



# Science Scene

## Research Report

October 2006 to January 2007

A Publication of the College of Science, Utah State University

### —The Dean's Corner—

For every issue of Science Scene, I prepare the table on contract and grant activity shown below. In the last issue, it was clear that proposal submissions were well above average for the year and I am pleased to announce that this trend has continued: based on data for the first four months of the current fiscal year, the dollar value of proposal submissions now exceeds 89% of last year's submissions. This bodes well for the research enterprise within the College and it indicates that our faculty are aggressively pursuing funding opportunities.

Our research activities provide numerous opportunities to mentor and train students and related to this is the need to be competitive when we recruit graduate students. In the last few years, we have found that we must consider offering health insurance to successfully recruit the best and brightest graduate students. Byron Burnham, Dean of Graduate Studies, has been gathering data on this issue and has led a number of discussions on this topic at various forums, such as deans council and research council. In the meantime, while a campus-wide plan is being developed, faculty are urged to include tuition and health insurance for their graduate research assistants when submitting research proposals.

We are also pleased to announce that the Geology Luminescence Geochronology Lab, located at Innovation Campus, is now in operation. This facility utilizes a custom made luminescence reader that was purchased with funds donated by the Val A. Browning Foundation. The lab has received a contract from the Government of Thailand to analyze a suite of samples and they have received inquiries and requests from researchers around the world. Not only will this facility advance research here at Utah State University, but it will provide hands-on training for our students. Read more about this facility and the services available at:  
<http://www.usu.edu/geo/luminlab/>

Please send any comments or suggestions for research-related topics that you would like to see presented in Science Scene to me via email at <[don.fiesinger@usu.edu](mailto:don.fiesinger@usu.edu)>.

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

Amounts (# of proposals)	October 2006	November 2006	Cumulative Totals for FY06-07
Proposals Submitted	\$6,811,341 (16)	\$8,761,653 (4)	\$35,673,289 (74)
Awards Received	\$387,264 (6)	\$581,033 (9)	\$3,641,983 (45)



— Spring Semester Reminders —

April 2-5.....USU Research Week (will include undergraduate and graduate events)  
April 25.....College of Science Awards Presentations (3:30-4:30 pm Eccles Conf. Center)

— Research on Capitol Hill, January 16, 2007 —

**Biology**

**Benjamin Christensen—Kim Sullivan, Faculty Mentor**  
“Willow Flycatcher Diet Analysis Using Stable Isotopes.”

**Nicole Frank—James Pitts, Faculty Mentor**  
“Comparative Morphology of the Sting Apparatus of Sphecidae Wasps (Hymenoptera).”

**Katherine Grover—Paul Clifton, Faculty Mentor**  
“Functional Divergence of Duplicate Genes in *Saccharomyces cerevisiae* and *Saccharomyces castellii*.”

**Uyen Lam and Janette Starks—Joseph Li, Faculty Mentor**  
“Analysis of Bluetongue Viral mRNA Degradation by qRT-PCR.”

**Amanda Mortensen and Ashley Wilkinson—Edmund Brodie, Jr., Faculty Mentor**  
“Correlations in Aggression and TTX Resistance in *Thamnophis*.”

**AmberLeigh Muller and Kimberly Warburton—Frank Messina, Faculty Mentor**  
“Remarkably Rapid Adaptation to an Unsuitable Host by the Seed Beetle *Callosobruchus maculatus* (F).”

**James Neiswender—Anne Anderson, Faculty Mentor**  
“The Micro-battle Against Head Blight.”

**Gregory Olsen, Erick Griffiths and Gerald McEwen—Anhong Zhou and Tim Gilbertson, Faculty Mentors**  
“Multi-Sensor Array for Real-Time Monitoring Cellular Apoptosis.”

**Brittany Webb—Kim Sullivan, Faculty Mentor**  
“Gender Studies in Science.”

**Chemistry & Biochemistry**

**Sydney Chamberlin—Tapas Kar, Faculty Mentor**  
“The Search for a Solution: Hydrogen Storage Research in Review.”

**Mathematics & Statistics**

**Shane Hansen—Brynja Kohler, David Brown and Lance Littlejohn, Faculty Mentors**  
“Investigating Immune System Models.”

**Physics**

**Jan Marie Andersen—Thomas Wilkerson, Faculty Mentor**  
“Extracting Structural Information and Velocity Data of Atmospheric Aerosols Using Remote Sensing Techniques.”

