how synthesis of apolipoprotein B, a component of your bad cholesterol, is regulated. Trina presented her work at the American Heart Association Roundtable held at Utah State in August. (Dates of fellowship: 13 June -22 August, 2005).

### Presentations

#### Biology

The following seminars were given in the Department of Molecular and Cellular Physiology, Stanford Medical School, Palo Alto, California:

**Shana Geffeney**. “Snakes Fight Back: Physiological and Molecular Genetic Mechanisms of TTX Resistance,” 29 April 2005.

**Charles Hanifin**, a PhD student in the lab of **Butch Brodie**. “Newt-Snake Coevolution: Matching the Phenotypic Interface or If a Newt and a Snake Got In a Fight, Who Would Win?” 11 July 2005.

Four biology undergraduates presented the following research at the recent National Conference on Undergraduate Research (NCUR), Lexington, Virginia, 21-23 April 2005:

**Danica Daly Francom** works in the lab of **Carol von Dohlen** and presented a poster titled “Historical Biogeography of Native South American Aphids.”

**Glen de Guzman** presented a poster titled “The Role of Transcription Factor FCR3 on Over Expression of MDR1 in *Candida Albicans*.” He conducted this research during a summer 2004 fellowship at Tufts University in Boston. Glen received an American Heart Association Undergraduate Research Fellowship for summer 2005. His research was done in **Daryll DeWald’s** lab.

**Ryan Jackson** works in the lab of **Joe Li** and presented a poster on his research of blue tongue virus. Ryan’s research has been supported by an URCO grant.

**Tyce Kearl** works in the lab of **Peter Ruben** and presented a poster titled “Differential Modulation of Fast- and Slow-Inactivation in Two Cardiac  $Na_v$  Channel Isoforms by an Inactivation Inhibitor.” Tyce has received support from an URCO grant and has just been awarded a department Undergraduate Research Grant for summer 2005.

The following presentations were given at the Joint Annual Meeting of the American Society of Naturalists, the Society for the Study of Evolution, and the Society of Systematic Biologist, Fairbanks, Alaska, 10-14 June 2005:

**Shana Geffeney**. Paper. “Diversification of a Sodium Channel and TTX Resistance in a Predator-Prey Interaction.”

**Charles Hanifin**. Paper. “Newt-Snake Coevolution: Match and Mismatch at the Phenotypic Interface.”

**Larry C. Gardner** and **Robert W. Schunk** presented a poster titled “Ion and Neutral Polar Winds for Northward Interplanetary Magnetic Field Conditions” at the International Association of Geomagnetism and Aeronomy (IAGA) Meeting, Toulouse, France, 18-29 July 2005.

**Geonhwa Gee**, **Robert W. Schunk**, and **Ludger Scherliess** presented a paper titled, “Effect of the Neutral Wind on TEC” at the Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR)-Geospace Environment Models Program (GEM) Joint Conference, Santa Fe, New Mexico, 26 June - 1 July 2005.

The following presentations were made at the American Geophysical Union Meeting, New Orleans, Louisiana, 23-27 May 2005:

**Larry C. Gardner** and **Robert W. Schunk**. Poster.  
“Global Neutral Polar Wind Model.”

**Kim Nielsen**, **Michael J. Taylor**, and **Martin J. Jarvis**.  
Talk. “Climatology of Small-Scale Mesospheric Gravity Waves Observed Over Antarctica.”

The following posters were presented at the Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR) - Geospace Environment Models Program (GEM) Joint Conference, Santa Fe, New Mexico, 26 June - 1 July 2005:

**John Jensen**. “Zonal Drift Velocities of Equatorial 150-KM Echoes.”

**Jed Littlefield**. “Mid-Latitude Structures in Spread-F Region.”

**Kim Nielsen**. “Climatology of Small-Scale Mesospheric Gravity Waves Observed over Antarctica.”

## Publications

### Biology

**Kristin A. Bakkegard**. 2005. Antipredator Behaviors of the Red Hills Salamander, *Phaeognathus hubrichti*. *Southeastern Naturalist* 4:23-32.

**Shana Geffeny**, PhD student in the lab of **Peter Ruben**, has just published a landmark paper in *Nature* (see complete reference in Faculty Publications in this issue of *Science Scene*). This publication is the second of two high-profile papers that Shana has published, both as first author, and represents a significant achievement that few graduate students attain. In the *Nature* article, Geffeny et al. discuss an evolved TTX resistance in garter snakes who prey on toxic newts. Other department authors include **Butch Brodie**, **Peter Ruben**, and former Ruben lab research associate **Esther Fujimoto**.

