



studentshowcase

4 .01 .08

utah state university

## **student showcase**

04 . 01 . 08

The mission of Utah State University is to be one of the nation's premier student-centered land-grant and space-grant universities by fostering the principle that academics come first, by cultivating diversity of thought and culture, and by serving the public through learning, discovery, and engagement.

From its initiation, the Office of Research has been committed to facilitating research campus-wide basis as a way to broaden our store of knowledge, enhance the capabilities of staff members, and introduce students to the excitement of scholarly creativity (Research at Utah State University, 1974).

For over 30 years, Utah State University has formally supported student research, recognizing that “research at USU is inexorably tied to academic programs and student involvement.” In the early 1970s, a report noted that “with each passing year more students are engaged in research.” As is clear from the listing in the back pages of this booklet, USU students are actively disseminating their research at state and national venues and competing successfully for national and international fellowships and scholarships.

Student Showcase has highlighted the marvelous work of undergraduate students at Utah State since 1998; before that time, it was called Scholars Day. It is gratifying to watch students who are excited about inquiry and discovery.

Utah State is recognized across the nation for its emphasis on student-centered, hands-on learning by faculty who care. In the Campaign for Utah State University– Honoring Tradition, Securing Our Future, we seek to enhance and increase the opportunities for students to engage in research. The Campaign for Utah State includes funding to enhance cutting-edge research for undergraduates. These opportunities prepare our students to be leaders in the information age as they head to graduate school or the workforce.

Utah State has invested in student research and will continue to do so as it honors the tradition established several decades ago and also secures the future of the university and its students.



Joyce Kinkead  
Associate Vice President  
Office of Research

Greetings!

Throughout the year, many events are held to chronicle the successes of USU's undergraduate researchers. Student Showcase is of particular note, however, because it is the one time when Utah State students gather at their own campus to congratulate each other on their accomplishments. This celebration certainly provides a hometown feel, but the effects of the research are anything but campus-bound.

From tracking lava flows in Yellowstone to controlling erosion at the Grand Canyon, USU students have taken their classroom knowledge into the field to make a difference in the world around them. At this year's Student Showcase, you'll see our students' impact on projects statewide, from tracking the health of ventilator patients at McKay-Dee Hospital in Ogden and exploring the dynamics of stepfamilies in rural Utah towns, to understanding how ants affect the ecosystem of the Eastern Great Basin and discovering how myths inhibit water conservation in Washington County.

Each of the projects displayed at Student Showcase represent a value-added experience for our students, preparing them for the next steps in their schooling and careers, but they also demonstrate the service-based citizenship that abounds among our Utah State student researchers. We are extremely proud of their accomplishments and invite you to get to know them better at this event.

Thank you for your interest in our students' research.  
Best Regards,



Brent C. Miller, PhD  
welcome

As an URCO grant recipient, and as a student dedicated to research, I understand first-hand the importance of undergraduate research at Utah State University. Research allows students the opportunity to take the things they are learning in the classroom and apply them to real life situations. The Associated Students of Utah State University (ASUSU) have been impressed with the student researchers they have been able to meet with throughout this year. Through the Academic Opportunity Fund, ASUSU has been able to help provide funding for students to attend conferences and present their research throughout the country. Though several of these students were conducting the types of laboratory experiments that come to mind when you hear the word "research," ASUSU was impressed to find students conducting research in the fields of sociology, psychology and even wildland resources.

I commend those students who have taken the time and energy to be involved with research here at Utah State University. Research takes time and can be difficult, frustrating and even draining. However, the experiences and accomplishments associated with research are some of the most rewarding experiences a student can have.

At Utah State University, research will continue to play an important role in the education of students. I would like to encourage any students that have not been involved with research to find something that interests them and to start asking questions! That's how great research projects get started.

Sincerely,

Kevin Abernethy  
ASUSU Academic Senate President

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## Adsorption Isotherms for Nitrogen (N<sub>2</sub>) on Graphite

## Nanostructuring

**Jennifer Albretsen & Ethan Lindstrom**

Physics

**Aaron Andersen**

physics

Nitrogen (N<sub>2</sub>) gas molecules interacting with a graphite surface through van der Waals attraction adsorb to the surface of the substrate through a process known as physisorption. The amount of N<sub>2</sub> gas entering the system is monitored. The expected increase in pressure of the graphite container is calculated and the actual vapor pressure increase in the container is measured. The difference between these two pressures

allows us to calculate the rate of adsorption. For a given temperature, the fractional coverage of the adsorption sites on graphite depends upon the pressure of the N<sub>2</sub> gas. Adsorption isotherms are obtained by plotting the fractional coverage as a function of vapor pressure. We then use these isotherms to determine the characteristics of the adsorbed layers for a given temperature and pressure.

local electric field from STM can be used for nanopatterning on strained semiconductor surfaces

## **Development of Polylactic Acid Gels as Resorbable Implant Materials Having Intrinsic Antibacterial Properties: Silver Release Profile from a Polymer Matrix**

***Tammy Andersen & Lindsay Housley***

biological engineering

A tympanostomy is a common treatment for chronic otitis media in children in which a ventilation tube is inserted into the tympanic membrane of the ear to relieve pressure. Although routine, complications can arise from bacterial adsorption on the implanted tube and variable tube extrusions. This research sought to fabricate a biocompatible, resorbable, and antimicrobial ventilation tube. Polylactic acid (PLA) was used because it is a biocompatible polymer that

is can be engineering to degrade at a defined rate. Silver was selected as an antimicrobial material and silver nanoparticles were incorporated into the PLA matrix to create a resorbable ventilation tube. To quantify results, silver release was quantified with atomic absorption and material properties were analyzed with differential scanning calorimetry. Antimicrobial tests were done with *Pseudomonas chlororaphis* O6.

## **Paleoindian Archaeology of Southeastern Idaho: A View from Private Collections**

***Holly Andrew, Ben Fowler, Katie Harris, & James Meservy***

anthropology

In 2007, a team of Utah State University archaeologists began to explore the area around Soda Springs, Idaho, in the southeastern part of the state. This region—the focus of little archaeological research to date—is ecologically intriguing and compelling because it is an ecotone where the Great Basin, Columbia Plateau, and Central Rockies meet. The USU team spent ten days conducting initial geoarchaeological reconnaissance of the

Blackfoot and Bear River drainages, informally surveying areas that appeared to be good candidates to yield early sites, and working with private collectors with knowledge of the area. This paper focuses on the latter component of this reconnaissance—establishing the basic nature of the Paleoindian record in an area where one can reasonably hypothesize there will be influences from the Northwest, the Great Basin, and the Rocky Mountains.

## Temperature Dependence of Kapton HN Breakdown Voltages

***Daniel Arnfield***

physics

Electric breakdown occurs when the potential across a material or medium is high enough to cause arcing through it, resulting in local degradation or destruction of the material. Kapton HN has a well-defined range of voltages at which breakdown occurs when the sample is at room temperature. At lower

temperatures, Kapton HN breaks down at noticeably higher voltages. Using liquid nitrogen cooling, breakdowns at temperatures from  $-120^{\circ}\text{C}$  to room temperature have been measured. Several models are examined to characterize the behavior of Kapton HN as a function of temperature.

## The Varying Effects of Emigration on Communities in Southeast Mexico

***Dani Babbel***

geography

Rural communities in southern Campeche, Mexico have recently experienced an upsurge in out-migration, mostly by male household-heads seeking higher wages in U.S. industries. This study examined two different communities, both characterized by a reliance on agriculture, particularly

the cultivation of maize and chili. Interviews were conducted throughout these communities to shed light on migrations effects on patterns of land use as well as gender-based divisions of labor. The two communities exhibited very different overall responses to the migration phenomenon.

## The Measurement of Evapotranspiration for Alfalfa, in Snowville, UT

**Burdette Barker**

biological engineering

During the growing season of 2007 (approximately May through October) research was conducted near Snowville, UT concerning evapotranspiration (Et) in alfalfa fields. Electronic weather stations were used to collect data necessary to measure and measure Et using the Bowen ratio energy approach. Measured Et values were compared to those calculated using

Penman type equations for estimating Et to verify the accuracy of Penman equations in high wind environments. Data were also collected concerning irrigation efficiencies of center pivots as well crop growth stages and soil moisture. Information gained may help increase the irrigation efficiencies of farmers in the state.

## Common Components of Advanced Readers at Risk Service Learning Projects

**Brianne Bartlett**

elementary education

By today's classroom standards, students who read above grade level are not likely to be a focus in reading instruction, meaning that the needs of gifted readers are typically ignored, placing the gifted readers at risk. The Advanced Readers at Risk project grew directly out of concern for the needs of gifted readers. Implementation of the Advanced Readers at Risk project was based on a paradigm known as the World Class Reader Model. The

model includes four basic components; (1) Learning to Read, (2) Reading to Learn, (3) Reading to Serve, and (4) Reading for Leisure. Reading to Serve was the focus of our research—namely service learning projects based on Reading to Serve. Analysis of each type of literacy-based service learning project exposed six common categories: (1) goals, (2) skills, (3) barriers, (4) products, (5) learning, and (6) reactions.

## Characterizing Histone Modifications to the Bovine Oct4 gene in Early Embryonic Development

***Mitchell Bassett***

animal, dairy & veterinary science

Epigenetic abnormalities are believed to be responsible for the low efficiency of post-implantation bovine somatic cell nuclear transfer embryos. Traditional ChIP was enhanced by the use of *Drosophila Melanogaster* carrier chromatin to compensate for the low cell numbers of embryos. Selectively fragmented bovine and *D. melanogaster* DNA bound to the histone of interest was collected by immunoprecipitation using

an antibody complimentary to the desired area of the histone. Following purification, real time PCR was performed to amplify the DNA region of interest to determine if the DNA fragment is bound to the corresponding histone region. The real time PCR results illustrate the relative inactivation of Oct4 in the donor cells and relative transcriptional activation of Oct4 in the IVF embryos.

## “The Path to Enlightenment”

***Pamela Bendio***

art

This metal sculpture represents a flowing road leading up to a horizon with the sun as the focal point. The earth's horizon always extends before us no matter how far we travel toward it. We experience our lives as a series of peaks and valleys in what seems a continuous pattern. When the observer is aligned with the path, looking at the level of the hilltop and through the hole which acts

as a gateway to the distant sun representing the desired destination of enlightenment, he/she finds their own image mirrored in the “sun” as if they had been transported there and are looking back at where they have been. This acts as a metaphor for the “leap of faith” or place where something that is not seen is relied upon to complete their journey.

## How Magnetometers Monitor Solar Storms

**Cameron Bodily**

physics

One of the most beautiful manifestations of geomagnetic activity are the aurora which are seen at high latitudes near the geomagnetic poles. These geomagnetic activity which can cause beautiful manifestations are also of some concern because these can cause radio communication difficulty, the GPS can be degraded, the satellite systems can be damaged as well as astronauts at high altitude

can be exposed to radiation. These geomagnetic activities occur during what is called a magnetic storm which is a rapid variation of the magnetic field in the atmosphere. The magnetometers measures these variations which can then tell us of solar storms. When there is a serious solar storm, one can take preventive measures to protect high tech systems and astronauts.

## A Comparison of Experimental and Computational Methods of Identifying Gene Regulatory Signals

**Christopher Bowen**

biology

Comparative genomics is a powerful tool for identifying functional DNA sequences that are conserved among different species. In this study, we are extracting experimental data that has been generated over the last 30 years and comparing it to computational predictions of gene regulatory sequences. We are analyzing current data, provided by high-throughput, genome-wide techniques, to identify reliable methods of inferring real transcription

factor targets. Ultimately we will use this data to train and improve computational methods for identifying gene regulatory signals using comparative genomics. These studies promise to greatly improve our fundamental understanding of gene regulation in *S. cerevisiae* and provide new analytical methods that should improve comparative gene regulatory motif discovery in any organism.

## **In Vitro Study of the Potential Damaging Effects of Carbon Nanotubes on the Human Respiratory System**

***Emily Bowen & Forrest Purser***

biological engineering

Manufacturers of carbon nanotubes (CNT's) are attempting to refine their fabrication process to produce CNT's on a larger scale and ensure the safety of their employees. While CNT's are already being produced on a massive scale, few studies have been performed which test their potential harmful effects. Among these risks, CNT's coming in contact with the human body through inhalation is one of the greatest concerns.

This project focuses on the effects CNT's could have upon accidental inhalation of the airborne particles during the manufacturing process. It is crucial to develop viable alternatives to in vivo tests to evaluate the toxicity of engineered CNTs and to develop validated models capable of predicting the release, transport, transformation, accumulation, and uptake of CNTs in the human respiratory system.

## **Identification of Specific Integrin Subunits Involved in Fertilization of the Bovine Oocyte**

***John Brinkerhoff***

animal, dairy & veterinary science

Although the mechanism involved in sperm-oocyte fusion and activation has been studied extensively, it is not completely understood. The receptor mediated theory suggests that a protein-protein interaction on the respective cell membranes results in activation of the oocyte. One specific protein group, the integrin family, is thought to be the major player in this theory and many integrin subunits have been

identified on the surface of bovine oocytes including:  $\alpha V$ ,  $\alpha 6$ ,  $\alpha 4$ ,  $\alpha 2$ ,  $\beta 1$ , and  $\beta 3$ . Function blocking antibodies were used to interfere with integrins on the surface of the oocyte to investigate their possible roles in fertilization. Blocking the function of the  $\alpha V$  and  $\beta 1$  subunits has the greatest impact on fertilization, and is compelling evidence that these subunits are essential for fertilization.

