Taking Science to the Moon

State-of-the-art learning facility opens doors

Meet the CSMAA board and officers
Taking Science to the Moon
Alumnus Don Beattie spent 10 years with NASA during the space race

Athletics
A chat with Marty Jertson

Short Takes

Mines: A Voice in the National Energy Policy

People Watch

Philanthropy at Mines
Unrestricted funds make a difference at Mines

Steel Center Forges Links

Whose Bright Idea Is This?
Professor illuminates patent process

Center for Technology and Learning Media
Now open for scientists and engineers
About Our Cover:
The United States won the space race in 1969 when we got men to the moon. But it took behind-the-scenes maneuvering at NASA to assure the trip was more than just a public relations coup. Don Beattie ’58 tells the story of getting science onto the payload. Photo by NASA.
Differing opinions

I would like to respond to the article “Benign cull or needless loss” in the summer 2001 edition of Mines. I have never read in the engineering press such a piece of BS. It is a real shock to see such an article in the magazine that carries the name “Mines.” No one can change the world to make it more benign. This is a tough profession. It is tough in challenges to our professional education, our ability to solve problems and our ability to make money to stay in business. If we fail through incompetence to protect human life, we lose our license and leave ourselves open to huge liability claims. If we build benign projects and lose money for our clients we fail. If we do not worry about our financial position we lose both our ability to survive and our company and our client. Blame the world, but the truth is all professions are tough. I am hard pressed to find a needless loss. Get out if you can not hack it. Let’s quit making excuses for those that cannot meet the bar. Let’s not get into the mode of dumbing down. Get this rot out of the magazine.

Frank J. Buturla EM’64

Your two recent articles dealing with teaching effectiveness at Mines (pages 20-21, summer 2001) struck a nerve and mandate a response. You are clearly onto something I consider one of Mines’, and more generally, higher education’s, critical failings: an abysmally poor quality of classroom instruction.

I graduated from Mines in the upper 10% of the class of 1971 and did about as well when I returned for an additional semester in 1979. I was anything but unprepared and I worked hard. The further removed I am from my Mines experience, the more convinced I become that many of the faculty members who taught me were to be clear, frankly incompetent as classroom instructors. They may have been, and most probably were, experts in their technical disciplines, but they were failures at communicating their knowledge to students and motivating students to care. I personally think much of this was intentional.

Experience suggests that classroom instruction, particularly at the undergraduate level, is about the least-valued activity of the academic profession, ranking far below research, fundraising and corporate consulting. Beyond that, I think there is an academic cultural imperative, perhaps accentuated at Mines, to be, and be perceived by students and colleagues, as “rigorous,” “tough,” “black,” and/or “mystic.”

My Mines experience left an indelible imprint. When I think of the School, what first comes to mind is not what I learned there in terms of my option curriculum. Regrettably, I recall rather little of whatever the faculty purported to teach me. Rather, I remember what I endured (a valid operative word) on the way to graduation in Steinhauser Field House. I see Mines in retrospect as a seven-semester (I was a transfer student) “gut check.” I proved that I was tough enough to survive, but so what?

In a further attempt to be fair, I have to note that while Mines may be an egregious example, the instructional shortfalls… are far from unique… That is regrettable, because becoming a good instructor is not particularly difficult…

The military routinely trains competent instructors in a couple of weeks. The most important thing is attitude and the central thing here is to accept a paradigm shift to an internalized view that the principal burden of learning is on the instructor, that if the student has not learned, the instructor has failed to teach.

Again, I applaud your articles raising the vital issue of instructional quality…

William C. Duesbury BSc ’71
Colonel, US Army (Retired)

I teach faculty development at the Command and General Staff College at Fort Leavenworth, KS. One of your graduates, Lt. Col. Lowell Solien MSc Math ’90, is currently a member of our faculty. Lt. Col. Solien shared your two articles from the summer issue with me. I would like to share them with our faculty. That would mean 500 copies of each. The articles are specifically: “Mines researches teaching effectiveness” and “Benign cull or needless loss.”

Thanks for writing such pertinent literature.

Rhoda Risner Ph.D.
Command and General Staff College
Fort Leavenworth, Kan.
Dear Friends of Colorado School of Mines:

We’ve begun the 2001/2002 academic year filled with pride in our past accomplishments and with commitment to the realization of further goals. At this writing, the horrible events on and since September 11 have overwhelmed us. The entire Mines community is struggling to know how to deal with the tragedy and to understand what meaning or lessons might be derived from it.

We have three immediate thoughts. First, we grieve for the innocent victims and express our condolences and support for the loved ones and friends who suffer their loss. Second, we express our support for people and their leaders everywhere who are trying to make sense of these senseless events. We all hope for wisdom at a time like this– that these unspeakable acts do not lead to even more senseless and demeaning acts as a consequence, but rather lead only to responses that are measured, appropriate and wise. Finally, we affirm our resolve to remain strong as a community. We on the Mines campus are bonded by a common sense of purpose—working and learning together to make the world a better place through the intelligent development of natural and human resources everywhere. Diversity is one of our greatest strengths. As we work individually and together to deal with and learn from these horrific events, we particularly want to affirm our resolve to welcome and embrace our international colleagues—students, faculty and staff—and everyone else who shares in the spirit of the Mines community.