— URCO-Undergraduate Research and Creative Opportunities Awards, Fall 2006 —

**Biology**

**Tristan Parry—Katarina Stoffekova, Faculty Mentor**

“Effects of CaM on Fast Inactivation of Skeletal Muscle Channel Nav1.4.”

**Chemistry & Biochemistry**

**Joseph Delka—Joan Hevel, Faculty Mentor**

“Understanding the Role of PRMT N-terminus in Sub-Cellular Localization.”

**Sara Huefner—Lisa Berreau, Faculty Mentor**

“Aqueous Chemistry of an Fe/Zn Model for Glyoxalase II.”

**Geology**

**Shay Chapman—Jim Evans, Faculty Mentor**

“Fault Termination of the Treadale Exhumed Reverse Fault in South Central Utah.”

**Christopher Tressler—Joel Pederson, Faculty Mentor**

“Development of an Experimental Flume to Study Gullying and Erosion-Control Measures at Archaeological Sites in Semi-Arid Landscapes.”

— Challenges & Opportunities—

High Performance Computing in Agriculture and Life Sciences

The Center for High Performance Computing at Utah State University is pleased to present a symposium on Opportunities for High Performance Computing in Agriculture and Life Sciences at Utah State University in Logan, Utah on March 26-27, 2007.

Hands-on teaching workshops will demonstrate HPC tools, including visualization, data mining, and scientific computing for agriculture and life sciences applications. Come learn about HPC tools that can enhance your research.

Please visit their website at [www.hpc.usu.edu](http://www.hpc.usu.edu) to register, or call 435-797-1182 or send an email to [barbara.sidwell@usu.edu](mailto:barbara.sidwell@usu.edu)

We look forward to seeing you there!

The Sponsored Programs Office has begun training on GAMS (Grant Application and Management System). GAMS contains a complete proposal development module that addresses the major components of the pre-award process. GAMS enables a researcher to build a proposal budget, create and print a full set of proposal forms by agency, and route a proposal electronically for approval. GAMS will replace the SP01. Once a proposal has been created, reviewed and approved, the Sponsored Programs Administrator can electronically submit it to funding agencies. This includes proposals submitted through Grants.Gov.

For the researcher, GAMS maintains current salary, fringe benefit rates, demographic information, publications and degrees attained, and current and pending support from other grants. For the university, GAMS maintains an institutional profile of the unique identification numbers that are needed for proposal preparation and it maintains F&A rates. GAMS also maintains sponsor/program profiles which contain the budgeting rules for each agency and the forms required for submission. As a proposal is prepared, all this data is then compiled by GAMS for proposal submission.

Once you have attended a training session you will be given access to the GAMS production website and all proposals you create after February 1st will be able to be created in the GAMS system. The Sponsored Programs Office is anticipating a late summer/early fall deadline for all proposals to be submitted through GAMS. To sign up for training please visit our website <http://www.usu.edu/research/programs/gams.cfm> (USU-Sponsored Programs-Education and Training-GAMS Training) and register. Training has been set up by college by month but, anyone can attend a session with an open seat.

Thanks to all who have participated in training so far! Please feel free to call or email me with questions regarding GAMS.

*Kellie Hedin*

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

## —CoS Undergraduate Research Funding Opportunities—

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

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

### **Application Process:**

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

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

Fill-in PDF applications are available at: [www.usu.edu/science/CoSMinigrant.htm](http://www.usu.edu/science/CoSMinigrant.htm)  
[www.usu.edu/science/EcclesURF.htm](http://www.usu.edu/science/EcclesURF.htm)

## — STUDENT ACTIVITIES —

### Student Awards, Recognition & Grants

#### Physics

The Utah State Physics Department Society of Physics Students (SPS) chapter was selected by the national SPS organization as an outstanding SPS chapter for the 2005-2006 school year. The selection is based on depth and breadth of SPS activities, physics research, public science outreach, physics tutoring programs, hosting and representation at physics meetings and providing social interaction for chapter members.

The following awards were presented at the American Physical Society Four Corners Section Meeting, Utah State University, Logan, Utah, 6-7 October 2006

(\* denotes undergraduate, \*\* denotes graduate):

**Jan Marie Andersen\*** received a Best Undergraduate Talk Award for “Extracting Air Motion Velocity Data from Aerosol Distortion Patterns Detected in Fast Lidar Scans.”

**M. Addae-Kagyah\*\*** received a Best Graduate Talk Award for “Effects of Generalized Ion Stress on Plasma Sound Waves.”

