

# INSIGHTS

UTAH STATE UNIVERSITY - COLLEGE OF SCIENCE

.....  
*When students and faculty learn together... discovery follows.*

SUMMER 2007

## Undergrad Research

*USU mentors next generation  
of scientists*

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Summer  
2007

*Computer Scientist Arthur Mahoney  
Undergraduate Research Fellow and Goldwater Scholar*

Biology | Chemistry and Biochemistry | Computer Science | Geology | Mathematics and Statistics | Physics



# FROM THE DEAN'S OFFICE

Parents and prospective students often ask whether USU, as a PhD-granting research institution, acknowledges and values undergraduate education. In reply, we point out that our faculty are dedicated teachers as well as researchers and that three of our six departments in the College of Science have, to date, been recognized with the university's Departmental Teaching Excellence awards. In addition, the College of Science has placed considerable emphasis on involving undergraduates in our research endeavors. This is reflected in our college motto: "When students and faculty learn together..., discovery follows."



Dean Don Fiesinger

Note that the motto does not differentiate who these students are. We are committed to engaging students at all levels because we feel strongly that this is an essential part of their education and training as Science majors.

Within this current issue of *Insights*, we are highlighting the research efforts of our students and faculty and you will note that many of the students featured are undergraduates. From the Dean's office alone, we disperse nearly \$100,000 each year in support of undergraduate research. For example, we offer College of Science Mini-grants of \$1,000 for small, semester-long projects, and Willard L. Eccles Undergraduate Research Fellowships of \$7,500 for year-long projects under the supervision of a faculty mentor. As many as 18 mini-grants and ten Eccles fellowships are awarded each year, with three mini-grants and at least one fellowship committed to majors in each of our six departments in the College. You will find mention of this support in various articles within this issue.

This will be my last contribution to *Insights* as Dean. Later this summer I will return to the Geology Department and resume teaching in the fall. I would like to take this opportunity to thank you, our alumni and other friends of the College of Science, for your continued support of our students, faculty, and academic programs. Our success is a reflection of your commitment to Utah State University. I anticipate even greater accomplishments among our students and faculty as we proceed under the strong leadership of our new dean, **Dr. Mary Hubbard**. Dr. Hubbard will leave her position as head of the Geology Department at Kansas State University and begin her duties as dean of the College of Science in July. Please give her a warm Aggie welcome.

Sincerely,

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On the cover: Undergraduate Research Fellow Arthur Mahoney poses in front of a rack of computers. Just midway through his undergraduate career, Mahoney has been named a Goldwater Scholar, a Governor's Scholar and has presented his research at a professional meeting. He is the recipient of a 2007-08 Willard L. Eccles Undergraduate Fellowship.

Cover photo by Donna Barry. Cover design by Megan Hemmert.





## UNDERGRAD RESEARCH

### USU MENTORS NEXT GENERATION OF SCIENTISTS

From classroom day one, students in the College of Science explore new frontiers. Opportunities abound for undergraduates to step beyond the classroom to participate in advanced research activities in the lab, the field and even in outer space. As the college motto has demonstrated time and again, *'When students and faculty learn together...discovery follows.'*

#### Near-Sighted Tarzan Algorithm

*Student Computer Scientist and Mentor Seek Streamlined Network Communication*

If you can't see the jungle for the vines, take a lesson from Tarzan – just start swinging.

Is it the most thorough approach to path planning? Maybe not. But if you know the general direction you're heading, grabbing the nearest vine might get you in touch with Jane, Boy and Cheetah more quickly than stopping to ask for directions.

That's the gist of an algorithm Computer Science undergraduate **Arthur Mahoney** is developing with faculty mentor **Dan Watson**.

The two computer scientists are seeking a method to improve communications among agents – such as robots or a collection of processors – operating in a large network.

"Our focus is on communications in Altruistically Negotiating Systems or 'ANS,'" says Mahoney, who graduated from Utah's Logan High School in 2005.

ANS, he says, feature a collection of agents with diverse responsibilities that behave in a manner in the best interest of the entire team.

Sounds like a coach or military commander's dream team, right? Well, yes, says Mahoney, but imagine that each visually challenged team member is working in a vast, fast-changing environment filled with hostile obstacles and doesn't even know if the other members exist. How do team members communicate with each other?

One of the most common forms of ANS is Unmanned Autonomous Vehicle systems, which extend the reach of humans into dangerous environments and are increasingly used in industrial and military applications. "With UAVs, you have a group of robots equipped only with line-of-sight radio communications," says Mahoney. "Those communications are frequently interrupted by physical obstacles."

Among the path planning algorithms proposed for use in ANS is a relatively new sampling-based method called Rapidly-exploring Random Leafy Tree. "RRLT has some advantages over older methods but it still has constraints," says Watson, associate professor in USU's Computer Science Department. "There are characteristics of the RRLT approach that don't lend themselves well to a distributed approach – that is, having many agents working together to solve a problem."

A possible solution?

"Art (Mahoney) has taken the idea of RRLT and tried to come up with a way to randomly sample points in the domain – that is, randomly sample different vines in the jungle and add new vines until agents are found," he says. "He calls this method 'The Near-sighted Tarzan Algorithm.'"

With just one year of college behind him, Mahoney, an Undergraduate Research Fellow in computer science, presented his and Watson's findings last summer at the 2006 International Conference on Parallel and Distributed Processing, Techniques and Applications in Las Vegas.

"We got really good feedback," says Mahoney. "It was a great experience."

"Conferences are a wonderful way to have your results reviewed by peers and get new ideas," says Watson. "One of the nice things is that our work will be read by other researchers in this field of study."

Working on your own research project is much more meaningful than learning facts in the classroom, says Mahoney. "With my research



Computer science Undergraduate Research Fellow Art Mahoney, right, with faculty mentor, Dan Watson.

I've been forced to solve or work around problems that I would have never dealt with in class – and that's real computer science."

Mahoney, who was recently named a 2007 Goldwater Scholar, is a 2006-07 Governor's Scholar, and a 2007-08 recipient of a Willard L. Eccles Undergraduate Fellowship, also thinks research makes learning more enjoyable. "Programming for a professor's homework assignments during the wee hours of the morning is tedious, stressful and bothersome – but programming for research during the wee hours is fun," he says.

"Art quickly learned the protocol for tapping into the university's undergraduate research opportunities and hit the ground running with this project," says Watson. "For students with initiative, there's a path for exciting hands-on learning at USU. There's definitely a path."

### Lessons from Icarus

*Undergrad physicist tests limits of spacebound materials*

When Daedalus constructed wings for himself and son Icarus to make their daring escape, his choice of materials was limited. And he knew the inherent risks of flying an apparatus crafted with wax too close to the sun.

Physics undergraduate **Jennifer Albretsen** has a much broader and sophisticated range of materials to choose from for NASA's planned Solar Probe satellite, but her concern still centers on the impact of solar radiation. And whereas Daedalus was preparing for low altitude flight and a comparatively short hop from Crete to Sicily, the Solar Probe is expected to travel within three solar radii (3 RS) of the sun's surface. In the course of its journey, the satellite

will be exposed to temperatures in excess of 1,400 K (1,700 degrees C or 3,400 degrees F), along with large fluxes of light and charged particles from solar wind.

"NASA is trying to determine what materials could survive such a mission," says Albretsen, an Undergraduate Research Fellow who is completing her second year at Utah State. She was recently named a 2007 Goldwater Scholar and a 2006-07 Governor's Scholar.

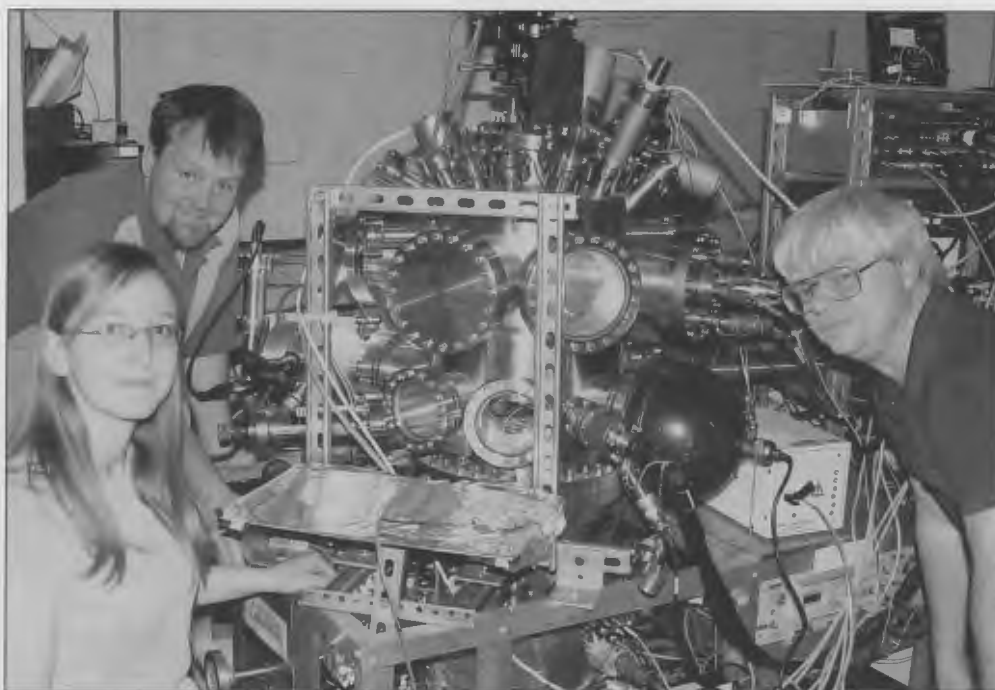
Working with mentors **J.R. Dennison**, Physics Department professor, and graduate student **Ryan Hoffmann** in USU's Materials Physics group, Albretsen subjects insulating ceramic materials, including aluminum oxide, barium zirconium phosphate and polyboron nitrate, to specific frequencies of light and measures the resultant current from electrons emitted by each material.

"We place samples in a vacuum chamber," she says, indicating a large, round device that looks like a deep sea diving bell. "When light interacts with a surface, its energy is transmitted to embedded electrons. Often this forces the electrons out of the material, causing it to become charged."

In addition to the Solar Probe, which Hoffmann says resembles "a giant flying ice cream cone," the research trio and colleagues are investigating materials to construct NASA's James Webb Telescope, planned successor to the Hubble.

A Wisconsin native, Albretsen, a National Merit Scholar, USU Presidential Scholar and Honors Fellow, chose Utah State because "I felt welcome, not like a number."

"USU was small enough that I felt like I would receive personalized attention, yet large enough to provide interesting research opportunities," she says.



Physics Undergraduate Research Fellow Jennifer Albretsen, left, with graduate student mentor Ryan Hoffmann, center, and faculty mentor J.R. Dennison, right, beside a vacuum chamber used to test spacebound materials.

Albretsen is enthusiastic about the projects that have come her way. "First of all, research is fun – it's a different experience from sitting in a classroom," she says. "You get a deeper understanding than from reading a textbook or doing homework."

Dennison concurs. "Undergraduate research is incredibly valuable because it gives students a chance to see what they can accomplish with what they learn from books," he says. "Classes are essential, but what makes science science is the thought process that goes with testing a hypothesis. You have to figure out what you don't know. There's no substitute for getting in the lab and making a lot of mistakes."

As a graduate mentor, Hoffmann also sees the value of undergraduate research. "Unlike many colleges, USU



offers many hands-on learning opportunities,” he says. “Not being involved in research is like going to a lecture about flying a plane without ever getting to pilot it.”

He adds that as undergrads are added to the research group, he benefits from the teaching experiences. “For me, bringing new scientists up to speed makes the whole process much clearer in my mind,” he says. “Going back and explaining the basics keeps me focused on the big picture and helps me avoid getting caught up in details.”

Dennison says pairing undergrads with graduate students, as well as faculty mentors, provides the former with a valuable orientation for graduate school. “From the start of their college years, students are introduced to the opportunities offered beyond undergraduate study.”

## Understanding Obesity

*USU Undergrad Partners with USTAR Researcher to Explore Molecular Processes*

Biology undergraduate **Andrew Burgon** tells family and friends his faculty mentor **David York** is to obesity research what director Steven Spielberg is to filmmaking.