It is an exciting time to serve at CSM. Several recent developments have confirmed our unique role in the world:

- Last spring, the Colorado Legislature passed a bill recognizing Mines as an “exemplary institution” of higher education, the only college so designated in the state.
- In July, the Accreditation Board for Engineering and Technology awarded reaccreditation to all Mines undergraduate engineering programs, affirming the quality of our revised curriculum and instructional approach.
- In August, the Center for Technology and Learning Media opened with new laboratories, classrooms and study rooms for state-of-the-art instruction using the latest technologies and pedagogical methods.
- In September, The Petroleum Institute welcomed its first students in interim facilities in Abu Dhabi, United Arab Emirates. Mines was chosen as the institute’s long-term partner by the Abu Dhabi National Oil Company because of our pre-eminence in engineering and applied-science education.

Building upon the strong foundations established by our predecessors, Mines is moving forward with confidence and with full appreciation of the institutional responsibilities that our reputation and resources impose. We are now engaged in the development of a long-range and comprehensive strategic plan for the School. Working together in the months ahead, we will define our purpose at the highest level, asking what are the most important contributions this institution can make to enhance life in the future. As Frank H. T. Rhodes, president emeritus of Cornell University, has written: “Universities represent the crucible within which our future will be formed…[they] provide each new generation of leaders, educated, influenced, and shaped within the culture of the campus.” It is a tremendous responsibility. To guide us, we must define our unique, noble purpose among enterprises that can make a difference in the world. No less will be expected from an “exemplary institution.”

John U. Trefny
President
ANCHORED TO ITS LAUNCH PAD ON THE MORNING OF JULY 16, 1969, and scheduled to launch Apollo 11 on our first attempt to land men on the Moon, the fully fueled Saturn V launch vehicle weighed over six million pounds. From the nozzles at the base of the giant S-IC first stage to the top of the solid, rocket-propelled escape tower, it measured 363 feet. In 1962, one year after President Kennedy had given the go-ahead for Project Apollo, the critical decisions had been made on how to execute his difficult challenge. Saturn V, with its multiple stages, was the key to reaching the goal, the product of seven years of effort by hundreds of thousands of government and contract workers. Because the president’s mandate did not require that any specific tasks be accomplished on the Moon, the initial spacecraft design did not include weight or storage allowances for scientific payloads. The earliest thinking at NASA was, “We’ll land, take a few photographs, pick up a few rocks and take off as soon as possible.” The need to do much more was not considered in the planning. For many NASA engineers and managers, the lunar landing was a one-shot affair. After the first successful landing, NASA would pack up its rockets and do something else. Why take any more chances with the astronauts’ lives on this risky adventure? This thinking was soon to change, at least in some circles.
The first officially sanctioned attempt to change this thinking took place in March 1962 when Charles P. Sonett, of the NASA Ames Research Center, was asked to convene a group of scientists to recommend a list of experiments to be undertaken on the Moon. The “Sonett Report,” submitted to NASA in July, became the foundation for subsequent lunar science studies and recommendations. Circulated in draft form at NASA and other organizations throughout the rest of 1962 and most of 1963, the report elicited both support and criticism.

The major, fundamental lunar questions being debated by planetary scientists when the Apollo program began can be quickly summarized: How old is the Moon, how was it formed, and what is its composition? Finding answers was the driving force behind the desire to carry out a host of experiments on the Apollo missions. The origin and age of the Moon had intrigued astronomers and Earth scientists for many centuries, with theories proposed based on a minimum of hard data. A primary scientific justification for studying the Moon, with either manned or unmanned spacecraft, was to help us unravel Earth’s early history. By studying the Moon, we believed we would learn much about Earth, especially that part of its history obscured by geological processes.

I joined NASA in September 1963 after working for Mobil Oil in Colombia S.A. for almost six years. Most of my NASA office colleagues had degrees in electrical, aeronautical, or mechanical engineering and little or no training in earth sciences. We were charged to determine how to exploit the capabilities being designed into the Apollo hardware and, specifically, how to expand the ability to explore the Moon and develop the experiments and supporting equipment.

Because the Saturn V had to lift some six million pounds of equipment and fuel from the Earth’s surface to Earth orbit, and the succeeding stages had to perform efficiently in order to send as large a payload as possible on to the Moon (much of it in the form of rocket fuel), the weight of the Saturn V and all its components rapidly became an overriding design concern. Engineers designing and building the lunar lander, for example, took the weight problem so seriously they were counting rivets as they modified the design to achieve their weight targets. We were trying to convince management to add hundreds of pounds of science payloads; without question we knew it would be a difficult selling job.

