



## MacMahon's Musings

I think that spring must be close at hand. The snowdrops are blooming in our yard, the students are on their spring break, you can walk across campus without a coat, and I am interviewing our graduating seniors to see how they feel about their experience at Utah State now that they are about to enter a new phase of their lives.



Dean Jim MacMahon

The response of the students is really quite encouraging. Most say that if they had it to do all over they would choose USU again. They generally like their teachers, although there are always a few complaints. They enjoyed the student-friendly atmosphere at USU and understood that we really care about their current achievements and their futures. This is quite heartening since many schools across the United States are experiencing a decline in the students' positive feeling about their education. We have always prided ourselves on our open and caring relations with our students. A few years back when we queried some of our graduates from the 1970s, 80s, and 90s about their continued satisfaction with their education at USU, more than 94% were still pleased. The exit interviews that I conduct with seniors suggest that this has not changed. My own hope, and that of all of our faculty and staff, is that this percentage will increase the next time we do such a study.

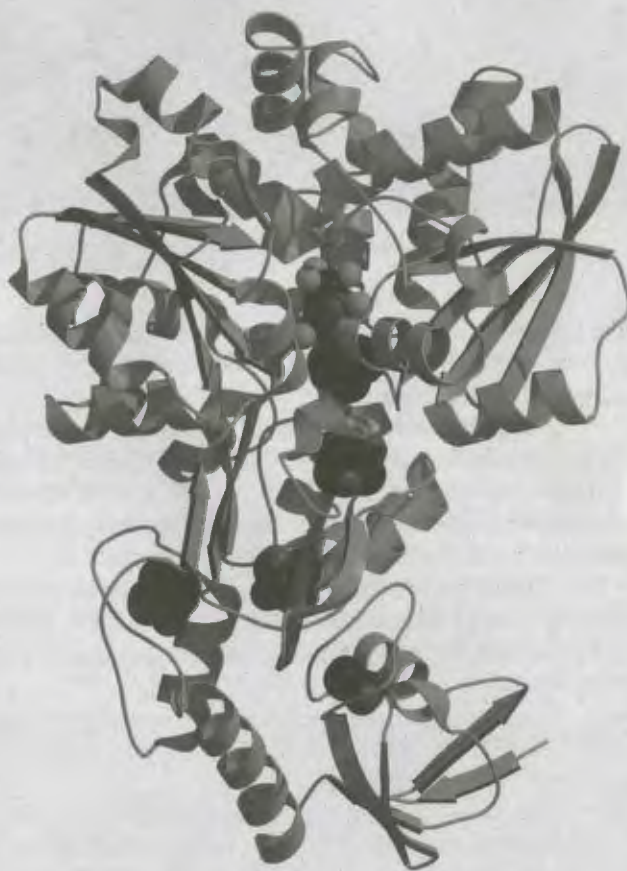
I have mentioned to you before that graduation is a special time on campus. During graduation week you can see all the seniors scrubbed and smiling. Their

MUSINGS...

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## Biochemists Determine Enzyme's Structure

Ground-breaking research on the structure of a hydrogenase, an extremely important biological enzyme that catalyzes the production of hydrogen gas from protons and electrons (and also the breakdown of hydrogen into protons and electrons), was reported recently in the journal *Science* by Drs. John Peters and Lance Seefeldt, Department of Chemistry and Biochemistry, and graduate students William Lanzilotta and Brian Lemon. This research provides new and unexpected findings on the enzyme's structure, solving a structural mystery that had existed since



Hydrogenase enzyme, showing five clusters of iron and sulfur atoms.

discovery of the enzyme in the 1930s, and it provides a new basis for investigation of the enzyme's mechanism of action. Also, because hydrogen is used throughout the chemical industry and is much discussed as a potential fuel source, the research has important potential industrial implications. The research was funded primarily by the National Science Foundation and also by the American Chemical Society-Petroleum Research Fund.

The biochemists investigated, using X-ray crystallography, an iron-rich hydrogenase from the hydrogen-producing, anaerobic soil bacterium *Clostridium pasteurianum*. They discovered that the enzyme's iron and sulfur atoms form five distinct clusters. Four of the clusters are similar to those found in other metal-containing enzymes. However, the fifth cluster—the one considered to be the probable site of catalytic activity, i.e., the H (hydrogen) cluster—has a structure that is unique, unexpected, and markedly

ENZYMES

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## ENZYMES

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John Peters and Lance Seefeldt, Department of Chemistry and Biochemistry

different from previously observed biological metal clusters and proposed clusters.

The H cluster has an unexpected arrangement of six iron atoms existing as a  $\text{Fe}_4\text{S}_4$  cubane subcluster covalently bridged by a cysteinyl thiol to a  $\text{Fe}_2$  subcluster. The iron atoms of the  $\text{Fe}_2$  subcluster both exist with an octahedral coordination geometry and are bridged to each other by three non-protein atoms, assigned as two sulfide atoms and one carbonyl or cyanide molecule. Drs. Peters and Seefeldt depict the enzyme's overall structure as a mushroom, with the active-site H cluster in the mushroom's cap and the four remaining clusters in the stem (see illustration). Hydrogen is produced by the transfer of electrons from iron-sulfur clusters in the stem to the active-site cluster in the cap and the reaction of those electrons with protons.

With knowledge of the enzyme's structure, a mechanism for its production of hydrogen was hypothesized. However, the biochemists caution

that knowing the structure enables them to propose only a plausible mechanism, with no guarantee of accuracy. They believe that the real importance of their structural research is that it provides a basis from which to design experiments to probe the enzyme's mechanism.

In a commentary accompanying the research article, Michael W. W. Adams (University of Georgia) and Edward J. Stiefel (Exxon Research and Engineering Company) state, "The rapid evolution of hydrogen catalyzed by hydrogenase, over  $10^6$  turnovers per second per site at  $30^\circ\text{C}$  for the clostridial enzyme, is a capability that remains the envy of catalytic chemists, who wonder whether the mechanisms underlying nature's hydrogen metabolism, now known with greater definition, can be mimicked and exploited in chemical systems."

The biochemical research conducted today by Drs. Peters and Seefeldt and their students may lead one day to the development of inexpensive and stable catalysts for use in hydrogen production in an industrial setting. In addition, since hydrogen is a clean-burning and renewable fuel, their research could ultimately contribute to a cleaner environment for everyone. ♦

## MUSINGS

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parents are beaming with justified pride. It is a great time to visit us and enjoy the electricity of a campus as vital as ours. If you can come, why not visit this year? The College will have an open house for our seniors, their parents, and loved ones. You could join us for the food, fellowship, and music. That event will be on Friday 7 May from 3:30 - 5:00. Graduation will be on Saturday morning and the College of Science ceremonies will be at noon in the Taggart Student Center. Wouldn't it be fun to join us? If you decide to come, drop me a note so I am sure to meet you.