**Ryan Hoffmann\*\*** received a Best Graduate Poster Award for “Effects of Fluence and Charge Density for Pulsed, Low-Fluence Measurements of Electron Emission in Highly Insulating Materials.”

**Hema Karnam\*\*** received a Best Graduate Poster Award for “Seasonal Investigations of Variance in Mesospheric Wave Structures at Low Latitudes Observed Over Maui, Hawaii.”

**Keith H. Warnick\*** received a Best Undergraduate Poster Award for “Reconstructing Systems of Nonlinear Differential Equations from Time Series.”

### Student Presentations

#### Biology

**Jesse Walker**, Jay Price, and Karen Froerer presented a workshop on “The Mormon Environmental Ethic” at the Bioneers conference on Saturday, 21 October 2006 at Utah State University.

The Biology Undergraduate Research Symposium was held on Thursday, 30 November in the Skyroom. The event was organized by Drs. **Mary Barkworth** and **Dennis Welker** for presentation of undergraduate research projects in the Department. The following students gave an invited talk:

**Ian Whipple** and **Shaun Bushman**. “Genomic Resources in Perennial Grasses.”

**Amanda Mortensen** and **Edmund D. Brodie, Jr.** “Aggressive Behavior in Neonate Garter Snakes, Part 1.”

**Ashley Wilkinson** and **Edmund D. Brodie, Jr.** “Aggressive Behavior in Neonate Garter Snakes, Part 2.”

In addition, 26 posters were presented by undergraduate researchers. The following received awards:

First place:

**Amber Muller, Kelly Patterson, Kim Warburton, and Frank Messina.** “Remarkably Rapid Adaptation to an Unsuitable Host by the Seed Beetle *Callosobruchus maculatus* (F).”

Second place:

**Melody Anderson** and **Edward W. Evans.** “Enhanced Biological Control of the Cereal Leaf Beetle.”

**Daniel Odell, Cody Mickelsen, and Anthony R. Torres.** “Immunogenetics of Autism: Detecting Single Nucleotide Polymorphisms in Tumor Necrosis Factor Gene via Restriction Digest.”

**Amrita Dubey, Giovanni Rompato, Reed Gann, and Bart Weimer.** “Microbial Diversity in Great Salt Lake.”

**Joshua Pope** and **C. Kent Evans.** “Digital Image and Microscopic Analyses of Primary Leaf Lesions on Wheat Seedlings of Frontana and Alsen Inoculated with *Fusarium graminearum*.”

Student research was judged by: **Diane Alston, Anne Anderson, and Alice Lindahl.**

## — FACULTY ACTIVITIES —

### Awards & Recognition

#### Biology

**Keith Mott** co-organized a meeting entitled “The Biology of Transpiration” at Snowbird, UT from 10 – 14 October. The meeting was co-organized by Sally Assmann (Penn State) and Steve Long (University of Illinois), and was patterned after a Gordon Conference, with 141 participants from the U.S., Australia, France, Germany, Japan, China, Canada, the Netherlands, and the U.K.

The November 2006 issue of the *Journal of Invertebrate Pathology* (v.93, issue 3) featured a figure from Don Roberts’ lab on its cover. The featured figure is from the article: **Drauzio E.N. Rangel**, Michael J. Butler, Javad Torabinejad, **Anne J. Anderson**, Gilberto U.L. Braga, Alan W. Day, and **Donald W. Roberts.** 2006. “Mutants and Isolates of *Metarhizium anisopliae* are Diverse in their Relationships between Conidial Pigmentation and Stress Tolerance.” *Journal of Invertebrate Pathology* 93/3:170-182.

#### Chemistry & Biochemistry

**Lisa M. Berreau** was named to the Editorial Advisory Board of *Inorganic Chemistry* (2007-2010).

## **Faculty Grants**

### **Biology**

#### **Brett Adams**

Whitehall Foundation, Inc.  
1 December 2005 to 30 November 2007-\$74,000  
“Modulation of Neuronal CA Channels by Inomeric G Protein.”

#### **Michelle Baker**

Utah Division of Water Resources  
1 August 2006 to 31 December 2008-\$125,710  
“Nutrient Criteria Development For East Canyon and Spring Creeks.”

#### **Edmund Brodie**

University of Virginia  
1 September 2006 to 31 August 2007-\$34,000  
“Independent Evolutionary Origins of Tetrodotoxin Resistance as a Test of the Geographic Mosaic of CoEvolution.”