“I’m incredibly fortunate to be working with someone of his stature,” says Burgon, a native of Utah’s Cache Valley. “Not only is he a great thinker, but he takes the time to involve me in every aspect of the experimental process.”

Burgon, who hopes to enter medical or dental school, sought research opportunities through his advisor, who directed him to York.

“My first task was helping Dr. York unpack boxes and set up his lab,” says Burgon.

Formerly with Louisiana State University’s renowned Pennington Biomedical Research Center, York joined USU in 2006 as one of the first researchers recruited through the Utah Science, Technology and Research (USTAR) Initiative. He’s director of USU’s nascent Center for Advanced Nutrition, which is focused on exploring the impact of nutrition on such 21st century plagues as obesity, Type 2 diabetes and cardiovascular disease.

Burgon, York and research assistant professor **MieJung Park**, are investigating a powerful peptide called enterostatin that is produced in the brain, pancreas and gastrointestinal tract in response to the ingestion of fat.

“The research team is using microarray genomic approaches to identify genes that are regulated and functional pathways affected by enterostatin,” says Burgon.



*Biology undergrad researcher Andrew Burgon, right, with mentors USTAR professor David York, left, and research associate professor MieJung Park.*

The team’s study shows that enterostatin regulates dietary fat intake by inhibiting the release of a protein that slows an organism’s appetite for fat.

“This is cutting-edge research,” says Burgon. “We’re literally discovering molecular processes. We’re part of discoveries that have implications for controlling obesity, cardiovascular disease, Alzheimer’s disease – discoveries that could be society-changing.”

At each step of the project, says Burgon, York and Park have taught him various experimental processes and techniques and then allowed him to run the experiment.

“They’re so proactive about promoting undergraduate research,” he says of his mentors. “It’s really cool to have these hands-on experiences and be a part of an important project.”

Over the course of the study, Burgon has been introduced to phase contrast and fluorescence microscopy used in conjunction with immunohistochemistry.

“Participating in research gives students a totally different perspective on the information they’re learning in class,” says York. “In science, we don’t deal with absolute truths. Working in the lab helps students appreciate the amount of effort, along with the sophisticated techniques and methods, needed to reach scientific conclusions.”

Park says students involved in research glean important insights and learn to work collaboratively. “Students gain greater



enthusiasm for their studies when they have opportunities to work alongside scientists," she says.

Along with York and Park, Burgon hopes to publish the results of their study and present the research at an upcoming professional meeting. "This would be an extraordinary opportunity for me as an undergrad," says Burgon. "I'm learning so much. Plus, it will look really good on my application when I'm ready to apply for professional school."

Before selecting Utah State as his college destination, Burgon considered another school that touted teaching over research. "Because they are a non-research institution, they claimed I would receive more attention from professors whose only responsibility was teaching," he says. "But I can't imagine a setting where I'd receive more personalized learning than USU. I would have missed so much if I hadn't ventured outside the classroom and into the lab."

Hands-on research offers lessons that can't be learned from a textbook, says Burgon. "Dr. York and Dr. Park have taught me how to approach problems, design experiments and the tools to pursue answers," he says. "It's a privilege, for sure." ■

#### CREATIVE SCIENCE

USU undergraduate **STEVE HART** is exploring a quantum-based theory known as "hopping conductivity" alongside his USU physics faculty mentor **J.R. DENNISON**. Hopping conductivity is an idea originally developed to describe the electrical behavior of semiconductors when subjected to electrical fields. Hart is applying the theory to a polymer known as Hytrel. A highly insulating material, Hytrel is among the choices under consideration for use on NASA's planned James Webb Space Telescope, expected successor to the Hubble.

Hart says he is grateful for the opportunity to pursue what he calls "creative science."

"Much of the research in our country is need-driven, deadline-driven and the focus is on applied science and technology transfer," he says. "But a lot of important discoveries have resulted from tinkering. When you're allowed the freedom and support to be creative, you sometimes discover things that you might otherwise miss."

## TWO AGGIES NAMED GOLDWATER SCHOLARS, THIRD RECEIVES HONORABLE MENTION

College of Science students **Jennifer Albretsen** and **Arthur Mahoney** were named 2007 Goldwater Scholars by the Barry M. Goldwater Scholarship and Excellence in Education Foundation. Student **Jodie Tvedtnes** was awarded an honorable mention in the prestigious competition.

Albretsen and Mahoney are featured in the "Undergrad Research" article in this issue of *Insights*. Both were named 2006-07 Governor's Scholars by **Gov. Jon Huntsman, Jr.** in November 2006.

Tvedtnes, who earned an associate's degree from Salt Lake Community College, entered USU after receiving a Presidential Transfer Scholarship. She started her academic career in classics but switched her major to physics with minors in math and classics.

Tvedtnes, who serves as president of USU's Society for Physics Students chapter, presented the research poster, "*Comparison of Satellite and Ground-Based Data on Polar Mesospheric Clouds*" at the society's 2006 Four



Jennifer Albretsen, center, and Art Mahoney, right, were named 2007 Goldwater Scholars. Jodie Tvedtnes, left, received an Honorable Mention.

Corners meeting. Her future plans include earning a doctorate in atmospheric physics and pursuing further study of upper atmospheric phenomena, particularly in the mesospheric region.

This year, 317 Goldwater Scholars were selected nationwide from a field of 1,110 mathematics, science and engineering students nominated by the faculties of their institutions. Twenty-eight of this year's award recipients are math majors, 223 are science majors, 54 are majoring in engineering and 12 are computer science majors.

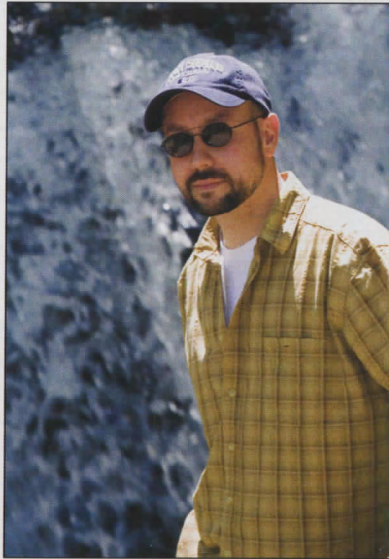
Past USU Goldwater Scholar honorees include **Logan McKenna**, electrical engineering; **Heidi Wheelwright Johnson**, physics and **Keith Warnick** (Honorable Mention), physics in 2006; **Stephanie J. Chambers**, biology and **David Hatch**, physics in 2004; **Jamie B. Jorgensen**, physics in 2002; **Lara B. Anderson**, physics in 2001 and **Jeff Jacobs**, mechanical engineering in 1998.

The Goldwater Scholar program was established by Congress in 1986 to foster academic excellence in science and mathematics in United States' universities. ■

# TRACKING SPACE INVADERS

## STATISTICIAN MEVIN HOOTEN EXPLORES DYNAMICS OF INVASIVE SPECIES, EPIDEMICS

During a virulent outbreak of cholera in mid-19th century London, physician John Snow doggedly went from door to door interviewing families of victims and piecing together evidence of disease transmission through contaminated water systems. With his collected data, Snow made a spot map that revealed the spatial distribution of cholera deaths – most clustered around a water pump in Soho's Broad Street.



Statistician Mevin Hooten

Snow's ideas were largely dismissed by the medical establishment of the time, which was mostly ignorant of microbiology and stubbornly clung to miasma theory. But his work paved the way for modern epidemiology and use of spatial and spatio-temporal statistics to test dispersal theories of natural phenomena.

"These fields have burgeoned over the last few decades," says USU statistician **Mevin Hooten**, who uses hierarchical models to determine how invasive species and diseases spread and change over time and space.

While knowledge of germ theory and the sophistication of tools for statistical analysis have grown markedly, he says, the threat of modern pandemics – bird flu, SARS – and the unknown consequences of invasive species foster as much fear and uncertainty as plagues of yore.

A forest ecologist by education and experience, Hooten, along with colleagues, recently applied emerging modeling methods to an invasive bird species gaining a foothold in North America. The team's research was highlighted in "*Hierarchical Spatiotemporal Matrix Models for Characterizing Invasions*," in the June 2007 issue of *Biometrics*.

"The survival, interaction and spread of species are key elements of ecology," says Hooten, who joined USU's Department of Mathematics and Statistics as an assistant professor in 2006. "The statistics community has developed models to determine the abundance of species but we need better tools for understanding the actual population size of different species – particularly, invasive species."

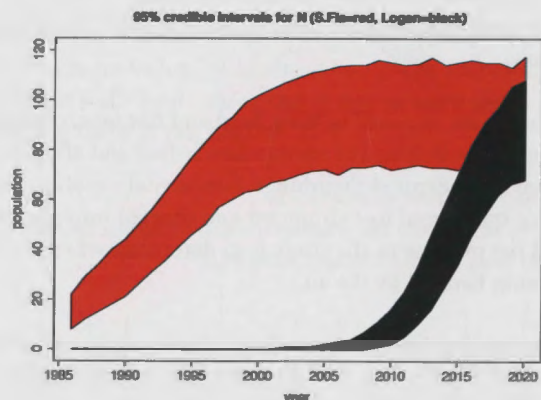
In a study funded by the National Science Foundation and the U.S. Geological Survey, Hooten and co-investigators Christopher Wikle of the University of Missouri-Columbia and USGS scientists Robert Dorazio and Andrew Royle used a hierarchical Bayesian framework to explore the march of the Eurasian Collared-Dove (ECD) westward from Florida, its probable point of entry.

The innocuous-looking gray bird, with a black half-collar at its nape, is now at mid-invasion, says Hooten. "ECD is a prolific species and may pose a threat to native ecosystems. We predict the bird will colonize the entire United States within a few decades."

He notes that the dove is even taking up residence in USU's community. "Based on model predictions, we are on the cusp of a very rapid period of ECD population growth here in Logan."

For Hooten and crew, the dove, disparaged by birders with such unflattering names as "scuzdove" and "Eurotrash," offered a ready opportunity for testing the efficacy of their modeling methods. "Large scale ecological datasets that provide quantitative population information are rare," he says. "Fortunately, the long-term monitoring efforts of the North American Breeding Bird Survey provided us with invasive species data to fuel our research."

The advantage of his team's method over other invasive species models, says Hooten, is its simplicity and flexibility. "It accommodates uncertainty and also provides tangible graphical and numerical output," he says. "Ecologists and resource managers can use the results to understand ecological processes and make decisions." ■



The first, red wave indicates the growth of ECD population in Florida. The second, black wave predicts ECD population growth in Logan, Utah.



## SHORTNESS OF BREATH

### STUDENT RESEARCHERS EXPLORE LINK BETWEEN AIR QUALITY, ASTHMA

This past spring semester, USU premedical, pre dental and prepharmacy students returned to grade school, with their sights set on getting into grad school.

Forty Aggies assisted the Bear River Health Department and the University of Utah with a study aimed at determining whether short-term exposure to air pollution has a negative effect on the lung capacity of children, especially those with asthma. The study, which began January 8 and concluded March 8, was conducted with youngsters at North Logan's Greenville Elementary School.



A Greenville Elementary student exhales into a spirometer. Photo by Eli Lucero, courtesy of The Herald Journal.

**Clayton Cook**, a sophomore pre dental student majoring in biology, said the study fulfills the requirement for students going into medical fields to participate in hypothesis-based research, but it is more fun than some of the other options.

"Instead of going and working with some inanimate object, you're working with kids, you're working with people and that's what I enjoy," Cook said.

Using a device called a spirometer, which measures the air volume a person exhales, the USU student researchers examined whether short-term exposure to Cache Valley's notoriously dirty winter air had an impact on the lung capacity of 100 third-, fourth- and fifth-graders.

The children were required to blow hard and fast for six seconds into the tube-like instrument on test days before and after recess. The spirometer measured their lungs' forced vital capacity, and results were transferred to a computer and charted into graphs. Cook said the purpose of the study is to determine whether the kids are being harmed by the air.

"We're not hoping there are bad effects. We just want to see what the effects are. If we're just sending them out every day and it's affecting them adversely then we're at fault," he said.

Cook, who said even he has trouble blowing into the device for a full six seconds, said though the results aren't complete, there is a noticeable difference in some of the children.

"You can definitely tell the difference between those kids that do

have asthma and those kids that don't," Cook said. "But whether that's because of the air quality, we don't know yet."