## Enterostatin Regulation of Protein Translocation in HepG2 Liver Cells

**Andrew Burgon**

center for advanced nutrition

HepG2 cells in culture were transfected with an F1-ATPase  $\beta$  subunit-Green Fluorescent protein (FA-GFP) construct. Incubation with enterostatin induced translocation of the FA-GFP protein to the plasma membrane where it was associated with lipid rafts and not membrane caveolae. To investigate further the effects of enterostatin on protein translocation, we used immuno-histochemical

techniques to study the effects of enterostatin on membrane localization of proteins SCAMP2 and Dynamin2, markers for exocytosis and endocytosis respectively. Enterostatin increased Scamp2 and altered its location while decreasing the level of Dynamin 2, suggesting that enterostatin promotes exocytosis.

## The Influence of Information Disclosure on Brand Image: A Copy Test of Food Product Certification

**Vikki Carlisle**

business administration

Consumers often attribute more meaning to product certifications than is justified. For example, while some granting agencies do not require independent verification, this is not normally disclosed and, as a result, consumers may infer that independently testing was conducted. Similarly, while some granting agencies require monetary payment, this information is also not readily disclosed to consumers. In the absence of such disclosure, it appears that certifications

can create misleading impressions. Ironically, while the Nutritional Labeling and Education Act of 1990 (NLEA) was designed to protect consumers by regulating information disclosure, it does not cover third-party food certifications. Furthermore, federal regulations do not require information disclosure regarding verification standards or monetary payments. As such, there exists a potentially important gap in consumer protection policy. We address this issue using copy-test procedures.

## Growth Parameters for Antifungal Cyclic Lipononadepsipeptide Production

**Nathaly Carranza**

biology

The cyclic lipodepsinonapeptide syringomycin E (SRE) produced by *Pseudomonas syringae* is being developed as a natural product agrofungicide. The purpose of this research was to identify the most effective *P. syringae* growth parameters for SRE production under shaking conditions. *P. syringae* strain M1 was grown in 2L capacity fermenters, 125mL Erlenmeyer flasks and in capped test tubes, all with agitation. A variety of compounds, including amino acids that are components of SRE, were added to the growth medium to study their effects on SRE production. L-histidine was found to be the best amino acid for promoting SRE production. Strain M1 extracts from

test tube cultures had strong antifungal activities. SRE production was most efficient when the bacteria were grown in capped test tubes than when incubated in aerated fermenters. SRE production in 125 mL Erlenmeyer flasks was minimal or non-existent. Other parameters such as temperature, agitation speed and pH were tested as well. The growth parameters under which SRE production was most favorable were 28 °C, 147 rpm and pH 5.5. The production of SRE was monitored by bioassays using the yeast *Rhodotorula pilliminae* and also by High Performance Liquid Chromatography (HPLC) assays. SRE production on test tubes was found to be as high as 28µg/mL.

## Measuring Thermal Emissivity with Specific Application to Spacecraft Design

**Alex Chanson**

physics

Controlling satellites' temperatures is key to keeping them operational. Unshielded satellites range from 116 K to 394 K, fluctuating rapidly from direct solar heating. The problem is magnified with deep space telescopes, such as the James Webb Space Telescope (JWST), to be launched in 2012. Located at the Lagrange point (L2) for earth and the moon, the JWST must be able to operate for years without maintenance. Therefore the JWST must have a powerful heat shield to protect it. My objective is to find a material with a high emissivity in a

vacuum. An infrared sensor must be used to measure temperatures because it is in a vacuum. By monitoring its temperature with both the sensor and a thermocouple, the emissivity of a material can be derived using the Stephan-Boltzmann law ( $E = \sigma T^4$ ), the difference in the measured temperatures, and the emissivity the sensor assumes ( $e = .95$ ). The sensor must also be linked to a computer (for accuracy), which requires some delicate engineering. This experiment should help keep the JWST operational for years — even at 2.4 million kilometers away.

## The Physics of Weapons

**Kathryn Chapman**

physics

My project consists of research pertaining to the physics of weapons. The weapons I will talk about include those used for electronic warfare and ground combat, through nuclear weapons. I will show equations used in the creation of the first atomic bomb and show the effects that using such a weapon

costs. I will also focus on the air weapons used in warfare including radar frequencies and stopping enemy aircraft from spotting our planes. The physics behind these methods is both interesting and practical. Although I cannot test my research, I will explain as clearly as possible how physics is incorporated into today's military.

## Characterization of waste water generated by coal pyrolysis using GC-MS and FTIR spectroscopy

**Dustin Clark**

biology

Petrochemical industries play a crucial role in the economy of the Uintah Basin. Waste water is a prevalent concern for most of these industries and a significant potential source for environmental degradation. IR and GC-MS methods were used to characterize principal chemical contaminants of waste water generated from coal pyrolysis. Hydrobenzenes, including phenol and cresols,

and aliphatic carboxylic acids were the most abundant species characterized. By derivatization of hydroxyl and carboxylic functional groups with TBDMS better peak separation, an increase in intensity of signal, and a decrease in fragmentation in GC-MS spectra increased the number of unambiguous identifications of chemical species.

## Construction and Characterization of Electrodes for Oxygen Diffusion Rate Determination in Soil

**Casey Clegg**

physics

Traditionally, platinum electrodes are used for measurements of the oxygen diffusion rates in soils. This report details different types of metals such as Stainless Steel, Tungsten, and Titanium in addition to Platinum were employed with the intent to see if reliable data could be produced. To determine this, a soil column with eight

electrodes, four placed at the top and four placed at the bottom of the soil column, all of which were wired to a data logging device in order to get voltages of the various electrodes embedded in the soil column. The data were then analyzed to determine the oxygen diffusion rate at varying depths and saturation along the soil column.

## Use of Laser Engineered Net Shaping (LENS) for Titanium and Silver Integration to Improve Antimicrobial Properties in Medical Implants

**Ben Clyde & Nathan Hansen**

biological engineering

Silver has been used for its antimicrobial properties for many years in an array of different applications. This research will investigate the possibility of using Laser Engineered Net Shaping (LENS) to integrate Ag and Ti64. The LENS system consists of a rapid prototype system using metal powders. It is hypothesized that a surface suitable for

application in weight bearings implants will result. This surface will be evaluated for microbial resistance and biocompatibility. Human fibroblast and osteoblasts will be used to determine biocompatibility and the surface will be challenged with *Pseudomonas chlororaphis* 06 (Pc06), a biofilm forming bacteria.

## Differential Gene Expression in Ovules of Apomictic and Sexual *Boecheera*

**Kevin Cope & Kyle Heywood**

plants, soils & climate

Apomixis, a form of asexual reproduction, operates via apomeiosis and parthenogenesis. The plant genus *Boecheera* contains two apomictic species (*B. microphylla* and *B. lignifera*) and one sexual species (*B. formosa*). Expression of apomixis in *Boecheera* is genetically based and currently believed to be controlled by a genetic cascade which regulates the succession of ovule development. Important genes involved in this cascade include MADS-box, Polycomb-group (PcG), Trithorax (TrxG), and Argonaut

genes. Microarray analysis of DNA excised from ovules from all three species of *Boecheera* at various stages of development allowed for genomic comparison across species. Results show that the amount differential gene expression in the embryo sac stage of ovule development exceeds that of the meiosis/apomeiosis stage. The data suggest that genes responsible for differential gene expression may be expressed just before the meiosis/apomeiosis stage, and these genes may initiate the expression of apomixis.

## Investigations of Ute Archaeology, Gunnison and Hinsdale Counties, Colorado

**Stephanie Crockett,  
Ariana Phillips, & Ashley Smith**

sociology, social work & anthropology

This poster reports on the test-excavation of a Ute component at the Heath Site (5GN3418), Gunnison County, Colorado and the documentation of new Ute sites in the Hinsdale and Gunnison Counties' high country. Well documented Ute sites remain comparatively rare in the Southern Rockies, and so each new surface locality and excavated component

helps us better understand these consummate Rocky Mountain-based people. The Heath site yielded, among other finds, a roasting pit containing Ute pottery sherds. Sites documented on survey included a wickiup (which is rare), camp sites, and lithic scatters at elevations ranging from about 9,500ft to 11,500ft above sea level.

## Multi Path FTIR Agriculture Air Pollution Measurement System

**Eve Day**

physics

Open-path Fourier transform infrared spectroscopy (OP-FTIR) is a versatile, technology that allows the measurement of multiple pollutants simultaneously at concentrations of low parts per billion (ppbv). We present an OP-FTIR system that is designed to allow multiple path configurations with a single spectrometer. The system has a 500 m range and allows 360° scan in azimuth and 45° scan in elevation. To study large scale

sources two or more similar systems may be needed. To determine the comparability of the systems, we ran two similar but not identical OP-FTIR systems side by side in a controlled environment and also in a field environment. We determined that the attainable agreement between the two systems for measurements of NH<sub>3</sub> in a controlled environment is around 3% and 3%-10% in a field environment.

## Discovering the Role of the PRMT N-terminus in Sub-Cellular Localization

**Joseph Delka**

chemistry & biochemistry

Protein Arginine N-Methyltransferases (PRMTs) are an important class of enzymes involved in a number of cellular processes. The sub-cellular location of PRMTs is one thing that determines its list of substrates. PRMT 1 variant 2 has been shown to reside in the cytoplasm while PRMT 6 resides in the nucleus. While the core regions of these two enzymes share many similarities, the N-terminal

regions are quite different. Is there something in the N-terminus that dictates sub-cellular localization? To answer this question, we have created DNA constructs which encode two chimeric proteins with swapped N-termini: PRMT 1v2 N-terminus/ PRMT 6 core and PRMT 6 N-terminus/ PRMT 1v2 core. These will be used later to create GFP fusion proteins to trace their positions in the cell.

## The Landscape Architect's Role in LEED NC v. 2.2 Certification

**Kirk Dimond**

landscape architecture & environmental planning

As the need for sustainable development increases, "going green" is the new fad; however, many who profess to be "green," in reality have missed the point. Fortunately, the United States Green Building Council (USGBC) has developed the LEED Rating System as a third party certifier confirming sustainable practices in the building industry. While all design and construction disciplines are involved at

some level in LEED projects, landscape architects play a vital role and should be knowledgeable on what they can do to design a truly "green" landscape integrated as part of the entire building system. This thesis explores in depth the issues addressed by individual LEED credits applicable to landscape architecture and why they are important to both humans and the natural environment.

## Social Network Structure and Co-Authored Papers Between Men and Women Engineers

**Sara Driggs**

engineering & technology education

This paper examines the differences between men and women engineers' interaction by performing a social network analysis of the co-authored papers from the American Society for Engineering Educators conference. Understanding these interactions provides insight to how professionals network and how these networks form. The analysis tracked information about the authors, with whom they wrote and if those connections are male-male,

male-female, or female-female. The data were analyzed for the degree, betweenness, and closeness, in a networking software program, followed by statistical analyses comparing the two genders to find differences. The objective is to discover if men and women in engineering differ and how? This will be answered if the graphs are scale-free or random, if one gender network has more links than the other, or if they are the same.

## Marginal Value of Public Grazing Permits for Utah Ranches

**Tierra Fackrell**

economics

Public grazing permits fill an essential role for Utah's ranches. The research question is "What is the value of these permits to Utah's ranchers given price and precipitation fluctuations and a potential for their loss?" Three innovative ranch sizes were modeled based on actual survey data (Petersen, 1994). Linear Programming (LP) was used to determine the most profitable solutions during an 11-year period, given externally imposed conditions: cattle price and precipitation cycles, different levels of public permit access, and size-specific land-type constraints. From these, quasi-demand curves were generated for the public permits.

Results point to the critical role that drought cycles play in Utah ranch net returns. Regardless of feed mix, permits are used by all ranch types. The public permits are found to have a higher marginal value during times of drought and when AUMs are restricted. The quasi-demand models indicate that total permit costs exceed their marginal values in most cases at current levels of use. However, having public permits in times of drought proves beneficial in the long-run. Furthermore, it is likely that some of the value of the permits has been capitalized into the value of the privately held land.

## Gene Analysis of Mycobacterium Through Bioinformatics

**Scott Fehser,  
Dallin Hubbard, & Jeremy Neff**

computer science & biological engineering

*Mycobacterium* KMS, *Mycobacterium* JLS and *Mycobacterium* MCS were discovered in Montana by Utah State University researchers. These new mycobacteria were genetically sequenced by the U.S. Department of Energy Joint Genome Institute. They are the first non-pathogenic mycobacteria sequenced. They have many similar genes to the pathogenic mycobacteria including *Mycobacterium tuberculosis*, which has been previously sequenced because of its important role in adversely affecting public health. The genes in these microorganisms can provide valuable information on the difference between non-pathogenic and

pathogenic mycobacteria. These specific differences may give clues about which genes are involved in pathogenic mycobacteria and thus help identify possible cures diseases caused by mycobacteria. In addition, the non-pathogenic mycobacteria are able to degrade many different environmental substances, including toxic and hazardous chemicals. Through the use of KEGG maps from Oak Ridge National Laboratory we are attempting to analyze the genetics, proteomics, and metabolomics of mycobacterium for possible degradation pathways to use in bio-remediation processes for the sustainable restoration of environments including soil, air, and water.

