



Science Scene

Research Report

March to May 2005

A Publication of the College of Science, Utah State University

—The Dean's Corner—

Last month we announced the arrival of **Kellie Hedin**, the sponsored programs administrator for the College of Science, here in the Dean's Office. Kellie will be making regular contributions to our research newsletter under "Kellie's Korner," so look for updates and information from the Sponsored Programs Office.

I would also like to take this opportunity to announce that **Lisa Berreau**, associate professor of Chemistry & Biochemistry, will be joining the Dean's Office as an associate dean (25% time) beginning July 1. This position has been redefined to emphasize research and faculty development and we look forward to working with Lisa as she begins this new assignment.

Searches for new faculty hires have just about concluded. We filled seven positions for fall 2005 with an additional faculty member beginning in the fall of 2006. We will be welcoming two new faculty in Biology, four in Computer Science, and one in Mathematics & Statistics. Geology and Mathematics & Statistics are close to making offers on two remaining searches and hope to have their respective positions filled soon. Several of these hires will add to our faculty depth and expertise in bioinformatics.

We are also pleased to announce the first Willard L. Eccles Undergraduate Research Fellowships, made possible by a generous grant from the Willard L. Eccles Foundation. A competitive award, the 10 recipients will receive \$7,500 each, allowing them to pursue a research project for the next 12 months under the direction of a faculty mentor. The names of our first 10 recipients are listed later in this newsletter.

There is a major initiative underway in the College this spring. Peter Ruben, professor of Biology, and an interdisciplinary team of colleagues from the colleges of Science, Engineering, Agriculture, and Education are working on a proposal in response to an RFP from the Howard Hughes Medical Institute and the National Institute of Biomedical Imaging and Bioengineering (HHMI - NIBIB). The primary goal of this RFP is to develop a program to train PhD scientists with broad interdisciplinary knowledge and skills which will allow them to conduct research at the interface between the biomedical sciences and the more traditional physical sciences and engineering.

And congratulations to **Jim MacMahon**, who was recently named the Director of the Ecology Center, effective July 1. Jim replaces Martyn Caldwell, who will be retiring.

Please send any comments or suggestions related to the items above to me via email at don.fiesinger@usu.edu. Also, if there are other research-related issues that you would like to see presented in *Science Scene*, contact me as well.

— CURI GRANT — RECIPIENTS FOR 2005-06

Congratulations to the following CURI Grant recipients:

Rick Holz (Chemistry & Biochemistry) New Drugs to Treat Antibiotic Resistant Bacterial Infections in Utah: \$34,917

Tim Doyle and **Brent Carruth** (Physics) Cell-Level Ultrasonic Analysis Methods for Advanced Medical Diagnostics: \$28,851

Tim Gilbertson (Biology) and **Kytai T. Nguyen** (Biological & Irrigation Engineering) The Obesity Epidemic in Utah: Development of Nanoparticle Technology to Reduce Dietary-Induced Obesity: \$30,270

Xiaojun Qi and **Vladimir Kulyukin** (Computer Science) A Vision-Based Assisted Navigation System for Visually Impaired Wheelchair Users: \$33,603

Tom Lachmar (Geology) Geochemical Investigation of the Fate of Salt Water Injected into Navajo Sandstone in Central Utah: \$16,412

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— NEW FACULTY RESEARCH GRANT — RECIPIENTS FOR 2005-06

Congratulations to the following New Faculty Research Grant recipients:

David E. Brown (Mathematics & Statistics) Characterization of Bipartite Unit Probe Interval Graphs: \$11,576

Carol M. Dehler (Geology) Basin Analysis and Geochronology of the Neoproterozoic Uinta Mt Group: \$14,840

C. Kent Evans (Biology) A Study of the Differential Lesion Reaction in Wheat: \$15,000



— Focus on Facilities —

USU Stable Isotope Laboratory

The USU Stable Isotope Laboratory is a nonprofit research laboratory associated with the Department of Biology and the Ecology Center at Utah State University. As a service to researchers within and outside USU, they analyze soil, plant, and animal tissues, and other combustible materials containing natural abundance and enriched concentrations of carbon ($^{13}\text{C}/^{12}\text{C}$) and nitrogen ($^{15}\text{N}/^{14}\text{N}$) isotopes.

All analyses are performed by continuous-flow direct combustion and mass spectrometry, using a Europa Scientific SL-2020 system. With this system, precise measurements of total C and N contents, as well as C and N isotope ratios are obtained.

If you have any questions regarding ^{13}C or ^{15}N analyses, such as sample preparation and cost, check out the website at <http://bioweb.usu.edu/stark/isotope.html> or contact **John Stark** via email at jstark@biology.usu.edu or by phone at 797-3518.