**Joseph Whitehead**, a junior pre dental student majoring in biochemistry, said even though the study isn't directly related to dentistry, he believes his participation in it will help him get into dental school and later help him work with patients.

"This internship for me has been a good opportunity," said Whitehead. "It's the first time I've had any sort of patient exposure. We're always cracking jokes with the kids, teasing them. I think that exposure will help."

**Lane Severe**, a junior pre dental student majoring in finance, said he also thinks the interaction with kids will help him later in his career. He said at first the children were timid but warmed up to the USU students once they began to get used to them and understand the study. Severe said, in dentistry, it's especially important to learn how to talk to kids in order to make them calm and comfortable.

"I've watched a few dentists and, you know kids get squirming around all over, and then you have to put a sharp thing in their mouth," he said.

Severe said the research doesn't have to be related to dentistry to help him. He and his classmates have been able to interact with each other and with the children. He said because they're dealing with children, the students had to undergo fingerprinting and a background check in order to participate in the study.



## TOWARD FEWER BAD AIR DAYS INVESTIGATING THE CHEMISTRY OF POLLUTION



Chemist Phil Silva

The unique landscape of Cache Valley, home of Utah State, makes it an enchanting place to live, study, work and play. Yet the encircling majestic peaks, the pastoral scenes of grazing cattle and the snowy winters are the very factors that contribute to one of the area's not-so-attractive qualities: hazy winter air pollution.

During cold months, Logan and surrounding communities experience periods of air pollution caused by "inversions" or altitudinal increases in temperature. Stagnant high pressure systems trap cold air beneath warm air in bowl-shaped Cache Valley, which prevents pollutants from escaping.

USU analytical chemist **Phil Silva** is investigating the chemistry behind Cache Valley's problem air. The main source of the pollution, he says, comes out of the tailpipes of cars and cows.

"Ammonium nitrate accounts for about 50 to 70 percent of northern Utah's air pollution," says Silva, an assistant professor in the Department of Chemistry and Biochemistry.

"Ammonia is a byproduct of livestock waste. During inversions, our snow-covered valley allows ammonia to accumulate, which reacts with vehicle exhaust to form tiny ammonium nitrate particles."

A rapidly expanding metropolitan region, Cache Valley has more than 85,000 registered vehicles and provides a busy travel corridor for freight and tourist traffic between the southwestern U.S. and Rocky Mountain recreational areas. The area's robust dairy and meat industries boast upwards of 75,000 head of cattle, 13,000 hogs and 4,000 sheep.

In recent winters, Cache Valley has racked up unhealthy readings for PM<sub>2.5</sub>; that is, particles less than 1/40 the diameter of a human hair. Such readings are worrisome because the minute particles settle deep in the lungs and can cause health problems, says Silva, who serves as an advisor to the Bear River Health Department and the State of Utah's Division of Air Quality.

Understanding the source of pollution, he says, is the first step toward formulating solutions. "Once we understand the causes, we can implement policies and provide information to the public so that everyone can do their part to lower pollution." ■

"Most graduate schools are looking for anything that will set you apart from the next student," he said.

Physician **Ed Redd**, BRHD medical director, who is overseeing the study, praised the USU students, calling them "fantastic" and "dedicated." He said he believes their assistance in the study will help many of them get into graduate school.

Overall, he said he has confidence in the USU students' understanding of the study and use of the spirometer, even though it's a "complicated piece of equipment."

"They're bright kids, and they know what they're doing," said Redd. "I've trained them. I've watched them do it."

Whitehead said one of the rewarding aspects of the internship has been working with Redd and learning about particulate matter in Cache Valley air.

"He's teaching us a lot of the chemistry behind the inversion that happens in Cache Valley," Whitehead said. "The knowledge of that has been really cool, taking the things we learn about in class and applying them in real life." ■

—by Jen Beasley,

USU junior print journalism major

This article appeared in the February 28, 2007 issue of *The Utah Statesman* and is reprinted with permission.



## DISCOVERY IN THE DARK

### GEOLOGY DEPARTMENT OPENS UTAH'S FIRST OSL LAB; BROWNING FOUNDATION FUNDS INNOVATIVE RESEARCH TOOL

In his writings and speeches, the late **Kermit Hall**, USU president from 2001-04, often referred to the distinct benchmark left by ancient Lake Bonneville that edges Utah State University's Logan campus. He used the landmark as a metaphor to describe the university's strong foundation, crafted by efforts of pioneering visionaries, and the institution's aspirations for continually higher standards of excellence.

With the opening of the new **USU Luminescence Laboratory** on North Logan's Innovation Campus (formerly known as the USU Research Park), Aggies and local residents had the opportunity to learn more about the mysterious geological formations that lay beneath Utah's land-grant university. Managed by the Geology Department, the new lab features cutting-edge capabilities in optically stimulated luminescence or "OSL" geochronology that enable geologists, archaeologists and other scientists to accurately determine the age of sediment samples.



Lab director Joel Pederson stands at the lab's entrance. A revolving dark room door protects tiny samples from light contamination prior to processing in the luminescence reader.

The lab's first assignment? How about determining the age of the USU campus? No, not the date the university was established – which was 1888 – but the actual age of the ground upon which Aggies walk.

"One of the primary challenges in earth science has always been understanding the dimension of time – how old a canyon is, how long it takes to build a mountain range, how often earthquakes happen," says **Joel Pederson**, associate professor of geology and director of the new lab. "I think it's fitting that the very first age determination performed in the new lab was on the geologic material

that forms Utah State University's foundation."

In September 2005, a landslide overlooking Logan's Island neighborhood just south of the university quad exposed an inner section of the Lake Bonneville benchmark. While citizens and local authorities fretted about the mishap's implications for life, limb and property, USU geologists scrambled to collect precious samples.



USU research associate Gary O'Brien collects a sediment sample from the site of the September 2005 landslide at the edge of Utah State's campus.

**Pederson and Rittenour will present a session on using geochronology to build better records and solve questions at the October 2007 Geological Society of America Annual Meeting in Denver, Colorado.**

Attendees of the lab's open house this past January were invited to estimate the age of the lab's campus sediment samples and participants posed excellent guesses, says Pederson.

"Ancient Lake Bonneville was around for a long time, so as we examine the deposits we have to ask, 'To what lake level stand do they belong?'" says Pederson. "And when did they occur during that stand?"

The lab's core instrument, which was funded by a grant from the **Val A. Browning Foundation**, is a luminescence reader developed by Denmark's renowned Risø National Laboratory. About the size of a personal computer, the reader uses controlled doses of radiation and light to incite and measure the responding light, or luminescent glow, of sand grains and thus determine their age.

Pederson says recent technical advances in luminescence dating make it one of the most powerful, accurate and cost-effective methods for solving geological problems. It offers a number of advantages over conventional methods such as radiocarbon and cosmogenic dating of young geologic samples. Both of these older methods are difficult and costly, he says, which means neither is conducive to student research.



"I'm always looking for ways to involve students in research," Pederson says. "The new lab offers great opportunities for undergraduates and grad students to learn about luminescence dating and conduct projects on their own."

Pederson says only a handful of similar labs are located in the United States.

"The U.S. is somewhat behind in this technology," he says. "More labs are currently found in Europe and India."

Prior to the Utah State lab's opening, Pederson was sending samples from USU to out-of-state facilities.

"I thought, 'Why use our precious research funding to send samples and students somewhere else when we could be doing the work here?'"

He envisions the USU lab having a regional focus and primarily serving Intermountain students and scientists, though it already has clients in Thailand and Alaska.

"We already have a six-month backlog in projects," he says. "The time and effort we devote to measurement of external samples will help fund the ongoing operations of the lab."

**Dean Don Fiesinger** says the university is grateful to the Browning Foundation for funding a facility that enhances hands-on learning.



In the darkened USU Luminescence Laboratory, Geology undergraduate researcher Melissa Jackson prepares a sample from Alaska. Photo by Mitch Mascaro, courtesy of The Herald Journal.

"The lab encourages innovative research opportunities for students at all levels of their academic careers."

So, what did OSL dating performed in USU's lab reveal about the age of the university's campus? "The samples are 19,300 years old – give or take 1,200 years," he says. ■

## USU GEOLOGIST RECONSTRUCTS EVOLUTION OF MISSISSIPPI RIVER OSL Lab Manager Tammy Rittenour Publishes Findings in GSA Bulletin

Revered in song, literature and lore, the mighty Mississippi River pulses through the heart of North America on a long, winding amble. At first glance, Old Man River, aptly classified by scientists as a meandering river, reveals little of its distant past as a vast glacial stream.



Satellite image of the Mississippi River, right, at the town of Cairo, Illinois. Vertical lines in the center of the image reveal the path of ancient braided stream deposits.

Yet recent findings by USU geologist **Tammy Rittenour**, bolstered with optically stimulated luminescence or "OSL" dating technology, support earlier speculation that glacial melt, not sea-level change, is largely responsible for the waterway's evolution during the past 100,000 years.

"Our dating of geological deposits indicates that changes in the river coincided very

closely with glacial advances," says Rittenour, assistant research professor and manager of the USU Luminescence Laboratory.



Geologist Tammy Rittenour

Rittenour conducted the study, funded by the National Science Foundation and other sources, as part of her doctoral dissertation project at the University of Nebraska with co-investigators

**MISSISSIPPI RIVER...**  
Continues on page 20

## "THE PREMED ADVISOR WILL SEE YOU NOW"

### BIOLOGY DEPARTMENT'S ADVISING CENTER SETS STUDENTS ON STEADY TRACK TO PROFESSIONAL SCHOOL



Prehealth professions advisor Liz Heffernan

For an aspiring physician, dentist or other health care professional, preparations for post-undergraduate education begin long before commencement. Admittance to medical schools, dental schools and other health profession programs is highly competitive, yet USU graduates are consistently accepted at rates above the national average. Why? Much of the reason is due to the efforts of dedicated faculty and staff members who ensure that Aggies are well prepared for the application process.

"It's insane – the amount of work involved in preparing for and applying to (professional schools) is incredible," says Liz Heffernan, prehealth advisor in USU's Biology Department. "That's why it's important to start early and begin with an organized plan."

A common misconception people have about USU's premed program is that there's one set premed major or biology major, says Heffernan. "While it's true that certain courses are required for medical or dental school admittance, a prehealth student can choose to declare virtually any major."

In the Class of '07, 28 percent of the applicants to health profession schools were biology majors, but others pursued study in economics, English, nutrition, physics, Asian studies and a variety of other fields.

"Today's professional schools are seeking students who are versed in a broad range of areas," says Heffernan.

Other preparation includes involvement in extracurricular activities and undergraduate research, in which USU provides a wealth of opportunities. (Heffernan and colleagues were instrumental in recruiting prehealth majors to participate in the Bear River Health Department's study – see accompanying article in this issue.) USU grads also report that Biology lecturer **Andy Anderson's** courses in human anatomy, physiology and dissection, as well as bioethics, put them well ahead of the pack in preparation for tough medical school courses.

As students approach their junior year, the pressure's on. Aggies prepare for and complete the DAT or MCAT – professional school entrance exams – and begin the formal application process. The cost is steep. Students shell out roughly \$3500 just to apply and pay their own way to school interviews. The formal interview process begins during their senior year.

Before heading to an interview, students benefit from a rigorous practice process, which includes mock interviews with three members from USU's Prehealth Professions Evaluation Committee. The 37-member, all volunteer committee consists of faculty and staff members from varied departments, along with local physicians and dentists. "We're very grateful to the generous people who volunteer their time to help our students pursue their goals," says Heffernan.

"Our members try to simulate what a student will encounter in a real interview," she says. "Students get a lot of feedback on how to make themselves more competitive."

As students work toward their goal, Biology's Advising Center polishes applicants' letters of recommendation. "We prepare thorough, 3-page letters that explain what makes that person unique and why they're a strong applicant," Heffernan says.

Throughout their undergraduate years, Heffernan encourages prehealth students to meet early and on a regular basis with both their prehealth and major advisors and to become involved in prehealth student groups. Her office also supports a peer advisor program, which offers extra support to students. Heffernan also urges students to attend prehealth orientation gatherings and to take advantage of campus visits by representatives from professional schools. "We offer a lot of resources to those with initiative," she says.

Heffernan says she's pleased that USU's Connections program's 2007 Summer Literature Experience, conducted by the Retention and First Year Experience office, will feature physician Atul Gawande's book, *Complications: A Surgeon's Notes on an Imperfect Science*.