## Optical Particle Characterization

**Levi Fifield**

physics

Space Dynamics Laboratory (SDL) and the Dugway Chemical Test Facility currently employ Lidars and FTIRs in field campaigns to measure airborne particle densities. Currently these devices have no real time capacities. The information they acquire must be compared with data acquired from mini-vols, placed throughout the test area, to understand what the quantitative particle densities were during a test. Allen

Howard, coordinating the efforts of SDL and Dugway, is working on a solution to this problem. He plans to build a calibration device, which will permit the Lidars and FTIRs to obtain quantified real time measurements. This poster will focus on two aspects of this project: image processing, to obtain and optical particle diameters and the correlation between these diameters and an aerodynamic diameter.

## For the Optimization of Geometric Features of a Particle Sorter Primary Channel

**William Fish**

mechanical & aerospace engineering

A new particle sorting technology is being developed at Utah State University in the Experimental Fluid Dynamics Laboratory called Aerodynamic Vectoring Particle Sorting (AVPS). There are many industries such as aerospace, ceramic, life science, coatings, cosmetic and pharmaceutical which use particle sorting. The purpose of this project was to build a model of the AVPS facility to research the effects of different geometry on the exiting primary channel jet flow. The motivation for this research is to improve the range of velocities that are feasible for AVPS. In order to sort smaller particles, the

fluid velocity at the primary channel exit must be higher. The maximum exit velocity however is limited by the transition of the flow from smooth, laminar flow to turbulent flow. This project has demonstrated how to increase the fluid velocity while maintaining laminar exit flow. It was achieved by applying a contraction (i.e. a decreased area in the flow direction) in the primary channel, which is known as a Favorable Pressure Gradient (FPG). The application of a FPG resulted in a 50% reduction in the velocity fluctuation level for velocities as high as 40 m/s.

## Translating the French Genealogy from the Fly-Leaf of the Fifteenth-Century

### *De Villers Book of Hours*

**Scarlet Fronk**

english

The De Villers Book of Hours is a fifteenth-century Latin prayer book donated to the Utah State University Special Collections in 1953 by L. Boyd and Anne McQuarrie Hatch. The manuscript includes a handwritten genealogy of the De Villers family in French, dating from the seventeenth century. A former history graduate student, Kenneth R. Williams, transcribed the French genealogy in his Master's thesis in 1996, but did not translate the passages into English. Our purpose in

translating these passages is to learn more of the history and provenance of the manuscript. We compared the thesis transcription with the manuscript in order to make necessary corrections to the transcription. We then consulted with Dr. Sarah Gordon (USU specialist in medieval French) about our translation. We now intend to research seventeenth-century French genealogical records to learn more about the De Villers family and the history of the manuscript.

## Enjoyment of Family Work, Division of Labor, and Marital Satisfaction

**Adam Galovan**

family, consumer & human development

Enjoyment of family work was evaluated as a moderating variable for the effect of an inequitable division of family work on marital satisfaction in a sample of 152 couples and 51 individuals married for five years. Preliminary results show that enjoyment of family work is related both to higher marital satisfaction as well as higher satisfaction with how family work is divided between spouses. Implications for family life education and suggestions for future research are discussed.

## Identification of ncRNAs in *Candida tropicalis* using Comparative Sequence Analysis of Closely Related Species

***Katherine Grover***

biology

Recent evidence suggests that non-coding RNA (ncRNA) play a significant role in regulating gene expression. Large numbers of novel ncRNAs are being identified in eukaryotes, some involved in cancer and neurological diseases. Unlike other eukaryotes, the *Saccharomyces cerevisiae* genome has only a small number of ncRNAs and lacks machinery needed to create ncRNAs. *Candida*, a relative to *Saccharomyces*, also shows this lack of machinery.

This study investigates how common ncRNAs are in the *Candida* lineage. We used bioinformatics tools and ad hoc Perl scripts to align intergenic region sequences of seven *Candida* species. QRNA was then used to classify the sequences as RNA based on mutational patterns. A small number of possible ncRNAs were identified. Our results suggest the *Candida* lineage doesn't have an abundance of novel ncRNAs.

## Open-Source UAV

***Chris Hall & Daniel Morgan***

electrical & computer engineering

Many applications today require UAVs to do tasks autonomously that a human cannot perform easily or cannot perform at all. UAVs are capable of carrying various sensors and aerial imagery equipment in order to survey and take samples of pictures at a lower cost than that of a manned airplane. Our project is to make a low cost and easy to use solution for the

purpose of autonomous aerial flight, capable of performing various tasks including: waypoint navigation, creating aerial images and target recognition. Using remote control airplane frames we have built various autonomous systems based on the open source project, Paparazzi. This system uses a PID controller to obtain stable autonomous flight.

## Storing Carbon in Wildland Soils: Where is it and how stable is it?

**Nickoli Hambly**

wildland resources

This project is part of a study that examines differences in amount and quality of soil carbon under montane ecosystems. Soil samples were taken from the T.W. Daniel Experimental Forest in Logan Canyon, UT in four different vegetation types and two soil depth classes. The samples were subjected to size density fraction separation using

sodium polytungstate and wet-sieving techniques to assess what proportion of soil carbon exists in mineral-associated, protected macro- and microaggregates. Carbon content was determined for intact soil samples and also for individual fractions. This analysis showed that there are differences in carbon fractions by vegetation type and depth.

## The Translations of Jess

**Courtney Hill**

art

Just as a translator transforms text and language into his own discourse and dialect, reshaping words and ideas into his own cultural aesthetic, the artist known as "Jess" translates various literary texts and cultural elements into modernist collages and paintings. His surrealistic "Paste-Ups" and Romantic "Salvages" reflect the aesthetics and ideas of writers such as James Joyce, William Blake, Max Ernst, and especially his partner, the Berkeley Renaissance poet Robert Duncan. Although Jess was primarily classified as a Pop Artist, he preferred

to describe himself as "a Romantic artist, poetic artist..." and described his works as including elements in classicism, mysticism, and romanticism. In this paper, I demonstrate the ways in which Jess translates Classical, Victorian, and contemporary culture into a "Pop Art" form, not only to better understand interpretations of concepts within his own reality but to better understand art's general purpose as a physical reflection and translation of the abstract and subjective reality of its creator.

## The First Structural View of the TRAMP Component Mtr4

**Bradley Hintze**

chemistry & biochemistry

RNA surveillance is a widespread cellular process that is critical for cell function and viability. The highly conserved and essential eukaryotic TRAMP complex (Trf4, Air2, Mtr4 polyadenylation complex) plays a central role in nuclear RNA surveillance. TRAMP activates RNA degradation by identifying, labeling, and delivering RNA substrates to cellular degradation machinery. TRAMP contains helicase (Mtr4), polyadenylation (Trf4),

and putative RNA binding (Air2) activities. However, the current understanding of these essential activities is limited by a lack of structural data. No structures are currently available for TRAMP or any of its individual components. Here we present our recent advances in determining a 3.4 Å crystal structure of the RNA helicase Mtr4 from *Saccharomyces Cerevisiae*, which represent the first structural view of a TRAMP component.

## Financial Management Practices of Couples with Great Marriages

**Amanda Horrocks**

family, consumer & human development

This qualitative study focused on financial management practices of self-selected couples willing to participate in a study about great marriages. Almost two-thirds of the couples stated that one of the spouses handled the day-to-day money management. Trust and communication were important factors discussed by many couples. It did not seem to matter if the wife or the husband handled

the finances or if they had joint accounts or separate accounts. Over half of the participating couples said they had little or no debt or were trying to get out of debt. They tended to be frugal and lived within their means. There were no real spending problems in the participants. In the past they had faced financial challenges but they work together to get through those challenges.

## Mutations of Critical Amino Acids in the Human Enzyme PTP 1B

**Sara Huefner**

chemistry & biochemistry

Protein tyrosine phosphatases, or PTPs, are enzymes that remove phosphate from the tyrosine residues of other proteins, serving to regulate such vital processes as cell growth and insulin uptake. These enzymes have become prime research targets, as disruption of PTP function, by genetic mutation or the presence of pathogenic PTPs, results in diseases such as cancer, diabetes, gastrointestinal disease, and the Bubonic Plague. It is already known that general acid catalysis in

PTPs is accomplished by an aspartic acid that swings into the active site via closure of the flexible WPD loop. In human PTP 1B, we examined the kinetic and structural consequences of mutations to two residues involved in WPD loop movement: the active site R221 that triggers loop closure, and the loop hinge W179. Both mutations to Ala decrease activity in the enzymes, reducing  $k_{cat}$  by 3-5 orders of magnitude and disabling general acid functionality as compared to the native enzyme.

## A Technology Based Approach to the Charter School Lottery Selection Process

**Joseph Irvine & Joshua Kerkmann**

management information systems

Charter schools are publicly funded schools that have greater flexibility in governance and curriculum issues than traditional public schools. This flexibility has made Charter schools an increasingly attractive option to parents, and led to some schools not being able to admit all interested students. To alleviate this problem while complying with federal regulations, schools have turned to admissions lotteries for student selection. The lottery process can be time

consuming, not only to execute, but also in terms of the administrative preparation needed. This study provides details of a new methodology to automate the lottery process. An algorithm based on the principles of random number generation was used to successfully select students. This algorithm was embedded within a user friendly software program built using the Visual Basic .NET development language.

## Migration Turnover Rates and their Determinants in U.S. Counties

***William Israelsen***

economics

The Migration Turnover Rate (MTR) measures the population turnover of an area, through in-migration and out-migration, during a given period of time. Just as employee turnover creates costs for the employer, population turnover creates costs for society. The MTR is measured as the minimum of gross in-migration and gross out-migration as a percentage of the population of each county in the United

States for the periods 1985-1990 and 1995-2000. An econometric model is used to identify the importance of a variety of factors associated with counties in influencing the size of MTR. It is found that a number of economic, demographic, social, environmental, geographic, and political variables are significant determinants of county migration turnover rates.

## OSL dating and geoarchaeology at the Paleoindian Heath Site, San Juan Mountains, Colorado

***Melissa Jackson***

geology

Geologic studies supporting archaeological investigations at the Heath Site in the San Juan Mountains of Colorado have the goal of establishing age control and interpreting landscape history. The study implemented new optically stimulated luminescence dating techniques and results confirm this is a Paleoindian-age deposit, as suggested

by diagnostic points found at the surface. The sediments preserving the site are debris flow and slope wash deposits with some eolian input. The site location, which is currently on a river terrace 26 m above the Lake Fork of the Gunnison River, had become a river terrace before the first occupations of the site.

## Rainwater Harvesting: Contemporary Applications for an Ancient Technology

**Kevin Jensen**

landscape architecture & environmental planning

As more open spaces and agricultural lands are converted to urban and suburban areas the quality and quantity of our water resources seems to diminish. The increase in impervious surfaces associated with development significantly contributes to demands on storm drain systems and water treatment plants. The lack of stormwater infiltration into the ground is diminishing our aquifers and water table, thus resulting in decreased native wildlife habitat, and

increased erosion and sedimentation in our rivers and streams. In response to these concerns, many individuals, municipalities, and developers are turning to the age-old practice of collecting or “harvesting” rainwater to meet our society’s water demands. Harvested rainwater can be used for potable or non-potable applications, and has the potential to positively impact social, political, economic, and environmental sectors.

## Relationship between Seismic Velocity and Fracture Densities at the San Andreas Fault Observatory at Depth

**Tamara Jeppson**

geology & physics

We can examine the geophysical structure of fault zones to understand the composition of materials in the fault zone and relate composition and geophysical character. In order to increase our understanding of fault behavior at depth, the San Andreas Fault Observatory at Depth (SAFOD) provides geophysical data and rock samples from a borehole passing through part of the San Andreas Fault Zone.

Compressional and shear wave velocities measured at SAFOD were compared to fracture density to determine how deformation affects wave propagation. At low fracture densities there is a wide range in the velocity values, probably caused by variability in material properties. At higher densities the minimum velocity increases. This increase could be due to lithology, anisotropy, or fluid content.

## Characterization of soil texture and pH on crested wheatgrass seedings and potential controls on plant community dynamics

**Jamin Johanson**

wildland resources

Crested wheatgrass (*Agropyron cristatum*) is a perennial bunchgrass that has been successfully planted throughout the western United States. Research is currently being conducted at USU to determine how ecological factors influence the plant community structure of areas seeded to crested wheatgrass, over time. In conjunction with their work, I have characterized the physical and chemical soil properties of 38 crested

wheatgrass sites seeded between 30 and 50 years ago. Upon completion of all related studies being conducted at USU, the characterization of these soil variables will be analyzed with statistical ordination to provide information about the effects that soil has on plant succession in these ecosystems. Preliminary analyses suggest that soil pH has a greater influence on rangeland soil fertility than soil texture in these sites.

## Optimizing the Expression and Purification of PRMT1

**Scott Johnson**

chemistry & biochemistry

PRMT1 is an enzyme that covalently modifies protein arginine residues by asymmetrically attaching methyl groups to them. In order to understand how this enzyme works, substantial amounts of purified recombinant PRMT1 are needed. The goals of this research are to optimize two important aspects in the purification of recombinant PRMT1: expression of the protein in *E. coli* and isolation of it by metal affinity chromatography.