I hope that all of you will have a pleasant spring and be able to find some time to enjoy personal pursuits during the summer. I want to thank you for your support, moral and financial, throughout the last year. Your continued interest in the College is important to the faculty and especially to me.

Sincerely,

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# Departmental Scholarships: Enhancing the Student Experience

*(Editor's Note: In the last issue of Insights we provided information on scholarships in support of science students and highlighted those general scholarships administered by the Dean's Office. In this issue of Insights we devote space to those privately funded scholarships benefiting students exclusively in the Departments of Biology and Computer Science. The next issue of Insights will highlight scholarships in the Departments of Chemistry & Biochemistry and Geology.)*

Like all departments in the College of Science, the Departments of Biology and Computer Science are constantly reminded of the role that private financial support for scholarships plays in helping to improve the educational experiences of our students. A select few students in these departments are particularly fortunate to be the beneficiaries of contributions given to create new or enhance existing scholarships.

With two semesters of tuition and fees at Utah State University amounting to \$2,245, the scholarship needs of science students have never been greater. Only a very small fraction of deserving students in science receives scholarship assistance while attending the university. In short, more qualified students are seeking scholarship assistance than there are scholarships to award. Given the learning benefits of maximizing research time in labs and conducting field-work, our students have difficulty finding jobs during the school year that allow them the time to participate fully in these learning opportunities. As a result, science students benefit greatly from gifts designated for scholarship support.

**"There is perhaps no better way to provide assistance to students in our department than to urge the creation of additional privately funded scholarships."**

— Biology Department Head, Dr. Edmund D. Brodie, Jr.

In 1998 - 1999, 11 privately funded scholarships in the Departments of Biology and Computer Science provided needed scholarship awards to selected students. In particular, there are seven scholarship endowments and four outright scholarships that faculty, alumni, and friends have donated to support students in these two departments. The seven scholarship endowments expend only a percentage of their annual earnings to provide ongoing scholarship support, while the remaining earnings are plowed back into the fund as a hedge against the effect of inflation on the purchasing power of the fund over time. In contrast, outright donor gifts must be received annually in order to provide scholarship awards year after year.

## Department of Biology

"There is perhaps no better way to provide assistance to students in our department than to urge the creation of additional privately funded scholarships," says Dr. Edmund D. Brodie, Jr., department head in biology, and he should know. The Department of Biology has more than 900 students in it, making it the single largest department on campus, larger than three of the university's colleges put together. Given the number of students, the need for additional scholarship support for biology students is quite pronounced. The seven scholarships benefiting biology students are highlighted below.

The **Department of Biology Scholarships** are funded entirely through the generosity of alumni, faculty, and friends who earmark their annual donations for biology scholarships. The scholarships are awarded annually and assist outstanding majors in any field of biology. *The current Department of Biology Scholars are seniors Melany J. Dye and Justin Jacobson, carrying a 3.903 and 3.882 GPA, respectively.*

**"I am grateful that people were willing to invest in me as a student in such a meaningful way."**

— Senior Biology Student, Seth Spanos

The **Thomas L. Bahler Endowed Scholarship** was established in recognition of Dr. Thomas Bahler's dedication and support to students in the Department of Biology. The endowment, made possible by gifts from alumni, friends, and others, provides from one to four scholarships annually to students in biology who are preparing for medical school. *The 1998 - 1999 Bahler Scholars are Tyler L. Christensen, a junior with a 3.989 GPA; Tom B. Sanders, a senior holding a 3.854 GPA; Seth A. Spanos, a senior carrying a 3.948 GPA; and Belinda Trieu, a senior with a 3.965 GPA.*

"The funding I received this year from the Bahler Scholarship has allowed me to concentrate more time on my studies, both in the classroom and in the lab, which I would not be able to do if I had to rely on work during school to pay for my education. I am grateful that people were willing to invest in me as a student in such a meaningful way," says Bahler Scholar Seth Spanos.

**SCHOLARSHIPS**  
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**SCHOLARSHIPS***Continued from page 3*

The Christenson Memorial Scholarship Endowment for Undergraduate Studies assists senior biology students focusing their studies in entomology and zoology. The endowment was originally established by the friends and family of L. Dean Christenson and makes available from one to three annual scholarships. *The current Christenson Scholars are Melanie Eaton, carrying a 3.913 GPA; Phillip M. Stevens, with a 3.956 GPA; and Matthew B. Thomas, holding a 3.910 GPA.*

The Eldon J. Gardner Endowed Undergraduate Research Award in Genetics is one of two new endowments providing scholarship assistance to selected biology students. The endowment posthumously honors Dr. Eldon Gardner (BS 1935, MS 1936), former professor and Dean of both Graduate Studies and the College of Science at USU, and was given by his spouse, Helen R. Gardner. The endowment's inaugural awards were given for the 1998 - 1999 academic year and provide assistance to as many as three students working on genetic research projects with the help of senior faculty members. *The inaugural Gardner Scholars are senior Justin Jacobsen, who has a 3.882 GPA; Tyson Georgi, a junior holding a 3.814 GPA; and Heather Maughan, a junior with a 3.210 GPA.*

The Datus M. Hammond Memorial Scholarship Endowment perpetuates the memory of former department head, Dr. Datus Hammond. The endowment generates an annual scholarship benefiting selected biology graduate students. The award is given based on scholastic achievement, character, and professional promise. *The current Hammond Scholar is Jeremy D. Roberts, a senior with a 3.871 GPA.*

**"I can think of no more meaningful way to invest in the young people of this country than to make gifts designated to provide scholarship support for their personal and educational dreams while at USU."**

— Professor Emeritus, Dr. Richard J. Shaw, Department of Biology

The Richard J. and Marion A. Shaw Endowed Scholarship provides assistance to biology students pursuing an emphasis in plant biology and demonstrating high academic achievement, superior potential, and personal integrity. Established by Dr. Shaw (BS 1948, MS 1950, and emeritus professor) and Mrs. Shaw, the endowment provides scholarship support to one student annually. *The 1998 - 1999 Shaw Scholar is David J. Mortensen, a junior holding a 3.566 GPA.*

Remarking on why he thought it important to create the Shaw Scholarship Endowment, emeritus professor and alumnus Dr. Richard J. Shaw offered, "I can think of no more meaningful way to invest in the young people of this country

than to make gifts designated to provide scholarship support for their personal and educational dreams while at USU."