In February 1964 a memorandum was sent to the Office of Space Science and Applications (OSSA) providing a preliminary listing of the scientific investigations that should be considered for Apollo. This memo defined the areas of interest for each scientific discipline and listed the scientists who would help plan individual experiments. With this guidance, my office wrote a short report outlining a program of Apollo scientific investigations in order to have a handout for distribution at the Lunar Exploration Symposium to be held at the Manned Space Center (MSC) in June. At the symposium, lively debates took place, with the science side attempting to understand and relax constraints imposed by the MSC engineers so that more scientific work could be accomplished. The science planning team members described the experiments they hoped to have the astronauts deploy and the studies and observations that would be needed. Everyone left with a better understanding of what lay ahead before we could all agree on how the missions could be designed to accomplish the best science.

At the symposium, two trends were becoming evident. We were becoming more and more at odds with the MSC Engineering and Development Directorate on how to incorporate science on the missions and even on what experiments should be carried. Yet we were developing a close relationship with members of the Crew Systems Division and other offices that had day-to-day contact with the astronauts.
contact with the astronauts in developing operational protocols.

In early 1964, the next step was taken toward controlling what science would be carried out on the Apollo flights. Many types of experiments besides those falling under OSSA’s purview were being suggested by other offices. Some dealt with the life sciences, and others were engineering experiments proposed by several NASA offices as well as the Department of Defense. To establish uniform requirements and set priorities for inclusion on the flight, the Manned Space Flight Experiments Board (MSFEB) was formed. The board consisted of senior managers from NASA headquarters and field centers and one representative of the Air Force Systems Command. Experiments would be selected by various NASA offices such as OSSA and then passed to the Board. Those of us who had been trying to increase the science payload allocation looked with deep suspicion on this Board. We could see the limited science payload being slowly eaten up and given to what we felt were peripheral experiments, not designed to study the Moon as a planetary body. The MSFEB would be the ultimate judge of whether the experiments passed the rigid integration criteria and would be approved, rejected, or sent back for modification. Principal investigators soon learned that if they wanted to participate in the program they needed patience and perseverance and that they must overlook what seemed like strange, bureaucratic rules.

In late September 1965, the first “Lunar Exploration Plan” was circulated. The Plan represented the culmination of years of effort to define how and why we should explore the Moon. From our perspective this plan contained all the right words we had labored to have our senior management embrace publicly for the past two years. Now we had it in writing in an official NASA document. To give a brief sample, the plan stated: “The primary objective... is to define the nature, origin and history of the moon as the initial step in the comparative study of the planets.... A secondary objective is to evaluate the potential uses of the moon.” Apollo and post-Apollo lunar exploration would accomplish all we had wanted if the words were followed up with action.

After much give and take on how experiments and the science community would interact with mission controllers and the astronauts during an Apollo mission, MSC agreed in 1967 to build an experiments room in the mission control building. Jack Schmitt, Donald Lind and other astronauts deserve credit for supporting the idea. Having worked with training and simulation teams assembled by scientists at the U.S. Geological Survey, they had firsthand knowledge of how valuable it would be for the crews on the lunar surface to have experienced scientists backing them up. Another advance for science was the promotion of scientist-astronauts to be mission scientists, the single person charged with overseeing each crew’s science training, and eventually they were assigned as capsule communicators (CapComs) during the lunar landing mission. CapComs were the only ones allowed to speak directly to the astronauts during missions, and they had to be astronauts themselves.

On July 16, 1969, along with a multitude of other sightseers (local Civil Defense officials would later estimate one million), my family and I were on hand to watch the launch of Apollo 11. Old Glory was flying everywhere, and the crowd was in a party mood. The countdown proceeded smoothly, and at 8:32 a.m., the Saturn rocket lifted off accompanied by loud cheers and many teary eyes, mine included. Beyond a doubt our hearts went with the crew of Apollo 11. Four days later, Neil Armstrong and Buzz Aldrin became the first humans to walk on the Moon. Although reduced in scope from that originally planned, both astronauts performed all their scientific assignments better than expected. They returned to Earth with still photographs, movies and 47 pounds of individual rocks, soil and drive-tube cores. Apollo 11 was followed by five additional missions, each with increasingly complex scientific objectives.

Conceived primarily as a political statement, Apollo achieved much more than its original goal of landing a man on the Moon and returning him safely. To sum up just the operational accomplishments of the six Apollo landing missions: Almost 5,000 pounds of experimental equipment were carried to the Moon’s surface, and 840 pounds of lunar material were returned under carefully controlled conditions. Five lunar-surface experiments packages, that included 53 individual experiments, were deployed by the astronauts and placed at different locations on the Moon. Approximately 60 miles of traverses were recorded in support of the field geology studies and geophysical surveys. All of this contributed to helping us decipher the Moon’s many mysteries.