We compared the relative yields of PRMT1 by IPTG-based induction of protein expression with auto-induction based methods. These studies revealed IPTG induction yielded proportionately more PRMT1 than autoinduction methods. We are also investigating the efficiency of isolating the His-tagged PRMT1 on nickel and cobalt resin chromatography columns. Our results will compare the relative efficiency of each type of column in purifying PRMT1.

## **Decoding the American Dream: Understanding the American Dream and the Lure of “El Norte”**

***Danielle Jones***

american studies

The United States purports to be a land of promise, a beacon to those seeking freedom and financial success. This promise of happiness and success was checked by the regulations on immigration at the beginning of the nineteenth century. In the twentieth century, Latin Americans are kept out of the United States with xenophobic zeal; suddenly there are too many “poor, tired, huddled

masses” seeking freedom in the United States. Juxtaposing the desire to go to “el Norte” (the north) demonstrated by Latin Americans with the traditional American Dream underscores the similarity of values held by both groups. Through literature, film, and individual experiences, this paper will allow the American Dream to leave the realm of myth and become a piquant reality.

## **Price Competition in the Grocery Industry: A Clearer View of Price Disparity**

***Grant Keaton***

business administration

The business world is dynamic and often turbulent. One area that appears to be going through some significant changes is the grocery industry. In recent years competition in this industry has increased significantly with the entrance of discount stores and warehouse clubs in the market. Given this heightened competition, it is especially interesting to note the great price disparity that exists among the different

grocery retailer formats. Naturally, prices will vary according to brand, quality, and quantity, but prices for equivalent products also seem to vary significantly among the different formats. Past studies comparing prices for similar products among grocery retailer formats have shown some methodological limitations. This study will provide a clearer view of price disparity among these different grocery retailer formats.

## The Effects of Different Schedules of Food Delivery on Chronically Administered d-Amphetamine in a Rat Model of Human Drug Use

**Adam Kynaston**

psychology

Sensitization to the effects of stimulants may be more likely to occur when the effects of the drug do not interfere with earning reinforcers. In these experiments, we were interested in whether random-ratio (RR) and random-interval (RI) schedules can produce differential tolerance and sensitization to the effects of d-amphetamine. In a ratio schedule, responding is directly related to the rate of reinforcement, making rate-decreasing drug effects are

directly incompatible with reinforcement. In an interval schedule, the relationship between responding and reinforcement is nonlinear, and a relatively low rate of responding can still earn the maximum available food. Two experiments were conducted to test the hypothesis that rats responding on a RR schedule of food delivery would be more likely to develop tolerance relative to rats responding on a RI schedule.

## Analysis of Apoptotic Gene Expression in Human A549 Lung Carcinoma after Infection with Oncolytic Bluetongue Virus Serotype 17

**Uyen Lam**

biology

Bluetongue virus (BTV) is a double stranded RNA virus that primarily infects domestic cattle and some wild ruminants. Recently we discovered that wild-type BTV-10, 13, and 17 have oncolytic activities that selectively kill human carcinomas. Potential mechanisms that generate cell cycle arrest and apoptosis in human carcinomas are currently unknown. Expressions of 84 human genes involved in apoptosis were analyzed using PCR and qRT-PCR in BTV-infected A549 cells. Gene families analyzed included: TNF ligand and receptors,

caspases, death effector domains, anti-apoptosis, p53, and DNA damage responses. Preliminary data has shown up-regulation of ABL1 and BCL2A1, down-regulation of FAS, and no significant variations of expression in the other genes. These results suggest that BTV's mechanism of inducing apoptosis in human carcinomas is not by influencing transcription, but through directly regulating gene products. Further quantitative analysis of apoptotic gene expression needs to be conducted to confirm these results.

## Trophoblast Stem Cell Differentiation

***Rochelle Lambertsen***

biology

Trophoblast stem cells are responsible for the aggregation of connected fibers in forming the trophoblast, and ultimately the placenta. It is feasible that the low percentage of calves produced by nuclear transfer is due to this weak lining and one possible solution to expanding and reinforcing

this lining forming the placenta would be to ensure correct reprogramming of the trophoblast stem cells. However, before reprogramming may occur, I must first understand the process of differentiation. This portion of my research is doing just that.

## Auger Electron Spectroscopy of Metal, Insulator, and Semiconductor

***Michael Larson***

physics

Electron spectroscopy analyzes the energies of ejected electrons from excited atoms or molecules to determine atomic species and bonding between atoms. In particular, Auger electron spectroscopy (AES), which, in our case, uses an electron beam to excite surface atoms, has been used to determine surface species and coverage. However, the shape and relative peak intensities of

the AES are often subject to other factors such as charging effect, primary beam focusing and secondary electron emission, which could affect quantitative determination of surface coverage. I will present AES studies on metals (Ti, Cu, Mo), semiconductors (Si) and insulator (macor) to show the many factors that could affect the AES.

## Temperature Waves in the Upper Atmosphere

**Jarron Lembke**

physics

Recent LIDAR research at USU has observed large amplitude temperature waves in the upper atmosphere. Where do these waves come from? Initial analysis suggests that these waves

coincide with the diurnal tides. Also observed along with these large amplitude waves was a noctilucent cloud. How are these two phenomena related, or are they even related?

## The Production of Bioplastics using the Waste Streams of an Anaerobic Digester

**Elisabeth Linton**

biological engineering

In an effort to improve the economics of bioplastic production, we propose the use of anaerobically digested dairy waste as the nutrient and carbon source for microbial growth and PHA accumulation. Effluent from a commercially operational anaerobic digester will be used as the model substrate source for this project. The digester breaks down dairy waste to produce an aqueous effluent rich in volatile fatty acids (VFAs) and

inorganic nutrients, as well as a gaseous (methanol and carbon dioxide) byproduct stream. These waste streams have been explored for PHA accumulation by microorganisms and to obtain kinetic parameters. Successful nutrient utilization and PHA production using the effluent will lower the cost of bioplastic production and provide additional revenue sources for anaerobic digester systems, mostly located in rural communities.

## Japanese Costume: Modifying Traditional Asian Construction Techniques for the Stage

***Elicia Lord***

theatre

When studying costume design and clothing construction for the stage, the majority of institutions of higher learning within the United States focus purely on western aesthetics and dress. Although there is a wealth of applicable knowledge to be gained from discovering Asian costume construction, the lack of experience that western designers have concerning Asian clothing and aesthetics hampers the ability to design authentic costumes

for theatrical productions. This project attempts to seek out this information by looking into Asian construction techniques focusing particularly on those of Japan. By researching these authentic techniques and finding the best way to adapt traditional Japanese clothing construction for the stage, the theatre community's knowledge about a vital but underrepresented area of historical clothing creation can be enhanced.

## Scalable, Parallel, and Distributed Approximate Shortest Paths in Massive Graphs

***Art Mahoney***

computer science

This paper introduces a distributed and parallel adaptation to a path-planner, the Rapidly-exploring Random Tree (RRT), that enables it to search for approximately shortest paths in massive, undirected, and unweighted graphs. Our adapted RRT is compared with an asynchronous distributed Breadth-First Search in terms of both speed and solution quality. Wallclock execution time experiments show our distributed adaptation to the RRT to find paths faster

than the BFS for all but the shortest paths on the same system of processors. A "strong scalability" study described in this paper demonstrates the distributed RRT's ability to scale to an increasing number of processors. Our distributed adaptation of the RRT aims to satisfy a need for rapid and approximately shortest path finding in graph theoretic applications that use graphs of size that require a parallel and distributed memory solution.

## Inhibitory effectiveness of St.-John's-Wort-derived compounds against Mycobacterial isolates

**Trent Mortensen & Andrew Vanderwerf**

biological engineering

The emergence of an Extensively Drug-Resistant (XDR) strain of Mycobacterium Tuberculosis has made new drug therapy a matter of utmost importance. It is the design of this research to establish if extracts from St. John's Wort have an inhibitory effect against M. Tuberculosis through studying its effects on genetically-similar mycobacterial isolates (three of which were discovered at Utah State University). A series of extracts, or "teas," have been created using

various organic solvents and have been shown to inhibit mycobacterial proliferation while not affecting gram negative strains. Threshold inhibitory dosage range has been determined for the ethanol extract, and experiments are now underway to determine the inhibitory compounds; such studies will be performed using three known active ingredients of St. John's Wort as controls: hypericin, pseudohypericin, and hyperforin.

## Measurement Error-Based Weights in Distance Measures

**Shelley Moss**

math & statistics

Many areas of research require the use of distance formulas in comparing different multidimensional profiles. For example, in gene profiling research distance formulas are used to compare different subject's gene expression profiles to determine which subjects are most similar. Many times the measurements used to determine the multidimensional profile are not exact and have associated error. In the past,

the distance formulas used do not take into account this measurement error. The formulas we've developed take into account that error. The Moss distance adds to the Euclidean distance the distance between the measurement errors. The weighted statistical distance weights each measurement by the error associated with it. Using these two distance formulas in certain situations produces better groups of similar subjects.

## Alkaline Commercial Wash Water and Bacterial Survival

**AmberLeigh Muller**

biology

Water from a commercial washing system contains bacteria although it is alkaline (greater than pH 9). To determine the bacterial species present, the water samples were plated on two different media types. Isolating and attempting to identify some of the colonies has provided some interesting results as well as opportunity

for further research. Alkaline waters and their bacterial content was not often a subject of study historically, thus the bacteria present in this water offers unique opportunity to learn more about the bacterial world and how these organisms function and adapt to their surroundings.

## Production of Omega Fatty Acids using Crude Glycerol

**Daniel Nelson**

biological engineering

The objective of this research is to study the production of Omega-3 Fatty Acids, which are high value nutritional supplements, using microbial cultures grown on crude glycerol. Crude glycerol, a major co-product of biodiesel production, is a low value carbon and energy source that is contaminated with many impurities. Recovery of pure glycerin from this crude mix is often uneconomical

and therefore it is necessary to find alternative uses. In this study, we are studying omega fatty acids production by the marine fungus *Schizochytrium limacinum* SR21 during growth on glycerol. Quantitative lipid analysis is being performed using gas chromatography (GC) with flame ionization detection (FID) and mass spectroscopy (MS).

## Optimizing Micropropagation of Chokecherry

**Tasha Newman**

plant, soils & climate

There is interest in chokecherry (*Prunus virginiana*) as an alternative fruit crop, but little is known about efficient clonal propagation. We are investigating carbon source, salt concentration, gelling agent concentration, and the effects of different rooting hormones on in vitro chokecherry propagation. In comparing carbon source, we found that while glucose increases the number of shoots that are produced per plant, the plants in the

sucrose based media have much better overall health. In a comparison of the two hormones naphthaleneacetic acid (NAA) and indolebutyric acid (IBA) we found minimal difference in root number or root length. However, the plants in the NAA based media rooted more rapidly than those on IBA media. An optimized tissue culture media should enable rapid propagation of clonal chokecherry for commercial orchard establishment.

## Impact of Teacher Practices on Student Outcomes in the Advanced Readers At Risk Project

**Aubree Nielsen**

elementary education

In the wake of school accountability systems focused on high stakes testing, the needs of advanced learners have often taken a back seat to needs deemed more pressing, such as test preparation for lower achieving students. This seems to be the case particularly in reading education. In response, a federally funded project, called Advanced Readers at Risk (ARAR), was implemented in Utah to prepare teachers to be more responsive to the learning needs of advanced

readers. The intended outcomes of ARAR included improving advanced readers' access to appropriately challenging instructional materials and process so that they could continue to experience growth in reading achievement and attitude toward reading. The purpose of the specific study reported here was to determine the degree to which implementation of appropriate teaching practices for advanced readers was related to changes in student reading achievement and reading attitudes.

## **Title: Comparison of Methylation Patterns Concerning 5 Transcription Factors**

***Bryce Osborne***

biology

DNA contains all of the genetic information needed to develop and maintain our bodies. Transcription is the process of reading genetic information contained within DNA and transforming it into a biological building material. During this process, transcription factors bind to specific regions of the DNA and effect certain sequences. The main focus of the

research that is taking place in Dr. White's lab is to study the epigenetic factors that cause abortion of cloned fetuses. In this project I study the methylation patterns of five main transcription factors that have been shown to be aberrantly expressed, either in levels too high or too low in clones when compared to IVF ( In-Vitro Fertilization) controls.

## **Hairy Hearts and Other Wonders: Sculteto's 1658 Treatise on Trichiasis Admiranda**

***Charles Oughton***

history

This paper surveys one aspect of a larger project to produce a transcription, translation, and commentary of Johann Sculteto's 1658 Medical Treatise, Trichiasis Admiranda, which has never been translated from its original Latin. In publishing this work, Sculteto and his printer Michael Ender introduced many grammatical and syntactic errors, the

nature of which can only be identified and resolved by determining how the text was created, for instance, the way in which the printer assembled the plates and copyediting took place. This paper will review our experience in transcribing and translating this text, focusing on the more difficult problems encountered and the solutions proposed.

## Creating Boron Delta Layers on Silicon: Investigating Decaborane(14) as Source in Chemical Vapor Deposition

**Cade Perkins**

physics

I will present the preparation and analysis of a decaborane (B<sub>10</sub>H<sub>14</sub>) source for creating boron delta layers in silicon. A commercial decaborane source was purified by a trap-to-trap sublimation process. A stainless steel, UHV manifold was designed and assembled for both the purification process and vapor delivery. Melting and boiling

of the decaborane crystal was recorded by a CCD camera. A residual gas analyzer (RGA) in the deposition chamber was utilized to analyze the purity and measure the partial pressure of the decaborane. An analysis of the suitability of decaborane for the chemical vapor deposition will be presented.