The John R. Simmons Endowed Scholarship is the second of two new scholarship endowments benefiting selected biology students and is offered in the name of alumnus and former department head, Dr. John Simmons (BS 1955, MS 1957). Recently established by Dr. and Mrs. Simmons (BS 1952), the endowment will provide an annual scholarship to a junior or senior demonstrating financial need, exhibiting personal integrity, and having a minimum GPA of 3.25. The inaugural Simmons Scholar will be selected for the coming academic year.

**"One of our goals in the department is to increase the number of scholarships available to our majors."**

— Computer Science Department Head, Dr. Donald Cooley

Department of Computer Science

Though computer science degrees have been awarded to science students at Utah State since 1967, it has been designated a department of the College of Science only since 1983. "One of our goals in the department is to increase the number of scholarships available to our majors," says Department Head Don Cooley. "In fact, scholarships are deemed so critical by our faculty, that since 1996, every one of us has made personal contributions to fund a scholarship designed to recruit incoming freshman students interested in pursuing a degree in computer science."

The four privately funded scholarships benefiting computer science students are cited below.

The Computer Science Department Scholarship is a new scholarship funded by donations from the faculty of the Computer Science Department. In conjunction with participation at the department's Computer Science Camp, an outstanding incoming freshman interested in studying computer science at USU is given the opportunity to enroll at the university with the help of this scholarship. The scholarship is activated following enrollment and one year of course work in computer science.

The Wendell L. Pope Endowed Scholarship provides annual scholarship support to a computer science student in advanced standing in the department and showing promise in the field. This endowment was established by Professor Pope (BS 1956) who is recognized for, among other things, helping to develop and establish a bachelor's degree in computer science at USU. *The 1998 - 1999 Wendell L. Pope Computer Science Scholar is James Thompson, a graduating senior holding a 3.778 GPA.*



The Idaho National Engineering and Environmental Laboratory (INEEL) Scholarships provide a generous annual award, equivalent to resident tuition and fees for three years plus salaried summer internships, to two outstanding freshman computer science students. Funds for these comprehensive scholarships are provided annually by Lockheed Martin Corporation, which is affiliated with INEEL. The 1998 - 1999 INEEL Scholars are Uyen Tu Chau, who has a perfect 4.0 GPA, and Scott Hanson, who carries a 3.243 GPA.

**"The Scholarships I have received while a student have afforded me the opportunity to focus my time on my studies without being consumed with working or relying on loans to gain an education."**

— Senior Computer Science Student, Carli Connally

The First Security Foundation Scholarships provide generous funds sufficient to award up to two annual scholarships to outstanding undergraduate computer science majors. The Foundation initiated these scholarships for award during the 1998 - 1999 school year with an outright gift equivalent to resident tuition and fees for one year. The inaugural First Security Foundation Computer Science Scholars are Richard M. Lambert, a sophomore holding a 3.905 GPA, and Carli Connally, a graduating senior with a 3.927 GPA.

"My success as a student is due to many things, but one thing that cannot be overlooked is the role that scholarship assistance has played. The scholarships I have received while a student have afforded me the opportunity to focus my time on my studies without being consumed with working or relying on loans to gain an education," says Carli Connally, a graduating senior and recipient of a First Security Foundation Scholarship.

As demonstrated by the recipients of these 11 departmental scholarships, students in the Departments of Biology and Computer Science are of outstanding caliber. There is currently no greater need within these departments or the college as a whole than attracting additional scholarship support for the many deserving students pursuing degrees in science.

Gifts to establish or further enhance scholarship opportunities for biology, computer science, and other students will help the College of Science provide the kind of support that these students both need and deserve. To learn more about how you might be able to make a difference in the lives of science students, simply contact Jerome Davies at [jeromed@cc.usu.edu](mailto:jeromed@cc.usu.edu) or (435) 797-3510 or use the enclosed postage-paid envelope found in this section of Insights. ♦

## In Memoriam: Dr. Jack E. Chatelain



Dr. Jack Ellis Chatelain, emeritus professor in the Department of Physics, died on 26 January 1999 after a long illness. Born in Ogden, Utah, on 17 July 1922, he was 76.

Dr. Chatelain was an active member of the USU Department of Physics from 1957 until his retirement in 1987. However, his association with USU began even earlier—he obtained a BS degree from USU in 1947 and an MS degree in

1948. After doing graduate work at the University of California at Berkeley, teaching physics and photography at the University of Wyoming, and working at White Sands Missile Range in New Mexico, he earned a PhD degree in theoretical physics at Lehigh University in 1957.

When Dr. Chatelain arrived at USU as an assistant professor in 1957, the department was still located in Widtsoe Hall and had only three other members. Since he was the only theoretical physicist in the department, his role was to teach theoretical physics. He loved teaching, and he will long be remembered by his students for his unique methods of illustrating complex phenomena with everyday, more familiar objects for analogy.

During Dr. Chatelain's career, he supervised numerous graduate students, including eight PhD students. The research conducted by him and his students dealt with fundamental processes of elementary particles and forces. In addition to his work at USU, he spent many summers involved in theoretical research on various topics at major national facilities such as EG&G in Las Vegas, Nevada; the National Reactor Testing Station at Arco, Idaho; and government-funded labs in Albuquerque, New Mexico.

Dr. Chatelain had many pursuits outside of physics. His interests included geology, paleontology, astronomy, botany, spelunking, mathematics, medicine, classical music, opera, and gardening (particularly orchids). He especially enjoyed spending time with his family and students in the outdoors. In fact, his students often complained about failing to complete assignments because of time spent mountain-climbing, hunting, fishing, and river-rafting with Dr. Chatelain. His many interests inspired the careers of his three children, all of whom earned BS degrees and two of whom earned MS degrees from USU.

Dr. Chatelain retired from USU in 1987 to travel, grow orchids, and spend time with his family. He and his wife

**MEMORIAM**  
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## Alumni Achievement Award Presented to Dr. Steven Aust

An Alumni Achievement Award from Washington State University was presented recently to Dr. Steven D. Aust, a member of the Department of Chemistry and Biochemistry and the interdepartmental Graduate Program in Toxicology. Dr. Aust was cited for "a distinguished career in research, education and the preservation of the environment in the science of toxicology."