## Awards & Recognition

### Biology

**Mary Barkworth** traveled to Pakistan 24 July through 5 August to discuss the development of a botanical garden at the University of Peshawar, where she is a member of the Steering Committee for the botanical garden. It will include a herbarium, research laboratories, and a library. Mary visited the site, talked with students discussing the graduate programs, and met with high level-university officials. She returned very impressed with Pakistan’s commitment to higher education as well as research in plant biodiversity.

**Joseph K.-K. Li** attended the 4<sup>th</sup> Sino-US International Symposium on Medicine in the 21<sup>st</sup> Century, 19-21 August 2005, San Francisco, California, where he assisted in organizing the symposium and participated in a general discussion on “Stem Cell Research and Bio-makers for Identification of Infectious Diseases and Cancer.”

Trustee Professor and Ecology Center Director **Jim MacMahon** received the Distinguished Service Citation from the Ecological Society of America (ESA) at its annual meeting held recently in Montreal, Canada. ESA cited his “long and distinguished service to the ESA, to the larger scientific community, and to the larger purpose of ecology in the public welfare” as the basis for this honor. In 1997, Jim served as ESA president and helped the organization overcome significant challenges. He has been a member of several national research council committees, and currently serves on the Senior Management Team developing the design plan for NSF’s NEON (National Ecological Observatory Network) and heads the IRON (local Utah) program.

**Frank Messina** serves as one of four editors of the journal *Functional Ecology*, which is published by the British Ecological Society.

**Mike Pfrender**’s research was featured in the 2005 *Research Matters* magazine published by the USU Office of the Vice President for Research. The article discusses Mike’s work in ecological or environmental genomics. He and his lab study the genetic basis of adaptation and extinction in *Daphnia*, a microscopic crustacean that is found in most North American freshwater ecosystems.

**Peter Ruben**’s work with **Elba Serrano**, Biology associate professor at New Mexico State University, was cited in the 24 August 2005 edition of the Las Cruces *Sun-News*. Dr. Serrano wants to repair destroyed sensory cells in the ear through cloning. Dr. Serrano’s students have cloned one type of ion channel and Dr. Ruben is working with them to confirm that the channel is functional.

### Chemistry & Biochemistry

**Lisa M. Berreau** chaired the F04 Chemical and Bioanalytical Sciences Fellowship Review Panel at the National Institutes of Health in Washington, DC, 11-12 July 2005.

Spiricon, a local high-tech electro optics corporation, has donated laser beam imaging and diagnosis equipment to Professor **Stephen Bialkowski**’s research lab. The equipment will greatly facilitate research in photothermal spectroscopy by rapidly profiling laser beams—allowing rapid optical design and experimental optimization. Spiricon is owned by Dr. Carlos Roundy, a graduate of Utah State University.

**Tapas Kar** was chosen to serve as a member of “Nanotechnology Advisory Committee” for the State of Utah Economic Development Office.

## Physics & Center for Atmospheric & Space Sciences

**Jan J. Sojka** became the chair of the National Science Foundation (NSF) Upper Atmospheric Division’s Aeronomy Programs Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR) Science Steering Committee (CSSC) July 2005. This appointment is for two years.

## Faculty Grants

### Biology

**Anne Anderson and Clare Beelman**

Community/University Research Initiative (CURI) Award

1 May 2005 to 30 June 2006—\$33,000

“Assessing Selenium Levels in the Pariette Wetlands of the Middle Green River Basin, Utah.”

**Timothy Gilbertson, Kytai Nguyen, and Anhong Zhou**

Center for Integrated BioSystems,

Functional Genomics Seed Grant Program

1 July 2005 – 30 June 2006—\$50,000

“Nanoparticle Targeting to Enteroendocrine Cells: An Approach to Reduce Dietary-Induced Obesity.”

**Keith A. Mott and David Peak**

National Science Foundation

1 August 2005 to 31 July 2008—\$200,000

“Stomatal Interactions and Emergent Behavior.”

**Ethan P. White**

National Science Foundation

1 November 2005 to 31 October 2007—\$120,000

“Postdoctoral Fellowship in Bioinformatics.”

**Wayne Wurtsbaugh and Michelle A. Baker**

National Science Foundation

15 September 2005 to 31 August 2009—\$1,043,959

“Collaborative Research: Landscape Limnology of Mountain Watersheds: Nutrient Retention and Ecosystem.”