## Investigating Seasonal Variability in Short-Period Gravity Waves Over Bear Lake Observatory, Utah

**Richard Phillips**

physics

The Center for Atmospheric and Space Sciences has operated a sensitive digital camera at Bear Lake Observatory (41.6° N 111.6° W) since 1999 recording images of structure in the visible and near infrared airglow emissions which occur naturally in layers within the earth's upper atmosphere (Altitude range 80 – 100 km). Atmospheric gravity waves, generated in the lower atmosphere by strong weather disturbances propagate upwards and can be observed in different airglow emissions (which occur at different heights)

as wave patterns. Analysis of these image data enables us to investigate the characteristics of these waves (horizontal wavelength, velocity and direction of motion) as well as their occurrence frequency and duration. This study focuses on characterizing seasonal properties of these waves during the period 2003 – 2004 and has revealed copious gravity waves exhibiting a strong seasonal variability in their direction of propagation. These results will be compared with similar type measurements at other latitudes.

## **Bingham Creek: History of Challenge, Future of Change**

***Jake Powell***

landscape architecture & environmental planning

The Bingham Creek has a strong history of challenge, and a future of change. A primary discharge of the legendary Bingham Canyon mining district, the creek fueled much of the early success that occurred in the Bingham Canyon. The corridor now sits dry, the victim of large scale mitigation cleanup, showing little resemblance of its former importance. The master plan for Daybreak

has identified Bingham Creek as a significant opportunity for recreation, open space, and greenway development. It could provide large-scale recreational areas as well as a crucial link in east-west and north-south trail networks. As a site for interpreting the natural and cultural history of Bingham Canyon and the southwest valley, the creek offers unparalleled opportunities.

## **Analyzing E-bay Auctions: Does the Power Seller Designation Affect Final Purchase Price?**

***Myles Powell***

management information systems

The intent of this research was to determine what effect, if any, the rank of "Power Seller," among other characteristics and attributes, had on auctions at the auction website E-Bay.com. We selected two items that had large quantities of identical items available for auction. We choose Hannah Montana concert tickets and Play Station II game consoles. Then we monitored the selected auctions, noting if

the seller was a Power Seller as well as the final purchase price of the item, among other details.

We are still analyzing the data, but the preliminary results indicate that being a Power Seller might result in a lower final purchase price than non power sellers. A full statistical analysis will be performed and presented at the showcase.

## **Analysis of the Reactions of Secondary and Tertiary Amines with O<sub>3</sub> and NO<sub>x</sub> Using a Proton-Transfer Reaction Mass Spectrometer and an Aerosol Mass Spectrometer**

***Derek Price***

chemistry

Studies of Cache Valley ambient air quality during wintertime inversion periods have shown the presence of amines. To understand how these amines are formed and react in the atmosphere, several collaborative experiments were performed in the University of California-Riverside smog chamber. This provided a controlled environment to observe the amine reactions. Two different instruments

were used to analyze the reactions, an aerosol mass spectrometer (AMS) and a proton-transfer reaction mass spectrometer (PTR-MS). The AMS was able to detect and analyze particles in the 0.05 to 1.0 micron size range while the PTR-MS focused on the gas phase species. Two secondary and three tertiary amines were examined. Each amine was introduced into the smog chamber followed by ozone and then NO<sub>x</sub>.

## **Cultural Resources of Capitol Reef National Park**

***Boyd Reschke***

landscape architecture & environmental planning

Just three years after the creation of the National Parks Service, the National Parks Conservation Association (NPCA) was created in 1919, to provide an independent voice for the protection of park's resources. NPCA initiated a program in 2000 to develop complete and comprehensive, peer-reviewed studies of the current natural and cultural resource management of the nation's parks. This report was conducted for the NPCA

study and reviews how the cultural resources are being managed in Capitol Reef National Park. This park is located in the south-central part of Utah and contains huge sandstone monoliths, narrow slot canyons, high desert plateaus, scores of arches and natural bridges, dinosaur bones, and petrified wood. There are breath-taking vistas, deep river gorges, vegetated riparian areas, abundant wildlife and even the largest fruit orchard in the National Park Service system.

## **Environmental Effects on the Condition Factor of Arctic Grayling (*Thymallus arcticus*) and Lake Trout (*Salvelinus namaycush*) in Arctic Alaska.**

***Melissa Sanders***

wildland resources

Lake Trout (*Salvelinus namaycush*) and Arctic Grayling (*Thymallus arcticus*) are common in lakes near the Toolik Field Station in Arctic Alaska (68°38'N, 149°38'W). Despite similarity of diets, there is inter-lake variability in the condition factor (k) of grayling and lake trout populations. We collected baseline environmental variables and length/weight data for eleven populations of Arctic grayling and five populations of lake trout during the summers of

2005 – 2007. This allowed us to calculate condition factors, and assess the effects of environmental properties, versus inherent difference between the two fish species, in explaining the observed differences in growth patterns. We investigated physical, chemical and biological properties to see which was most highly correlated to the condition factor and thereby give insight to how buffered against environmental change these populations are.

## **Civil Liberties versus National Security in the War on Terror**

***Kendal Schneider***

political science

Since the War on Terror began after the terrorist attacks of September 11, 2001, the United States federal government has implemented security measures designed to prevent another such attack on American soil. But, as the FBI conducts surveillance without court orders, as terror suspects are detained without being charged, and as other policies of the Bush administration are implemented, many of these new security measures

represent an encroachment on basic civil liberties. The question has become, how much civil liberty should be sacrificed in the name of national security? I argue that civil liberties should not be forfeited for better security. As the government seeks to prevent future terrorist attacks, this encroachment on civil liberty represents the destruction of the very society the government is striving to protect.

## Involving Communities in Conservation in Africa

**Mary Sundblom**

anthropology

In competition with humans, great ape populations have declined dramatically within the last century. Human population growth, rapid deforestation, and the commercial bush-meat trade result in a challenging conservation dilemma. Examination of the Jane Goodall Institute's (JGI) approach to conservation reveals an anthropologically-influenced model of

sustainable community involvement. JGI's programs address poverty and support sustainable livelihoods while arresting rapid degradation of natural resources through a holistic program which includes public/private partnerships in support of locally managed education, socio-economic development and sustainable natural resource management.

## Use of High-Resolution RH map to fine mapping potential QTL regions on Sheep chromosome 9 (OAR9)

**Devin Tanner**

animal, dairy & veterinary science

Gastrointestinal parasites have a profound detrimental effect on sheep production and producers would benefit greatly from identified markers to help select parasite resistant animals. Therefore, a genome-wide QTL scan has been implemented using samples from 42 grandparents, 3 F1 sires, 97 F1 dam, and 195 F2 offspring, for which fecal egg count (FEC) for *Haemonchus contortus* and packed cell volume (PCV) were measured after natural and experimental challenges. Selective genotyping of the upper and lower 20% of the lambs for FEC after natural challenge identified potential QTL regions on ovine chromosome OAR9 between MCM63 and BM2934 with 10.00 cM interval. In order

to narrow down the potential QTL regions and fine map the QTLs on OAR9, the mapping resolution was improved by using radiation hybrid (RH) mapping. The USUoRH5000cR hybrid panel was used to construct a high-resolution RH map of OAR9. Using a logarithm of the odds (LOD) threshold of 6.0, one-linkage group has been constructed which were aligned with the genetic linkage map of this chromosome. The resulting RH map consisted of the 28 microsatellite markers, 21 BESs and 8 genes. The combined mapping results predicted the QTL regions located on OAR9 around 90.00 Mb on the latest virtual sheep genome with the 8.00 Mb interval.

## Effects of Microstructure on the Effective Properties of Soils, Tissues, and Other Complex Media

**Adam Tew**

physics

Analytical methods for approximating the material properties of particle-filled media, such as the dielectric properties of soil, assume a uniform, random particle distribution. To determine what effect microstructure has on the effective physical properties of a particle pack, a multipole computer model was used to simulate wave propagation and scattering in simulated non-uniform particle packs. Two types of microstructure were examined, a foam type and an

aggregate or clumped type. The test packs contained approximately equal numbers of particles with varying degrees of microstructure. It was found that the foam type structure had consistently higher dielectric properties than uniform packings, while the aggregate structure had properties which were consistently lower. Also simulated were microstructural changes in tissue due to invasive cancer, and those results will be presented as well.

## Noctilucent Clouds from Above and Below

**Jodie Tvedtnes**

physics

Polar Mesospheric Clouds are ice clouds that form near the extremely cold ( $<150\text{K}$ ) mesopause region (80-85 km) during the summer months at high-latitudes. From the ground, these clouds are seen during twilight hours as Noctilucent or "night shining" Clouds (NLCs). Observations by the Solar Backscatter Ultraviolet instruments on the NOAA satellites have shown that the occurrence and brightness of NLCs have been increasing over the last

several decades prompting speculation concerning their role in climate change. In this poster we compare satellite observations with data collected from the ground during a campaign in Canada from June 30 to July 17, 2007, focusing on the night of July 1-2 when there is good coincidence between satellite and ground-based data, in order to investigate the temporal and spatial extent of the clouds.

## **Vulnerability for Eating Disturbances among Male and Female College Students: Associations with Relationship Quality and Gender Roles**

***Victoria VanUitert***

psychology

Neumark-Sztainer (2005) found that over half of teenage girls and nearly one third of teenage boys engage in unhealthy weight control behaviors, such as fasting, smoking, vomiting, skipping meals, and using laxatives. Previous research has linked romantic relationship experiences to both gender role orientation and eating disturbances/body dissatisfaction. About 1/3 of men and 1/2 of women feel that the opposite sex influences their eating habits, exercise, or feelings

towards their bodies (Murray, Touyz, Beumont, 1995). A sample of 160 college students completed an online survey assessing romantic relationship quality, gender role orientation, and body image dissatisfaction or disorder eating behavior. I examined how romantic relationship quality is associated with male and female vulnerability to engage in eating disturbance thoughts and behaviors with gender role orientation as a moderating variable.

## **Offense, Offender, and Victim Predictors of Sexual Victimization of Children vs. Adolescents**

***Nathan Voge***

math & statistics

There has been much research and concern recently regarding the sexual victimization of children and adolescents. This study aims to understand the differences between these perpetrators who have victimized children versus adolescents. Our data are unique in that they are a representative sample of U.S. inmates obtained from the 1997 BJS/US Census Survey of Inmates in State and Federal Correctional Facilities'. Through the use of a logistic regression statistical

model, we found that the following factors significantly discriminated between groups of perpetrators: guardians' use of drugs, friends' use of drugs, sexual abuse history, family size as a child, family size as adult, , victim use of drugs, offense location, and victim-offender relationship. Results indicate that these groups can be differentiated on several variables, providing clues about the prevention of these violent acts.

## Choosing Nucleic Acid Sequences for Phylogenetic Studies of the Rust Genus *Phragmidium*

**Michael Whyte**

biology

Among causal agents of plant disease, rust fungi are some of the most destructive. The effects of rusts can be very costly, as they commonly infect many agriculture crops. One group of rusts found in the in western US is the genus *Phragmidium* which infects members of the Rose family. Not only do members of the genus cause diseases, certain species with high host specificity have been used effectively as a bio control

agent for blackberry in South America where it is exotic and problematic for endemic species. By amplifying and sequencing selected portions of the rust genome, phylogeny and genetic variation can be determined. It is the aim of this study to choose genes useful for constructing a phylogeny of samples of *Phragmidium* species collected from the western US.

## Strawberry Salinity Screening

**Laura Rowley Wright**

plants, soils & climate

Strawberries could potentially be a very important fruit crop grown in Utah. However, strawberries are not very tolerant of the high pH and saline soils common in Utah. Some varieties may be more tolerant than others. We are developing a system to quickly and easily test multiple cultivars to find out which would thrive in Utah's soils. Fifteen salt treatments of varying degree

are automatically delivered to each treatment over a set period of time. Data are taken each week to determine which varieties survive under high salt stress. Once this system is perfected, it could be used on many different fruit and vegetable crops, and to measure response to other growth factors including nitrogen or other nutrients.

## Asset-Based Community Development in Huanchaco, Peru

**James Young**

sociology, social work & anthropology

Over the last two decades tourism has transformed Huanchaco, Peru, from a rural subsistence-fishing village into a demographically diverse, urbanized community. Infrastructural inadequacies caused by this rapid transition to urban life have become the focus of various Peruvian and international development projects. In 2006 Utah State University's Ethnographic Field School decided to shift focus from conducting

ethnographic research, to facilitating community development. Contrary to development projects that are reliant on excessive outside resources, our sustainable approach of Asset-Based Community Development places an emphasis on utilizing abilities and resources found within the community in order to construct mutually beneficial relationships and projects of the community's design.

## A Look into the Unknown: Effects of Heat-Treatment on Quartzite

**James Meservy**

plants, soils & climate

Archaeologists have some evidence that leads researchers to believe that prehistoric population exposed quartzite to heat-treatment to improve knappability. I have taken this research a step further to determine the effects of

heat-treatment on the flake-ability of quartzite. I have exposed quartzite samples to heat-treatment, and have documented the difference in flake-ability of heat-treated quartzite in comparison to non-heat-treated quartzite.