Dr. Aust received a BS degree in agriculture in 1960 and an MS degree in nutrition in 1962, both at Washington State University. He earned a PhD degree in dairy science from the University of Illinois in 1965, and was a postdoctoral fellow in toxicology at the Karolinska Institute in Stockholm, Sweden. Dr. Aust was at Michigan State University in the Department of Biochemistry during 1967 - 1987, and he also held positions as associate director of the Environmental Toxicology Center and director of the Center for the Study of Active Oxygen in Biology and Medicine. Dr. Aust came to USU in 1987 and served as director of the Center of Excellence in Biotechnology during 1987 - 1991.

Currently, Dr. Aust serves on the Advisory Committee on the Toxicology Information Program of the National Academy of Science-National Research Council, the External Advisory Committee of the Dartmouth Superfund Program, and the Advisory Panel for the Metabolic Biochemistry Program of the National Science Foundation. He was named a Fellow in the Academy of Toxicology Sciences in 1992 and in The Oxygen Society in 1994. Dr. Aust has been an author on 307 scientific publications and has trained 28 PhD students, 14 MS students, and 17 postdoctoral fellows.

One of Dr. Aust's main research interests is biodegradation of environmental pollutants. Currently, he and his students are conducting research on the use of white-rot fungi for remediation of explosives and for degrading synthetic polymers such as those found in disposable diapers. Dr. Aust is founder of Intech One-Eighty Corporation, the exclusive licensee of USU white-rot fungi toxic organic chemicals bioremediation technology. He says that he hopes "to build a technology for cleaning up all kinds of environmental pollution problems, everything from contaminated soil to contaminated water to contaminated air." The white-rot fungi technology has been described as "biological fire" because of its effectiveness in biodegradation. However, Dr. Aust describes the process as very safe and very clean.

Another area of research interest is the role of iron in various pathologies. It has been hypothesized that the accumulation of iron in the body may be related to many diseases, including heart disease, cancer, diabetes, Alzheimer's disease, and Parkinson's disease. However, there are many unknowns in regard to even normal handling



of iron in the body. Cellular and molecular work in Dr. Aust's laboratory is aimed at understanding how iron is stored in the protein ferritin in cells and how excess iron can be safely removed.

Another interesting research project is the identification of free radicals in sonicated irrigating solutions used during cataract surgery. The ultrasound used in cataract surgery results in the generation of oxygen radicals that can be damaging to the cells of the eye. So Dr. Aust and his students are hoping to develop an anaerobic irrigating solution for use in surgery that would result in the elimination of oxygen radicals and thereby make cataract surgery safer and less damaging.

During his career, Dr. Aust has received more than 10 million dollars in grant funding from various companies and government agencies and has worked on the development and/or improvement of technology in many fields. He has the sincere desire "to get all this technology out there and get it applied" before he retires. ♦



**WE ARE  
NOW ON  
THE WEB!**

This issue and all past issues of *Insights* (along with other information of interest to alumni, friends, and donors of the College of Science) can now be viewed on the Web at:

<http://www.usu.edu/~science/alumni&friends/Insights>



# Drilling Into Geological Fault Zones

Geologically, fault zones are surfaces in the earth along which slippage has occurred, and they exist throughout all rocks. The problem of faults in regard to oil, natural gas, or groundwater exploration is that faults can act as either barriers to or collectors of fluids and gases located within the earth. Thus the properties of fault zones are of extreme interest to anyone wanting to drill into the earth and successfully remove oil, natural gas, or groundwater. According to Dr. James Evans, Department of Geology, faults play "a very big factor" in how much oil or gas a particular region can produce, and as

reserves decline, knowing about the fault and its properties becomes more and more important.

Faults are recognized in the subsurface by offsets in a certain type of signal sent into the earth, termed a seismic reflection. The problem is that these signals have a limit of resolution of about 8 meters, and even 8 meters of slippage on a fault can be important because it can continue on for kilometers and have a large impact on fluid flow in rocks. Recent research conducted by Dr. Evans and other investigators involves drilling into fault zones to better understand and even predict their geophysical properties.

Dr. Evans and Dr. Thomas Lachmar in the USU Department of Geology, Dr. Kevin Hestir in the USU Department of Mathematics and Statistics, Dr. Craig Forster of the University of Utah, Dr. Patience Cowie and graduate student Zoë Shipton of the University of Edinburgh, and several USU graduate and undergraduate students, including Bill Schied and the late Kim Robeson, worked during July and September of 1998 at a fault in the San Rafael Swell in south central Utah. With funding from the US Department of Energy, seven oil companies, and the USU Office of the Vice President for Research, the researchers drilled a total of five holes, approximately 60-90 meters (200-300 feet) deep, at two locations along the fault. Then they ran geophysical probes down the holes to investigate the "signature" of the rock, i.e., the various properties of the surrounding rock that give information about where the fault is and what fault properties are in regions that are difficult to sample directly. In addition, they measured the actual permeabilities of rock in the fault zone and are studying these in relation to rock signatures in order to be able to predict permeability properties from the signatures. The researchers are currently "furiously working on the data," says Dr. Evans.

Dr. Evans also is one of several investigators in a proposed project to study the San Andreas fault in California in an effort to understand the earthquake process. Using oil-based drilling technology similar to that used in the San Rafael Swell project, a hole will be drilled so that it intersects the San Andreas fault zone at about 4 kilometers deep, the depth where earthquakes start to form. From that master hole, lateral holes will be drilled across the entire fault zone, resulting in about 1000 meters of core (compared with about 400 meters of core in the San Rafael Swell project). The scientific rationale for the project is to provide direct observational data on the composition, physical state, and mechanical behavior of a major active fault zone at depth, with implications for monitoring and even reducing the hazards of earthquakes. ♦



*Rig for drilling into fault zone, in an arroyo in the San Rafael Swell.*



*Fault zone (center of photo) in deposit of Navajo Sandstone. Small white card is about 15 cm long.*



# New Program Encourages Minorities, Women

The underrepresentation of minorities and women in mathematics, engineering, and science is a serious problem at the high school, college, and professional levels in Utah and throughout the country. Utah



MESA/STEP (Mathematics, Engineering, Science Achievement/Science, Technology, Engineering Programs) aims to be part of the solution to that problem. Utah MESA/STEP is a statewide consortium of people in public and

higher education working with local industry to actively increase the number of underrepresented minorities and women who enter and succeed in mathematics, engineering, and science.

MESA is the pre-college component of the program. Its goals are (1) to incorporate into the educational system enrichment and counseling activities that prepare participants for engineering, science, and other math-based careers; (2) to promote career awareness so that participating students can learn of opportunities in math- and science-related professions early enough to prepare for them; and (3) to encourage students to acquire the academic and social skills they need to major in math, engineering, or science in college.