This piece was excerpted from Taking Science to the Moon: Lunar Experiments and the Apollo Program by Don Beattie, published by The Johns Hopkins University Press, 2001. Beattie has loaned the CSM geology museum several items from his days with NASA, including an American flag that went to the moon. Beattie has also written and edited History and Overview of Solar Heat Technologies (MIT Press) and is working on another about the International Space Station.
Marty Jertson is about as big as they come in Golden, Colo., athletically speaking that is. Jertson, a senior, has been the backbone of the Colorado School of Mines golf team since his arrival from Phoenix, Ariz., in 1998. Since coming to Mines, Jertson has scored 13 Top-10's and 18 Top-20's to go along with wins in the Ft. Hays State University Invitational in 1999 and the District VII Qualifier in both 2000 and 2001. He has been named to the All-Rocky Mountain Athletic Conference team every year he has been in Golden. Jertson has also been selected team MVP and named to the Dean's list for three consecutive years. If this sounds amazing, that's only his collegiate honors. He has also competed in several amateur events, winning the Southern Colorado Amateur title and the Highlands Hills Amateur in 2000. He also won the qualifier for the U.S. Public links in 2001. Jertson has competed in the Colorado Open the last two years, and he managed two top-30 finishes in this pro event. His most recent victory came in the Colorado State Amateur Tournament where he fired a four-round total of 282 (-6).

I had a chance to sit down with Marty and pick his brain about his successes and his goals for the season and for the future.

**Question** - What does the win in the Colorado State Amateur Tournament do for you heading into the upcoming season?

**Marty** - “This is one of the biggest tournaments in the state of Colorado. It gave me plenty of confidence going into the season because I didn’t hit the ball as well as I could so I learned to score better.”

**Question** - What are your goals for the season?

**Marty** - “For the team to do well enough to get into regionals as a team. As an individual goal I want to win every tournament in the fall.”

**Question** - What do you think is the biggest key for success for this season?

**Marty** - “For the team, consistency is the key, we need to play well in every tournament.”

**Question** - What's next for Marty Jertson after your Collegiate career?

**Marty** - “I’m thinking hard about trying to play for a living. I would like to try and get some sponsors out of college. If I could do that than I would like to turn pro.”

**Question** - What has been the biggest moment in your golf career at Mines up till this point?

**Marty** - “I actually have two, the first was my very first tournament win. It was in Kansas and it was really windy and I had to fight the conditions. The second was when I came from eight shots back to win the conference qualifying tournament, I shot a 68 in really windy conditions.”

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Middleton Appointed VPAA

Dr. Nigel T. Middleton has been selected as CSM’s new vice president for academic affairs and dean of faculty. He replaces John Trefny, who was appointed president in August. “I have great confidence in Dr. Middleton,” said Dr. Trefny. “His breadth of experience in the military, in industry, and in academia will serve CSM well.”

Middleton joined the School’s Engineering Division in 1990 and served for more than five years as assistant division director. Since June of 1996, he has served as associate vice president for academic affairs.

He received the CSM Alumni Award for Outstanding Teaching in 1996 and the Board of Trustees Outstanding Faculty Award in 2000. He was also instrumental in the development of the multi-disciplinary engineering laboratory sequence of courses, which has won numerous awards and national recognition. As associate vice president for academic affairs, he had much of the responsibility for managing the implementation of CSM’s new undergraduate curriculum.

This past year he coordinated the School’s preparation for reaccreditation review, which resulted in all CSM undergraduate engineering programs receiving reaccreditation. He also collaborated with Dr. Robert Baldwin in developing a partnership with the Abu Dhabi National Oil Company to create The Petroleum Institute in Abu Dhabi, United Arab Emirates.

Middleton earned B.Sc. and Ph.D. degrees in electrical engineering from the University of the Witwatersrand in Johannesburg, South Africa.

“I am delighted and deeply honored to have this opportunity,” said Middleton. “I look forward to working with the CSM community in fulfilling the School’s academic agenda, with all its dimensions and potentials.”

Abu Dhabi Petroleum Institute Opens Its Doors

The Petroleum Institute in Abu Dhabi, United Arab Emirates, opened its doors in newly constructed interim facilities on Sept. 15, when the first 140 U.A.E. students began a foundation year to prepare them for baccalaureate courses in engineering.

The permanent campus is under construction, with a physical plant in excess of $100 million planned.

Welcoming ceremonies for these students took place in the interim facilities on Sept. 8, at an event attended by the students, new faculty and administration of The Petroleum Institute, representatives from Mines, and from the Abu Dhabi National Oil Company (ADNOC).

CSM faculty Barbara Olds and Ron Miller, along with Karl Smith from the University of Minnesota, conducted a five-day workshop for the institute’s faculty.

The purpose of the workshop was to expand their teaching skill sets, extend their knowledge of effective assessment and form a faculty team to collaborate throughout the year.