## Cost Equity Methods and Valuing Energy Utility at the Utah State Tax Commission

**Nicholas Rupp**

business administration

The Utah State Tax Commission established administrative rule R884-24P-62, which became effective as of January 1, 1999. This administrative rule, usually referred to as Rule 62, has been modified or amended several times since it was first promulgated. Rule 62 was formulated to reduce the controversies and litigation related to state-assessed ad valorem property tax by establishing a framework and specifying defined methods to be applied by the Property Tax Division of the Utah State Tax Commission in its assessment functions. One of the most detailed sections of Rule 62 concerns the estimation of cost of common equity as an important component of the discount (capitalization) rate in the income indicator of value. As discussed in Rule 62, the Utah State Tax Commission prefers the CAPM (Capital Asset Pricing Model) over all other cost of equity models,

including the discounted cash flow model and the risk premium model. In estimating the cost of common equity, the Utah State Tax Commission directs the Property Tax Division to place at least 50 percent weight on the CAPM as specified in Rule 62. Specially, this paper examines the estimation of the cost of common equity, inducing the relative implied weights assigned to each model and the specific use of components or variables for each model, by the Property Tax Division of the Utah State Tax Commission for energy utility property in Utah during recent years. The implications of the estimated cost of common equity for the income indicator of valuation for centrally assessed property of energy utilities in Utah are explored. Counties in Utah obtain property tax revenues from (i) centrally assessed property and (ii) locally assessed property.

## InTech High School Participants

The InTech Collegiate High School represents the effort of the Box Elder, Cache, Logan, and Rich school districts, as well as Utah State University (USU) and the USU Innovation Campus to give every student the opportunity to complete high school and at least two years of college in a challenging learning environment. Dr. Stephanie Kawamura mentors the young scientists featured here, who have distinguished themselves in research, and are competing regionally.

## **From Gray to Green: Observing the Effects of Graywater on Brassica rapa**

***Louisa Barta***

As the modern population continues to grow and consume, graywater has become a topic of increasing interest to the scientific community. Graywater, or household wastewater containing no biomatter, is hypothesized to be of use in water conservation in both industrial and developing countries. Though water is one of the most prominent resources consumed, the successful implementation of recycled water in everyday life could also make it one of the most replenishable. To test its effects, three different types of the Brassica rapa plant (Purple Stem Hairy, F1 Yellow-Green Leaf, and Anthocyaninless) were nourished with recycled water from a household

washing machine treated with bleach for a period of 33 days. Overall, the graywater plants withered in comparison to those grown with distilled water. None of the graywater seedlings survived to reproduce, and all showed signs of significant degradation in measurement of height and biomass, appearance and color, complete cellular deterioration, and minimized cell density. The effects of the graywater were general rather than plant specific. The collected data offered insight as to which aspects of the plants' development are most affected by graywater, therefore suggesting action that could make the usage of graywater in practical irrigation a reality.

## **Comparison of Audiological Profiles and Brainstem Processes in Children With and Without Language-based Learning Disabilities**

***Menen Bitter & Connor George***

In this study 10 children with Language-based learning disabilities and 10 normally developing children were given 8 audiological tests to determine if there were statistical differences in the responses given by the two groups. Previous studies have suggested that some children with Language-based Learning disabilities had abnormal auditory processing of the speech signal in the auditory pathway. There was no previous research to suggest that normally developing children to suggest that

normally developing children would have abnormal auditory processing. Results from Noise Left of the HINT test and the BioMAP did not yield statistical significance between the two groups. However, they did suggest that there may be a subgroup of normally developing children who also have abnormal auditory processing. Future studies will be focused on this subset of normally developing children to determine if there was an early indication of language disability that was remediated formally or informally.

## **The Relationship Among Elevation, Temperature, and Chemical Composition of PM2.5 in Smithfield Canyon, Utah**

***JR Dupont & Neal Hengge***

The purpose of this experiment was to determine the change in PM2.5 levels and temperature as a function of elevation during inversions. Another purpose of this experiment was to find if a correlation existed in chemical composition of PM2.5 with elevation and temperature. The air sampler used in the experiment passes a measured volume of air through a filter. PM2.5 particles are trapped on the filter. The filter is weighed before and after sampling to find the amount of PM2.5 that was trapped. Then the filters were extracted and the ionic compositions were found using ion chromatography. The data showed that under non-inversion conditions, levels of PM2.5 were constant at all elevations. Under inversion conditions, PM2.5 levels were significantly less at higher elevations, while PM2.5

levels at lower elevations were greater. In terms of chemical compositions found in the filters, sodium, ammonium, chloride, and nitrate levels were the major ionic components found in the PM2.5 particles under non-inversion conditions. Under inversion conditions, ammonium and nitrate levels were much higher. The analysis showed that, on the yellow and red air quality days, the chemical composition has a much greater contribution from nitrogen, which originates from agricultural sources. No consistent trends or differences were observed in the chemical composition with elevation. However, at the highest elevation location the cation analysis found less ammonium and more calcium than at the lower elevation sites.

## **Muscular Utilization Through Synthetically Conductive Linear Elastics**

***Nathan Johnson, Jeffrey Karren, Sarah Spall, & Carson Sparks***

M.U.S.C.L.E: Muscular Utilization through Synthetically Conductive Linear Elastics is a technology of the future that utilizes specialized materials called electroactive polymers, or EAP's. Electroactive polymers are made to contract in response to an electric current, mimicking the properties of actual human muscles. M.U.S.C.L.E will help to treat patients with muscle diseases, known as myopathies, as long as the primary defect is within the muscle itself and not the nerves or the brain. However, M.U.S.C.L.E is still years away from becoming real,

even though EAP's already exist. Muscles are very sensitive and require a great degree of control, as well as a significant amount of energy. Furthermore, a power source for M.U.S.C.L.E needs to be developed, and so do surgical techniques of implanting it into the human body. In the future, M.U.S.C.L.E. will be very useful, but several advancements must be made, because it cannot be developed today. Hopefully, one day M.U.S.C.L.E. will become a reality, so the lives of those suffering from myopathies can be relieved of their pain, suffering, and everyday struggles.

## Number One Phenomenon: Benford's Law in the Natural World

***Abby Stevens***

The purpose of my experiment was to see if Benford's Law applied to natural environmental systems data. Benford's Law is a mathematical phenomenon stating that 1 appears as the first digit of data 30% of the time and 9 appears as the first digit 4% of the time. I hypothesized that Benford's Law would apply to environmental systems data, but only when the data are completely unregulated. To test this hypothesis, I first used data from three natural sources to test which best fit Benford's Law. I investigated water discharge, water turbidity, and PM10 concentration. Using a computer program which identified and counted the first digit, it was concluded that turbidity data fit Benford's Law best overall. Then, the

location of each source of turbidity data were found and plotted on Google Earth. Each river was carefully analyzed with Google Earth to determine if the water was regulated or unregulated. A regulated system is a system that is influenced by such things as reservoirs, dams, and pollution. Once the original turbidity data were tested, a second set of turbidity data was tested in the same manner. The data from the first tested supported the hypothesis with one exception, but only 60% of the data from the second test fit the hypothesis. Therefore, I concluded that further research will have to be conducted in order to either confirm or reject the hypothesis, as there are many other variables that need to be addressed.

## The Analysis of Grasses Reaction to Different Growth Stimulating Plant Hormones

***Logan Stodart***

Many chemicals reaction on plants is known, but not very wide spread in the different types of plants that it affects. My Science Fair project was to take chemicals that I did not know the reaction of on grass and test that. Many chemicals can be harmful to many land owners and I wanted to know what some of these chemicals do. With these chemicals there were many known facts that in different countries these chemicals were causing minor

problems to some of the farmers that were growing there. In my test I am seeing how grass will react to amounts of Gibberellic Acid, Indole-3-Acetic Acid, and Indole-3-Butyric Acid. These acids all end in Acid, and as I found out all chemicals that end in acid will burn or melt through things. Through this test I hope to find the major and minor impacts that the chemicals had on the grass that they will be tested on.

# research recognition

## The David and Terry Peak Undergraduate Researcher of the Year Award

The awards given to USU's Undergraduate Researchers of the Year now carry a new name: The Peak Prize, an endowment established in honor of Dr. David Peak, professor of physics, and Dr. Terry Peak, associate professor of social work.

The David and Terry Peak Undergraduate Researcher of the Year Award is presented to one student from each of the seven academic colleges as well as one student from a Regional Campus.

Both David and Terry Peak have earned accolades for their work with students and have invested in undergraduates significantly since their arrival at Utah State in 1994.

Terry Peak, director of the Social Work Program, came to Utah State from the State University of New York at Albany, where she received her PhD and served as a research associate at the Ringel Institute of Gerontology and directed the Caregiver Support Program at the Stratton VA Medical Center.

Since coming to Utah State, Terry Peak has received numerous accolades for her support of students. She was named Robins Advisor of the Year in 2007 and is a three-time Top Prof winner. She was also the Utah NASW Educator of the Year in 1999. Her social work program has also been recognized for its dedication to working with scholar-athletes.

David Peak, prior to coming to Utah State, had taught for twenty years at Union College, a private liberal arts college in upstate New York. He held other academic and research positions at Princeton University, Argonne National Laboratory, NASA Goddard Spaceflight Center, and Richmond University.

David Peak's national reputation for championing undergraduate researchers includes being a founding board member and chair for the National Conference on Undergraduate Research. His influence also led to the creation of the NCUR Interdisciplinary Grant Program that has awarded dozens of campuses the opportunity to create interesting research projects for students from diverse disciplines. His refereed publications include 12 undergraduate co-authors. For his research accomplishments at Union, Peak was awarded the 1996 American Physical Society's Prize for Research by a Faculty Member at an Undergraduate Institution. At USU, he has been honored as the College of Science Teacher of the Year as well as Undergraduate Research Mentor of the Year.

Both David and Terry Peak currently mentor Undergraduate Research Fellows.

## Scott Jones

undergraduate research mentor of the year

Dr. Scott Jones has a short, yet intense, history in working with undergraduate researchers. In his six-year career at Utah State, Scott has mentored twelve students from five departments in three different colleges, including Science, Engineering, and Natural Resources. The connection among the diverse research students is Scott's development of environmental sensors and instrumentation. Researchers involved with Dr. Jones have produced numerous technical papers and presentation abstracts, and they have also advanced to graduate program throughout the nation. Dr. Jones' focus is

on Soil Physics, and he is a member of the Department of Plants, Soils, and Climate. His funded research includes competitive federal and private grants to the tune of more than \$3 million, several of them from NASA. He has garnered an additional \$1 million from other sources to help support a Drought Management Initiative. He has been an invited lecturer in Brazil, Canada, and Mexico. Dr. Jones has been actively involved in USU's Water Initiative and helped organize a Spring Runoff Conference. His students benefit enormously from his energetic and active research agenda.

## Laura Rowley Wright

undergraduate researcher of the year

Laura Rowley Wright grew up working on the family fruit farm in Santaquin, Utah. During high school, she also worked at a commercial greenhouse business where she became interested in pursuing her education in Horticulture. Laura came to USU as a freshman in 2006, majoring in Ornamental Horticulture. She immediately approached Dr. Brent Black about part-time employment opportunities, and became interested in his research on fruiting plants native to Utah. During her freshman year, she designed and carried out experiments to optimize seed propagation of chokecherry (*Prunus virginiana*). She presented these results at the annual meetings of the American Society for Horticulture Science (ASHS) in Phoenix, Arizona, where

she was awarded a travel grant, and won first place in the ASHS undergraduate poster competition. With the assistance of USU graduate student Nathan Phillips and Dr. Black, she submitted these findings to the Journal of the American Pomological Society, where they were published in the October 2007 issue as a peer reviewed article. Laura is now pursuing additional research with Dr. Black, Dr. Grant Cardon, and graduate student Austin Hawks to develop methods for determining the relative salinity tolerance of strawberry varieties. As development pressure in the Intermountain West pushes agriculture to more marginal soils, Laura's work with salinity tolerance will have immediate benefits to Utah's fruit producers.

## Kenneth R. Bartkus

undergraduate research mentor of the year

Dr. Kenneth R. Bartkus is professor of marketing in the Jon M. Huntsman School of Business. His commitment to undergraduate research mentoring is evident through his contributions to program development, student/faculty collaborations and service. He founded The Research Group™, a consortium of university scholars dedicated to the advancement of quality research experiences for undergraduate students. The program has received national recognition as an “exemplary model” from the American Association of University Administrators. Under his mentorship, students have presented at such scholarly undergraduate venues as Research Day on Capitol Hill, the Student Showcase, the Utah Conference on Undergraduate

Research, and the National Conference on Undergraduate Research. His students have also had papers and presentations accepted at scholarly professional conferences such as the Western Decision Sciences Institute and the Marketing Management Association. His co-authored research with students has appeared in the Journal of Business Inquiry and the Journal of Social Behavior and Personality. His article, “Fostering Student/Faculty Collaborations through the ‘Research Group’ Model: An Application to Colleges and Schools of Business” was published in CUR-Quarterly and highlights the need for more undergraduate research programs in business. Dr. Bartkus has been recognized as the undergraduate research mentor of the year for the Huntsman School of Business four times.