#### **James MacMahon**

US National Park Service  
1 October 2006 to 30 July 2007-\$19,200  
“Letter of Agreement-National Parks Conservation Association.”

### **Chemistry & Biochemistry**

#### **Steven Aust**

Alcon Laboratories, Inc.  
1 November 2006 to 31 October 2007-\$51,689  
“Quantification of Free Radical Production During Sonication.”

#### **Scott Ensign**

Department of Health and Human Services  
1 December 2004 to 30 November 2008-\$216,986  
“Microbial Metabolism of Aliphatic Alkenes, Epoxides, and Ketones.”

#### **Steve Scheiner**

Binational Science Foundation  
1 October 2003 to 30 September 2007-\$9,950  
“Proton Transfer Reactions.”

#### **Philip Silva**

US Army Dugway Proving Grounds  
25 September 2006 to 24 September 2007-\$30,433  
“Infrared and Mass Spectral Analysis of Pesticides and Simulants on Solid Particle Supports.”

### **Computer Science**

#### **Heng-Da Cheng**

National Cooperative Highway Research Program  
1 July 2004 to 30 September 2006-\$45,000  
“Automated Real-Time Pavement Crack Detection/Classification System (Type 2).”

#### **Stephen Clyde**

United States Bureau of Land Management  
13 September 2006 to 31 August 2007-\$15,000  
“Adding of the Bureau of Land Management (BLM) National Back Country Byways on the National Scenic Byways Website.”

#### **Robert Erbacher**

Intellivis, Inc.  
1 October 2006 to 31 December 2006-\$12,500  
“Java Implementation of Visalert.”

#### **Vladimir Kulyukin**

National Science Foundation  
1 February 2004 to 31 January 2008-\$99,188  
“Assisted Navigation in Dynamic and Complex Environments.”

#### **Vladmir Kulyukin**

CastleRock Engineering  
30 September 2006 to 31 August 2007-\$61,977  
“A Wearable Multi-Sensor Navigation Device for the Visually Impaired.”

#### **Seungjin Lim**

Multimedia Data Services Corporation  
1 December 2006 to 30 June 2007-\$20,743  
“Data Analysis of the National Scenic Byway Program.”

#### **Xiaojun Qi**

National Science Foundation  
1 February 2005 to 31 January 2008-\$79,583  
“REU Site Program in Computer Vision and Imaging Processing.”

### **Geology**

#### **James Evans**

Southern California Earthquake Center-USC  
1 February 2002 to 31 January 2007-\$5,000  
“Examination of Exhumed Faults of the San Bernardino and San Gabriel Mountains, Implications for Earthquake Rupture and Termination Processes.”

#### **Thomas Lachmar**

Cache County  
1 September 2003 to 31 December 2007-\$11,000  
“Discharge Monitoring and Chemical Characterization of Springs in East-Central Cache Valley Utah.”

#### **Joel Pederson**

US Bureau of Reclamation  
1 September 2005 to 1 January 2007-\$95,000  
“Development of a Treatment Plan for the Colorado River Corridor of the Grand Canyon.”

### **Mathematics & Statistics**

#### **James Powell**

United States Department of Agriculture/Forest Service  
10 August 2006 to 30 June 2007-\$20,000  
“Validating a Southern Pine Beetle Phenology Model and Testing Hypotheses of Spot Initiation and Success.”

## Physics and The Center for Atmospheric & Space Sciences

### Robert Schunk

Air Force Office of Scientific Research  
1 April 2006 to 30 November 2007-\$96,921  
“Development of an Ionosphere Plasmasphere Polar Wind Model and Studies of Storms and Substorms.”

### Larry Gardner

Air Force Office of Scientific Research  
1 April 2006 to 30 November 2007-\$50,672  
“Development of an Ionosphere Plasmasphere Polar Wind Model and Studies of Storms and Substorms.”

### Akira Hirose, Ajay Singh, et al. (numerous participants from, UK, Germany, Czech Republic, Egypt, Iran, Mexico, and Brazil)

International Agency for Atomic Energy, Vienna, Austria  
2005-2007—No set grant amounts to developed countries, just participation “Coordinated Research Projects Using Small Tokamaks.”

### Robert Schunk

United States Office of Naval Research  
1 October 2006 to 30 September 2009-\$165,000  
“A Thermosphere-Ionosphere Data Assimilation Model Component for a Seamless Ocean-Atmosphere Model.”