During this school year, Dr. Saleh Al Hashimi of Abu Dhabi will work at Mines with Dr. John Humphrey in the Department of Geology and Geological Engineering and with Dr. Ruth Streveler, director of academic services.

CSM liaison for the institute is Dr. Robert Baldwin.


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New Board Member

Gov. Owens has appointed a new member, Terrance G. Tschatschula, and reappointed Hugh W. Evans to the Colorado School of Mines Board of Trustees.

Tschatschula, founder and president of Aspen Petroleum Products, Inc., graduated from the University of Texas in 1980 with a B.S. in chemical engineering.

Hugh W. Evans, retired president and CEO of Enoxy Coal, Inc., has served on the Board since 1997.

The governor of Colorado appoints the seven-member Mines board for four-year terms. Tschatschula and Evans will serve on the Board until March 23, 2005.

The following individuals have been elected as officers to the CSM Board of Trustees:

- Frank Erisman, Holme Roberts & Owen LLP, board president.
- F. Steven Mooney, Thompson Creek Metals Co., board vice president.

In Memoriam

Emeritus Professor of Physics Dr. Jerrold J. Burnett died July 21st of apparent heart problems.

He received a Ph.D. in engineering sciences from the University of Oklahoma in 1966 and joined the CSM physics faculty shortly afterward, later becoming an associate professor and then professor of physics.

In 1970, he was registered as a professional engineer by the State of Colorado.

During his tenure at CSM, he established the first summer science education program in the area for public school teachers, with funding from the National Science Foundation.

From this beginning, he built one of the largest in-service teacher training programs in the state. An evolved program is still operated out of the Department of Physics.

He served in the department until his retirement in 1986.

The institute was established by Abu Dhabi government decree as a separate legal entity, operating in the Emirate of Abu Dhabi, and funded by ADNOC and its industrial partners.

Colorado School of Mines and ADNOC have a 10-year agreement for the development of the institute.

Located on the Arabian Gulf, Abu Dhabi is the largest of the United Arab Emirates and has estimated hydrocarbon resources that comprise 10 percent of the world’s oil and natural gas reserves.

Public Safety Design Wins

According to Law and Order Magazine and 3M, the graphic design that appears on CSM’s public safety vehicles is the best in the world.

The design submitted by CSM’s Department of Public Safety took top honors over 5000 entrants in Law and Order Magazine’s 13th Annual Police Vehicle Design Competition.

The design was also awarded first place in the 2001 Federal or State Agency category.

“Winning this award is an achievement of extreme pride for our department,” said Richard Boyd, director of public safety. “It’s quite prestigious.”

The design, displayed on all of CSM’s silver patrol cars, features a stylized blue “M” to reflect the “M”-Blem on Mt. Zion and embodies the colors and traditions of CSM. The design also complies with state requirements.

The competition was established to raise awareness of the need for using graphic standards in identifying patrol cars.

In addition to having a photo of the winning vehicle published in the July edition of Law and Order Magazine, the department was given $400 to donate to charity. They chose the Table Mountain Animal Shelter.
CSM Students Win First Dragon Boat Festival

Three CSM graduate students from Mongolia helped power the boat that took top honors in Denver’s first Dragon Boat race this summer.

Amarjargal Sharkhuu, Sainnyambuu Munkhuu and Ochirbal Bolookhuu had never been in a boat before, and Amarjargal cannot swim.

Nonetheless, the three graduate students paddled their way to victory, as part of a 21-member team finishing the 200-meter course in about two minutes.

Held at Sloan’s Lake Park in August, the event celebrated Asian culture and heritage.

The festival was designed to honor Qu Yuan, a renowned Chinese poet who drowned himself after being banished unfairly by the king.

Sixteen teams competed, to the sound of pounding drums and paddles beating the water, in the same manner that Qu’s followers kept fish away from his body over 2000 years ago.

CSM INTERLINK Program Accredited

The CSM INTERLINK Language Center recently joined a select group of 17 programs in the U.S. to be awarded accreditation by the Commission on English Language Program Accreditation (CEA).

INTERLINK has long advocated the establishment of standards for intensive English programs, to promote excellence in the field and provide objective assessments of program quality.

Mines Gets An “A”

The School has achieved full reaccreditation from the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET) for all its undergraduate engineering programs:

- Chemical Engineering
- Engineering
- Engineering Physics
- Geological Engineering
- Geophysical Engineering
- Metallurgical and Materials Engineering
- Mining Engineering
- Petroleum Engineering.

“The result of our evaluation is excellent testimony to the quality of all our programs, especially as it comes on the heels of a major institution-wide undergraduate curriculum reform effort,” said Dr. Nigel Middleton, vice president for academic affairs.

In addition, ABET had revised its own accreditation criteria, which introduced an element of the unknown to this round of accreditation.

“I am very proud of how the School performed during the accreditation process. It took a real team effort to achieve full accreditation of every one of our programs,” said President John Trefny.