— Visiting Scholar Profile —

Deokjoon Cha

Home Institution: Professor, Department of Physics, Kunsan National University, Miryong, South Korea

Research project or interests: NSMM (near-field scanning microwave microscopy) study on dielectric and semiconducting materials

Name of USU Collaborator: Haeyeon Yang

Length of Visit: March 2005 - March 2006

Dr. Cha will be visiting the nanophotonics lab in the Physics Department and will engage in nanostructures study on III-V semiconducting materials using Molecular Beam Epitaxy (MBE) and Scanning Tunneling Microscopy (STM).

— Kellie's Korner —

I am pleased to announce my relocation from the Sponsored Programs Office in the basement of Old Main to the College of Science Dean's Office, ESLC Room 245A. In an effort to provide better customer service to our researchers, this will create a "one-stop shop." Please feel free to come to my office, or I am available to come to yours. My phone number has remained the same, 797-0470, and I can also be reached at Kellie.Hedin@usu.edu. If I am not available, you can still contact the folks in the main office at 797-1226, Old Main Room 64.

We had a successful Sponsored Programs Workshop on Faculty Research Day during Research Week 2005 and were treated to a great session on the National Institutes of Health (NIH) with valuable insight from **Tim Gilbertson** on the NIH Study Section. Thanks to all who participated!

Utah State University is registered on Grants.gov., allowing organizations to electronically find and apply for competitive grant opportunities from all Federal grant-making agencies. Navigation of Grants.gov is simple. You can search for grant opportunities, register for email notification of grant opportunities, and download grant application packages. Visit the Web site at <http://grants.gov/>. You can find additional funding opportunities on the sponsored programs Web site at <http://www.usu.edu/vpr/funding/programs/fundingopps.asp>.

As we come to the end of the fiscal year (June 30, 2005) please note that facilities, administrative, and staff benefit rates may change. The Sponsored Programs Office (SPO) has provided an updated budget template on our Web site at http://www.usu.edu/vpr/funding/programs/Proposal_Cost_Template.xls. This is a useful tool in calculating your proposal budgets.

As always, please let me know if I can be of service to you.

Kellie Hedin

— COLLEGE OF SCIENCE CONTRACT & GRANT ACTIVITY —

Amounts (# of proposals)	Feb 05	Mar 05	Cumulative Totals for FY 04 - 05
Proposals Submitted	\$5,531,433.00 (21)	\$3,931,353.00 (11)	\$29,872,917.25 (109)
Awards Received	\$1,326,092.00 (15)	\$487,575.00 (4)	\$7,459,637.03 (81)

**UTAH STATE UNIVERSITY
COLLEGE OF SCIENCE**

**Willard L. Eccles
Undergraduate Research Fellowship
Recipients 2005-06**

Name and Major	Project Title	Research Mentor/Dept
Jonathan Abbott Physics	Study of the Electron Emission Properties of Materials with Particular Application to Spacecraft Charging	J.R. Dennison Physics
Kathryn DuHadway Comp Sci	Developing a Mathematical and Computer-Based Model of a Network of Stomata (pores on the surface of plant leaves)	David Peak, Physics Keith Mott, Biology
Rochelle Echols Biology	Genetic Distinctness of the Las Vegas Buckwheat (<i>Eriogonum corymbosum</i>): An Endangered Plant?	Paul Wolf Biology
Tyce Kearl Biology	Biophysical properties of Human Cardiac Voltage-Gated Sodium Channels, especially the Process of Slow Inactivation	Peter Ruben Biology
Kelly Mitchell Geology	Determine if Tensile Strength Correlates with Field Compressive Strength Measurements and to Channel Width and Gradient of the Colorado River in the Glen and Grand Canyons	Joel Pederson Geology
Rebecca Mitchell Chemistry	Measurement of Kinetic Effects (KIEs) to Discover How Certain Acid Phosphatases React with Nucleophilic Histidines in Phosphoryl Transfer Reactions	Alvan Hengge Chemistry & Biochemistry
Joseph Spencer Mathematics	Study of String Theory and Yangs-Miller Theory to Further the Understanding of General Relativity and Quantum Gravity	James Wheeler Physics
Sandra Viera Chemistry	Tissue Distribution of the Bifunctional Dehydratases in Normal and Cancerous Human Tissues	Joannie Hevel Chemistry & Biochemistry
Isaac Westfield Geology	Stomatolites as Paleobathymetric Indicators in the Middle Cambrian Wheeler Formation of Western Utah	David Liddell Geology
Michael Yurth Interdisc. Studies	Probing a Putative Water Channel in Nitrogenase	Lance Seefeldt Chemistry & Biochemistry