### Mike Taylor

National Science Foundation  
1 January 2006 to 31 December 2007-\$102,330  
“Development and Optimization of Tomographic Imaging Methods for Advanced Gravity Wave Studies in the MLT Region.”

### Mike Taylor

University of Washington  
15 June 2004 to 31 May 2007-\$12,039  
“Subcontract from University of Washington for Balloon-Borne Sprite Measurements.”

## Faculty Presentations & Related Professional Activities

### Biology

**Joseph Li** presented an invited lecture entitled “Potential Treatment of Human Cancers with Six Oncolytic Bluetongue Viruses” at the 9th dsRNA Virus International Symposium at Cape Town, South Africa, 21 – 26 October 2006.

**Joseph Li** presented two posters at the 9th dsRNA Virus International Symposium at Cape Town, South Africa, 21 – 26 October 2006:

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

**Joseph Li, Margaret K. Buccambuso, Gary Miller and Justin Hoopes.** “A Kinetic Analysis of Bluetongue Virus mRNAs by qRT-PCR.”

## Chemistry & Biochemistry

**Lisa M. Berreau** presented an invited talk titled “Model Studies of a Nickel Dioxigenase” at Tulane University, 25 September 2006.

**Alvan C. Hengge** presented an invited talk titled, "Metals in Phosphoryl Transfer: From Model Systems to Purple Acid Phosphatases" at the meeting of Australian Society for Biochemistry and Molecular Biology, in Brisbane, Australia, 24-28 September 2006.

**Alvan C. Hengge** presented an invited talk titled, "Metals in Phosphoryl Transfer: From Model Systems to Purple Acid Phosphatases" at Loyola University-Chicago, Department of Chemistry, 30 November 2006.

### Geology

**James P. Evans** was field trip co-leader of “Overview of Geology and Energy Resources, Wyoming, Utah, and Colorado” for the Institute of Journalism and Natural Resources, University of Montana, conducted in Salt Lake City, Utah and Kemmerer, Wyoming, 6 September 2006.

**James P. Evans, Dr. Judith Chester, and Dr. Yehuda Ben-Zion** conducted a workshop titled “Shallow Drilling into Active Faults” at the Southern California Earthquake Center Annual Meeting, Palm Springs, California, 7-8 September 2006.

**James P. Evans** presented a poster titled “Insights into Fault Zone Processes: Results from the SAFOD Project, California” at the Southern California Earthquake Center Annual Meeting, Palm Springs, California, 9-11 September 2006.

**James P. Evans** presented a talk titled “Utah 2050: Life with Six Million of Your Closest Friends” at the Wallace Stegner Center, College of Law, University of Utah, 19 September 2006.

## Physics and The Center for Atmospheric & Space Sciences

**J. R. Dennison and Nelson Green** presented an invited talk titled “Recent Advances in Measurements Related to the Charging and Discharging of Spacecraft Materials” at the American Institute of Aeronautics and Astronautics Space Environments and Effects Working Group Annual Meeting, Aerospace Corporation, Redondo Beach, California, 15 November 2006.

**Michael J. Taylor** presented a talk titled “Development of a Narrow Field Auroral CCD Imager for the AMISR Observatory” at the First AMISR Science Planning Workshop, Monterey, California, 11-13 October 2006.

**Haeyeon Yang** presented a talk titled “Study on Nanodot-Chains for Optical Devices Using Molecular Beam Epitaxy and In-Situ Scanning Tunneling Microscopy” at Nano-Utah, University of Utah, Salt Lake City, Utah, 5 October 2006.

**Robert W. Schunk** presented a talk titled "Magnetosphere-Ionosphere-Thermosphere Coupling on a Range of Spatial Scales" at the Huntsville Workshop, Nashville, TN, 1-6 October 2006.

The following presentations were given at the American Physical Society Four Corners Meeting, Logan, Utah, 6-7 October 2006

(\* denotes undergraduate, \*\* denotes graduate):

**Jonathon Abbott\***, **J. R. Dennison**, **Jason Kite\*\***, **Ryan Hoffmann\*\***, and **Robert E. Davies**. Talk. “From Whence Come the Electrons?”

**Joseph Abel\***, **Dongjun Kim\*\***, **E. Addison Everett\*\***, and **Haeyeon Yang**. Poster. “One Dimensional Array of QDs for a Single InGaAs Layer Deposition on a Smooth (001) Surface of GaAs Substrate.”