## Chemistry & Biochemistry

**Lisa M. Berreau**

National Institutes of Health

10 January 2005 to 31 December 2007—\$208,500

“Model Studies of a Nickel Dioxxygenase.”

## Mathematics & Statistics

**Xiaofeng Ren**

National Science Foundation

1 July 2005 to 30 June 2008—\$100,876

“A Study of Morphologies in Block Copolymers and Langmuir Films.”

## Presentations & Related Professional Activities

### Biology

**Mary E. Barkworth and Seung Jin Lim** presented a poster titled “Extending Access and Opportunity in a World of Varying Electronic Wealth: A Demonstration Based on the Web Site for the *Manual for Grasses of North America*” at the 17<sup>th</sup> International Botanical Congress, Vienna, Austria, 17-23 July 2005.

**Timothy A. Gilbertson and Dane R. Hansen** gave an invited plenary lecture titled “Roles of Peripheral Potassium Channels in Fat Chemoreception and Fat Intake” at the Ingestive Behavior Research Center Symposium “Dietary Influences on Obesity: Environment, Behavior and Biology” at Purdue University, West Lafayette, Indiana, 22-24 April 2005.

**Rosalind R. James** gave a presentation titled “*Varroa* Control with Fungal Pathogens: Will This Little Piggy Ever Go to Market?” at the Annual Meeting of the Society of Invertebrate Pathology Anchorage, Alaska, 7-11 August, 2005. Rosalind also organized the symposium titled “Transmission of Insect Pathogens.”

**Kristina J. Spray, T. J. Davis, Anil G. Menon, and Timothy A. Gilbertson** gave a presentation titled “Behavioral Responses to Taste Stimuli in AQP-5 Deficient Mice” at the American Physiological Society Conference *Neurohypophyseal Hormones: From Genomics and Physiology to Disease*, Steamboat Springs, Colorado, 16-20 July 2005.

**Jon Y. Takemoto** presented a talk titled “Bioactive Cyclic Lipopeptides from Plant Pseudomonads” at the Symposium on Bioactive Peptides at the 96<sup>th</sup> Annual Meeting of the American Oil Chemists Society, Salt Lake City, Utah, 1-4 May 2005.

The following presentations were made at the Cambridge Healthtech Institute Conference on Quantitative PCR: The Validation Tool of Choice, La Jolla, California, 21-23 March 2005 (\*denotes undergrad co-author):

**Catherine A. Burcks, Dane R. Hansen, Nathan J. Putnam\*, J. Ryan Taylor\*, and Timothy A. Gilbertson.** “Modulation of the Aldosterone-regulated Salt Transduction Pathway by Changes in Dietary NaCl.”

**Dane R. Hansen and Timothy A. Gilbertson.** “Expression of Delayed Rectifying Potassium Channels in Taste Cells of Obesity-prone and -resistant Rats.”

The following presentations were given at the USU Science Week, Logan, Utah, 11-15 April 2005:

**Maggie K. Buccambuso, Ryan N. Jackson, Uyen Lam, and Joseph K.-K. Li** Oral presentation. “Differential Analysis of Bluetongue Virus Nonstructural mRNA Using Different Primer Sets by Quantitative Real Time Polymerase Chain Reaction.”

**Justin Hoopes, Joseph K.-K. Li and Maggie K. Buccambuso.** Poster. “Development of a New Method of Two-dimensional Electrophoresis to Characterize Bluetongue Virus Protein Expression.”

**Ryan N. Jackson, Maggie K. Buccambuso, Gary Miller, Uyen Lam and Joseph K.-K. Li.** Poster. “The Effectiveness of Antiviral Agents Against Bluetongue Viruses.”

The following presentations were given at the 27<sup>th</sup> Annual Meeting of the Association for Chemoreception Sciences, Sarasota, Florida, 13-17 April 2005 (\* denotes undergrad co-author):

**Arian F. Baquero, Catherine A. Burks, and Timothy A. Gilbertson.** Poster. "Regulation of ENaC by Intracellular Chloride in Taste Cells."

**Catherine A. Burks, Dane R. Hanson, Nathan J. Putnam\*, J. Ryan Taylor\*, and Timothy A. Gilbertson.** Poster. "Dietary NaCl-induced Changes in the Aldosterone-regulated Salt Taste Transduction Pathway."