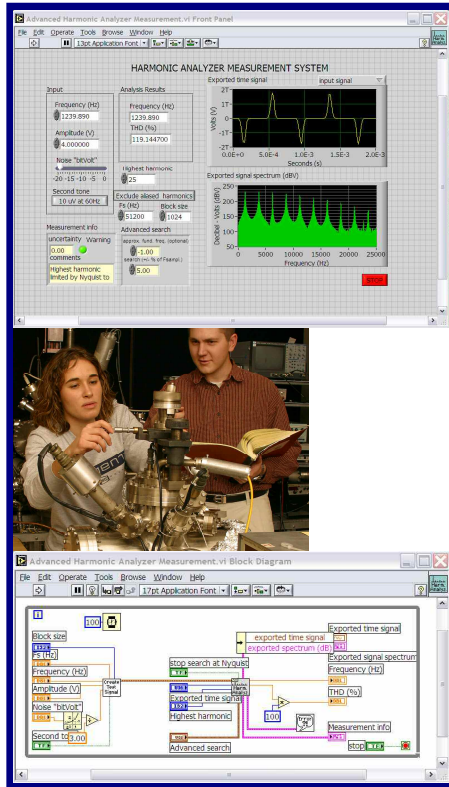
Introduction to Computer Interfacing and Control with LabVIEW™

2 Credit Summer Workshop

PHYX 3500 or 5500

June 6-10, 2005

Instructor: JR Dennison
Physics Department
Utah Sate University



Who Should Take This Workshop?

The workshop is designed for upper division undergraduates and graduate students or researchers in industry and academics who want to learn this versatile industry standard tool. Only basic familiarity with instrumentation and simple programs like Windows or Excel are expected.

What Will You Learn?

The workshop will introduce participants to basic computer interfacing and control of laboratory instrumentation from the ground up. It uses the industry-standard, graphical-interfaced program, LabVIEW™. The course uses a combination of lecture format; simple examples to work through in a guided, self-paced laboratory setting; and intermediate-level, hands-on laboratory exercises. Each day participants will learn about programming techniques and related LabVIEW capabilities and will then apply this knowledge to practical real-world applications. They will learn to interface a simple temperature sensor to measure, plot, record, and analyze data. They will also gain experience with data acquisition cards (DAC), instrument control, and GPIB interfacing. They will be taught how to design and construct simple control algorithms that will allow the development of effective applications and make use of the vast array of drivers and virtual instruments already developed. The course culminates in a capstone final project that will use elements of basic flow and control techniques, simple state machines, data storage, and other advanced techniques. After finishing the course, participants will have the skills to develop their own applications and the experience to delve further into more complex LabVIEW features.

Topics Covered

Day 1:

What is LabVIEW?
How to Navigate within LabVIEW
Types of Data and Programming Structures
Creating Simple Virtual Instruments
Documenting Your LabVIEW Creations

Day 2:

Basic Programming Structures
LabVIEW Programming Etiquette
Analog and Digital Interfacing with DAC's

Day 3:

Higher Level Programming Structures
Interfacing Diverse Transducers
Instrument Control
Graphics and Data Analysis with LabVIEW
Data File I/O

Day 4:

Advanced Programming Topics
Using Instrument Drivers
Instrumentation Protocols (Serial, GPIB, USB)

Day 5:

Review of Additional LabVIEW Resources
Final Capstone Project—A Fully Automated PID Temperature Controller

Sponsored by the USU College of Science

For Further Information Contact: JR Dennison (JR.Dennison@usu.edu or 435-797-2936)

REGISTER SOON—SPACE IS LIMITED

—Student Activities—

Student Awards, Recognition & Grants

Biology

Julie Ford, Public Health junior, was named the Outstanding USU Industrial Hygiene student by the Utah Section of the American Industrial Hygiene Association.

Chemistry & Biochemistry

Anastassia Alexandrova received the Chemical Computing Group (CCG) Excellence Award from the American Chemical Division of Computers in Chemistry at the 229th National American Chemical Society Meeting, San Diego, California, 13-17 March 2005. She is one of ten winners.

Rex Watkins received the American Chemical Society Division of Inorganic 2005 Chemistry Travel Award.

Rex Watkins received a 2005 National Phi Kappa Phi Graduate Fellowship.

The following students received National Sigma Xi Grant-in-Aid of Research Awards:

Miguel Alejandro Pabon

National Sigma Xi Grants-in-Aid of Research Award.
22 April 2005, \$800

This grant will support his research project, "Stereochemistry of Proton Addition to a N₂ Analog Catalyzed by α 70^{Val}→^{Ala} Nitrogenase: A 2D-NMR (COSY) Structural Study."

Eric Vawdrey

National Sigma Xi Grants-in-Aid of Research Award.
22 April 2005, \$915

This grant will support his summer research project, "Pyrotechnic Effects Upon Air Particle Composition."