"I think the book will be of great interest to our students," she says. ■



## SCIENCE GRAD ONE OF USU'S FIRST UNDERGRAD RESEARCH FELLOWS

### NATHAN CARRUTH TO PURSUE HUMANITARIAN SERVICE, GRAD STUDIES

Prior to entering USU's freshman class in fall 2004, math and physics student **Nathan Carruth** was selected for the inaugural class of University Undergraduate Research Fellows. At this spring's commencement ceremony, Carruth and English major **Amanda Marinello** received degrees – both with honors – after just three years of study.

The fellowship program was formally initiated by USU's Vice President for Research Office to identify ambitious students early in their college careers, guide them to faculty research mentors and provide them with a \$1,000 stipend for research.

Carruth graduated summa cum laude with a bachelor of science in mathematics and physics. Home schooled prior to college, he brought to USU 24 credits from Stanford University's continuing studies program in math. Carruth was mentored by Mathematics Professor **Lance Littlejohn**, who accompanied the undergrad to Europe to present a professional paper.

"Nathan is one of the best students I have seen in my 23 years at Utah State," Littlejohn says. "He is, for certain, going to one of the best graduate programs in the country."

The Logan native plans to pursue studies at Princeton University following a two-year leave for humanitarian service.

In addition to his undergraduate courses, Carruth undertook graduate study in physics. He was awarded an honorable mention in the National Science Foundation Graduate Fellowship competition.

"Nathan advanced further and faster in his studies in physics than I could have imagined," says Physics Professor **David Peak**.



Nathan Carruth

### JOIN USU'S 2007 SUMMER LITERATURE EXPERIENCE

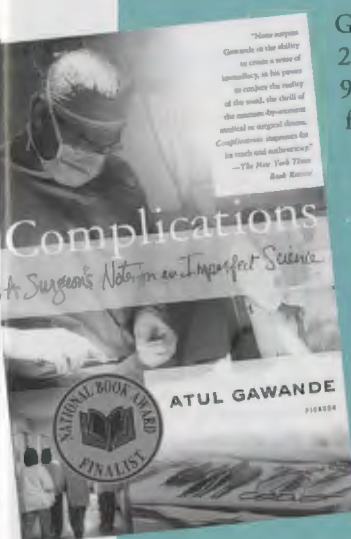
Alumni and friends are invited to join with USU's entering freshman class in reading Atul Gawande's book, *Complications: A Surgeon's Notes on an Imperfect Science*, as part of the Retention and First Year Experience office's Connections program's Summer Literature Experience.

Gawande visits campus Saturday, August 25, to discuss his book. His talk begins at 9:30 a.m. in the Kent Concert Hall and is free and open to all.

"The Summer Literature Experience is designed to quickly draw new students into USU's academic environment," says **Noelle Call**, program director. "We invite the community to join us in this enriching experience."

This is the fifth year USU has offered the Summer Literature Experience. Community participation in the activity has grown each year. ■

For more information, visit  
[www.usu.edu/connections/literatureexperience](http://www.usu.edu/connections/literatureexperience).



**Joyce Kinkead**, associate vice president in the Office of Research, coordinates the program. "We interview Presidential Scholars prior to the start of their freshman year," she says. "These are students who want to engage in research, scholarship or creative activity from day one of their undergraduate careers. Undergraduates can enter a research track at any point in their studies, but there are some students for whom immediate immersion is very important."

Kinkead reports that some students have turned down Ivy League admission to come to Utah State because they know they can be in a lab immediately.

Associate Dean **Richard Mueller** coordinates orientation seminars for the College of Science fellows to acquaint them with the variety of research opportunities offered in each department. "We gather for an opening social where new students can meet each other, as well as each department's undergraduate research coordinator and past fellows," he says. "From there, we meet weekly with the different undergraduate research coordinators in each coordinator's department and tour that department's lab facilities. This introduces students to the broad scope of research taking place throughout the college and fosters interdisciplinary opportunities."

Twenty-eight students who are entering USU this coming fall have been invited to join the fourth group of University Undergraduate Research Fellows – 11 of these are science majors. They join more than 70 current fellows, of whom 19 are College of Science students. ■

— Patrick Williams



# INAUGURAL PROFESSORS

## COLLEGE OF SCIENCE FACULTY MEMBERS PARTICIPATE IN HONORARY LECTURE SERIES

Each year, Utah State University invites faculty members, who have been promoted to full professor during the previous year, to participate in the Inaugural Professor Lecture series. Each participant presents a lecture about his or her academic and professional journey at university president **Stan Albrecht's** home during a reception attended by family, friends and colleagues. We congratulate the 2006-07 honorees – **Adele Cutler**, Mathematics and Statistics (who was featured in the Winter 2006 issue of *Insights*); **Daryll DeWald**, Biology; and **Tim Gilbertson**, Biology – who contribute immeasurably to our college.

### It's About People

Cell biologist **Daryll DeWald** loves to chase the big discoveries as much as the next scientist. But he concedes that the human side of science is the most fascinating of all.

"To loosely borrow Bill Clinton's 1996 campaign phrase, *It's about people, Stupid*," concludes DeWald.

Head of the Biology Department, DeWald says he wanted his lecture "to celebrate the people I've interacted with" in an academic and professional journey that's taken him throughout the United States.

Not that DeWald has ever been a stranger to relocation. A self-described Air Force brat, his family moved about every two years during his childhood. Each new home – in Texas, Louisiana, Colorado, Ohio, Okinawa, California – afforded varied environments for the budding scientist to explore. DeWald clearly remembers his fascination with ant lions in the Mojave Desert. The youngster scouted out the insects' inverted cone-shaped homes and watched hapless ants try to escape the traps of fine, slippery sand.

"I called them 'doodlebugs,'" he says. "I wondered how big of an ant they could eat."

As he entered his teens, athletics vied with science for DeWald's attention and he dreamed of earning a baseball scholarship to

college. Alas, the scholarship didn't come, but DeWald headed to the University of Wyoming where his interest in scientific pursuits was reignited. At UW, DeWald met molecular biologist Randy Lewis, who became a significant mentor and friend.

"We studied endorphins and enkephalins – painkillers naturally produced by the body – and I had my first opportunity to publish my research," says DeWald.

His own academic experience may explain why DeWald is a strong advocate for undergraduate research. "I have a real heart for undergrads," he says. "Pairing students with faculty mentors and involving them in meaningful research is critical to a positive, productive experience."

Following graduation from UW, DeWald worked as an industrial scientist for pharmaceutical giant Upjohn. His areas of research included cancer biology and biopolymer chemistry. And co-workers approached him about being an alpha-tester for a promising new hair loss treatment. DeWald declined but recounts the memory with ironic amusement pointing to his own hirsute-challenged head. The resulting product was none other than bestseller Rogaine.

DeWald headed back to academia and earned his doctorate in plant biochemistry from Texas A&M University. Postdoctoral studies followed at the prestigious Howard Hughes Medical Institute at the University of California, San Diego School of Medicine. He joined USU's faculty in 1995 and, prior to his appointment as Biology Department head in 2006, he served as associate director for research for USU's Center for Integrated BioSystems.

DeWald's research interests span yeast, plant and mammalian cell signaling.

"We're exploring what happens inside cells, how new proteins are made – protein trafficking, if you will."

In each organism, DeWald is examining the role of phosphoinositides – a form of lipids that regulate key cellular processes. With plants, he's exploring how varied species respond to drought, salt and heat stress. In mammals, he and colleagues are studying the role of phosphoinositides in breast cancer metastasis.

The latter research has become a personal mission, as two of DeWald's extended family members are currently battling breast cancer.



*"I have a real heart for undergrads. Pairing students with faculty mentors and involving them in meaningful research is critical to a positive, productive experience." – Daryll DeWald*





"I don't see my role as just meddling about in a lab," he says. "I want to be doing things that help humankind."

In his pursuits, DeWald draws upon lessons learned from mentors, colleagues and students who have demonstrated strong moral positions. One of those mentors was his late father.

"He invested in others, treated people with respect and valued them," says DeWald. "That's the kind of leadership model I try to emulate."

### Never Say Never

Perhaps 'never say never' should be one of **Tim Gilbertson's** personal mantras. The Los Angeles native, who joined USU's Biology Department faculty in 2000, was once "sure I'd be a lifelong Californian."

After completing his undergraduate studies in biology and psychology at the University of California, San Diego, he also swore he'd never return to academia. "I was worn out from the tough, competitive grind," Gilbertson says.

He took a job as a research technician at The Scripps Research Institute by day and ran his own graphic arts business by night. What free time was left was devoted to surfing.

Life was good, but after a few years of less-than-challenging assignments, Gilbertson decided it was time to head to graduate school. This time, however, his interest, fueled by his sideline pursuits in graphic design, focused on a new area of study.

Accepted into UC Berkeley's graduate program in architecture, Gilbertson started making moving plans. His boss at Scripps had very different plans. "Once he caught wind of my intent to leave biology, he convinced me to stay at least one more year – and upped my salary considerably."

Gilbertson put Berkeley on hold and embarked on what would become his first foray into "actual research."

Four years in college and several more at Scripps and no research experience? Not really, says Gilbertson.

"At that time, undergrads at UC San Diego basically washed dishes in the lab, and as a technician at Scripps I was helping other investigators," he says. "These are highly competitive environments."

During his final year and a half at Scripps, Gilbertson says his supervisor "really took the time and effort to involve me in research and, during that time, I ended up with eight publications."

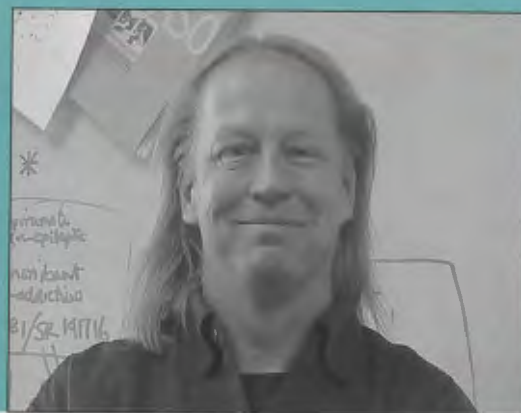
Gilbertson was now ready to enter grad school – in neurobiology, not architecture – and, still determined to stay in California, faced

two choices: UC Davis and UC Irvine.

"Honest to gosh, the truth is I couldn't decide," he says. "It came down to a coin flip – UC Davis."

Once ensconced in graduate study, Gilbertson made a very easy decision – to marry his newfound ultimate Frisbee partner, **Donna**. "She had only one condition and that was I had to promise never to live in a big city," he says.

*"How do cells work together to affect changes in behavior?"*  
– Tim Gilbertson



Another pivotal decision followed, when Gilbertson chose to change his research focus from highly studied visual systems – the eyes – to the relatively untouched study of taste systems. "I thought it would be a good move for a new investigator trying to find his niche," he says.

The decision propelled Gilbertson and his new bride out of California, first to Colorado, then to Louisiana State University's Pennington Biomedical Research Center. But in each instance, Gilbertson kept his promise of rural residences, affording the couple homes in the majestic beauty of Estes Park and the moss-laden swamps of St. Amant.

Now happily settled in Utah – Donna is an assistant professor in USU's Psychology Department – Gilbertson continues his quest for answers to a question that dates back to his undergrad years, "How do cells work together to affect changes in behavior?"

In USU's emergent Center for Advanced Nutrition, in which he works with his former LSU collaborator, USTAR professor **David York**, Gilbertson is exploring how our taste systems regulate our food choices.

"With David (York) on board, I feel like my career has come full circle," he says. "The center is really getting its feet under it and we're starting to meet our objectives." ■

## ALUMNI EVENTS



Gathering for a February '07 alumni event in Boise were, back row, from left, Greg Warren, Development Director Chris Tallackson and Dean Don Fiesinger. Front row, from left, Kim Warren, Kelly Reister, Phil Nyborg, Bob Geddes and Suzanne Budge-Schaefer.



Alumni who also gathered in Boise included, from left, Mark Salisbury, Computer Science Department Head Don Cooley, Joel Gyllenskog and Peg Gyllenskog.



Eastern Utah alumni gathered in Price. From left, Don Hamilton, Albert Spensko, Shirley Spensko, Professor Pete Kolesar, Dean Don Fiesinger, Mike Leschin and Connie Leschin.