**Timothy A. Gilbertson and John I. Glendinning.** Symposium Presentation. "Coding in the Taste System: New Perspectives on an Old Problem."

**Dane R. Hansen, Catherine A. Burks, and Timothy A. Gilbertson.** Poster. "Diet-induced Changes in Expression of Fatty Acid-sensitive Potassium Channels in Rat Taste Buds."

**Kristina J. Spray, T.J. Davis\*, Anil G. Menon, and Timothy A. Gilbertson.** Poster. "Taste Responses in Mice Lacking AQP5."

The following presentations were given at the Fifth International Triticeae Symposium, Prague, Czech Republic, 6-10 June 2005:

**Mary E. Barkworth and Julie McGrew.** Presentation. "Determining Ecological Limits and Predicting New Localities by Combining Herbarium Data with Spatial Data."

**Mary E. Barkworth, Julie McGrew, and Guanghua Zhu.** Poster. "The *Triticeae* in China."

**Mary E. Barkworth and Roland von Bothmer.** Presentation. "Twenty-one Years Later: The Impact of Löve and Dewey on Research in the *Triticeae*."

The following presentations were made at the 38<sup>th</sup> Annual Meeting of the Society for Invertebrate Pathology, Anchorage, Alaska, 7-11 August 2005:

**Helen G. Bignayan, Drauzio E.N. Rangel, Edward W. Evans, and Donald W. Roberts.** Poster. "Virulence of Two *Metarhizium anisopliae* Varieties to Mormon Cricket, *Anabrus simplex*, Nymphs and Adults."

**Seth J. Dettenmaier, Drauzio E.N. Rangel, Edward W. Evans, and Donald W. Roberts.** Poster. "Comparative Susceptibility of *Metarhizium anisopliae* Varieties *anisopliae* and *acridum* to the Selective Fungicide Dodine."

**Drauzio E.N. Rangel, Anne J. Anderson, and Donald W. Roberts.** Paper. "*Metarhizium anisopliae* Conidia Produced Under Environmental and Nutritional Stresses Exhibit Increased Virulence and Tolerance to UV-B Radiation and Heat."

**Drauzio E.N. Rangel, Gilberto U.L. Braga, Anne J. Anderson, and Donald W. Roberts.** Poster. "Isolates of *Metarhizium anisopliae* are Diverse in their Relationships between Pigments and Stress Tolerance."

The following presentations were made at the 90<sup>th</sup> Annual Meeting of the Ecological Society of America, Montreal, Canada, 7-12 August 2005:

**Karl Cottenie, S. K. Morgan Ernest, Richard Stevens, and Sam Fuhlendorf.** Paper. "Dispersal through Time: Temporal Metacommunity Dynamics of Annual Desert Plant Communities."

**S. K. Morgan Ernest, Ursula Gaedke, Esteban Muldavin, Richard Stevens, Theodore Willis, and Ian Woivod.** Paper. "Temporal Dynamics of Community Structure."

**Allen H. Hurlbert and Ethan P. White.** Paper. "Exploring the Swiss Cheese Effect: Causes and Consequences of Patchily Occupied Geographic Ranges."

**Ethan P. White and Michael A. Gilchrist.** Poster. "Effects of the Temporal Structure of Individuals on Temporal Turnover in Two Desert Communities."

The following presentations were made at the Annual Meeting of the Botanical Society of America, Austin, Texas, 15-18 August 2005:

**Mary E. Barkworth and Seung Jin Lim.** Presentation/Discussion. "Bridging the Digital Divide" (at the meeting of the American Association of Plant Taxonomists.)

**Joshua Der and Daniel Nickrent.** Paper. "Molecular Systematics of Santalaceae: Phylogeny and Classification of a Paraphyletic Family of Hemiparasitic Plants."

**Mark W. Ellis, Jessie M. Roper, Rochelle E. Gainer, and Paul G. Wolf.** Paper. "Genetic Analyses of *Eriogonum corymbosum* Populations."

**Andrew G. Murdock, Brent D. Mishel, A.R. Smith, Karen S. Renzaglia, Scott Schuette, Charles J. O'Kelly, Jessie M. Roper, Sterling K. Hansen, and Paul G. Wolf.** Paper. "Phylogeny of the Land Plants: Analysis of a New Comprehensive Morphological Matrix in Relation to Nucleotide Sequence Data and Comparative Organellar Genomics."