The following students received URCO Grants for Fall 2004:

Kelly Doyle. "Synthesis and Reactivity of Four and Five-Coordinate Zinc Complexes Containing Six Members."

Faculty Mentor: **Lisa M. Berreau**

Sandra Viera. "Tissue Distribution of the Bifunctional Dehydratases in Normal and Cancerous Human Tissues."

Faculty Mentor: **Joan Hevel**

Rex Watkins. "Mechanistic Investigation of Metal-Mediated Amide Hydrolysis."

Faculty Mentor: **Lisa M. Berreau**

Michael Yurth. "Probing a Putative Water Channel in Nitrogenase."

Faculty Mentor: **Lance C. Seefeldt**

The following students received URCO Grants for Spring 2005:

Talina Christensen. "Asbestos Effects as a Carcinogen and the Role Iron Plays on Increased Reactive Oxygen Species Levels within Cells."

Faculty Mentor: **Ann Aust**

Ren Gonzalez. "Identification of Mitogen-Activated Protein Kinase Phosphatases."

Faculty Mentor: **Ann Aust**

Rebecca Mitchell. "Mechanistic Study of Acid Phosphatases."

Faculty Mentor: **Alvan Hengge**

Geology

Graduate Student News

Andy Brehm received a student research grant from the Geological Society of America for \$1,700 for his grant proposal, "Re-Evaluation of the Jesse Ewing Canyon Formation: Implications for Neoproterozoic Paleogeography and Tectonic Setting of Northeastern Utah."

Sarah Draper received \$4,500 from Direct Observation and Sampling of Earth's Continental Crust (DOSECC) for her research on samples from the San Andreas Fault Observatory at Depth project.

Student Presentations

College of Science

The following presentations were given during the USU Student Showcase on 12 April 2005:

Jonathon Abbott and **J.R. Dennison** (faculty mentor).

"Methods for Determining Crossover Energies in Insulating Materials."

Stephanie Chambers and **Joan M. Hevel** (faculty mentor).

"Biochemical Classifieds: Stealthy RNAi Seeking Attractive PRMT6."

Glen de Guzman. "The Role of Transcription Factor FCR3 on Over Expression of MDR1 in Candida Albicans."

Kelly Doyle and **Lisa M. Berreau** (faculty mentor). "Structural, Spectroscopic and Reactivity Properties of N₂S₂ (Thioether) O (Amide)-Ligated HG(II) Complexes."

Molly Hubbard and **Joan M. Hevel** (faculty mentor).

"Mutational Analysis of Residues Important in Forming Tetrameric Dehydratase."

Landon Karren and **Steven D. Aust** (faculty mentor). "The Role of Iron in Electron Transfer Involving Homocysteine."

Jed Littlefield and **Michael J. Taylor** (faculty mentor).

"Observations and Measurements of F-Region and Mid-Latitude Structures."

Amanda Otterstrom and **J.R. Dennison** (faculty mentor).

"*Sky Drop*: A Physics-based Activity for USU Physics Day at Lagoon."

Jared Otterstrom and **J.R. Dennison** (faculty mentor). "Pulsed System for Optical Discharge of Thin-film Insulators."

Joshua Alan Schliesser and **Steven D. Aust** (faculty mentor).
“The Quinone Induced Release of Iron from Ferritin.”

Shigeyuki Takahashi and **J.R. Dennison** (faculty mentor).
“Measurement of Resistivity of Spacecraft Insulators.”

Brian Thomas and **Brett A. Adams** (faculty mentor).
“Modulation of L-Type (CAV 1.3) Calcium Channels.”

Sandra Viera and **Joan M. Hevel** (faculty mentor). “Distribution of DCoH in Normal and Carcinogenic Human Tissue.”

Rex Watkins. “Kinetic Studies of Amide Hydrolysis/Alcoholysis in ZN(II) Complexes of Amide-Appended Chelate Ligands.”

The following presentations were given during the USU Graduate Student Symposium, 13 April 2005:

Jeff Boyd. “Isolation of Acetone Carboxylase from *Rhodobacter Capsulatus*.”

Maggie K. Buccambuso, **Ryan N. Jackson**, **Uyen Lam**, and **Joseph K.-K. Li**. “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 Buccambuso**. “Development of a New Method of 2-Dimensional Electrophoresis to Characterize Bluetongue Virus Protein Expression.”

Liming Hu. “A High Performance Edge Detector Based on Fuzzy Logic and Inference Rules.”

Ryan N. Jackson, **Maggie Buccambuso**, **Gary Miller**, **Uyen Lam**, and **Joseph K.-K. Li**. Poster. “The Effectiveness of Antiviral Agents Against Bluetongue Viruses.” Undergraduate Ryan Jackson won first prize in the Biological Science Division and a \$50 gift certificate.

Andrew Kulmatiski. “Using a Multi-Factor, Field-Based Experiment to Examine Exotic Plant Invasions.”