## FALL 2006 COMMENCEMENT



Dean Fiesinger, Fall '06 Valedictorian Carl Potter and faculty escort Jim Cangelosi



From left, Jeremy Pack, Chris Meadows, Chris Hall, Rob Hall, Carl Ellsworth, Karl Kohlbrand, Aaron Andersen and Josh Dawson.

## FALL 2006 HONORS



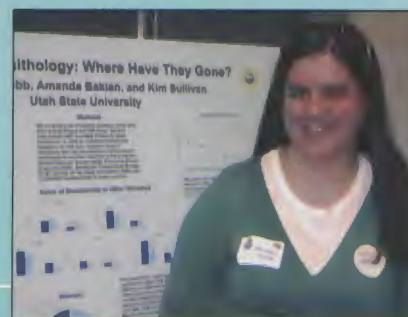
A-Pin recipients, from left, Jake Jones, William Israelson and Ryan Campbell were honored at a December 7 luncheon hosted by Dean Fiesinger. Other recipients included Malody Anderson, Jeremy Brodis, Robert Call, Chris Healey and Cody Pehrson.



Students Heidi Wheelwright Johnson, Carl Potter and Aimee Hunt were inducted into Phi Kappa Phi in a November 15 ceremony.

## POSTERS ON THE HILL 2007

Physics and chemistry major Brittany Webb was among 42 Aggies presenting at Undergraduate Research Day on Capitol Hill January 16 in Salt Lake City. Webb served as College of Science Student Senator for 2006-07 and returns for a second term in 2007-08.



From left, Biology undergrad researchers Uyen Lam and Janette Starks presented their research to Utah Rep. Fred Hunsaker and Utah Sen. Lyle Hillyard at Posters on the Hill.



## SPRING 2007 COLLEGE OF SCIENCE AWARDS CEREMONY



College of Science Scholarships for 2007-08 were awarded to, from left, Braden Parker, McLain Knutson, Ryan Allen, Calvin Burton, Amanda Evans, Cade Perkins, Dustin Larsen, Ammon Larsen and Sherry Baker. Not pictured is Benjamin Toney.



Dean Fiesinger congratulates recipients of 2007-08 Willard Eccles Undergraduate Research Fellowships, from left, Jodie Tvedtnes, Shelley Taylor, Tamara Jeppson, Cade Perkins, Art Mahoney, Nathely Carranza, Jennifer Fisch, Brad Hintze and Jake Jones. Not pictured is Sunghun Park.



Scholarship honorees included, from left, Chris Bowen (Seely-Hinckley); Brandon Wright (Seely-Hinckley); Mike Keller (Questar); Amanda Evans (Theodore M. Burton); Brad Hintze (Seely-Hinckley); Scott Johnson (Oscar Wood Cooley); Trey Banbury (Seely-Hinckley) and Garrett Bentley (Charles J. Sorenson).



Biology undergrad William Israelsen, left, was presented with the Campbell Scientific Science Scholarship from Campbell Scientific president and CEO Paul Campbell.



From left, Undergraduate Research Mentor of the Year Joseph Li, Faculty Advisor of the Year Scott Ensign and Faculty Teacher of the Year Lance Seefeldt. Not pictured is Faculty Researcher of the Year Piotr Kokoszka, who is on sabbatical.

## SPRING 2007 COMMENCEMENT



Dean Don Fiesinger, right, was presented with a special appreciation plaque by Associate Deans Lisa Berreau and Richard Mueller.



Spring '06 Valedictorian Melody Anderson, right, with faculty escort Andy Anderson.



Graduates gather to celebrate their accomplishments.



## COLLEGE OF SCIENCE SCHOLARS (2006-07)



### **Carli Capener Potter**

*Fall '06 Valedictorian*

Tackling complicated math and stats problems proved a formidable challenge for **Carli Capener Potter**, who earned a BS degree in composite mathematics/statistics education. But an even greater challenge was boosting the fragile confidence of students at Logan High School who were preparing to take the state's basic mathematics competency test.

"They already thought they weren't good at math so they needed a lot of encouragement and patience," says Potter, who conducted her student teaching at the Cache Valley high school. "Managing the classroom was challenging at first but, eventually, I felt like I really connected with the students."

Potter says she appreciated the collegial atmosphere among teachers at Logan High and was excited to be invited to assume teaching duties in early 2007 for a teacher going on maternity leave. "The teachers at Logan collaborate a lot and share materials and ideas," she says. "Even though I was a student teacher, they treated me as an equal and offered good advice."

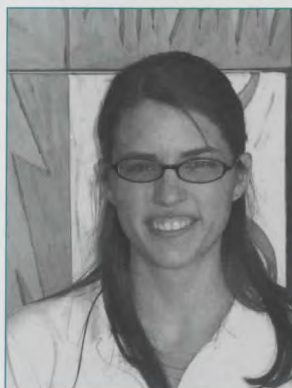
She now heads to a permanent teaching position in Utah's Box Elder School District, following in her grandfather's footsteps.

Potter says she "always wanted to be a teacher" and, by middle school, she knew she wanted to be a math teacher. "I really liked math and took every math course I could in middle and high school," says the native of the tiny farming community of Riverside, Utah.

She began her undergraduate career at BYU-Idaho in Rexburg, but chose to transfer to USU along with her husband, **Justin Potter** (BA 2006, English) in 2004. Interestingly, the pair grew up only two and half miles apart but didn't meet each other until about a year before their marriage.

"The change to Utah State was good," says Potter. "I got a great education at USU. I couldn't have asked for better. And I've loved going to Aggie basketball games."

Potter was accompanied by faculty escort **Jim Cangelosi**, professor of mathematics, at Fall '06 Commencement. "Dr. Cangelosi was the first person I met at USU and has taught me so much about teaching," she says. "He's offered new perspectives and he's always been there for me."



### **Melody Rose Anderson**

*Spring '07 Valedictorian*

By the time she entered Utah's Copper Hills High School, **Melody Anderson** knew she wanted to become a high school teacher or a physician. Either profession, she thought, would allow her to "benefit people in a major way." With acceptances to five medical schools in hand, it appears Anderson is well on her way to a career in medicine.

Shortly before graduation, Anderson was awarded a **Phi Kappa Phi Graduate Fellowship** for 2006-07. She is one of only 57 recipients of the prestigious award nationwide and joins 12 Aggies who have won the fellowship since 1995.

An Honors student, Anderson graduated with a 4.0 GPA in her biology major and chemistry minor, along with an impressive resume of research and service projects accomplished during her undergraduate career.

A recipient of the Willard L. Eccles Undergraduate Research Fellowship, one of Melody's research ventures was investigating enhanced biological control of the Cereal Leaf beetle with faculty mentor **Ted Evans**.

Anderson also served as an Undergraduate Teaching Fellow for human anatomy with faculty mentor **Andy Anderson**. The experience allowed her, she says, to "share my enjoyment of the subject with others." Teaching and research, she says, "cemented the information further in my mind and allowed me to apply and understand concepts from different angles."

She invited Anderson to be her faculty escort at spring commencement.

Beyond campus, Anderson maintained a busy volunteer schedule, serving as a hospital operating room volunteer, a tutor to elementary school students, a hospice volunteer and a volunteer intern in a pediatrics practice.

During her USU career, Anderson managed to squeeze in an Aggie basketball game or two and enjoy the occasional mud football game or ultimate Frisbee match with roommates. She leaves USU with fond memories of "terrific academic opportunities on a research-oriented campus with great friends, fun times and beautiful mountains at our doorstep."



## COLLEGE OF SCIENCE SCHOLARS (2006-07)



### Elizabeth Lund

#### *Scholar of the Year*

A native of Jackson, Missouri, **Elizabeth Lund** likes to pursue challenges of both mental and physical endurance. During her years at USU, Lund has honed her research skills in the lab, while swimming, running and biking in preparation for triathlons.

Lund, who was named Outstanding Graduating Senior in the

Department of Chemistry and Biochemistry, plans to begin graduate studies in chemical engineering next fall at Montana State. "Many of the research projects I've been involved with here at USU have been application-based," she says. "I look forward to tackling hands-on studies."

Lund chose USU, she says, because of "the fantastic undergraduate research opportunities."

Her first foray into research involved investigation of bacteria strain used in the development of cheddar cheese. More recently, Lund and faculty mentor **Alvan Hengge** have studied phosphatase mechanisms, including a unique enzyme that initiates multiple reactions.



### Rebecca J. Atkins

#### *Dean's Scholar*

*Chalk one up for USU Physics Day!*

**Rebecca "Becky" Atkins** chose to attend Utah State largely because of the scholarship she earned as a USU Physics Bowl contestant. The Idaho native attended the popular annual gathering at Utah's Lagoon amusement park while a student at Twin Falls High School.

She initially chose engineering as her major, but soon switched to math and physics. "I've always liked math and realized that I wanted to teach," says Atkins, who served as an Undergraduate Teaching Fellow.

She earned a bachelor's degree in math education with a minor in physics. Prior to commencement Atkins completed student teaching at Utah's Sky View High School. She says teaching math and physics to high schoolers was a challenge, but she soon found she was learning as much as her students.

Atkins looks forward to having her own classroom, where she'll emphasize hands-on learning and active participation from students. "Math and science are not just about plugging numbers

into a formula," she says. "It's important to understand how and why things work."

"If I can help one student get excited about math," Atkins says. "Then I'll feel like I've achieved success."



### Jan Marie Andersen

#### *Undergraduate Researcher of the Year*

Since age 14, **Jan Marie Andersen** has dreamed of becoming an astrophysicist. "My high school geology teacher showed us Carl Sagan's *Cosmos* videos every Friday and I fell in love with the subject," she says. "USU, with its strong space research program, was the logical choice for my college destination."

A physics and math major, Andersen was a member of USU's Microgravity Research Team and completed a NASA summer internship at California's Ames Research Center. She was awarded a College of Science Undergraduate Research Minigrant and received a Physics Department Undergraduate Research Award. Since the summer of 2005, she has researched aerosol transport in the atmosphere with faculty mentor **Tom Wilkerson** at USU's Space Dynamics Laboratory.

With commencement behind her, Andersen embarks on a new adventure: She was awarded a Fulbright Scholarship to begin studies this fall at the Niels Bohr Institute of Denmark's University of Copenhagen. "My plan is to focus on stellar evolution and the early universe – one of my favorite subjects," Andersen says.



### Chad Dallon

#### *Undergraduate Teaching Fellow of the Year*

Biology major **Chad Dallon** is recognized for his outstanding work as an Undergraduate Teaching Fellow in human dissection and anatomy courses taught by Biology faculty member **Andy Anderson**.

While juggling teaching responsibilities and classwork, Dallon pursued research of the Bluetongue virus in Biology Professor **Joseph Li's** lab. He was a featured speaker at the Spring 2007 Biology Undergraduate Research Symposium.

Beyond campus, Dallon is employed as a certified nurse aide with Community Nursing Services Home Health and Hospice. An aspiring physician, he plans to attend medical school.





### Matthew Bailey

*Graduate Student Teacher of the Year*

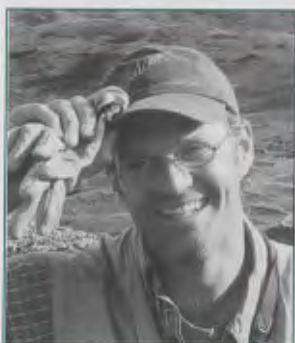
After earning a bachelor's degree in civil engineering from USU in 1998, **Matthew Bailey** headed to a job in industry. But his interest in physics courses he took during his undergrad years led him back to graduate studies at Utah State.

"The academic and research atmosphere at USU is great," says

Bailey. "I really like the Physics Department."

Bailey has taught three physics courses along with a science course called *Science in Society*. "It's been interesting to tackle controversial subjects ranging from stem cell research to evolution versus creationism to 'Do cell phones cause cancer?'" he says. "It's been interesting to have open discussions and hear different points of view."

Bailey's current research, with faculty member **Mike Taylor**, explores the dynamics of "sprites" – lightning that shoots upward, rather than downward, from clouds.



### Justin E. Heavilin

*Graduate Student (PhD) Researcher of the Year*

California native **Justin Heavilin** says his studies of mathematics have afforded him the opportunity "to work with very bright people in a variety of disciplines from biology, ecology, engineering and statistics."