**Daniel Nickrent, Frank Anderson, and Joshua Der.** Paper. "Phylogenetic Analyses Identify the Photosynthetic Relatives of *Cynomorium* and *Balanophoraceae*."

**Daniel Nickrent, Katherine A. Speicher, and Joshua Der.** Paper. "Phylogenetic Utility of Chloroplast Acetyl-CoA Carboxylase in Angiosperms."

**Jessie M. Roper, Sterling K. Hansen, Andrew G. Murdock, Jennifer V. Kuehl, Jeffrey L. Boore, Kenneth G. Karol, Dina F. Mandoli, Richard Olmstead, Brent D. Mishler, and Paul G. Wolf.** Poster. "Chloroplast Genome Sequence of the Marattioid Fern *Angiopteris*."

**Paul G. Wolf and Joel R. Duff.** Paper. "RNA Editing in Land Plant Organellar Genomes and Its Effect on Phylogenetic Analysis."

## Chemistry & Biochemistry

**Lisa M. Berreau** gave a seminar titled, "Hydrogen Bond Donor/Acceptor Moieties in Bioinorganic Model Systems" at Washington State University, Pullman, Washington, 11 April 2005 and at the University of Vermont, Burlington, Vermont, 13 July 2005.

**Alvan Hengge** presented at talk titled "The Effect of Metal Ions on Phosphoryl Transfer Reactions," at the Isotopes 2005 Conference, Bath, United Kingdom, 27 June – 1 July 2005.

The American Society for Engineering Education (ASEE) sponsored **Tapas Kar** to participate in collaborative research on Nanotechnology at Wright-Patterson Air Force Research Lab, Dayton, Ohio, 8 June 2005 through 31 August 2005.

The following posters were presented at the 12<sup>th</sup> International Conference on Biological Inorganic Chemistry, Ann Arbor, Michigan, 31 July – 5 August 2005:

**Lisa M. Berreau, Amrita Saha, and Atta M. Arif.** “Thioester Hydrolysis Reactivity of Binuclear Zinc Hydroxide Complexes: Investigating Reactivity Relevant to Glyoxalase II Enzymes.”

**Amy L. Fuller, Rex W. Watkins, Atta M. Arif, and Lisa M. Berreau.** “Mononuclear Nitrogen/Oxygen-Ligated Mn(II) Halide Complexes: Progress Toward Understanding Halide Effects in Oxalate Degrading Enzymes.”

**Sanghamitra Mitra and Richard C. Holz.** “Mechanistic Studies on the Nitrile Hydratase from *Pseudonocardia thermophila* JCM 3095.”

**Ewa Szajna, Atta M. Arif, and Lisa M. Berreau.** “Coordination Chemistry of Mononuclear Ni(II) Complexes of Relevance to Acireductone Dioxygenase.”

## Mathematics & Statistics

**Xiaofeng Ren** presented a talk titled “Critical Mass Constraint in the Cahn-Hilliard Equation” at the East China Normal University Workshop on Nonlinear Partial Differential Equations, Shanghai, China, 15 June 2005 and at the 2nd East China Normal University Partial Differential Equations (PDEs) Conference, Shanghai, China, 7 July 2005.

**Xiaofeng Ren** presented a talk titled “Interface Oscillation in Block Copolymers” at the Huazhong Conference on Nonlinear Partial Differential Equations (PDEs), Zhangjiajie, China, 10 July 2005.

## Physics & Center for Atmospheric & Space Sciences

**Susanna M. Messinger, David Peak, and Keith A. Mott** presented a paper titled “Noise Enhanced Emergent, Distributed Computation in Plants,” at the First Symposium on Plant Neurobiology, Florence, Italy, 17-20 May 2005.

**Robert W. Schunk** presented a talk titled “The Global Ionosphere” at the Radio Frequency (RF) Ionospheric Interactions Workshop, Santa Fe, New Mexico, 17 April 2005.

**T.-C. Shen** gave a presentation titled “Silicon Nanoscale 2D Donor Devices Fabricated by UHV-STM Lithography” at the American Physical Society Meeting, Los Angeles, California, 22 March 2005.

**T.-C. Shen** presented a Science and Technology colloquium titled “Integrable Nano- to Atom-Scale 2D Donor Devices in Silicon” at IBM Almaden Research Center at San Jose, California, 24 June 2005.

**T.-C. Shen** conducted a seminar titled “Integrable Nano- to Atom-Scale 2D Donor Devices in Silicon” at the Integrated Nanosystems Research Facility at University of California, Irvine, California, 22 November, 2004.