## William Israelsen

undergraduate researcher of the year

William J. Israelsen is an economics and biology major who has been involved in undergraduate research in the Economics Department with Dr. Dwight Israelsen since 2005. He has been involved in several research projects that deal with the migration of people between counties in the United States. As part of these projects, he conducted background research, used econometric techniques in working with large data sets, and contributed both to the analyses and to the text of the resulting publications. William’s largest contribution was as the primary author of a paper entitled “Migration Turnover Rates of Mountain States Counties,” in which he was instrumental in developing the novel concept of a Migration Turnover Rate,

which is a better measure of the impact of migration on an area than is the traditional measure of net in-migration. Because population turnover is associated with economic and social costs and benefits, William’s work in identifying the Migration Turnover Rates of U.S. counties and their determinants has provided an important new tool for public officials and policy-makers. William has been the co-author of three refereed journal publications, four Economic Research Institute study papers, and has given presentations at the Annual Meetings of the Utah Academy of Sciences, Arts, and Letters and at the Western Economic Association International Conferences. He is a native of North Logan, Utah.

## Linda Skogrand

undergraduate research mentor of the year

In the past three years, Linda Skogrand has worked extensively with undergraduate students in conducting qualitative research, including conducting interviews, analyzing data, publishing results, and presenting at conferences. This work has resulted in nine published Extension fact sheets, including undergraduate students as coauthors. Most of her work with undergraduate students has involved research with diverse populations. At one point in time, she was directing four students in analyzing data and writing journal articles focusing on low-income and Latino stepfamilies who participated in stepfamily education. There are currently three journal articles in progress as a result of this work. Linda has made efforts to include undergraduate students

in all aspects of research. Two years ago, Linda enlisted an undergraduate student in analyzing qualitative data about strong Navajo marriages. The student then had the major responsibility for writing six facts sheets. Linda also took this student with her on a three-day trip to the Navajo Reservation where they attended a Navajo Institutional Review Board meeting. The fact sheets and a draft of the Navajo marriage curriculum were presented to the Board. All of these examples of students actively involved in research have resulted in Dr. Linda Skogrand, Assistant Professor and Extension Specialist, being honored by the College of Education and Human Resources as Undergraduate Research Mentor of the Year.

## Adam Kynaston

undergraduate researcher of the year

Adam Kynaston is a psychology major in his senior year of study. After researching in various areas of psychology, Adam has chosen to focus on the field of behavioral pharmacology for his career. His honors thesis is an experiment examining the development of tolerance to d-amphetamine in a rat model of human drug abuse. He loves research and has thoroughly enjoyed the many hours of study and analysis that he has participated in while working with Dr. Amy Odum. His work has resulted in a number of presentations and a publication. He plans on graduation in May, and attending graduate school next Fall. After obtaining a Ph.D., Adam hopes to secure a tenure-track position at a research university. He has worked as a laboratory technician

for Dr. Odum for over two years, where he has learned a number of techniques commonly used in his field. He was able to put these skills to use this past summer during a 10-week internship at the University of Michigan, which was supervised by James H. Woods, a pioneer in the field of behavioral pharmacology. During this internship, Adam was able to design, conduct, and analyze data from three different experiments; he also had the opportunity to present his data several times throughout the summer. During that experience, Adam gained confidence in his choice on a career in behavioral pharmacology. Originally from Mapleton UT, Adam and his wife now call Logan their home. Busy with children and school, Adam looks forward to graduation and a summer off before graduate school.

## Doran Baker

undergraduate research mentor of the year

Doran Baker has been a mentor for students in undergraduate research every year since he was recruited to USU over four decades ago. He founded the NASA-sponsored Rocky Mountain Space Grant Consortium for Utah. The Consortium provides support to students throughout the Intermountain West. Doran is the faculty supervisor of the USU student branch of the IEEE, where he mentors student activities, contests, and undergraduate papers. He also has directed the Co-op program at the undergraduate level. In this latter role, Doran's extensive experience and contacts with industries and NASA Centers has helped students find challenging and interesting work experiences. In 2005, he was named Advisor of

the Year for the College of Engineering, with strong support from students whom he had served. He then received the USU Robins Award followed by a National Advisor Award by NACADA in Indianapolis. Currently, Doran personally supervises and supports the work of 11 undergraduate students, mostly doing analysis of data acquired from NASA space missions. Over the years, he typically has been mentoring the work of over two dozen undergraduate students at a time. It is difficult to count the number of students that Doran has mentored in his time here; it is easily estimated to be in the many hundreds. His students usually have gone on to earn graduate degrees and obtain leadership positions in industry or academia.

## Elisabeth Linton

undergraduate researcher of the year

Elisabeth Linton has been working as an undergraduate researcher since September of 2004. As a Biological Engineering major, her work is focused on applying engineering principles to realistic issues. Over the years, she has been involved in several research projects with Dr. Ronald Sims, including studies on pollutant degradation. Specifically, the majority of her work has been on the production of a biodegradable plastic compound, called polyhydroxyalkanoate (PHA), using various waste sources like municipal waste and biodiesel byproducts. She is currently the principle investigator on a reactor design project that is focused on using the carbon rich effluent of an agricultural anaerobic digester to produce the

bioplastic compound, which would add economic value to dairy farms, while simultaneously resulting in environmentally neutral and economic plastic production. Elisabeth has also presented research at multiple conferences, including the Institute of Biological Engineering and the Inland Northwest Research Alliance. Exposure to a wide range of sustainability issues as an undergraduate student has influenced her goals for her graduate work by encouraging her to pursue research in bioprocessing and bioenergy with the intent of furthering research in sustainable alternatives to petrochemicals and other nonrenewable resources. She will be starting her Masters Degree at Utah State University in the Fall of 2008.

## John Seiter

undergraduate research mentor of the year

John Seiter, Professor of Speech Communication, is a prolific researcher and inspirational teacher who has won college and university-wide awards for his efforts in these areas of responsibility. It is not surprising that John has combined these two passions by mentoring undergraduates in the research process. John incorporates research projects into the classes he teaches, making it a natural part of the learning environment. His courses are wonderful examples of how research and teaching can be combined into a unified whole. This research experience for the students has resulted in nine peer-reviewed publications for undergraduates in journals, such as Psychological Reports, Communication Reports and the Applied Journal

of Social Psychology. These publications were co-authored with 14 undergraduate students. In addition, John has had 11 conference papers accepted that were co-authored with undergraduate students. He has also worked with dozens of other students on research projects that have not been published. No wonder so many of his students go on to prestigious graduate programs. His students appreciate not only his expertise, but the way he goes about mentoring. John has also been an active reviewer for the Undergraduate Research and Creative Opportunities (URCO) grant applications here on campus. He stays in touch with his students and has collaborated with some years after their graduation.

## Courtney Hill

undergraduate researcher of the year

Courtney is a double major in art history and English education, with a double minor in Classics and philosophy. Just from this ambitious program of study, it's clear that she sets high standards for herself intellectually and is not afraid to tackle a challenge or to engage with learning in diverse ways. But Courtney's passion for knotty problems and thorny subjects is paired with an amazing quality of joie-de-vivre. As a freshman Undergraduate Research Fellow, she worked on a group of medieval Spanish miracle legends; the language was archaic and very different from the Spanish she had learned in school, the content was to say the least peculiar, and the research project well outside the realm of what was comfortable or familiar

for her. Nevertheless, she approached the project with enthusiasm, asking excellent questions of the material and her mentor, and independently seeking out resources to help her deal with the strange vocabulary and grammar. As she has matured as a researcher, she has developed her own projects with an equal degree of commitment and energy: two URCO grants have allowed her to develop and curate an exhibition at the AVA and pursue her undergraduate Honors thesis research in museum and archive collections in California. In addition, she has contributed generously to the program in art history as a peer mentor as an Undergraduate Teaching Fellow and as a Rhetoric Associate.

## Karen Mock

undergraduate research mentor of the year

Karen Mock has been actively involved in mentoring undergraduate researchers since her arrival in 2000. Her laboratory focuses on conservation genetics, and she regularly encourages undergraduate students to gain experience there, providing them training as volunteers and then hiring them as technicians. Karen has mentored 7 undergraduate students in her laboratory for a period of more than 6 months each, in addition to a recent student just starting in the lab. Of these students, five have entered graduate school in a field related to the molecular lab experience they obtained, one was a co-author on a paper in a prestigious journal (*Molecular Ecology*), one has a professional job with a natural resources agency, and two are undergraduate

students actively working in the lab. In addition, Karen has actively worked to recruit undergraduate students to USU from the Umatilla Indian Reservation in Oregon. Karen has worked on research projects with this Tribe for several years. As a result, Karen's lab hosted a Tribal member full time for a week in her laboratory in 2007. The experience of this Tribal member has also led to current discussions between Karen and Tribal representatives about the establishment of a program for small cohorts of high school students to become CNR undergraduates. Karen has a strong commitment to mentoring undergraduate students with an interest in research and she is highly deserving of the recognition this award will bring.

## Melissa Sanders

undergraduate researcher of the year

Melissa Sanders is a senior majoring in the Conservation and Restoration Ecology BS degree in the Wildland Resources department. She has worked in Dr. Chris Luecke's laboratory for the past three years and has been a field assistant for one of his PhD students during the past two summers at the Toolik Field Station in northern Alaska. Melissa has done an excellent job assisting with the collection of fish, invertebrate, and water samples in a variety of lakes near this field station. Last spring, Melissa began an independent study on the environmental factors that affect growth of fish in these lakes. As part of this process, she reviewed a number of papers on

this subject and assessed growth conditions for 14 fish populations. She then evaluated how well the variation in growth rates correlated with different environmental factors for the two most common species of fish, Arctic grayling and lake trout. Individual lake trout grew best in large, deep lakes, where as grayling grew best in small, shallow lakes and both species did better when they were the only species present. From these results, Melissa inferred that a number of morphometric, physical and biological variables displayed strong relationships with fish growth for both species and that these correlations may be explained by community composition and the lack of biological competitors and predators.

## Alvan Hengge

undergraduate research mentor of the year

Dr. Alvan Hengge has been a consistently outstanding mentor of undergraduate researchers since his arrival at USU in 1996. Undergraduates in the Hengge lab are an integral part of his nationally recognized research program. As his department head Steve Scheiner noted, Alvan's approach with undergraduate researchers is to "provide each one with a measure of independence" which enables the students to "quickly learn the critical thinking skills they will need as they progress through their careers". Just since 2001, this approach has resulted in 11 publications that include undergraduate student co-authors. Undergraduates in the Hengge lab have also presented their research at local and national meetings, and have been successful in obtaining independent funding via URCO grants

and Willard Eccles Undergraduate Research Fellowships. Alvan's former undergraduate researchers talk about how he encouraged them to "pursue dreams and utilize opportunities". They also note his willingness to meet with each and every student on a weekly basis, focusing not only on their current research, but also on their career goals. Several of his undergraduate research students have gone on to attend medical or dental school, while others are enrolled in top tier PhD programs. Overall, Alvan believes that "research, especially undergraduate research, can be a life-altering experience. This happens when the research experience changes a student's perception of science from a body of existing knowledge to a method of discovery, in which they can participate."

## Arthur Mahoney

undergraduate researcher of the year

Art Mahoney began performing research in computer science as a high school student. The results of this work were published in the Proceedings of the 2005 Aging Aircraft Conference. After being awarded a USU Presidential Scholarship as an incoming freshman, Art was also selected as an Undergraduate Research Fellow. His research with Professor Dan Watson initially focused on distributed implementation of altruistic negotiation systems. In support of this research, Art wrote and received an URCO grant in 2006 to construct a new computer cluster. His work quickly advanced, with Art presenting a paper entitled *Path Planning for Altruistically Negotiating Systems: The Near-Sighted Tarzan Algorithm* at the 2006 International Conference on Parallel and Distributed Processing Techniques and Applications.

In the same year, Art was recognized as a Utah Governor's Scholar. This award was given to only four USU students. In 2007, Art was selected for the prestigious Barry M. Goldwater Scholarship, being one of only 10 computer science students chosen nationwide for this honor. Starting in 2007, Art initiated a new research project focused on the development of a generic distributed parallel path planner to perform path finding in graphs of massive size with applications in biological and social network analysis. The results of this research have been submitted to the journal IEEE Transactions on Parallel and Distributed Systems with Art listed as the primary author. In 2008, Art was selected as one of eight finalists for the Computing Research Association's Undergraduate Researcher of the Year Award.

## Carrie Young

undergraduate researcher of the year

Carrie Young is a Biology major at the Uintah Basin Regional Campus (UBRC). Since 2004 she has worked on an array of natural resources research projects as an intern and also as a volunteer. Throughout this time she has worked with Dr. Rich Etchberger and other faculty at the UBRC. Carrie spent the summer of 2004 as a field researcher with the Bureau of Land Management in Coyote Basin, Utah. Her project focused on censusing white-tailed prairie dog populations as part of the black-footed ferret reintroduction. In 2005, Carrie worked for the US Forest on the Ashley National Forest working with the northern goshawk. During this time, she also assisted a graduate student with

an elk habitat study in northeastern Utah. In addition to these projects, Carrie has worked annually with Dr. Lianna Hatfield studying the occurrence of plague in small mammals. Currently, Carrie holds a one-year appointment as a research associate intern at Pariette Wetlands. This internship focuses on managing the wetlands by evaluating waterfowl populations and manipulating habitat conditions. Through her research experience, Carrie has gained valuable insights about how natural resources are managed. This experience, coupled with her excellent academic achievements at USU have prepared Carrie for a career in natural resources management.