His research at USU included development of models for study of pine beetle infestations in Western forests with faculty member **Jim Powell**.

Heavilin completed his undergraduate studies at California's Humboldt State and Germany's Universitaet Bielefeldt. His future plans call for more international travel: He is currently working with Engineers Without Borders on a solar water heater project in a small community in Peru. In the fall, Heavilin looks forward to teaching mathematics at Palestine's An-Najah National University. ■

### MISSISSIPPI RIVER...

*Continued from page 11*

Michael Blum, now of Louisiana State University, and Ronald Goble. In a paper published in the May-June 2007 issue of the *Geological Society of America Bulletin*, Rittenour's detailed examination of the river's fluvial evolution, conducted from the southern tip of Illinois to Baton Rouge, La., builds on findings from 20th century studies.

The Mississippi River spawned from the waters of ancient Lake Agassiz, which dominated present-day central Canada. Rittenour says the waterway has alternately changed from a braided river – featuring multiple, intertwined channels indicative of glacial runoff – to a meandering river in response to shifting glacial periods. Throughout much of the river valley, the landscape along the Mississippi appears almost flat. But satellite images reveal a web of braided belts throughout the river valley – remnants of glacial melt snaking its way south.

"Our new chronology and longitudinal profiles of the Mississippi offer insights into the response of this continental-scale river system to climatic and sea level changes during the most recent glacial cycle," says Rittenour, who joined USU as a postdoc researcher in 2005. "This could shed light on the future impact of climate events on the river."

Rittenour spent four years collecting core samples from braid belts along the river and hauling them back to her alma mater's luminescence lab for processing. "It was kind of like following Huck Finn's path," she says. "I encountered a lot of fried catfish and hush puppies on the menus of old cafes along the way."

Rittenour was instrumental in the planning and installation of USU's new luminescence geochronology lab. "Luminescence dating offers a wealth of new research opportunities," she says. "The technology is powerful, accurate and cost-effective."

Since joining USU, Rittenour notes that she now lives outside the massive Mississippi River watershed, which stretches from western Montana to Pennsylvania. Her focus now, she says, is working with colleagues on study of the American West's Colorado River. ■

### NEON SIGNS OF ENVIRONMENTAL CHANGE

Biology Trustee Professor **JIM MACMAHON** is among a group of researchers leading efforts to establish a nationwide system capable of continuously monitoring thousands of environmental measurements. The massive project, called the National Ecological Observatory Network or "NEON," will enable scientists to forecast what's happening to the human environment, says MacMahon. Visit [www.neoninc.org](http://www.neoninc.org).



## CHEMICAL REACTION

### UNDERGRAD PEER MENTORS SPARK HIGH SCHOOLERS' INTEREST IN SCIENCE



Associate Dean Lisa Berreau, right, and undergraduate peer mentor Sara Huefner, left, guide high school science students through chemistry experiments.

**D**ecked out in safety goggles and gloves, students from North Logan's **InTech Collegiate High School** learned what happens when you mix and heat a few ordinary-looking liquids and solids.

"Oh, that's disgusting!" exclaimed one participant as students watched a "carbon snake" – a gray mass formed from an organic compound mixed with sulfuric acid – slowly bulge from a beaker.

"The snake is a graphite form of carbon," USU undergrad **Sara Huefner** explained to the group. "It's one of the known 'allotropes' of carbon. Do you know what an allotrope is?"

"Isn't it, like, when you have the same chemicals but in a different form?" ventured one student.

"You are so correct!" answered Huefner. "Can anyone give me an example of another allotrope of carbon? I'll give you a hint – what's something really expensive you wear on your hand?"

"Diamonds!" the students chimed in unison.

At another station, students stretched long, sticky strands of dissolving Styrofoam, in an experiment demonstrating what happens to polystyrene molecules when mixed with a solvent.

"It looks like a promo from a Spider-Man movie," quipped USU Chemistry and Biochemistry Department Head **Steve Scheiner**.

At yet another station, teens burst into giggles over white foam spewing from a flask.

"You like to blow things up, I see," said **Lisa Berreau**, associate professor and associate dean of USU's College of Science. "Okay, that doesn't surprise me."

Tenth graders from InTech, one of Utah's six early college charter high schools, recently visited USU's Chemistry and Biochemistry Department to experience hands-on experimentation in a university lab. InTech, located on the university's Innovation Campus, first opened its doors to students in 2006.

For the high school students, a day in the chem lab offered a glimpse of learning opportunities that await them at the university level. For members of the USU Chemistry Club, undergraduates who conducted the workshop for high schoolers, the gathering offered a valuable lesson in peer mentoring.

"It's very interesting to see the different reactions from the kids," said **James Ewell**, a junior biochemistry major who helped with the workshop. "Some don't care; some are fascinated."

"It lets the kids see that chemistry can be applied to everyday things," added **Matthew Volk**, a sophomore biochem major who also helped with the workshop. "Examples of chemistry are all around us."

A veteran of four peer mentoring gatherings plus three demonstrations for Aggie Family Day, Volk is an old hand at engaging youngsters in learning activities. Huefner still has some doubts.

"I'm a terrible mentor," she lamented. "I have trouble keeping everyone on task."

Maintaining focus and order among active teens, the mentors agreed, is a formidable challenge. But a worthwhile endeavor, Berreau, faculty advisor, assured the undergrads.

"Inviting teens to campus is a key step in the recruitment process," she said. "We need to reach these kids early to spark their interest in science and let them know about the many opportunities that are available to them."

Berreau and other faculty members in the Department of Chemistry and Biochemistry will test the waters this summer with a week-long chemistry workshop for students from InTech. Innovation funds awarded from the college's budget will cover the cost of this year's inaugural gathering. The goal is to expand the opportunity to students from other Utah high schools in coming years, she said.

"Many teens simply don't know about all the learning and scholarship opportunities that USU offers," said Berreau. "Perhaps they haven't even considered that college is an option they can pursue. Our outreach programs, bolstered by our undergrad peer mentors, are an effort to change that." ■

# USU EMBARKS ON NASA CLOUD STUDY

## PHYSICIST MIKE TAYLOR ON AERONOMY OF ICE IN THE MESOSPHERE SCIENCE TEAM



Mike Taylor

**C**irrus clouds, stratus clouds, cumulus clouds – since ancient times, people have gazed skyward and pondered fluffy wisps of white and angry gray thunderheads.

USU physics professor **Mike Taylor** looks beyond the Earth's visual atmosphere to the mesosphere, where the highest clouds, called noctilucent or "night-shining"

clouds – invisible during daylight – form at the edge of space.

"The mesosphere is the coldest region in our solar system up to the orbit of Saturn," Taylor says. "Very little is known about the icy clouds that develop in this region."

Taylor is a member of NASA's science team for the Aeronomy of Ice in the Mesosphere or "AIM" mission, which successfully launched a spacecraft into orbit April 25. USU's Space Dynamics Laboratory designed and built one of the instruments that will fly on the spacecraft and collect information about how and why noctilucent clouds, also called polar mesospheric clouds or "PMCs," form.

PMCs occur some 50 miles above the Earth's surface and are only visible at twilight, as the sun sinks below the horizon and illuminates the elusive formations. Historically seen only at higher latitudes, Taylor spotted the clouds from his east bench Logan home back in the summer of 1999.

"I was sitting on the deck with my brother-in-law when I saw them and jumped up to grab a camera," says Taylor. "We ended up running about the neighborhood photographing the clouds with both still and video cameras."

Taylor's chance glimpse remains the lowest documented sighting of PMCs from the United States. But the frosty clouds are being seen more frequently at lower latitudes – farther from their polar homes – and they seem to be growing brighter and more numerous. Could they be yet another harbinger of global climate change?

"We can't say for sure. We don't have enough information," says Taylor. "That's one of the things AIM will help us study – we'll be examining links between lower and upper atmospheric phenomena."

SDL's SOFIE, or Solar Occultation for Ice Experiment, instrument will measure a variety of atmospheric components, including temperature and water vapor, to probe the chemistry involved in forming the clouds, says Taylor.

"We still don't know what makes up the clouds," says Taylor. "We know the ingredients, but we don't yet have the recipe."

He looks forward to traveling to Alaska this summer with a team of USU undergrad researchers to set up field data collection stations at two sites about 30 miles apart. "With the AIM spacecraft in orbit, we'll be able to collect data from both above and below the mesosphere," says Taylor. "This will be a golden opportunity to learn more about these mysterious clouds."

The AIM mission is a poignant venture for Utah State. NASA granted SDL permission to include an engraving on the SOFIE instrument in memory of engineer **Brandon Paulsen '97, '98MS**. A USU graduate who began working at SDL while still a student, Paulsen, 32, managed the design of SOFIE prior to his death from cancer in 2005.



USU physicist Mike Taylor captured this unusual sighting of polar mesospheric clouds from Logan in 1999. The PMCs appear as wavy formations in the lower right of the photo. Note the green beam from USU's lidar on the far left.



## THE 'GREEN BEAM' GETS AN UPGRADE USU'S LIDAR INSTRUMENT MEASURES ATMOSPHERIC WIND, TEMPERATURE

Physics Professor **Vincent Wickwar** recalls a summer evening some years ago when two elderly gentlemen knocked on the door of USU's **Atmospheric Lidar Observatory** to inquire about the mysterious green light that emanates from campus.

As Wickwar explained the LIDAR (Light Detection and Ranging) instrument's function and its mesospheric measurements, the two visitors, both participants in Utah State's Summer Citizens program, exclaimed, "Oh, yes, we thought that's what it was."

Turns out the pair were retired scientists from Washington, D.C.'s Carnegie Institution. They had attempted similar observations, beginning in the late 1930s, using searchlights. Their studies were cut short by the funding and manpower demands of World War II.

Wickwar was intrigued; the earliest such experiments he was aware of were performed in the 1950s. He was also sympathetic. Wickwar, too, is impacted by tight federal funding that has left the observatory with insufficient operating dollars for nearly two years.

Yet his optimism is bolstered by recent upgrades to the observatory, first opened in 1993, that will increase the lab's capabilities and make it the largest laser of its kind in the world.

"We've added a second laser, more receivers and increased the size of our telescope," says Wickwar. "This will enable us to examine



Physics research assistant Josh Herron demonstrates USU's 'Green Beam.'  
Photo by Meegan M. Reid, courtesy of The Herald Journal.

an area of the atmosphere roughly 22 miles wider than the previous machine and will allow more sensitive measurements."

The new system also permits the beam to tilt 45 degrees and rotate in a full circle.

With only 11 years of data, Wickwar says it's difficult to identify trends. With some 5,000 hours of observation on more than 900 nights, USU has made a small dent, but Wickwar looks forward to resuming data collection. "We need a longer baseline of measurements to sort out what's happening," he says.

Learn more about the observatory at [www.usu.edu/alo/aboutlidar.htm](http://www.usu.edu/alo/aboutlidar.htm). ■

Principal investigator for the AIM mission is James Russell III of Virginia's Hampton University. Principal investigator for the SOFIE instrument and a co-investigator for the AIM mission is Larry Gordley, president and CEO of Virginia-based aerospace company, GATS, Inc.

Other instruments aboard the spacecraft include the Cloud Imaging and Particle Size Experiment and the Cosmic Dust Experiment built by the Laboratory for Atmospheric and Space Physics at the University of Colorado-Boulder.

The AIM spacecraft departed California's Vandenberg Air Force Base aboard a Pegasus XL rocket launched over the Pacific Ocean from a modified Lockheed L-1011 aircraft. AIM will follow a polar orbit more than 300 miles above Earth during its two-year mission.

To follow the progress of the mission, visit [www.nasa.gov/mission\\_pages/aim](http://www.nasa.gov/mission_pages/aim). ■

### ADVANCING THE WORKPLACE

USU's ADVANCE program is a project funded by the National Science Foundation that aims to improve the recruitment and retention of women faculty in the colleges of Science, Engineering, Agriculture and Natural Resources. The program seeks to foster a workplace environment that increases both faculty effectiveness and gender equity. Visit [websites.usu.edu/advance](http://websites.usu.edu/advance).

## STUDENT SPACE RESEARCH TEAM HAS NEW NAME, NEW CHALLENGES

### 'GAS' TEAM NOW CALLED 'MRT'



MRT member Steve Berkley displays his papier-mâché model of the original Sputnik satellite.