**Jan J. Sojka** presented a talk titled “Does the Mid-Latitude Ionosphere Exist During Super-Storms” at the American Geophysical Union Spring Meeting, New Orleans, Louisiana, 23-27 May 2005.

**J. D. West, David Peak, and Keith A. Mott** presented a paper titled “Sophisticated Information Processing in Plants,” at the First Symposium on Plant Neurobiology, Florence, Italy, 17-20 May 2005.

**Yucheng Zhao** presented a poster titled, “Ground-Based Measurements of the Annual and Semi-Annual Oscillations in Mesospheric Temperatures at Low Latitudes,” at the Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR)-Geospace Environment Models Program (GEM) Joint Conference, Santa Fe, New Mexico, 26 June-1 July 2005.

The following talks were presented at the Ionospheric Effects Symposia (IES 2005), Alexandria, Virginia, 3-5 May 2005:

**Robert W. Schunk and Howard G. Demars.** “Thermosphere Weather due to Mesoscale Ionospheric Structures.”

**Robert W. Schunk, Ludger Scherliess, Jan J. Sojka, Donald C. Thompson, and Lie Zhu.** “An Operational Data Assimilation Model of the Global Ionosphere.”

The following posters were presented at the American Geophysical Union Spring Meeting, New Orleans, Louisiana, 23-27 May 2005:

**Abedalrazq F. Khalil, Abdallah R. Barakat, and Mac McKee.** “Geomagnetic Activity Forecasting Using Self-Learning Algorithms: Application in Space Weather Studies.”

**Ludger Scherliess, Robert W. Schunk, Jan J. Sojka, Donald C. Thompson, and Lie Zhu.** “Comparison of the USU GAIM Ionospheric Plasma Densities with Arecibo ISR Observations.”

The following papers were presented at the International Association of Geomagnetism and Aeronomy (IAGA) Meeting, Toulouse, France, 18-29 July 2005:

**Bela G. Fejer.** “High Latitude Driven Low Latitude Ionospheric Effects.”

**Ludger Scherliess, Robert W. Schunk, Jan J. Sojka, and Donald C. Thompson.** “The USU GAIM Physics-Based Data Assimilation Model for the Ionosphere.”

**Robert W. Schunk, Ludger Scherliess, Jan J. Sojka, Donald C. Thompson, and Lie Zhu.** “An Operational Data Assimilation Model of the Global Ionosphere.”

**Jan J. Sojka.** “Multi-Point Observations: The Next Space Science Threshold.”

The following presentations were made at the 51<sup>st</sup> International Symposium of American Vacuum Society, Anaheim, California, 16-18 November 2004:

**Jeong-Young Ji and T.-C. Shen.** Poster. “STM Study of Phosphine Adsorption on Si (111)-7x7 Surfaces.”

**Jeff S. Kline and T.-C. Shen et al.** Talk. “Fabrication and Electrical Characterization of 2D Dopant Nanoelectronic Devices in Si.”

**T.-C. Shen, Jeff S. Kline et al.** Presentation. “STM Study of Silicon Surfaces At P-N Junctions Prepared by Low-Temperature Processing.”

## Faculty Publications

### Biology

**Peter B. Adler, Ethan P. White, William K. Lauenroth, Dawn M. Kaufman, Andrew Rassweiler, and James A. Rusak.** 2005. Evidence for a General Species-Time-Area Relationship. *Ecology* 86:2032-2039.

**James R. Buskirk, James F. Parham, and Chris R. Feldman.** 2005. On the Hybridisation Between Two Distantly Related Asian Turtles (Testudines: *Sacalia* x *Mauremys*). *Salamandra* 41:21-26.

**James H. Cane.** 2005. Pollination Needs of Arrowleaf Balsamroot, *Balsamorhiza sagittata* (Heliantheae: Asteraceae). *Western North American Naturalist* 65(3):359-364.

**James H. Cane, Robert Minckley, Linda Kervin, and T'ai Roulston.** 2005. Temporally Persistent Patterns of Incidence and Abundance in a Pollinator Guild at Annual and Decadal Scales: The Bees of *Larrea tridentate*. *Biological Journal of the Linnean Society* 85:319-329.