Susanna M. Messinger. “Noise Enhanced Distributed Emergent Computation in Plants.”

Gopinath R. Narasimhan, **Jesse Johnson**, **Antonio Rodriguez**, **A. J. Anderson**, **David W. Britt**. “Adhesion Mapping of Wild Type and Quorum Sensing Mutants of Bacteria *Pseudomonas Chlororaphis* 06.”

R. Kripa Ramanan. “Development of a Thermo Responsive Composite Film for Delivery of an Antimitotic Agent to Vascular Smooth Muscle Cells.”

Andrea Van Sickle. “Matrix Factorizations Via Homogenization/Wavelet Analysis.”

Gabriel Velázquez. “Isolating and Characterizing Acetone Carboxylase from *Xanthobacter Autotrophicus* and *Rhodobacter Capsulatus*.”

Dave A. Wampler. “An Anaerobic Photoheterotrophic Degradation Pathway of a Toxic Alkene-Amide:Acrylamide.”

Qian Zhao. “Hierarchical Bayesian Spatial-Temporal Model of Urban Growth Using Remotely Sensed Data.”

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

Danica Daly Francom works in the lab of **Carol von Dohlen**. Poster. “Historical Biogeography of Native South American Aphids.”

Glen de Guzman works in **Darryll DeWald’s** lab. Poster. “The Role of Transcription Factor FCR3 on Overexpression of MDR1 in *Candida Albicans*.” He conducted this research during a summer 2004 fellowship at Tufts University in Boston, Massachusetts. He also received an American Heart Association Undergraduate Research Fellowship for summer 2005.

Ryan Jackson works in the lab of **Joe Li**. Poster. A grant from URCO supported his research on blue tongue virus.

Tyce Kearnl works in **Peter Ruben’s** lab. Poster. “Differential Modulation of Fast- and Slow-Inactivation in Two Cardiac Na_v Channel Isoforms by an Inactivation Inhibitor.” A grant from URCO supported his research. He was also awarded a Biology Department Undergraduate Research Grant for summer 2005.

—Faculty Activities—

Faculty Awards & Recognition

Biology

Diane Alston received the 2005 E.G. Peterson Extension Award, 10 March 2005, at the Extension Annual Awards Conference. This award was established to honor an Extension professional who has given outstanding service to the State of Utah. Diane was cited for her professional expertise, innovative approach, effectiveness, her caring attitude, and her support of the goals and mission of USU Extension.

Jay Karren received an award for his dedicated service on the committee for the past three years at the Western Region Cooperative Agricultural Pest Survey Committee meeting, Fort Collins, Colorado, 8-10 February 2005.

Chemistry & Biochemistry

Steven D. Aust was named the 2004 recipient of the Kenneth A. Spencer Award by the American Chemical Society, 24 February 2005, in Kansas City, Missouri. The award is given to individuals who have made commendable contributions to agriculture and food chemistry.

Stephen E. Bialkowski was awarded a J. William Fulbright Fellowship to Slovenia. He will be working with **Professor Bladen Franko** at Nova Gorica Polytechnic University.

Vernon D. Parker was named the 2005 recipient of the USU D. Wynne Thorne Research Award. This award, named after USU’s first vice president for research, is the most prestigious research commendation annually given by the university to an outstanding university researcher.

Faculty Grants

Biology

Donald W. Roberts and Edward W. “Ted” Evans
Utah Department of Agriculture and Food—\$100,000
1 January to 31 December 2005
“Biological Control of Mormon Crickets in Utah.”

Eric Wagner, Chris Wilson, Mark P. Miller, and Dick Vincent
The Whirling Disease Initiative, Whirling Disease Foundation
1 May 2005 to 31 December 2006—\$83,816
“Characteristics of Whirling Disease Resistance Patterns in Rainbow Trout from Harrison Lake, Montana: Classification of Resistant and Susceptible Individuals and Elucidation of the Effects of Recent Natural Selection.”

Chemistry & Biochemistry

Stephen E. Bialkowski
USU Space Dynamics Laboratory Enabling Technologies Programs
July 1, 2005 to June 30, 2006—\$65,000
“Low Power Wavelength Independent Detector System for Point Measurements of Trace Gas Pollutants.”

Scott A. Ensign
National Institutes of Health
1 December 2004 to 30 November 2008—\$1,102,720
“Microbial Metabolism of Aliphatic Alkenes and Epoxides.”

Scott A. Ensign
Department of Energy Division of Energy Biosciences
1 January 2005 to 31 December 2005
“Proposal to Sequence Xanthobacter Autotrophicus Strain Py2.”

Geology

Carol M. Dehler
Utah Geological Survey
30 November 2004 to 31 May 2005—\$18,000
“Geochronology of the Uinta Mountain Group.”