New Hennebach Professor

The 2001-2002 Hennebach Visiting Professor in the Humanities is Robert Frodeman, Department of Philosophy and Religion, University of Tennessee.

Dr. Frodeman earned a B.A. in history and philosophy at St. Louis University in 1981, a Ph.D. in philosophy at Pennsylvania State University in 1988, and an M.S. in earth sciences at the University of Colorado-Boulder in 1996. From the perspectives of science, philosophy and public policy, Dr. Frodeman offers a synoptic view of contemporary environmental controversies.
To pass the rigorous standards set by CEA, INTERLINK met more than 50 standards in such areas as:

- Mission
- Administration
- Faculty
- Curriculum
- Student services
- Facilities and equipment
- Length and structure of program of study
- Assessment and student achievement
- Host university relations.

"With more than 1,300 language programs in the country, we are very proud of this distinction," commented Daniel Niles, director of INTERLINK.

See their Web site at mines.edu/Outreach/interlink/news.

CSM To Host Walking Machine Challenge

CSM’s Engineering Division will host the 2002 14th Annual Society of Automotive Engineers International Walking Machine Challenge April 26 and 27. Last year’s competition was held in Mexico.

A Mines team from the Robotics Club plans to compete in this decathlon challenge where students design, build and test a walking machine with a self-contained power source.

This hands-on design experience allows participants to become familiar with technologically advanced components and systems necessary for the construction and development of robots and other complex intelligent machines.

Competitors from 15 universities are expected and the competition is open to spectators.

CSM’s Walking Machine Challenge Team

SWE Chapter Tops In Region

The CSM student chapter of the Society of Women Engineers was named the Best Student Section in its region at the National Conference held in Denver in July.

CSM’s chapter is the 5th largest in the nation, with 243 students, representing 42 percent of the undergraduate women at CSM. It is also the largest professional association on campus, according to SWE sponsor Louise Wildeman.

SWE encourages women to achieve full potential in their careers as engineers and leaders, expand the image of the engineering profession as a positive force in improving quality of life, and demonstrate the value of diversity.

SWE sponsors numerous events for its members throughout the year, as well as reaching out to younger girls, with such activities as Evening with Industry, an ice cream social, holiday and pizza parties, and Girl Scout Badge Day.

It also hosts a “Continuum” each spring and winter, presenting each female graduate with a rose, a tradition which began with the 100th anniversary of the first woman to graduate from Mines.

Faculty Win Teaching Awards

In recognition of significant and meritorious achievement in teaching and scholarship, this year’s Dean’s Excellence Award went to Dr. David Matlock, professor in the Metallurgical and Materials Engineering Department and director of the Advanced Steel Processing and Products Research Center.

Dr. Hugh King, senior lecturer in the Department of Mathematical and Computer Sciences, received this year’s CSM Alumni Teaching Award, saluting his years of superior teaching.
Baldwin Wins BOT Award

The Board of Trustees Outstanding Faculty Award for 2001 has been presented to Dr. Robert M. Baldwin, professor of chemical engineering.

The purpose of the award is to recognize a faculty member who has made a significant positive impact on student learning, with special emphasis on teaching outside the classroom.

During his 27 years on the faculty at Mines— including 10 years as head of the Department of Chemical Engineering and Petroleum Refining— Baldwin has been the recipient of numerous other teaching awards including the Amoco Outstanding Teacher Award for superior undergraduate teaching, the Burlington-Northern award for combined teaching and research, and the Outstanding Faculty Member Award presented by the CSM student chapter of the American Institute of Chemical Engineers (three times).

“Bob has won every major teaching award on campus, some of them more than once,” said CSM Board President Frank Erisman, who presented the award at the 2001-2002 fall faculty forum.

He added that the nomination for Baldwin included strong support from both colleagues and students, citing some of their remarks:

From a colleague: “His love of teaching and learning has never ceased to be the central point of his professorship, and I can say with assurance that he continues to be one of the most effective faculty members on campus.”

From a student: “After a disappointing academic setback, he gave me the encouragement, direction and confidence I needed to try again.”

Baldwin’s current assignment is project director for the Petroleum Institute of Abu Dhabi. Mines has signed a 10-year contract with the Abu Dhabi National Oil Company to help develop the school. This one-of-a-kind collaboration between industry and academia will bring world-class educational resources and research to the Arabian Gulf.

New Head Of Chemistry And Geochemistry

The Department of Chemistry and Geochemistry welcomes new Department Head Paul Jagodzinski into the CSM community.

Jagodzinski joins CSM from a position as department chair at West Virginia University in Morgantown. His research focuses on laser spectroscopy and surface chemistry.

Publishing more than 50 papers and giving more than 70 presentations, he is excited about the interdisciplinary opportunities and the potential collaborations at CSM.

“I am extremely impressed by the quality of the students at CSM and look forward to working with undergraduate and graduate students in research ventures,” said Jagodzinski.