**S. K. Morgan Ernest.** 2005. Body Size, Energy Use, and Community Structure of Small Mammals. *Ecology* 86:1407-1413.

**Shana L. Geffeny, Esther Fujimoto, Edmund D. Brodie III, Edmund D. Brodie, Jr., and Peter C. Ruben.** 2005. Evolutionary Diversification of TTX-resistant Sodium Channels in a Predator-prey Interaction. *Nature* 434:759-763. (The article was also featured in *News and Views* titled Evolutionary Biology: Channels of Resistance.)

**Rosalind R. James.** 2005. Impact of Disinfecting Nesting Boards on Chalkbrood Control in the Alfalfa Leafcutting Bee. *Journal of Economic Entomology* 98:1094-1100.

**Rosalind R. James and Theresa P. Pitts-Singer.** 2005. *Ascospaera aggregate* Contamination on Alfalfa Leafcutting Bees in a Loose Cell Incubation System. *Journal of Invertebrate Pathology* 89:176-178.

**Joseph R. Mendelson III, Edmund D. Brodie, Jr., John H. Malone, Manuel E. Acevedo, Michelle A. Baker, Neal J. Smatresk, and Jonathan A. Campbell.** 2005. Factors Associated with the Catastrophic Decline of a Cloudforest Frog Fauna in Guatemala. *Revista Biologica Tropica (International Journal of Tropical Biology)* 52(4):991-1000.

**Mark P. Miller, Susan M. Haig, and R. Steven Wagner.** 2005. Conflicting Patterns of Genetic Structure Produced by Nuclear and Mitochondrial Markers in the Oregon Slender Salamander (*Batrachoseps wrightii*): Implications for Conservation Efforts and Species Management. *Conservation Genetics* 6:275-287.

**K. J. Min, C. G. Cha, and William Popendorf.** 2005. Determination of Urinary Metabolites of Phosalone, Methidathion and IBP after Oral Administration and Dermal Application to Rats. *Bulletin of Environmental Contamination Toxicology* 74(5):809-816.

**James P. Pitts.** 2005. Description of a New Species in the *Sphaerophthalma pennsylvanica* Species-group (Hymenoptera: Mutillidae). *Zootaxa* 1050: 39-43.

**James P. Pitts, Joseph V. McHugh, and Kenneth G. Ross.** 2005. Cladistic Analysis of the Fire Ants of the *Solenopsis saevissima* Species-group (Hymenoptera: Formicidae). *Zoologica Scripta* 34:493-505.

**James P. Pitts and Frank D. Parker.** 2005. Description of the Female, Redescription of the Female, Redescription of the Male, and Host Associations of the Nearctic Species *Sphaerophthalma jacala* Schuster (Hymenoptera: Mutillidae). *Zootaxa* 1011:1-10.

**Stephen H. Roxburgh, Sandra L. Berry, Thomas N. Buckley, Belinda Barnes, and Michael L. Roderick.** 2005. What is NPP? Inconsistent Accounting of Respiratory Fluxes in the Definition of Net Primary Productivity. *Functional Ecology* 19:378-382.

**Dov F. Sax, James H. Brown, Ethan P. White, and Steven D. Gaines.** 2005. Dynamics of Species Invasions: Insights Into the Mechanisms That Limit Species Diversity. *Species Invasions: Insights to Ecology, Evolution and Biogeography* 447-465.

**Stephen M. Shuster, Mark P. Miller, Brian K. Lang, Nathan Zorich, Lynn Huynh, and Paul Keim.** 2005. The Effects of Controlled Propagation on an Endangered Species: Genetic Differentiation and Divergence in Body Size Among Native and Captive Populations of the Socorro Isopod (Crustacea: Flabellifera). *Conservation Genetics* 6:355-368.

**Vijendra K. Singh.** 2005. Rehabilitation of Autism with Immune Modulation Therapy. *Journal of Special Education and Rehabilitation* 3(4):161-178.

**R. Steven Wagner, Mark P. Miller, Charles M. Crisafulli, and Susan M. Haig.** 2005. Geographic Variation, Genetic Structure, and Conservation Unit Designation in the Larch Mountain Salamander (*Plethodon larselli*). *Canadian Journal of Zoology* 83:396-406.

**Paul G. Wolf, Kenneth G. Karol, Dina F. Mandoli, Jennifer Kuehl, K. Arumuganathan, Mark W. Ellis, Brent D. Mishler, Dean G. Kelch, Richard G. Olmstead, and Jeffery L. Boore.** 2005. The First Complete Chloroplast Genome Sequence of a Lycophyte, *Huperzia lucidula* (Lycopodiaceae). *Gene* 350:117-128.