Carol M. Dehler and Bonnie Pitblado
USU—Advance Office
1 January, 2005 to 30 November 2005—\$8000
“Sourcing the Origin of Stone Raw Materials from the 8,000-Year-Old Chance Gulch Archaeological Site, Gunnison Basin, Colorado.”

Carol M. Dehler
Gardner Junior Faculty Travel Fellowship, USU
1 August 2005 to 30 September 2005—\$1200
Neoproterozoic Geology of the Scottish Isles Field Trip.

James P. Evans
Southern California Earthquake Center
1 May 2005 to 30 April 2006—\$7,000
“Recent Advances in Fault Zone Studies and Their Impact on Earthquake Source Processes: Workshop and Guidebook for a Seismological and Rock Mechanics Based Field Seminar on Faults of Southern California.”

James P. Evans
U. S. Geological Survey EDMAP Program
1 June 2005 to 30 May 2006—\$10,422
“Geologic Mapping of the Transition from Locked to Creeping Portions of the San Andreas Fault Near the SAFOD Site.”

James P. Evans
National Science Foundation
1 June 2005 to 30 May 2007—\$78,000
“Collaborative Research: Analysis of Core from the SAFOD project, Central California.”

Physics and the Center for Atmospheric & Space Sciences

Jim Dyer (PI), J.R. Dennison, Lee, Pearson, Lee Davis, James Burns, Scott Hyde, Tina Andrus, Andrew Auman, Jeff Duce, Tim Nielson, and Rob Leishman
USU Space Dynamics Laboratory (Enabling Technologies Program Grant)
July 2005 to June 2006—\$39,500
“Development Support and Pre-Flight Analysis for SUSpECS (State of Utah Environment and Contamination Study).”

Faculty Presentations & Related Professional Activities

Biology

Daryll B. DeWald gave a seminar, “Phosphoinositide Signaling and Cancer Cell Metastasis” at the University of Utah, Salt Lake City, Utah, 10 February 2005.

Mark Miller (in conjunction with **Dennis Shiozawa** from BYU) conducted a short course, “The Role of Genetics for Hatchery and Endangered Species Management” as part of the American Fisheries Society Continuing Education Program held during the meeting of the American Fisheries Society in Garden City, Utah, 7-9 March 2005.

Drauzio E.N. Rangel, Diane G. Alston, Anne J. Anderson, and Donald W. Roberts presented a paper, “Virulence of *Metarhizium anisopliae* Conidia Produced under Nutritional, Physical, and Oxidative Stress Conditions” at the 89th Annual Meeting of the Pacific Branch Entomological Society of America, Pacific Grove, California, 27 February–2 March 2005.

Katarina Stroffekova gave a seminar, “Skeletal Muscle DHPR: Organization, Function, and Modulation” at the USU College of Engineering, 22 March 2005.

The following presentations were given at the 49th Annual Meeting of the Biophysical Society, Long Beach, California, 12-16 February 2005:

James R. Groome, Jennifer A. Abbruzzese, Esther Fujimoto, and Peter C. Ruben. Poster. “Channel Closure and K⁺ Aggravated Myotonia: Comparison of Open- and Inactivated-State Deactivation Gating.”

Katarina Stroffekova, Paul D. Allen, and Kurt G. Beam. “The IQ Motif of the α_{1S} Subunit of the Skeletal Muscle DHPR is Important for Excitation-Contraction Coupling.”

The following presentations were given at the Quantitative PCR: The Validation Tool of Choice session of the Cambridge Healthtech Institute Conference, La Jolla, California, 21-22 March 2005:

Catherine A. Burks, Dane R. Hansen, Nathan G. Putname, 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 a Delayed Rectifying K Channels in Taste Cells of Obesity-prone and -Resistant Rats.”

The following presentations were made at the American Society for Limnology and Oceanography Aquatic Sciences meeting, Salt Lake City, Utah, 21-25 February 2005:

Christopher Arp, John Schmidt, and Michelle Baker.

“The Effect of Lakes on Stream Geomorphology in a Mountain Lake District.”

Michelle Baker and Robert Hall. “Denitrification in Streams: Silver Bullet or Moving Target?”

Keli Goodman, Q. Wang, P.P. Mou, and Anne Hershey. Poster. “Monitoring Water Quality in China: The Use of Biomonitoring Tools in a Developing Country.”

Robert Hall, Michelle Baker, Jennifer Tank, Christopher Arp, and Ben Koch “Export of Particulate Nitrogen during Storms Interpreted from 15n Tracer Studies in Streams.”

Amy Marcarelli, Wayne Wurtsbaugh, Ben Koch, and Michelle Baker. “The Importance of Aquatic Nitrogen Fixation in High Altitude Subalpine Watersheds of Central Idaho.”