**M. Addae-Kagyah\*\*** and **Eric Held**. Talk. “Effects of Generalized Ion Stress on Plasma Sound Waves.”

**Jennifer Albrechtsen\***, **James Hanna**, **Qi Zeng**, and **Ian Baker**. Talk. “Production and Examination of Nanocrystalline Copper.”

**Jan Marie Andersen\*** and **Tom Wilkerson**. Talk. “Extracting Air Motion Velocity Data from Aerosol Distortion Patterns Detected in Fast Lidar Scans.”

**Jeremy Bishop\*\***, **Ajay Singh**, **W. Farrell Edwards**, and **Eric D. Held**. Poster. “Experimental Verification of a New Plasma Equilibrium State.”

**Jerilyn Brunson\*\*** and **J. R. Dennison**. Talk. “E-Field Conditioning and Charging Memory in Low Density Polyethylene.”

**James Coburn**. Talk. “A Lecture Hall Sized Color Mixing Apparatus.”

**J. Corbridge\*\***, **J. R. Dennison**, **J. Hodges\***, **R. C. Hoffmann\*\***, **J. Abbott\***, **A. Hunt**, and **R. Spaulding**. Talk and Poster. “Measurements of the Radiation Induced Conductivity of Insulating Polymeric Materials for the James Webb Space Telescope.”

**J.R. Dennison** and **Jason Kite\*\***. Talk. “The Emission Angle and Incident Energy Dependence of the Boundary between Secondary and Backscattered Electrons.”

**Timothy Doyle** and **Keith Warnick\***. Talk. “Modeling Wave Propagation in Cells and Tissues at the Microscopic Level.”

**Joel Ellsworth\***. Poster. “Flush Air Data Sensing System for Trans-Atmospheric Vehicles.”

**E. Addison Everett\*\***, **Dong Jun Kim\*\***, and **Haeyeon Yang**. Poster. “Effects of  $As_4$  Flux on Morphology of InGaAs Quantum Dots and the Critical Thickness.” Talk. “Linear Alignment of InGaAs Quantum Dots on Nominal GaAs(001) Surfaces.”

**Brian Harker\*\***, **K. Balasubramaniam**, and **Jan Sojka**. Poster. “A Niching Genetic Algorithm For Milne-Eddington Spectral Line Inversions National Solar Observatory.”

**S. R. Hart**, **J. Brunson\*\***, and **J. R. Dennison**. Talk. “Electric Field Induced Hopping Conductivity: An Investigation of Electric Field-Dependent Resistivity in Polymers.”

**E. D. Held**, **W. F. Edwards**, and **A. Kullberg\***. Talk. “Generalized Stationary States for Fusion Plasmas.”

**E. D. Held**, **W. F. Edwards**, and **A. Singh**. Talk. “Evidence of New Plasma Equilibrium State Sought.”

**J. Hodges\***, **J. Corbridge\*\***, **J. R. Dennison**, **R. C. Hoffmann\*\***, **J. Abbott\***, **A. Hunt**, and **R. Spaulding**. Poster. “Instrumentation for Measuring Radiation Induced Conductivity of Insulating Materials.”

**R.C. Hoffmann\*\*** and **J.R. Dennison**. Poster. “Effects of Fluence and Charge Density for Pulsed, Low-Fluence Measurements of Electron Emission in Highly Insulating Materials.”

**John James\*\*** and **Eric D. Held**. Talk. “Non-local Plasma Heat Flow in a Perturbed Magnetic Field.”

**J. -Y. Ji\*\*** and **Eric D. Held**. Talk. “Collisional Braginskii Closure vs. the Integral Closure and Closing the Fluid Equations.”

**Dong Jun Kim**, **E. Addison Everett\*\***, and **Haeyeon Yang**. Talk. “Linear Alignment of InGaAs Quantum Dots on Nominal GaAs(001) Surfaces.”

**Jason Kite\*\*** and **J. R. Dennison**. Talk. “Measuring Auger Signatures Using a Rotatable, High-Resolution Retarding Field Analyzer Faraday Cup Detector.”

**A. Kullberg\***, **Eric D. Held**, and **W. Farrell Edwards**. Poster. “Generalized Stationary States for Plasmas with Conserved Global Helicities.”

**Nicolas Lambert\***, **Dong Jun Kim\*\***, and **E. Addison Everett\*\***, and **Haeyeon Yang**. Poster. “Effects of  $As_4$  flux on Morphology of InGaAs Quantum Dots and the Critical Thickness.”