### Chemistry & Biochemistry

**Krzysztof P. Bzymek, Aaron Moulin, Sabina I. Swierczek, Brian Bennett, Dagmar Ringe, Gregory Petsko and Richard C. Holz.** 2005. Kinetic, Spectroscopic, and X-ray Crystallographic Characterization of the Functional E151H Aminopeptidase from *Aeromonas proteolytica*. *Biochemistry* 44:12030-12040.

**Alicja J. Copik, Boguslaw Nocek, Sabina I. Swierczek, Shane Ruebush, Jang SeBok, Ventris M. D'souza, John Peters, Brian Bennett, and Richard C. Holz.** 2005. EPR and X-ray Crystallographic Characterization of the Product Bound Form of the Mn(II)-Loaded Methionyl Aminopeptidase from *Pyrococcus furiosus*. *Biochemistry* 44:121-129.

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**Amy L. Fuller, Rex W. Watkins, Kim R. Dunbar, Andrew V. Prosvirin, Atta M. Arif, and Lisa M. Berreau.** 2005. Manganese (II) Chemistry of a New N<sub>3</sub>O-donor Chelate Ligand: Synthesis, X-ray Structures, and Magnetic Properties of Solvent- and Oxalate-Bound Complexes. *Dalton Transactions* 1891-1896 (Cover article).

**Prasanta Kumar Nandi, Krishna Mandal and Tapas Kar.** 2005. Ab initio SCRF Study of Solvent Effect on the Nonlinear Polarizabilities of Different Intramolecular Charge-transfer (ICT) Molecules. *Theoretica Chimica Acta* 114: 200-207.

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**Magdalena M. Makowska-Grzyska, Kelly Doyle, Russell A. Allred, Atta M. Arif, Deborah C. Bebout, and Lisa M. Berreau.** 2005. Structural, Spectroscopic, and Reactivity Properties of N<sub>2</sub>S<sub>2</sub> (thioether)-O(amide)-Ligated Hg(II) Complexes: The First Examples of Hg(II)-Mediated Amide Cleavage. *European Journal of Inorganic Chemistry*: 822-827.

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**Sergey Rozhok, Clifton Kwang-Fu Shen, Pey-Lih Ho Littler, Zhifang Fan, Chang Liu, Chad A. Mirkin, and Richard C. Holz.** 2005. Methods for Fabricating Microarrays of Motile Bacteria. *Small* 1:445-451.

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**Kerensa Sorensen-Stowell and Alvan C. Hengge.** 2005. Examination of P-OR Bridging Bond Orders in Phosphate Monoesters using <sup>18</sup>O Isotope Shifts in <sup>31</sup>P NMR. *Journal of Organic Chemistry* 70(12):4805-4809.

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**Richard Cutler and Peter M. Ellis.** 2005. A Simple Model to Predict Loss Ratios in the Domestic Stock Property-Liability Insurance Industry Quarterly. *Journal of Business and Economics* 44(3-4):129-139.

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**Byung S. Moon and Leroy Beasley.** 2005. The Random Signals Satisfying the Properties of the Gaussian White Noise. *Journal of Korea Society of Industrial and Applied Mathematics* 9(1):1-8.

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**Howard G. Demars and Robert W. Schunk.** 2005. Effect of the Theta Aurora on the Polar Thermosphere. *Journal of Atmospheric and Solar-Terrestrial Physics* 67:489-499.

**Dominique Pautet, Michael John Taylor, Alan Z. Liu, and Gary R. Swenson.** 2005. Climatology of Short-Period Gravity Waves Observed Over Northern Australia During the Darwin Area Wave Experiment (DAWEX) and Their Dominant Source Regions. *Journal of Geophysical Research* 110:D03S90.

**Ludger Scherliess.** 2005. A "New" Tool for Ionospheric Sciences and Applications. *The CEDAR Post* 50:14.

**Jan J. Sojka, Michael David, Robert W. Schunk, and Anthony P. van Eyken.** 2005. Polar F-Layer Model-Observation Comparisons: A Neutral Wind Surprise. *Annales Geophysicae* 23:191-199.

**J. D. West, David Peak, J.Q. Peterson, and Keith A. Mott.** 2005. Dynamics of Stomatal Patches for a Single Surface of Xanthium Strumarium L. Leaves Observed with Fluorescence and Thermal Images. *Plant, Cell & Environment* 28:633-641.

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