Wayne Wurtsbaugh, Koren Nydick, Michelle Baker, Christopher Arp, Robert Hall, and James Haefner. “Lacustrine Control of Nutrient Flux Through Rocky Mountain Watersheds: Physical and Biological Mechanisms.”

Chemistry & Biochemistry

Alexander I. Boldyrev presented an invited talk, “Multiple Aromaticity – A New Tool in Deciphering Chemical Bonding in Main Group Clusters” at the 7th Congress of the World Association of Theoretically Oriented Chemists, Cape Town, South Africa, 16-21 January 2005.

The following posters were presented at the 229th National American Chemical Society Meeting, San Diego, California, 13-17 March 2005:

Anastassia N. Alexandrova, Alexander I. Boldyrev, Hua-Jin Zhai, and Lai-Sheng Wang. “Ab Initio Genetic Algorithm-Based Elucidation of Multiply Aromatic Clusters.”

Ben M. Elliott, Alexander I. Boldyrev, Anastassia N. Alexandrova, Hua-Jin Zhai, Xin Yang, Xue-Bin Wang, and Lai-Sheng Wang. “Oxygen Rich Species: Areas of Growth and Advancement.”

Kerensa Sorensen-Stowell and Alvan Hengge. “Use of ¹⁸O Isotope Shifts on ³¹P NMR to Probe Potential Medium Effects on Phosphate Ester Bond Strengths.”

Geology

Carol M. Dehler presented a talk, “Neoproterozoic Records From Grand Canyon and the Uinta Mountains: An Evolving View of Climate Change and Tectonic Setting at ~800-750 Ma” at the Utah Geological Association Luncheon, Salt Lake City, Utah, 14 March 2005; and at the University of Oregon, Department of Geology, Eugene, Oregon, 31 March 2005.

The following presentations were given at the Annual Meeting of the American Geophysical Union, San Francisco, California, 9-13 December 2004:

James P. Evans. Poster. “Microstructural Analysis of Exhumed Parts of the San Andreas Fault Near the SAFOD Drillsite, California.”

Vinita Ruth Hobson and John W. Shervais. Paper. “Variations in the Characteristics of Craters of the Moon Lava Flows from Vent to Termination: Remotely Sensed Spectra and Field Observations.”

Angela Isaacs, James P. Evans, and Sheng-Rong Song. Poster. “Characterizing Brittle Deformation, Damage Parameters, and Clay Composition in Fault Zones: Insights From the Chelungpu and Mozumi Faults.”

John W. Shervais. Paper. “Serpentinized Peridotites of the Stonyford Volcanic Complex: Melt Depletions and Enrichments in a Fore-arc Mantle Wedge.”

Mathematics & Statistics

Byung S. Moon presented a talk, “Another Solution of the Gaussian White Noise Driven Ornstein-Uhlenbeck Equation” at the 107th American Mathematical Society Meeting, University of California, Santa Barbara, California, 16 April 2005.

The following talks were presented at the 36th Southeastern International Conference on Combinatorics, Graph Theory and Computing, Florida Atlantic University, Boca Raton, Florida, 9-12 March 2005:

LeRoy B. Beasley. “Are there Chordal Hamiltonian Graphs that are not Cycle Extendable?”

David Brown. “The Hierarchy of Probe Interval, Interval k-, and Tolerance Graphs.”

Physics and the Center for Atmospheric & Space Sciences

T.-C. Shen presented a seminar at the Integrated Nanosystems Research Facility, “Integrable Nano- to Atom-Scale 2D Donor Devices in Silicon” at the University of California, Irvine, California, 16-18 November 2004.

The following papers were presented at the American Physical Society Meeting, 21-25 March 2005, Los Angeles, California. (They were also published in the 2004 *Bulletin of the American Physical Society* 50(1) Part II):

J.R. Dennison, T.E. Doyle, Jodie Corbridge, Sterling Smith, and Neal Nickles. “Studies of Thermally Annealed Graphitic Amorphous Carbon Resulting in a Decrease of Quasi-Stone-Wales Defects and Increase in Bandgap.”

T.-C. Shen. Talk. “Silicon Nanoscale 2D Donor Devices Fabricated by UHV-STM Lithography.”

Alec Sim, J. R. Dennison, and Clint Thomson. “Effects of Incident Electron Fluence and Energy on the Electron Yield Curves and Emission Spectra of Dielectrics.”

The following presentations were made at the 9th Spacecraft Charging Technology Conference in Epochal Tsukuba, Japan, 4-8 April 2005. There were nine presentations by the USU group, including two invited talks (Dennison) and seven posters. **Charles Swenson, Clint Thomson, and Chad Fish** received the “Best Poster” award at the conference.