A well-known student research team at USU – which is responsible for one of the university's well known bragging points – has taken on a new name, along with new challenges. Efforts by the **Get Away Special** or “GAS” team have led to USU sending more student-built experiments into space than any other university in the world. The interdisciplinary program, which fuses students’

diverse interests and talents into exciting team-building ventures, is now called the **Microgravity Research Team** or “MRT.”

As NASA's mission evolves and private space endeavors increase, so too is MRT exploring new opportunities in space and atmospheric research, says student team member **Steve Berkley**.

On MRT's agenda is the design and construction of “Little Nik” – USU's Sputnik CubeSat to commemorate the 50th anniversary of the first Sputnik space missions in 2007. Many alumni will recall that Sputnik 1, the first artificial satellite, was successfully launched into orbit by the former Soviet Union on October 4, 1957. Sputnik 2, carrying Laika the dog, was launched on November 3, 1957.

While Sputnik 1 was roughly the size of a basketball, Little Nik will fit into a box about the size of a softball.

“Our plan is for Little Nik to broadcast Sputnik's original signal, plus something about Utah State,” says Berkley.

MRT is also contributing to efforts to provide future lunar astronauts—NASA plans a four-astronaut moon landing in 2020—with the means to freely move about the moon's surface. Undergraduate **Vicki Ragsdale** says the team is investigating the use of magnetic energy to power future moon buggies. She adds that the lunar terrain poses significant challenges. “You've got to deal with dust on the moon,” she says.

In addition, the team continues working on microgravity research projects to be launched on NASA's K-Bird aircraft. The K-Bird is a specially outfitted C-9 military transport jet that dives from 30,000 to 20,000 feet in a controlled 25-second free fall to simulate weightlessness without leaving the earth's atmosphere. The plane has earned the moniker “Vomit Comet,” due to its potential impact on hapless passengers experiencing repeated shifts from minus-g to plus-g.

### STUDENT SPACE RESEARCH...

*Continues on page 30*

## CHRISTMAS IN JULY Aggies Share 'Out of this World' Holiday Cheer

Last December, it was beginning to look a lot like you-know-what with the usual lights, tinsel and ubiquitous candy canes adorning trees, storefronts and street corners. *Bah, humbug!* USU's Microgravity Research Team added some extraterrestrial pizzazz to a Salt Lake tannenbaum to share Aggie-infused holiday cheer with a statewide audience.

The team created an ornament for KSL-TV's Studio 5 Community Christmas Tree with a hint of space wonder. The decoration was constructed with parts from student-built experiments flown on past space shuttle missions.

The Aggie-blue globe, which sported the university's wordmark and an orbiting satellite, was featured on the Studio 5 television program and remained on the program's community Christmas tree, a focal point for Studio 5 viewers, during the holiday season. ■



MRT members, from left, Jeff Brady, Vicki Ragsdale and Steve Berkley borrow parts from an experiment flown on the space shuttle for their holiday ornament.



## ALUMNI HIGHLIGHTS



USU alum Steven Colson, right, with former mentor, William Moore, emeritus professor.

### Steven D. Colson Receives Chem's Alumni Achievement Award

Pondering a distinguished career of more than four decades, USU alum **Steven D. Colson's** advice to fledgling scientists expresses simple wisdom: Get up early, work hard, believe in yourself, study what you enjoy, try not to do anything stupid and expect divine intervention.

Colson is the recipient of the Department of Chemistry and Biochemistry's 2007 Alumni Achievement Award. He returned to campus April 17 to present the talk, *"Interactions Between Molecules, Photons and People,"* to students, faculty, staff, family and friends.

"USU had a tremendous impact on my life," says Colson, who, along with his wife, **Donna**, is currently serving a mission for the Church of Jesus Christ of Latter-day Saints in Atlanta. "What I've realized is that it was the impact of various individuals that made a difference. Without people, what I've accomplished would never have been possible."

Colson graduated from USU in 1963 with a bachelor's degree in chemistry. After earning a doctorate from Cal Tech and conducting postdoctoral research at the National Research Center in Ottawa, Canada, the Idaho native served on the faculty of Yale University for 21 years. He subsequently joined the Pacific Northwest Lab's W.R. Wiley Environmental Molecular Science Laboratory as associate director. The recipient of numerous research awards, Colson has published more than 130 articles in peer-reviewed journals.

Colson's first paper, which he authored with USU emeritus professor **William Moore**, was published in 1963. Colson ruefully recounted a day during his undergraduate career when he "blew up" Moore's lab in the old Widtsoe building. "I hope he has forgiven me," said Colson of Moore, who attended the April 17 lecture.

### Seismologist Robert "Bob" Smith Discusses Yellowstone Supervolcano

"Visit Yellowstone before it visits you," advises USU alum **Robert B. "Bob" Smith**, a professor of geology and geophysics at the University of Utah.

"Yellowstone National Park sits atop an immense active volcano – one of the largest and most active on earth," says Smith. "We don't know how close we are to the next super eruption."

A world renowned expert on the Yellowstone volcanic region, Smith returned to campus March 23 to present the talk, *"Shaking and Baking of the Yellowstone Hotspot."*

Smith, who earned bachelor's and master's degrees from Utah State in 1960 and 1965, respectively, has conducted research in the Yellowstone-Teton region for more than 40 years. He's the coordinating scientist of the Yellowstone Volcanic Observatory, where he directs the Yellowstone seismic and GPS network.

Smith serves as chair of the EarthScope Science and Education Committee and chair of the Advisory Committee of the Southern California Earthquake Center. He is senior author of the popular science book, *Windows into the Earth: The Geologic Story of Yellowstone and Grand Teton National Parks*, published in 2000 by Oxford University Press. ■



USU alum Bob Smith, center, with USU assistant professor Tony Lowry, a former student of Smith, left; and Geology Department Head John Shervais.



# USU NAMES NEW COLLEGE OF SCIENCE DEAN

## MARY HUBBARD ASSUMES NEW POST JULY 1

**M**ary S. Hubbard has been named the new dean of USU's College of Science. Her appointment was announced by USU Executive Vice President and Provost **Raymond Coward** February 21.

Hubbard, who is the second woman to lead the college – **Karen Morse**, now president of Western Washington University was first – assumes her new post July 1.

"We are very pleased to have Dr. Hubbard joining the administrative team of the university," says Coward. "She will bring a broad range of experiences in teaching, research, outreach and administration, along with a vibrant vision of excellence for the College of Science."

Hubbard said she looks forward to her new post and to becoming better acquainted with Cache Valley. "My family and I are excited about the opportunity to come to Logan and to join the Utah State University community," she says. "The faculty members of the College of Science have an impressive record of research and teaching accomplishments. I will be proud to work with this group as the College moves to even greater heights in research development and in the training of the next generation of young scientists. The enthusiasm and integrity of the leadership at USU provide the framework for a bright future. I am honored to be joining this wonderful team."

Hubbard previously served as professor and head of the Department of Geology at Kansas State University.

During her tenure at K-State, Hubbard contributed to two target programs of excellence at the university – the Center for the Understanding of Origins and the African Studies Center. Her expertise lies in the field of structural geology and tectonics, and she has completed field research in Senegal, New Zealand, France, Pakistan, Nepal, Norway and throughout the American West.

A native of the Chicago area, Hubbard earned a bachelor's degree



Mary S. Hubbard

in geology from the University of Colorado and completed her doctorate at the Massachusetts Institute of Technology.

Hubbard's appointment is the culmination of an exhaustive, nationwide search that began in August 2006. Coward enlisted a nine-member search and screening committee representing the college's students, faculty and staff to oversee and conduct the search process. Chaired by USU College of Natural Resources Dean **Nat B. Frazer**, the committee explored the applications of approximately 125 individuals nominated for the position.

"This has been a very thorough and comprehensive selection process," said Coward. "The university is very grateful to Dean Frazer and the committee members for their conscientious and dedicated efforts. Our final success in identifying this extraordinary scientist and academic leader is a direct result of the hard work of the search and screening committee."

Hubbard succeeds **Don Fiesinger**, who has served as dean of the college for nearly seven years. He announced his decision to step down from the post last summer.

Fiesinger was named interim dean in 2000, following the appointment of former dean **Jim MacMahon** as vice president for university advancement. Fiesinger was appointed dean in 2003. He returns to full-time teaching and research as a faculty member of the college's Department of Geology, which he joined in 1976 and for which he served as head for 18 years. ■



Hubbard gets acquainted with Physics Professor J.R. Dennison, right, and other faculty and staff at the College's spring brunch.



## FACULTY AWARDS AND RECOGNITION

### Biology

**Diane Alston** received the Award for Excellence in Integrated Pest Management at the 91st Entomological Society of America's Pacific Branch Meeting in Portland, Oregon, 25-28 March 2007.

**Mary Barkworth**, director of USU's Intermountain Herbarium, completed the second of two volumes of North American grasses. Volumes 24 and 25 of the *Flora of North America* series were published by Oxford University Press. The herbarium's Web site, "Fun Facts About Fungi," at <http://herbarium.usu.edu/fungi/FunFacts/factindx.htm> received the ClickSchooling Award. The Web site was designed by **Bob Fogel**.

**Joseph Li** was named College of Science Undergraduate Research Mentor of the Year.

USU's **Utah Plant Pest Diagnostic Laboratory** received the Extension Vice President's Award for Excellence – Team 2007. Lab team members include **Diane Alston, Kent Evans, Erin Hodgson, Julia Jenkins, Alan Roe** and **Marion Murray**.



From left, Intermountain Herbarium's Kathleen Capels, Sandy Long, Mary Barkworth, Laurel Anderton and Michael Piep proudly display published volumes cataloging North American grasses.

### Chemistry and Biochemistry

**Lisa Berreanu** was named to the editorial advisory board of *Inorganic Chemistry* (2007-2010).

**Scott Ensign** was named College of Science Faculty Advisor of the Year.

**Lance Seefeldt** was named College of Science Faculty Teacher of the Year.

### Mathematics and Statistics

**Piotr Kokoszka** was named College of Science Faculty Researcher of the Year.

### USU ADMINISTERS HACH SCIENTIFIC FOUNDATION SCHOLARSHIPS

Educating future generations of scientists includes educating future teachers who can foster youngsters' interest in science. This past year, the Colorado-based Hach Scientific Foundation provided funding to USU's Department of Chemistry and Biochemistry to administer two scholarships of \$6,000 per year, for up to six years, to students committed to becoming high school chemistry teachers.

USU's first Hach Scholarship recipient is **Nicole Brinck**, who transfers to campus this fall after completing studies at Utah's two-year Snow College.

The second scholarship will be awarded in 2008; the deadline for applications is March 17, 2008. For application information, contact **Geri Child** in USU's Chemistry and Biochemistry Department at 435-797-0544 or [gchild@cc.usu.edu](mailto:gchild@cc.usu.edu), or visit the application Web site at [www.chem.usu.edu/pages/Hach%20Scholarship.html](http://www.chem.usu.edu/pages/Hach%20Scholarship.html).

The foundation stipulates that USU can support two students at a time; additional scholarships will be awarded as the first recipients graduate.

The foundation also offers second career scholarships to professionals who wish to return to college to become high school chemistry teachers. For information, visit [www.hachscientificfoundation.org](http://www.hachscientificfoundation.org). ■

### ROSE BY ANY OTHER NAME USELESS

Taxonomic research requires development of tools that enable all researchers to identify plants using mutually understood and recognized names, says USU biologist **MARY BARKWORTH**. Collected data must be published under uniform names -- otherwise, the information is useless or misleading, says Barkworth, who heads the university's Intermountain Herbarium.