Grad Students Promote Understanding

CSM graduate students from the Middle East participated in a “tolerance teach-in” at Conifer High School in October. Panel discussions and question-and-answer sessions were held in various locations in the school throughout the day.

Panelists discussed historical, geographical and cultural perspectives of the Middle East region, as well as the backlash felt by Arab-Americans following the Sept. 11 terrorist attacks.

Other panelists included Japanese-Americans who experienced life in U.S. internment camps after the bombing of Pearl Harbor. The purpose of the teach-in was to eliminate fear of the unknown and promote tolerance among students.

Colorado Institute Of Technology Funds On-Line Courses

CSM has teamed up with the University of Colorado at Denver (UCD) to develop three on-line certificates in computer science: systems engineer, network engineer, and internet software engineer, according to Acting Department Head Junping Wang of the Department of Mathematical and Computer Sciences.

Collectively, the certificates constitute the core courses for a full degree program in computer science.

“Two faculty groups, led by Professors Graeme Fairweather of CSM and Kyrzysztof Cios of UCD, developed the unique on-line certificate programs to address the knowledge and skills required of in-demand technology positions,” said Dr. Wang.

Funded by the Colorado Institute of Technology (CIT), this CSM-UCD grant is part of $1.37 million awarded to seven Colorado universities in an effort to increase the number of technology graduates and the technology workforce as a whole.

Two more certificates will be added at CIT later, in database engineering and object-oriented software engineering.
Mines: A Voice in the National Energy Policy
by Leah McNeill

Always a key player in the energy industry worldwide, Mines is hoping to play a greater role in the formation of a national energy policy.

President John Trefny believes that Mines is eminently qualified, with faculty and alumni whose combined expertise could make a unique contribution. "We have a large number of individuals with experience and contacts in the energy business, in both industry and governments around the world. For example, many of our graduates are well placed in international oil companies and with national and international governments," he said.

He added that many members of the CSM faculty are also involved in relevant, interdisciplinary research, which provides them not only with technical expertise but also with political savvy, which they are willing to share.

Petroleum Engineering Department Head Craig Van Kirk is one faculty member who has been sharing his technological expertise, with such groups as the National Academy of Engineering and the House Committee on Science's Subcommittee on Energy.

In addressing the House subcommittee, Van Kirk was part of a panel of expert witnesses on oil and gas research and development. He was invited to testify by the American Petroleum Institute, the major national trade association representing the entire petroleum industry.

Broadcast over the Internet, the hearing included five-minute presentations by the panelists on reports they had submitted earlier. Then there was a less formal question-and-answer period that lasted about an hour. "I thought it went well," he said.

Often called upon by the media to speak on petroleum exploration and production issues, Van Kirk ranks at critics who say America has squandered its cheap energy. "What has this country done over the past century with its energy? For one thing, we've defended freedom, such as during World Wars I and II."

"We've invested it in medicines and medical procedures, without which many of us—including the nay Sayers—wouldn't be walking around today. And what about education? Why do you think the United States is the number one education destination in the world?"

"Sure there is an environmental consequence, but it's nothing when compared to the positive things that have been accomplished by Americans with their cheap and reliable energy," he says. "Far from squandering it, I think we have done an amazing job of using it to help make the world a far better place," he said.

He tells groups he addresses that the September 11th terrorist attacks on the United States should be a wake up call for these and other "ignored realities," including how much our prosperity and security depend on a stable energy supply.

"We need to educate the public, news media, and government leaders on where energy comes from... and that this supply should include a reasonable and balanced combination of domestic and foreign sources," he said.

He also advocates more research, both to improve recovery of known reserves and to find new reserves.

For example, without the technological innovations of the 1960s and 70s—which allow us to "see" through land and water to locate new reserves—we would not have the oil and gas that fuel our economy today.

"Historically, private companies have funded the bulk of R&D, supplemented with government funds. But as we now face exploring and producing in much more challenging environments—in the depths of the oceans and in harsh climates—more federal funding must be added to keep improving," he said.

Chief among the innovations driving these improvements has been 3D and 4D seismic imaging. Until the 60s, seismic information was inaccurate, low-resolution analog data.

"It wasn't until the '90s that we could routinely view in three dimensions, largely due to increased economic computing power needed to gather, store and process the massive quantities of data required to render a new generation of 3D images," he explained.

The newest development is 4D visualization, created by time-lapse monitoring of 3D data that can identify reserves previously bypassed in existing formations. Reserves of this kind can quickly and economically contribute to meeting energy needs.

There are many other technologies that are being researched—from subsalt imaging based on U.S. Navy technology developed during the Cold War for stealth submarines... to remote sensing by radar-imaging satellites that can spot leaks and spills along pipelines in remote areas.