Aroh Barjatya, Charles M. Swenson, Albert Hummel, Chad Fish, and Dave Hysell. Poster. “Vehicle Charging on a Sounding Rocket Payload.”

Sébastien Clerc, Sylvie Brosse, and J.R. Dennison. Poster. “Validation of Daylight Charging Capabilities of the SPARCS Code.”

Sébastien Clerc, J.R. Dennison, and Clint Thomson. Poster. "Importance of Accurate Computation of Secondary Electron Emission for Modeling Spacecraft Charging."

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

J.R. Dennison, Prasanna Swaminathan, Randy Jost, Jerilyn Brunson, Nelson Green, and A. Robb Frederickson. Poster. "Proposed Modifications to Engineering Design Guidelines Related to Resistivity Measurements and Spacecraft Charging."

Nelson W. Green, A. Robb Frederickson, and J.R. Dennison. Invited talk. "Charge Storage Measurements of Resistivity for Dielectric Samples from the CRRES Internal Discharge Monitor."

Alec Sim, J.R. Dennison, and Clint Thomson. Invited talk. "Evolution of the Electron Yield Curves of Insulators as a Function of Impinging Electron Fluence and Energy."

Charles Swenson, Don Thompson, and Chad Fish. Poster. "The ISS Floating Potential Measurement Unit."

Charles Swenson, Jeffrey Ward, Seth Humphries, and Chad Fish. Poster. "Plasma Impedance Probe Diagnostics: Model and Data."

The following presentations were made at the 51st International Symposium of the 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 and Jeff S. Kline et al. Talk. "STM Study of Silicon Surfaces at P-N Junctions Prepared by Low-Temperature Processing."

Faculty Publications

Biology

Edmund D. Brodie III, Chris R. Feldman, Charles T. Hanifin, Jeffrey E. Motychak, Daniel G. Mulcahy, Becky L. Williams, and Edmund D. Brodie, Jr. 2005. Parallel Arms Races Between Garter Snakes and Newts Involving Tetrodotoxin as the Phenotypic Interface of Coevolution. *Chemical Ecology* 31(2):343-356.

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.

Jacob R. Goheen, Ethan P. White, S.K. Morgan Ernest, and James H. Brown. 2005. Intra-Guild Compensation Regulates Species Richness in Desert Rodents. *Ecology* 86:567-573.

Charles D. Miller, Drauzio Rangel, Gilberto U.L. Braga, Stephan D. Flint, Sun-Il Kwon, Claudio L. Messias, Donald W. Roberts, and Anne J. Anderson. 2004. Enzyme Activities Associated with Oxidative Stress in *Metarhizium anisopliae* during Germination, Mycelial Conidiation and in Response to Near-UV Irradiation. *Canadian Journal of Microbiology* 50(1):41-49.

Drauzio E.N. Rangel, Gilberto U.L. Braga, Anne J. Anderson, and Donald W. Roberts. 2005. Variability in Conidial Thermotolerance of *Metarhizium anisopliae* Isolates from Different Geographic Origins. *Journal of Invertebrate Pathology* 88:116-125.

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

Chemistry & Biochemistry

Anastassia N. Alexandrova, Alexander I. Boldyrev, Hua-Jin Zhai, and Lai-Sheng Weng. 2005. Cu₃C₄: a New Sandwich Molecule with Two Revolving C₂²⁻ Units. *The Journal of Physical Chemistry* 109:562-579 (Cover page).

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Jeffrey M. Boyd, Heather Ellsworth, and Scott A. Ensign. 2004. Bacterial Acetone Carboxylase in a Manganese-Dependent Metalloenzyme. *The Journal of Biological Chemistry* 279: 46,644-46,651.

Daniel D. Clark, Jeffrey M. Boyd, and Scott A. Ensign. 2004. The Stereoselectivity and Catalytic Properties of Xanthobacter Autotrophicus 2-[(R)-2-Hydroxypropylthio] ethanesulfonate Dehydrogenase are Controlled by Interactions between C-Terminal Arginine Residues and the Sulfonate of Coenzyme M. *Biochemistry* 43: 6763-6771.

Ben M. Elliott and Alexander I. Boldyrev. 2005. Ab Initio Probing of the Aromatic Oxygen Cluster O₄²⁺. *The Journal of Physical Chemistry A* 109:236-239.

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Carol M. Dehler, Maya Elrick, John Bloch, Laura Crossey, Karl Karlstrom, and Dave DesMarais. 2005. High-Resolution $d^{13}C$ Stratigraphy of the Chuar Group (ca. 770-742 Ma), Grand Canyon: Implications for Mid-Neoproterozoic Climate Change. *Geological Society of America Bulletin* 117:32-45.

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John R. Tucker and T.-C. Shen. 2004. “The Road to a Silicon Quantum Computer.” *Quantum Information Processing* 3:105-113.

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