## GIVING BACK

### Wow! Thanks for Your Support

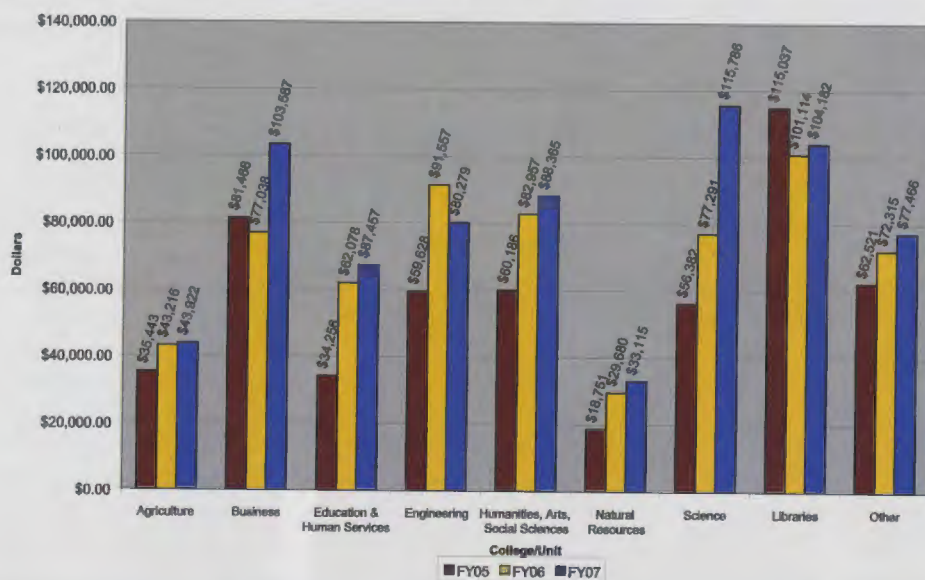
We are thrilled by the growing support we are receiving from our alumni and friends. Your support is a huge inspiration to our faculty who are heartened by the opportunities for students they could not otherwise offer. Thank you for your confidence in and support of the work being done here.

University campaigns are like earning a degree. Several years of concentrated effort, sacrifice, and a lot of inspiration result in

achievements that at times seemed out of reach. Earning a degree imbues a student with pride, knowledge and the opportunity for realizing their potential in the world of work and as citizens. A successful fundraising campaign results in the same outcomes for a university.

Thank you for your willingness to respond as Utah State and the College of Science set out to secure our future and achieve excellence.

**Annual Fund 3 Year Cash FYTD Comparison  
By College  
As of June 9, 2007**



**The College of Science  
Leads the Way in Annual  
Fund Giving**

### Heritage Society

Planned gifts are those made through your estate or a charitable trust. In addition to supporting educational opportunities, planned gifts may offer tax and income benefits to the donor. If you would like to discuss including Utah State in your estate or have questions about life income trusts, please contact Chris Tallackson at 435-797-3510. We welcome your inquiries about planned giving options.

The Heritage Society recognizes donors who have included Utah State in their estate or have arranged a charitable trust naming the College of Science as a beneficiary. We are very grateful for the gesture these donors have made.

Tom K.\* and Esther Archuleta  
Howard L. Blood\*  
Dr. Melvin C. Cannon\*  
J. Peter and Janet Chase  
Ralph P. Christenson\*  
Dr. John W. and Norda F. Emmett  
Keith W. and Beverly Fullmer  
Dr. Marguerite Greaves\*  
C.T. and Jo Ann K. Griffiths  
Ronney Dean and LuAnn Harris  
Wallace P. and Pauline Murdoch  
Robert Q., Jr. and Luella Oaks  
Dr. Grant M. Reeder\*  
Justus F. Seely\*  
Arthur VanVliet\*  
Dr. Jay R. and Lorraine M. West

\*Deceased



## UTAH STATE ANNOUNCES \$200 MILLION CAMPAIGN



In an historic step for Utah State University, **President Stan Albrecht** recently announced the public phase of a \$200 million fundraising campaign. The university has already secured more than \$109 million during the campaign's quiet phase, with the remainder to be raised by December 31, 2010.

"We are not asking people to help us launch a campaign, we are asking them to help us build a greater university," said President Albrecht. "We are taking a bold and important step on the path toward building a university of excellence and distinction."

The College of Science is committed to raising \$10 million during the campaign to secure our tradition of excellence at the most critical levels: learning and teaching. These resources will enable us to attract and retain the talented students and faculty, the heart and soul of a university. Our vision is to distinguish Utah State University on the basis of our academic strengths, making USU the university of choice for students and faculty seeking a top quality academic community.

As builders of our tradition, we hope you value the academic training and inspiration you received at Utah State and urge you to support our campaign effort. All contributions large and small are meaningful to this effort. Your partnership is the key to our success and brighter futures for our students.

"When students and faculty learn together...discovery follows"

You may also view information about the campaign on the web at [www.usu.edu/campaign/colleges/college\\_of\\_science.cfm](http://www.usu.edu/campaign/colleges/college_of_science.cfm)

*The College of Science welcomes your questions about giving to enhance our programs. Please don't hesitate to give me a call at 435-797-3510 or drop me a line at [chris.tallackson@usu.edu](mailto:chris.tallackson@usu.edu).*



*Best regards,*

*Chris Tallackson  
Development Director*

### Did You Know?

**What's the largest source of private support to the College of Science?**

- a) Foundations
- b) Corporations
- c) Alumni contributions

**The answer is c. More than 50 percent of private funding for the college comes from alumni and other individuals.**

***Please let us know if you plan to be in Logan or if you plan to attend any of these university events. We welcome opportunities to visit with you.***

#### **National Campaign Roll-Out Events with President Stan Albrecht**

Portland, OR – July 24  
Seattle, WA – July 25  
Denver, CO – August 7  
Chicago, IL – August 8  
Washington, DC – September 18  
New York, NY – September 19

#### **Logan Campus Events**

Homecoming – September 22

Aggie Parent and Family  
Weekend – October 12-14

Aggie Family Day – October 13

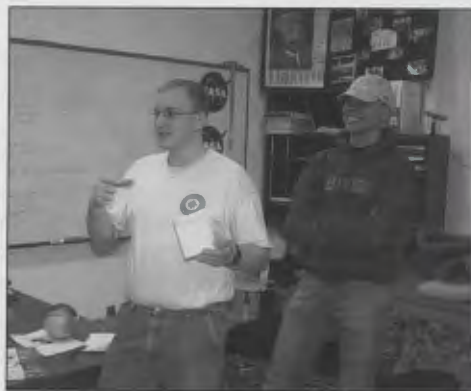
Old Main Weekend – October 19-20

For more information about these events or supporting our campaign effort, please contact Chris Tallackson, Development Director, at 435-797-3510, or via email at [chris.tallackson@usu.edu](mailto:chris.tallackson@usu.edu).

## STUDENT SPACE RESEARCH...

Continued from page 24

The GAS team was first organized at Utah State in October 1976. Former USU professor **R. Gilbert Moore**, then a Morton executive, attended conference where NASA administrators announced the development of a new opportunity for space research aboard the newly designed space shuttle. Moore stood up in the middle of the presenter's speech and wrote a check from his own money for the first Get Away Special (GAS) payload reservation. He donated it to USU, initiating the GAS program.



Computer science undergrad Joshua Jones (left) describes a paper model of MRT's proposed Sputnik CubeSat picosatellite as team member Colin White looks on.

The USU team launched the first GAS experiment in the world in 1982. G-001, as the experiment was named, flew on the Space Shuttle Columbia. Aggies have sent 11 payloads into space and their popular "space popcorn" experiment has helped thousands of K-12 students get involved in space research.

Utah State's renowned expertise in space research, along with the university's Space Dynamics Laboratory, has earned USU the nickname, "Utah Space University." According to the most recent National Science Foundation rankings, USU leads the nation in university space research funding, besting such prestigious research institutions as the Johns Hopkins University and the Massachusetts Institute of Technology. ■

### HIGH TECH DECISION-MAKING

The best laid plans can go awry when catastrophe strikes. USU computer scientist **SUPRATIK MUKHOPADHYAY** is leveraging the power of adaptive, situation-aware and secure service-based, or "AS3" systems, to improve public safety response to varied disasters. Automated decision-making can ensure accurate, timely response and thus save lives. Mukhopadhyay, assistant professor in the Computer Science Department, is collaborating with researchers at Arizona State University on development of AS3 systems for emergency response.

## TRANSITIONS

### RETIRING FACULTY

Peter T. Kolesar, Geology



When Professor Pete Kolesar, right, threatened to skip his own retirement party, resourceful colleagues created a life-size cardboard cutout in his likeness. Kolesar's wife, Mary V., left, received her own copy.

### 45 YEARS OF SERVICE

Lawrence O. Cannon, Mathematics & Statistics

### 35 YEARS OF SERVICE

E. Robert Heal, Mathematics & Statistics  
James A. MacMahon, Biology

### 30 YEARS OF SERVICE

Donald W. Fiesinger, Dean's Office and Geology  
Robert W. Schunk, Physics

### 25 YEARS OF SERVICE

Leroy B. Beasley, Mathematics & Statistics  
W. David Liddell, Geology

### PROMOTION

Piotr S. Kokoszka, Professor, Mathematics & Statistics  
Tsung-Cheng Shen, Professor, Physics

### TENURE AND PROMOTION

Michael E. Pfrender, Associate Professor, Biology

### EVOLUTION NOT ALWAYS ADVANCEMENT

Many wrongly assume that evolution implies progression toward something better, says USU biologist **PAUL WOLF**. Evolution by natural selection is a mechanical process, he says, that simply favors organisms better suited to a particular environment at a particular time. Evolution does not predict the future, Wolf says.



## KEEPING IN TOUCH

### 1950s

**De Lamar Gibbons, MD** (BS 1956, Chemistry), Blanding, Utah, earned an MD degree from The George Washington University School of Medicine in 1959 and practiced medicine in Blanding for most of his professional career. Prior to his retirement, he served as director of clinical research for *The Saturday Evening Post*. Dr. Gibbons is the author of a number of books, including *Their Secrets: Why Navaho Indians Never Get Cancer* and *The Self-Help Way to Treat Colitis and Other IBS Conditions*.

### 1960s

**Ronald Fayer** (MS 1964, PhD 1968, Zoology), Ellicott City, Maryland, was presented with the Presidential Rank Award for Distinguished Senior Professional by President George W. Bush. Fayer, who earned his graduate degrees under the direction of the late Datus Hammond, has been conducting research on parasitic diseases for the USDA Agricultural Research Service for the past 39 years.



Ronald Fayer

**Joseph C. Maheras, MD** (MS 1965, Chemistry), Billings, Montana, is an internist with St. Vincent HealthCare. His current area of specialty is sleep medicine.

**Gordon D. Waller** (MS 1967; PhD 1973, Entomology), Augusta, Wisconsin, is employed as a research entomologist with the U.S. Department of Agriculture. In 2002, he traveled as an agribusiness volunteer to Ukraine with the Citizens Network for Foreign Affairs.

**John H. Woffinden, PG** (BS 1969, Geology), American Fork, Utah, retired from the U.S. Air Force with the rank of Master Sergeant in January 2005. He retired from the Department of Defense at Dugway Proving Ground, Utah, in April 2006. He is currently employed as soils lab supervisor for Horrocks Engineering.

### 1970s

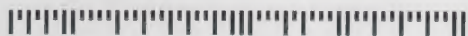
**Susan G. Kelley, MD** (BS 1970, MS 1972, Bacteriology), Ogden, Utah, closed her private medical practice in fall 2006 to return to teaching. She is a professor of clinical medicine at the Medical University of the Americas in Nevis, West Indies. Kelley earned a PhD from Texas Woman's University and an MD from Saba University School of Medicine in the Netherlands Antilles. She co-authored two books, *Basic Microbiology Techniques* and *Microbiology Techniques* with the late **Frederick J. Post**, former USU professor.

### 1980s

**Colonel Sven T. Berg** (BS 1983, Chemistry), Spring, Texas, serves as Chief of the Medical Staff with the U.S. Air Force 59th Medical Operations Group. Sven earned an M.D. from Cornell University Medical College in 1987 and a master's degree in public health-health services administration from the Uniformed Services University of the Health Sciences in 2003.

### 2000s

**Joe Jacobs** (MS 2005, Geology), Houston, Texas, is a petroleum geologist with Anadarko Petroleum Corporation.



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**Insights** is the alumni newsletter of Utah State University's College of Science. Our mission is to inform alumni and friends of current events, research and news within the college. The newsletter also provides a forum for alumni to follow the careers and professional development of their colleagues.

This issue of **Insights** was written and edited by Mary-Ann Muffoletto, college writer; with special thanks to Dean Don Fiesinger, Associate Dean Richard Mueller and Associate Dean Lisa Berreau. Photography by Donna Barry, Mary-Ann Muffoletto and Richard Mueller. Design by Megan Hemmert. Printed at USU Publication Design and Production. © 2007

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