STEP is the higher-education component of the program, and its current members include Utah State University, University of Utah, Weber State University, and Salt Lake Community College. The goals of STEP are (1) to increase the number of underrepresented minority and women students majoring in engineering, science, or other math-based fields; (2) to increase retention, progression, and graduation rates of these students; and (3) to provide an atmosphere that fosters academic excellence in college. USU joined Utah STEP in fall 1998. Also, as part of the statewide STEP organization, several industries hold workshops for underrepresented minority groups and women to enable them to improve their skills in getting and retaining a job.

The Expanding Your Horizons program, which encourages young women to pursue careers in science, has been discontinued at USU, and efforts are now being directed toward USU STEP, which encourages both women and minorities in science.

Currently, USU STEP provides tutoring for three students attending USU on MESA scholarships. Sue Morgan, USU STEP director and lecturer in the Department of Geology, sees "lots of potential" for USU STEP. She envisions a program where faculty and upper-level minority and female

students will mentor minority and female lower-level students, particularly freshmen, with the goal of increasing retention in the university in general, and science classes, in particular.

In regard to MESA and the Hispanic population in Cache Valley, Ms. Morgan would "like to help track these students through their education, encourage them, let them know what their opportunities are, and try to get them, of course, to come to Utah State." Other potential projects include after-school tutoring programs and a bridge program whereby junior or senior high school students would take classes on campus in the summer and be introduced to the university.

USU STEP is funded by the College of Science, College of Engineering, Multicultural Student Services, and the Office of the Provost. Ms. Morgan is currently working to obtain additional funding from the state legislature and other sources.

With increased participation and funding, USU STEP, as part of Utah MESA/STEP, has the potential to significantly increase both the number and the success of underrepresented minorities and women in math, engineering, and other sciences. ♦

## 1999 USU Calendar of Events

Senior Send-Off .....	21 April
College of Science Awards Program .....	23 April
Aggie Day .....	30 April
♦	
University Hooding Ceremony .....	7 May
College of Science Graduation Open House .....	7 May
College of Science Graduation .....	8 May
Alumni Travel to Santa Fe, Southwest Museum Tour .....	14-16 May
♦	
Aggie Lagoon Day .....	15 July
Class Reunion: 1949 .....	16-18 July
♦	
Hogle Zoo Day .....	7 August
♦	
Aggie Family Day .....	11 September
♦	
Homecoming Golf Tournament .....	8 October
Homecoming .....	9 October



## MEMORIAM

*Continued from page 5*

traveled to California and Florida several times each year to collect orchids for breeding and propagation, and he built and maintained three greenhouses. They also visited Alaska, Hawaii, the Caribbean, and Europe. At the time of his death, he was in the process of compiling his class notes to write a physics textbook.

Dr. Chatelain is survived by his wife, LaRae; three children, Ann Elise Moosman, Edward Ellis Chatelain, and Peter Frank Chatelain; four grandchildren; and one sister, Janet Anderson. ♦



### *Alumni & Guests*

*are invited*

*to attend an*

*Open House*

*in honor of our*

*1999 College of Science Graduates*

*Friday, 7 May 1999*

*3:30 - 5:00 p.m.*

*David B. Haight Alumni Center*

## *USU Alumni Reunion*

*Class of 1949*

*16 - 18 July 1999*

*Utah State University will be hosting a reunion this summer for graduates of the class of 1949. Activities will include a luncheon, campus tour, and attendance at the opera (Student Prince, Ellen Eccles Theatre) on Friday 16 July; brunch with guest speaker and Golden Aggie Reunion Banquet on Saturday 17 July; and Memorial Brunch on Sunday 18 July. Mel Thayne, Senior Class President in 1949, is head of the Reunion Committee.*

*Living USU science graduates from 1949 are listed below. If you are not listed and are a 1949 graduate, or know of someone who is, please contact USU Alumni Relations. For more information on the reunion, please contact Alumni Relations at 1-800-291-ALUM or alumni@cc.usu.edu.*

J. Clayton Allan  
Noel J. Becar  
Franklin K. Brough  
Wayne S. Brough  
Rodney A. Brown  
Roger D. Burgoyne  
Lawrence G. Cannell  
Eldon R. Child  
Jack Faulkner Dexter  
Lee Daines Eaton  
Heber Fackrell  
George Gordon Fleener  
Mary Udetta Gardiner  
Wilford R. Gardner  
Clarence L. Goodwin  
Hollis C. Green  
Lorin Robert Hanks  
Halver P. Hansen  
Ronald G. Hansen  
Stanley E. Harrison  
B. Austin Haws

Charles D. Hendricks  
Stanley R. Hunt  
George Aaron Jeffs  
Paul Warren Jeppson  
William L. Jones  
Norman G. Lewis  
Bennion N. Lloyd  
John M. MacNeur Jr.  
Kenneth B. Maughan  
Fauntella Smith Miller  
Wallace P. Murdoch  
M. W. Nielson  
James Joseph O'Toole  
Wayne R. Rich  
Charles A. Robinson  
Dee King Smith  
Lois Fryer Sorenson  
Charles James Stewart  
Lewis Glenn Weathers  
Dorothy C. Wilson



# College of Science SPRING COFFEE BREAK



Butch Brodie, Head of Biology;  
Jim MacMahon, Dean of Science;  
and Dick Mueller, Biology



Don Fiesinger, John Raitt, and Don  
Cooley, Heads of Geology,  
Physics, and Computer Science



College of Science faculty  
enjoy the Coffee Break



Judy Brodie, *Insights* editor;  
Dave Drown, Biology; and  
Jim MacMahon, Dean of Science



Tom Wilkerson, Physics and  
CASS, and David Peak, Physics



J.R. Dennison, Physics  
and Farrell Edwards,  
Physics and CASS



Eric Rowley, Mathematics and  
Statistics, and Jerome Davies,  
Development Director



James Shaver, Dean of Graduate  
Studies, and John Simmons  
former Head of Biology.



# Commencement 1999

The One Hundred Sixth Annual Commencement of  
Utah State University  
7 & 8 May



## FRIDAY, 30 APRIL

### **ROTC Commissioning Ceremony**

9:00 a.m., David B. Haight Alumni Center. Reception follows.

## FRIDAY, 7 MAY

### **Spouse Recognition Ceremony**

11:30 a.m., Chase Fine Arts Center, Morgan Theatre.