**David Peak**. Talk. “Does Size Matter? Searching for Rhyme or Reason in Course-End Student Surveys in a Large, Eclectic Physics Department.”

**D. M. Riffe** and **A. J. Sabbah**. Talk. “Coherent Excitation of the Optic Phonon in Si Measured with Femtosecond Spectroscopy.”

**S. J. Robinson**, **J. R. Tucker** and **T. -C. Shen**. Talk. “Electron Transport in Laterally Confined Phosphorous  $\delta$ -layers in Silicon.”

**M. Sharma\*\***, **J. -Y. Ji\*\***, **Eric D. Held**. Talk. “General Parallel Closures for Tokamak Plasmas.”

**Deepak Simkhada\*\***, **Michael J. Taylor**, and **Robert Stockwell**. Poster. “Investigating the Horizontal Characteristics of the Short-Period Gravity Waves Over Bear Lake Observatory, Utah.”

**Michael J. Taylor**. Talk. “Imaging Gravity Waves and Sprites in the Earth’s Upper Atmosphere.”

**Anthony Thomas\***, **J. R. Dennison**, **Steve Hart\*** and **R. C. Hoffmann\*\***. Talk. “The Effect of Voltage Ramp Rate on Dielectric Breakdown of Thin Film Polymers.”

**Charles Torre.** Talk. "What's New in Gravitational Physics."

**Jodie Tvedtnes\*, Michael J. Taylor, Matthew DeLand, Mark Zalcik.** Poster. "Comparison of Satellite And Ground-Based Data on Polar Mesospheric Clouds."

**Keith H. Warnick\* and Charles R. Tolle.** Poster. "Reconstructing Systems of Nonlinear Differential Equations from Time Series."

**Heidi Wheelwright\* and T. -C. Shen.** Poster. "Temperature Calibration for Sample Heating in Ultrahigh Vacuum."

**Richard Wilson\*, Dong Jun Kim\*\*, and E. Addison Everett\*\*.** Poster. "Study on Energetics of Self-Assembled Quantum Dot Using Molecular Beam Epitaxy and In-Situ Scanning Tunneling Microscopy."

**Haeyeon Yang, Dong Jun Kim\*\*, E. Addison Everett\*\*, and Richard Wilson\*.** Talk. "Morphological Study on Dot-chains Using Molecular Beam Epitaxy and In-situ Scanning Tunneling Microscopy."

The following posters were presented at the NA-MBE Conference, Duke University, Durham, North Carolina, 8-11 October 2006 (\* denotes undergraduate \*\* denotes graduate):

**E. Addison Everett, Dong Jun Kim\*\*, and Haeyeon Yang.** "Effects of As<sub>4</sub> Flux on Morphology of InGaAs Quantum Dots and the Critical Thickness."

**Dong Jun Kim\*\*, E. Addison Everett\*\*, and Haeyeon Yang.** "Linear Alignment of InGaAs Quantum Dots on Nominal GaAs(001) Surfaces."

**J R Dennison and Nelson Green** presented an invited talk titled "Recent Advances in Measurements Related to the Charging and Discharging of Spacecraft Materials," at the AIAA Space Environments and Effects Working Group Annual Meeting, Aerospace Corporation, Redondo Beach, California, 15 November 2006.

**T. E. Doyle and K. H. Warnick\*,** gave a talk titled "Simulation of Elastic Wave Scattering in Living issue at the Cellular Level," at The 4th Joint Meeting of the Acoustical Society of America and the Acoustical Society of Japan, Honolulu, Hawaii, 28 November-2 December 2006. Abstract Published in the *Journal of the Acoustical Society of America* 120 (5, Pt. 2), 3283 (2006).

The following papers were presented at the Fall American Geophysical Union (AGU) Meeting, San Francisco, California, 11-15 December 2006:

**Abdallah Barakat and Robert W. Schunk.** "Storm-Time Dynamic Response of High-Latitude Plasma Outflow: A 3-D mac-PIC Model."

**Michael David, Jan J. Sojka, Robert W. Schunk, and John M. Holt.** "Day-to-Day Variability in the Post-Sunrise F-Layer at Millstone Hill During Three Month-Long ISR Campaigns."

**Ludger Scherliess, Donald C. Thompson, Robert W. Schunk, and Jan J. Sojka.** "Ionospheric/Thermospheric Variability at Middle Latitudes Obtained From the Global Assimilation of Ionospheric Measurements (GAIM) Model."