## past awards

**Undergraduate Research Mentor of the Year****Agriculture**

<i>Ken White</i>	2007
<i>Heidi J. Wengreen</i>	2006
<i>Dan Drost</i>	2005
<i>Janis Boettinger</i>	2004

**Business**

<i>Kenneth Bartkus</i>	2007
<i>Kenneth Bartkus</i>	2006
<i>Ruby Ward</i>	2005
<i>Kenneth Bartkus</i>	2004

**Education & Human Services**

<i>Brian Higginbotham</i>	2007
<i>Melanie Domenech-Rodriguez</i>	2006
<i>Scott Hunsaker</i>	2005
<i>Eadric Bressel</i>	2004

**Engineering**

<i>Anhong Zhou</i>	2007
<i>Barton Smith</i>	2006
<i>Todd Moon</i>	2005
<i>Barton Smith</i>	2004

**Humanities, Arts & Social Sciences**

<i>Michael Nicholls</i>	2007
<i>Susan E. Manon</i>	2006
<i>Steven Simms</i>	2005
<i>Bonnie Glass-Coffin</i>	2004

**Natural Resources**

<i>Wayne Wurtsbaugh</i>	2007
<i>Phaedra Budy</i>	2006
<i>Chris Luecke</i>	2005
<i>Helga Van Miegroet</i>	2004

**Science**

<i>Joseph Li</i>	2007
<i>Lisa Berreau</i>	2006
<i>David Peak</i>	2005
<i>Daryll DeWald</i>	2004

**Regional Campus**

<i>David Law</i>	2007
<i>Lianna Hatfield Etchberger</i>	2006
<i>Susan Talley</i>	2004

**Undergraduate Researcher of the Year****Agriculture**

<i>John Brinkerhoff</i>	2007
<i>Katie Brown</i>	2006
<i>Aaron Davis</i>	2005
<i>Caralee Wilcock</i>	2004

**Business**

<i>Jeannette Blackham</i>	2007
<i>Zachary Ames</i>	2006
<i>Anne Israelsen</i>	2005
<i>Jeffrey Lynn Reece</i>	2004

**Education & Human Services**

<i>Aaron Anderson</i>	2007
<i>Brianne Bartlett</i>	2006
<i>Tracey Reeve</i>	2005
<i>Cheryl Jones</i>	2004

**Engineering**

<i>Gerald (Dusti) McEwen</i>	2007
<i>Zac Humes</i>	2006
<i>John Crockett</i>	2005
<i>Todd Bigelow</i>	2004

**Humanities, Arts & Social Sciences**

<i>Lenaye Howard</i>	2007
<i>Sarah Hatch Thompson</i>	2006
<i>Kacey Udy</i>	2005
<i>Jennifer Hulse</i>	2004

**Natural Resources**

<i>Kelly Sivy</i>	2007
<i>Jake Gibson</i>	2006
<i>Hayley Olsen</i>	2005
<i>Jessica Evans</i>	2004

**Science**

<i>Jan Marie Andersen</i>	2007
<i>Glen de Guzman</i>	2006
<i>Dustin Keele</i>	2005
<i>David Hatch</i>	2004

**Extension**

<i>Sean Haggarty</i>	2007
<i>Shanna Wheeler</i>	2007
<i>David A. Evans</i>	2006

**Goldwater Scholars**

<i>Art Mahoney</i>	2007
<i>Jennifer Albretsen</i>	2007
<i>Jodie Tvedtnes (honorable mention)</i>	2007
<i>Heidi Wheelwright</i>	2006
<i>Logan McKenna</i>	2006
<i>Keith Warnick (honorable mention)</i>	2006
<i>Stephanie J. Chambers</i>	2004

**James Madison Scholars**

<i>Julie Major</i>	2006
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**Rhodes Scholars**

<i>Lara Briana Anderson</i>	2004
<i>James E. Butcher</i>	1982
<i>William S. McEwan</i>	1938
<i>George Piranian</i>	1937
<i>G. Fred Somers</i>	1936
<i>Karl E. Young</i>	1926
<i>James Morris Christensen</i>	1921

**Udall Scholars**

<i>Danielle Babbel (honorable mention)</i>	2007
<i>Josh Hirschi (honorable mention)</i>	05-06

**National Security Education Program**

<i>Eric Hilleman</i>	02-03
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**Fulbright Scholars**

<i>Jan Marie Andersen</i>	2007
<i>Abigail Jensen</i>	2005
<i>Justin Randolph</i>	2003
<i>Jason van Tassell</i>	2000
<i>Mark Poe</i>	1998
<i>Travis Lybbert</i>	1997
<i>Michael Sawyer</i>	1996

**Gilman Scholarship**

<i>Amanda Wiberg</i>	2004
<i>Mark R. Morris</i>	2003
<i>Sebrina Wright</i>	01-02

**Awards**

<i>Nathan Carruth (honorable mention)</i>	2007
<i>Jonathan Beck</i>	2006
<i>Rex Wayne Watkins</i>	2006
<i>Kristine Perry</i>	2005
<i>Lara Briana Anderson</i>	2004
<i>Nathan Allen Hammond</i>	2004
<i>Christine Turner Merrill</i>	2003
<i>Ryan Richard Sargeant</i>	2003
<i>Michael David Larsen</i>	2002
<i>Alyssa Janel Magleby</i>	2002
<i>John Paul Haskell</i>	2001
<i>Marc Melchior Nielson</i>	2001
<i>Katherine Frances Smith</i>	2001
<i>Chandra Brie Heaton</i>	2000
<i>Jeffrey L. Jacobs</i>	2000
<i>Rebecca Ann Brown</i>	1999
<i>Eric Bair</i>	1999
<i>Gregory Nolan Nielson</i>	1999
<i>Deryl Owen Snyder</i>	1999

**Honorable Mention**

<i>Aaron J. Katz</i>	2006
<i>John S. Crockett</i>	2005
<i>Marriner H. Merrill</i>	2005
<i>Rex W. Watkins</i>	2005
<i>Dewain Keith Garner</i>	2004
<i>Aaron Jon Katz</i>	2004
<i>Kristine Perry</i>	2004
<i>John Price Calvin</i>	2003
<i>John Barton Visser</i>	2003
<i>Kevin Alan Hall</i>	2002
<i>Michael D. Mills</i>	2002

**Phi Kappa Phi Scholars**

<i>Jason Larkin</i>	2006
<i>Rex Wayne Watkins</i>	2005
<i>Kurtis Reed</i>	2004
<i>Michael Wilkinson</i>	2001

**2008 Utah Conference for Undergraduate Research**

*Shannon Babb*  
*Sherry Baker*  
*Mitchell Bassett*  
*Emily Bowen*  
*Andrew Burgon*  
*Vikki Carlisle*  
*Sydney Chamberlin*  
*Kevin Cope*  
*Lynsie Daley*  
*Tasha Falsley*  
*Margo Farnsworth*  
*Christopher Hall*  
*Jeremiah Harris*  
*Bradley Henrie*  
*Kyle Heywood*  
*Joeseph Irvine*  
*Joshua Kerkmann*  
*Elisabeth Linton*  
*Evan Lytle*  
*Mary McMillan*  
*Natali Naegle*  
*Christopher Peterson*  
*Forrest Purser*  
*Nicholas Rupp*  
*Kristan Sorenson*  
*Susan Wahlquist*

**2008 National Conference on Undergraduate Research**

*Brittani Atwood*  
*Sherry Baker*  
*Mitchell Bassett*  
*Chris Bowen*  
*Vikki Carlisle*  
*Rikelle Deaton*  
*Tasha Falslev*  
*Ashley Griffiths*

*Katherine Grover*  
*Ryan Jackman*  
*Uyen Lam*  
*Elisabeth Linton*  
*Natali Naegle*  
*Kaitlin Neville*  
*Chris "Luke" Peterson*  
*Joshua Pineault*

**Fall 2007 Undergraduate Research & Creative Opportunities**

<i>Tamara Anderon</i>	<i>BIE</i>
<i>John Brinkerhoff</i>	<i>ADVS</i>
<i>Benjamin Abbott</i>	<i>Watershed Science</i>
<i>Mitchell Bassett</i>	<i>ADVS</i>
<i>Emily Bowen</i>	<i>BIE</i>
<i>Ben Clyde</i>	<i>BIE</i>
<i>Michael Davis</i>	<i>BIE</i>
<i>Joseph Delka</i>	<i>Chemistry/Biochemistry</i>
<i>Sara Driggs</i>	<i>ETE</i>
<i>Brad Francis</i>	<i>BIE</i>
<i>Christopher Hall</i>	<i>ECE</i>
<i>Nathan Hansen</i>	<i>BIE</i>
<i>Rachelle Hartle</i>	<i>BIE</i>
<i>Brad Henrie</i>	<i>BIE</i>
<i>Courtney Hill</i>	<i>Art</i>
<i>Lindsay Housley</i>	<i>BIE</i>
<i>Lenaye Howard</i>	<i>History</i>
<i>Eric Innes</i>	<i>ADVS</i>
<i>Ryan Israelsen</i>	<i>BIE</i>
<i>Ryan Jackman</i>	<i>Anthropology</i>
<i>Jamin Johnson</i>	<i>FRRL</i>
<i>Adam Kynaston</i>	<i>Psychology</i>
<i>Rochelle Lambertsen</i>	<i>ADVS</i>
<i>Elisabeth Linton</i>	<i>BIE</i>
<i>Trent Mortensen</i>	<i>BIE</i>
<i>Daniel Nelson</i>	<i>BIE</i>
<i>Daniel Odell</i>	<i>BIE</i>
<i>Lance Pflieger</i>	<i>Biology</i>
<i>Joshua Pineault</i>	<i>History/Religious Studies</i>

undergraduate research conferences

<i>Forrest Purser</i>	<i>BIE</i>
<i>Kristan Sorenson</i>	<i>BIE</i>
<i>Benjamin Timmins</i>	<i>MAE</i>
<i>Cody Tramp</i>	<i>Biology</i>
<i>Victoria VanUitert</i>	<i>Psychology</i>
<i>Michael Whyte</i>	<i>Biology</i>

**Spring 2008 Undergraduate Research & Creative Opportunities**

<i>Rachel Bradshaw</i>	<i>BIE</i>
<i>Ian Burtenshaw</i>	<i>NFS</i>
<i>Corey Clawson</i>	<i>English</i>
<i>Stephanie Croasdell</i>	<i>Biology</i>
<i>Justin Dekany</i>	<i>Physics</i>
<i>Thomas Evans</i>	<i>Religious Studies</i>
<i>Bobby Free</i>	<i>Art</i>
<i>Richard Gardner</i>	<i>Wildland Resources</i>
<i>Arash Garrossian</i>	<i>Chemistry</i>
<i>Hyrum Gillespie</i>	<i>PSC</i>
<i>Christina Hansen</i>	<i>Chemistry &amp; Biochemistry</i>
<i>Jesse Hayes</i>	<i>Physics</i>
<i>Jordan Hunger</i>	<i>NFS</i>
<i>James Meservy</i>	<i>SSWA</i>
<i>Tasha Newman</i>	<i>PSC</i>
<i>Christel Olsen</i>	<i>BIE</i>
<i>Bryce Osborne</i>	<i>ADVS</i>
<i>Charles Oughton</i>	<i>History</i>
<i>Heidi Pearce</i>	<i>Geology</i>
<i>Christopher Peterson</i>	<i>Biology</i>
<i>Jared Randall</i>	<i>Watershed Sciences</i>

# research week schedule of events

**monday, march 31***faculty research day***Research Awards Luncheon****11:30am-1:30pm David B. Haight Alumni Center (by invitation)***Luncheon will honor Utah State's researchers of the year and will announce the 2008 D. Wynne Thorne Research Award winner.***D. Wynne Thorne Lecture****1:00pm-1:30pm David B. Haight Alumni Center***D. Ray Reutzler, chair and director of the Emma Eccles Jones Center for Early Childhood Education and 2007 D. Wynne Thorne Career Research Award winner, will give the address.***New Faculty Seed Grant Program Workshop****3:00 pm - 4:00 pm, University Inn, Room 507***Jeff Broadbent, associate vice president for research, will give background and tips about the new USU faculty seed grants, GEM, RC, and SPARC.***tuesday, april 1***undergraduate research day***Student Showcase****9:00am-2:00pm TSC International Lounge***Utah State students celebrate their research, scholarship, & creative activity.***Undergraduate Research Awards 12:00pm-1:00pm****TSC International Lounge***Undergrad researchers and mentors of the year will be honored. David and Terry Peak will be highlighted as sponsors of endowed Peak Prize.***Sponsored Programs Workshops****All day, University Inn, Room 507***Workshops will be offered on various funding and award topics. Visit <http://researchweek.usu.edu> for complete agenda.***wednesday, april 2***graduate student research day***Graduate Student Symposium****9:30am-5:00pm (TSC Walnut Room & International Lounge)***This interdisciplinary conference highlights graduate research in all fields. Visit [www.usu.edu/usugss](http://www.usu.edu/usugss) for full agenda.***thursday, april 3***innovation & invention day***USTAR Reception and Presentation****10:30am-11:30am David B. Haight Alumni House***Presentations will focus on research by USU's new USTAR faculty teams.***Technology Commercialization Luncheon****12:00pm-1:30 pm David B. Haight Alumni Center (by invitation)***Luncheon will honor USU faculty and business leaders who have 2008 technology commercialization achievements.*

{ celebrating undergraduate research,  
scholarship, and creativity }

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week 2008

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