### **Hooding Ceremony for Master's and Doctoral Degree Candidates**

12:30 p.m., Assembly of Candidates, Tunnel of Dee Glen Smith Spectrum.

1:30 p.m., Dee Glen Smith Spectrum.

### **College of Science Open House**

3:30 - 5:00 p.m., David B. Haight Alumni Center. *Alumni are encouraged to attend.*

### **Graduation Dinner and Concert**

6:00 - 7:45 p.m., Dinner (tickets required), Taggart Student Center, Evan N. Stevenson Ballroom.

8:00 p.m., College of Sounds Concert (tickets required), Chase Fine Arts Center, Kent Concert Hall.

## SATURDAY, 8 MAY

### **Assembly**

8:00 a.m., Taggart Student Center, Juniper Lounge, for Graduate Students; University Quadrangle for Undergraduate Students.

### **Academic Procession**

8:30 a.m., Taggart Student Center and University Quadrangle to Dee Glen Smith Spectrum.

### **Commencement Ceremony**

9:30 a.m., Dee Glen Smith Spectrum. Billy Mills will present the keynote address.

*Billy Mills was the Olympic Gold Medalist in the 10,000-meter run in Tokyo in 1964. A Native American (Oglala Lokota), Mills is America's only Olympic gold medalist in the 10,000-meter run.*

### **College of Science Graduation Ceremony**

12:00 p.m., Taggart Student Center, Evan N. Stevenson Ballroom.

### **Alumni Graduation Picnic**

11:00 a.m. - 2:30 p.m., University HPER Field (tickets required).

### **Alumni Reception**

11:00 a.m. - 3:00 p.m., Open House, David B. Haight Alumni Center.

*For additional information regarding Commencement  
see <http://www.usu.edu/~edserve/commence99/>*

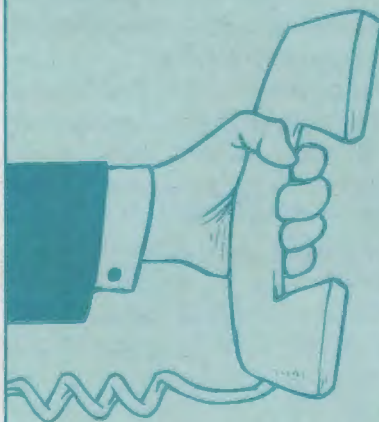


## The 1998 - 1999 College of Science Awards

Teacher of the Year .....	J.R. Dennison Department of Physics
Researcher of the Year .....	Ann Aust Department of Chemistry and Biochemistry
Graduate Student Teacher of the Year .....	Cora L. Neal Department of Mathematics and Statistics
Graduate Student Researcher of the Year .....	Thomas N. Buckley Department of Biology
Scholar of the Year .....	Ruth Anderson Chemistry Major
Valedictorian .....	Jennifer Youngberg Math Education Major

*These individuals will be honored at*  
**The College of Science Awards Program**  
Friday, 23 April 1999  
4:00 - 5:00 p.m.  
Taggart Student Center, Walnut Room

## Responsive Alumni Make for Successful Phonathon



The College of Science recently completed its 1999 Phonathon program. During the period 16-27 February, more than 2,000 science alumni were reached by telephone. Of those individuals contacted, nearly 600 pledged a contribution in support of the students and programs of the College of Science. Thank you for your generous support. Please help ensure that we are better able to meet the needs of a growing number of science students and, **if at all possible, fulfill your pledge within our fiscal year ending 30 June 1999.** To that end, you may use the postage-paid envelope found in this issue of *Insights* to submit your gift.

*If you have any questions or concerns about your phonathon pledge, please contact Jerome Davies at (435) 797-3510 or [jeromed@cc.usu.edu](mailto:jeromed@cc.usu.edu).*



# College of Science Recognizes Outstanding Students

The three students profiled here reflect the high academic standards and love of science that we encourage in our college.

## Department of Geology



Recent cum laude graduate Jennifer Smith is the outstanding student from the Department of Geology. She graduated with a BS degree in geology in December 1998 with a 3.79 GPA. Jennifer completed a senior thesis with Dr. David Liddell on "Sequence Stratigraphy and Paleogeography of the Middle Cambrian Bloomington Formation." In that research, she worked on reconstructing

the depositional environment and making interpretations about the paleogeography of rock outcrops in the Wellsville Mountains and Logan Canyon. The project involved measuring detailed stratigraphic sections in the field, collecting rock samples, conducting petrographic and geochemical analyses in the lab, and interpreting sea-level histories based on field and laboratory data.

Jennifer was awarded the John M. Branch Scholarship in 1997 as the outstanding junior in the Department of Geology, a Utah Geological Association field camp scholarship in 1998, and the Susan Ecdale Memorial Scholarship, also a field camp scholarship, in 1998.

Jennifer was a non-traditional student. Originally a public relations major at another university, she dropped out of school in her senior year. After a delay of 10 years, Jennifer came to USU along with her husband, Philip. She had taken two geology classes during her earlier student days and she says, "I loved them and I have just been interested in it ever since. When I decided to come back, I just thought that I really loved geology and that is something that I would like to study." Jennifer and her husband chose to attend USU because it has programs in both of their fields of interest—geology and industrial hygiene, respectively.

Jennifer's husband is in the US Navy. He received a PhD degree in industrial hygiene from USU in December 1998 and currently is teaching at the Uniformed Services University of Health Science in Bethesda, Maryland. Jennifer and their four children (ages 13, 10, 7, and 4) will continue to live in Logan until the school term is finished

and will then move to the Washington, DC, area where Jennifer plans to attend graduate school in geology.

Jennifer is thankful for the support of her husband and children. Also, she says that "the professors provided a challenging and interesting experience for me. It's been a great journey."

## Department of Mathematics and Statistics



The Department of Mathematics and Statistics has chosen David Stowell as their outstanding student. Dave is a 25-year-old senior with a major in mathematics and a minor in computer science. Dr. Chris Coray of the Department of Mathematics and Statistics says that David was chosen because he "has become progressively stronger each year of his study, he has worked with faculty on

some interesting research, and he seems to like this subject more all the time. His GPA is very good [3.65], he works very hard at learning, and he is a delight to be around."

When Dave first came to USU, he took some math classes because he knew that mathematics "would be something helpful for me to do." He found that he "liked the intellectual stimulation of studying mathematics" and chose to major and do research in the subject. Dave has worked for about a year with Dr. James Powell in the Department of Mathematics and Statistics on a project with the US Forest Service trying to develop mathematical models for representing how a certain type of beetle attacks and kills pine forests.