**Jan J. Sojka, Robert W. Schunk, Donald C. Thompson, Ludger Scherliess, and Trevor Harris.** "An Ionospheric Metric Study Using Operational Models."

**Donald C. Thompson, Ludger Scherliess, Robert W. Schunk, and Jan J. Sojka.** "The Operational USU GAIM Model."

The following posters were presented at the Fall American Geophysical Union (AGU) Meeting, San Francisco, California, 11-15 December 2006:

**Howard G. Demars and Robert W. Schunk.** "Supersonic Flow in the High-Latitude Thermosphere."

**Larry C. Gardner and Robert W. Schunk.** "Ion and Neutral Atom Outflow Structure in the High-Latitude Ionosphere."

**Geonhwa Jee, A. G. Burns, W. Wang, S. C. Solomon, Robert W. Schunk, Ludger Scherliess, Donald C. Thompson, Jan J. Sojka, and Lie Zhu.** "Continual Initialization of the TING Model with GAIM Electron Densities: Ionospheric Effects on the Thermosphere."

**Robert W. Schunk, Ludger Scherliess, Jan J. Sojka, Donald C. Thompson, and Lie Zhu.** "Strengths and Limitations of Data Assimilation Models."

**Ja Soon Shim\*\*, Ludger Scherliess, Robert W. Schunk, and Donald C. Thompson.** "Spatial Correlations of Day-to-Day Ionospheric Total Electrons Content Variability Obtained From Ground-Based GPS."

**Zhonghua Xu\*\*, Lie Zhu, Jan J. Sojka, Piotr Kokoszka, and Agnieszka Jach\*\*.** "An Assessment Study of the Wavelet-Based Index of Magnetic Storm Activity (WISA) and its Comparison of the Dst Index."

**Lie Zhu, Ludger Scherliess, Vince Eccles, Robert W. Schunk, and Jan J. Sojka.** "A Physics-Based Kalman Filter Electrodynamic Model for the High-Latitude Ionosphere."

**Ludger Scherliess** presented a talk titled "Assimilation of COSMIC Data with the USU GAIM Model" at the First Formostat-3/COSMIC Data Users Workshop, Boulder, CO, 16-18 October 2006.

**S. J. Robinson, J. R. Tucker, T. Schenkel, T.-C. Shen** presented a paper titled "Characterization of Ga-acceptor Nanoscale Wires in Si" at The 53rd International Symposium of American Vacuum Society, San Francisco, California, 14 November 2006.

**T.-C. Shen, J. R. Tucker and S. J. Robinson** presented a paper titled "Transport Characterization and Device Applications of P-donor Nanowires in Silicon" at the Materials Research Society Fall Meeting, Boston, Massachusetts, 29 November 2006.

**Haeyeon Yang, Dong Jun Kim, and E. Addison Everett** presented a paper titled "Linear Alignment of InGaAs Quantum Dots on Nominal GaAs(001) Surfaces," at the Materials Research Society (MRS) Fall Meeting, Boston, Massachusetts, 29 November 2006.

## Faculty Publications

### Biology

**Mark P. Miller**, Dana E. Weigel, **Karen E. Mock**, and Barry Roth. 2006. Evidence for an Outcrossing Reproductive Strategy in the Hermaphroditic Heterobranch Gastropod *Valvata utahensis* (valvatiidae), with Notes on the Genetic Differentiation of *V. utahensis* and *V. humeralis*. *Journal of Molluscan Studies* 72:397-403.

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**Richard H. Hoff\*\***, **Przemyslaw G. Czyryca**, Meihao Sun, Thomas S. Leyh, and **Alvan C. Hengge**. 2006. The Transition State of the Sulfuryl Transfer Reaction of Estrogen Sulfotransferase. *Journal of Biological Chemistry* 281:30645-30649.

### Geology

**R. V. Heermance** and **James P. Evans**. 2006. Evolution of the Chelungpu Fault, Taiwan: The Mechanics of Frontal Ramps and Fault Imbrication. *Journal of Structural Geology* 28:929-938.

### Physics

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**Sébastien Clerc, J. R. Dennison, Ryan Hoffman\*\***, and **Jonathon Abbott\***. 2006. Importance of Accurate Computation of Secondary Electron Emission for Modeling Spacecraft Charging. *IEEE Transaction on Plasma Science* 34(5).

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**L.B. Anderson, and J.T. Wheeler**. 2007. Yang-Mills Gravity in Biconformal Space, *Classical and Quantum Gravity* 24:475-496.

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