Dave thinks that the faculty members in the Department of Mathematics and Statistics "are very interested in students" and "do a really good job" in getting students involved in learning outside the normal classroom situation and in encouraging research.

He was awarded a USU Presidential Scholarship for four years and a Leadership Scholarship from the Sigma Chi Foundation. Also, Dave is a member of the USU track team and was named to the Academic All-Conference Team.

In addition to his academic and athletic pursuits, Dave volunteers in the United Way-sponsored Project Pals, in which he mentors a young person in Cache Valley. Dave also assisted with the Special Olympics this year.

Dave plans to eventually get a graduate degree and teach mathematics at the high school or college level.

Dave's brother Matt Stowell graduated from USU in 1997 with a BS degree in civil engineering.



## Department of Physics



The outstanding student in the Department of Physics is junior Arlynda Wright. Arlynda is very active in the Get-Away-Special program as a Get-Away-Special Scholar. She performed experiments aboard NASA's KC-135 "vomit comet" in April 1998 and helped produce the Get-Away-Special payload G-090 that orbited in the space shuttle in May 1998. Recently, she received a grant from USU Undergraduate Research and

Creative Opportunities (URCO) that supported additional microgravity research on the March 1999 KC-135 flight. Arlynda also conducts atmospheric research with Dr. Michael Taylor of the Space Dynamics Lab.

Arlynda presented the results of her research at Student Showcase 1998, a university-wide forum for undergraduates to showcase their research, and at a meeting of the Four Corners Section of the American Physical Society, where she won an award for best student presentation. Arlynda has a 3.7 GPA and last year received the O. Harry Ottesen Scholarship award for the quality of her work in the introductory physics course sequence.

"I have always been interested in science, and space is cool. When I was in high school, I discovered this wonderful thing called 'physics' and I really latched onto it," says Arlynda. She came to USU because of the Get-Away-Special program. "I wanted to go into some form of space research, and being here is probably the best place I could be to do that," she states.

Her plans include attending graduate school and continuing in space research.

Arlynda lives in Logan and is the youngest of nine children. Her mother, Orvaleve Taylor Wright, graduated from USU in 1977 with a BS degree in Family Life. ♦

## ALUMNET Responses

*Because we have received only a few ALUMNET responses since our last issue, we will hold those responses until the next issue. Please let us and your fellow alumni hear from you.*

## New Faculty Member Joins College of Science

### Dr. Tsung Cheng (T.-C.) Shen



Dr. T.-C. Shen, new assistant professor in the Department of Physics, came to the US in 1979 after receiving BS and MS degrees in physics from National Taiwan University and National Tsing Hua University, respectively. He earned a PhD degree in theoretical gravitation physics from the University of Maryland in 1985 and has worked since in postdoctoral positions in the US and Italy. For the last 10 years, he worked

at the Beckman Institute of the University of Illinois at Urbana-Champaign.

Dr. Shen's research is aimed at developing reproducible methods for device and circuit fabrication at dimensions down to approximately 5 nanometers. "My research is an integration of physics, chemistry, and material/surface science pointing towards nanofabrication," he says. Currently, he has a \$325,000 National Science Foundation grant to fund his nanostructure research. Dr. Shen came to USU to set up the new Nanoelectronics Laboratory in the Department of Physics, the goal of which is to fabricate prototype single electron devices and to use the fabricated structures to explore electron transport. He hopes "that the research of the Nanoelectronics Lab could initiate a coalition among the faculty and students of physics, chemistry, and electrical engineering departments to make USU a world leader in nanotechnology." He says, "In the long run, I hope to build a unique research capability to explore nanoscale science and technology and provide the students with brighter career opportunities. I believe that nanoscale science technology will play a key role for the next round of industrial revolution."

In addition to physics, Dr. Shen is very interested in cultural differences among the countries where he has lived, i.e., China, USA, and Italy, and he states that he would enjoy learning about the cultures of other countries.

Dr. Shen, his wife, Fen-Ann, and their two children (ages 6 and 9) live in Logan. Although Dr. Shen no longer has time for hobbies, he is interested in camping, skiing, tennis, opera, and movies. He hopes to have time to learn to play the clarinet after his children are reared. ♦



# Retired Biology Professor Gone Completely to the Dogs

Ivan Palmblad, emeritus professor in the Department of Biology, bought his first Saint Bernard in 1969; he bred his first litter in 1972; and he has been a major player in the world of Saint Bernard breeding, showing, and judging for many years. Since his retirement from USU in July 1997, he has been able to spend even more time with his Saint Bernards and Saint Bernard-related activities.

Dr. Palmblad is owner of Cache Retreat Kennels in Providence, Utah, where he normally houses 15-18 adult Saint Bernards. In addition, he usually has five to six dogs that are with handlers and are being shown. Dr. Palmblad's Saint Bernards have won many awards, including Best of Breed at the Saint Bernard Club of America national specialty show in 1991 and again in 1998. He has bred more than 120 champion Saint Bernards. He is especially proud of the fact that he has won the Breeder Achievement Award (based on the quality of his entries at the national show) for three of the four years that the award has been given. "That's the only trophy I've ever liked because it's coming from my peers," he says.

Dr. Palmblad is president of the Saint Bernard Club of America, with about 1000 members worldwide, mostly in the US. The Saint Bernard Club of America was established in 1888 and is the oldest breed club in the American Kennel Club. In addition, Dr. Palmblad judges three to four dog shows each year and gives seminars on genetics and breeding of Saint Bernards.

Since retirement, Dr. Palmblad has spent a lot of time improving his fledgling computer skills. For the two years before retirement, he worked, along with Department of Biology colleague Dr. Keith Mott, on developing PowerPoint presentations for their introductory biology class. Because of that project, he discovered how much could be done with PowerPoint, Photoshop, and other computer graphics programs. Currently, Dr. Palmblad is using his computer skills as the head of a major project for the Saint Bernard Club of America to develop an illustrated standard for Saint Bernards. He is preparing a booklet containing computer-modified color photographs of the "ideal" Saint Bernard that will be useful to dog show judges or anyone interested in Saint Bernards. He is also using his computer skills to develop educational materials for the national club and an advertising brochure for his kennel.

As part of a group of about 50 Saint Bernard fanciers, Dr. Palmblad toured Switzerland in 1998. The group visited the hospice where the breed originated and met with members of the Swiss national Saint Bernard club. Dr. Palmblad even found a cuckoo clock with a Saint Bernard that jumps up on the hour, which he proudly displays in his living room.

Dr. Palmblad spent more than 30 years at USU as a biology professor. He says, "I had mothers as students; I had



their daughters as students; and, thank God, I retired before I had their granddaughters as students!" He received many honors as a teacher. According to Dean James MacMahon, Dr. Palmblad was an excellent teacher who didn't sacrifice rigor for popularity. "His rigor was appreciated by his students as witnessed by his very high evaluations even in large classes," says Dr. MacMahon. Edmund D. Brodie, Jr., head of the Department of Biology, states that Dr. Palmblad "raised the level of expectations for the way we present our classes" and "acted as the departmental conscience regarding grade inflation." He was twice selected College of Science Teacher of the Year, and on student exit interviews was cited more often than any other as the person having the greatest positive influence on the college experience of biology majors.

One of Dr. Palmblad's most amazing accomplishments was learning the names of as many as 300 students by the second week of class. He did this to better motivate and challenge the students. In fact, he says, "I can still go back and put names on students, especially in the 1966 - 1976 period." Unfortunately, after classes got so large that labs had to be run simultaneously, he was no longer able to learn all the students' names. However, today, there are former students all over Utah who fondly remember Dr. Palmblad and the fact that he learned their name.

The dedication and talents that Dr. Palmblad demonstrated as a biology professor greatly improved the educational experience of many USU students. Now his dedication and talents are being utilized just as successfully to improve the dog breed that he loves, the Saint Bernard. ♦



# Awards, Honors, and Publications

Insights welcomes news of alumni awards, honors, and publications. Please mail announcements to Insights, Office of the Dean, College of Science, Utah State University, 4400 Old Main Hill, Logan UT 84322-4400, or use the ALUMNET form. Please include book covers if available. Announcements may also be emailed to [scido@cc.usu.edu](mailto:scido@cc.usu.edu) or faxed to (435) 797-3378.

## Alumni Awards and Honors

**Ann E. (Halloran) Jenkins** (BS 1976, Public Health) was named 1998 Southern Nevada Nurse of the Year—Infection Control, by the March of Dimes.

**Roy D. Wilcoxson** (BS 1953, Botany) was named a Fellow in the American Phytopathological Society, an Honorary Member of the Indian National Academy of Sciences, and an Honorary Fellow in the Indian Phytopathological Society.

## Alumni Publications: Non-fiction

*Bunt and Smut Diseases of Wheat: Concepts and Methods of Disease Management*, edited by **Roy D. Wilcoxson** (BS 1953, Botany) and E. E. Saari, is a scientific book for wheat breeders in underdeveloped countries and persons concerned with smut diseases anywhere. Paperback, CIMMYT (Center for International Improvement of Maize and Trigo).

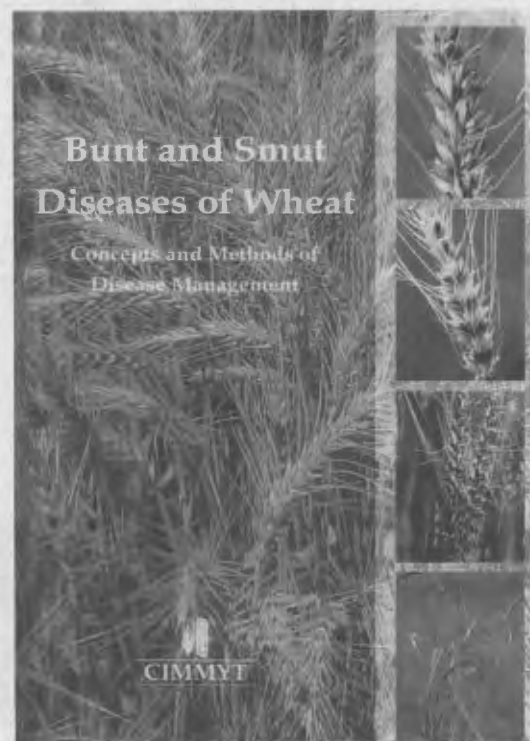
## Faculty Awards and Honors

**Steven D. Aust**, Department of Chemistry and Biochemistry, received an Alumni Achievement Award from Washington State University. (See article on page 6).

**Joseph K.-K. Li**, Department of Biology, was awarded a Distinguished Service Award from the Chinese Society of Medial Virology, the Chinese Medical Association, the State Key Laboratory for Molecular Virology and Genetic Engineering of the Chinese Academy of Sciences, and the Division of Medicine and Health Engineering of the Chinese Academy of Engineering. The award was in recognition of his outstanding contribution in the continuous promotion of international and academic exchanges during the past decade.

**James A. MacMahon**, dean of the College of Science, was elected a Fellow of the American Association for the Advancement of Science. Dr. MacMahon was recognized for his efforts to apply ecological theory to real-life situations and his contributions to science education.

**Jill Marshall**, Department of Physics, was appointed to serve a three-year term on the University Space Research Association Science and Engineering Education Council. ♦







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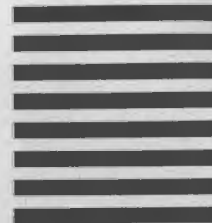


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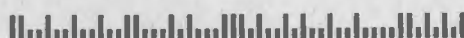
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# A L U M N I E T

Dear College of Science Alumni and Friends,

We always enjoy hearing from you and hope you will take a moment to complete and mail this alumni information form. Please note the postage-paid format—simply cut off this last page of the newsletter, fold along the lines marked on page 15, tape it shut, and drop it in the mail. You can also fax it to us at (435)797-3378 or email you information to [scido@cc.usu.edu](mailto:scido@cc.usu.edu).

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Home phone (     ) \_\_\_\_\_ Work phone (     ) \_\_\_\_\_

Email address \_\_\_\_\_ Web page URL \_\_\_\_\_

USU degree(s) \_\_\_\_\_ Year \_\_\_\_\_ Major \_\_\_\_\_

Other degree(s) \_\_\_\_\_ Year, school \_\_\_\_\_

Profession/employer \_\_\_\_\_

About yourself \_\_\_\_\_

*Insights, the alumni newsletter of Utah State University College of Science, is published twice a year. Its purpose is to inform alumni and friends of current events, projects, and changes within the college. The newsletter also provides a forum for alumni to follow one another's careers and professional development. This issue of Insights was produced under the direction of Judy Brodie, editor, and Colette Yates, project coordinator and editor. Contributors include Development Director Jerome Davies and Dean Jim MacMahon. Special thanks to Gene Underwood, James Evans, John Peters, and Steven Aust for photographs or illustrations; Kandy Baumgardner for editorial assistance; USU Editorial Services; and Watkins Printing.*

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