"Continued success will mean that the government, industry, and our educational system work together, according to Van Kirk. He envisions an interdisciplinary approach to support R&D over the short and long term."
House '79 Seeks Out-of-the-Way Places

Flying for miles by helicopter to remote jungle locations and being the only woman within hundreds of miles are all in a day's work for geophysicist Nancy House MSc Geop '79. Though currently back at Mines to earn a doctorate, House's career takes her to out-of-the-way places by design. “If I'm interpreting data for a survey, I always like to go out into the field,” she says. “I think I have an appreciation for it that other people don't have, especially coming from Mines where we had to go to field camp.”

House relishes being in the field even if she has to shower in cold water and dodge gigantic flying insects in the process. She chose geophysics as a career because it gives her the opportunity to return to South America, where she spent part of her childhood as the daughter of an American geologist. Once she completes her Ph.D. program, she hopes to consult for foreign national oil companies.

The highlight of House's career to-date was her years with Mobil Oil, 1994-1999, working on several exploration projects in remote areas of the Peruvian Amazon. She directed an exploration program in an unexplored region—one of few such areas left.

"It was a career high point to be the first person to see data that might locate the ever-elusive hydrocarbon deposit in an area as pristine and undisturbed as the Madre de Dios Basin in southern Peru," House says. Mobil, concerned about the environmental impact of its explorations, took steps to protect both the habitat and native populations, she adds. "You have to be careful not to upset the local balance. Once remote areas are exposed to the outside world, colonization and deforestation become a danger." The planning of all Mobil's seismic and drilling programs involved careful analysis to minimize the environmental impact and reduce the possibility of contact with voluntarily isolated native populations.

Disease was another concern. Native people never before exposed to the outside world have no immunity to Western diseases. An incident during the 1980s that caused contact between natives and a seismic survey crew resulted in about 30 native deaths from disease.

During the project, 650-square kilometers of seismic data were recorded over nine months in the concession. No incidents of contact occurred and no structures that might contain oil were located. The crews then removed all traces of the survey, reforested the helipads that had been cut to support operations, dismantled the base camp and left virtually no trace of their presence.

During the mid-1990s, House made two trips for Mobil to a remote Peruvian base camp. She arrived wearing a T-shirt emblazoned with the name of the region, "Madre de Dios" (mother of God), much to the amusement of the all-male crew. She had with her another 300 shirts to hand out to seismic crew members who had been working in the jungle for months under primitive, difficult conditions. House, the only woman in the area, remained in camp for a week during each trip. After her second visit, the men presented her with a toy helicopter—now a cherished souvenir—that they'd fashioned from materials found around camp.

The fun ended for Mobil's Peruvian concession when seismic data failed to indicate any significant geologic structure. The base camp, which had been created from a widening in the Las Piedras River, was torn down and the area restored to its original condition.

During six years of working the sub-Andean basins, House made four trips to some of the most beautiful and remote areas on Earth. In many ways, the project was a technical success and a well was drilled in one of the blocks. However the merger of Exxon and Mobil ended the company's interest in the area.

The merger also gave House an opportunity to pursue a dream she has had since meeting an American professor on the train to Machu Picchu (Peru's famous ancient Incan ruins) in the 1980s. He was there to consult for PeruPetro. House knew she wanted to follow in his footsteps. "It seemed like an honorable way to be able to return to Peru," she says.

House expects to finish her studies at Mines by 2002. She then hopes to return to South America as often as possible on business.

Three alumni start a company

If all goes as planned, the connections three alumni made at Mines will last a lifetime. Kurrin Barrett BSc Eng '99, BSc Econ '99, MSc Min Econ '00, Robert Potter BSc Geol '98, BSc Econ '99, MSc Min Econ '00, and Thaddeus Agar MSc Min Econ '01 met in an industrial psychology class, discovered they worked well together, and are now partners in a new venture. The result: a business consulting firm called Metavisio, Latin for "transcendent vision."

"The hours are no better than a salaried job and many of the
benefits aren’t monetary, but we wanted to problem solve and find solutions using our approach,” says Barrett. “Our Mines education gave us powerful conceptual, analytical and financial skills that can profoundly impact companies for the better,” says Agar.

Barrett continues, “We help companies develop, manage and implement solutions to complex business opportunities.”

“At Metavisio we measure our success by our client’s success,” follows Agar.

“Our methods use math, quantitative analysis, and organizational psychology to help solve business problems,” explains Potter. “We feel our philosophy is really unique though,” he continues, “We believe successful implementation is driven through organizational acceptance.” The three partners credit the philosophy, developed during their graduate education, to Dr. R.E.D. Woolsey.

Metavisio’s stated mission is to “provide holistic business solutions that transcend the expectations of our clients.” The long-term goal is to grow the business and expand internationally. Barrett, whose wife is German, would like to live in Germany some day. Currently, the three men work on-site and have opened their first office here in the Denver area. Current clients include Sun Microsystems, Level (3), 24-7 Media and The Kestrel Group. For more information, visit their web site at www.metavisio.com.

Neilson ‘83 Follows Family Dream

More than 30 years ago, Irv Nielson spent a lot of weekends in northwestern Colorado looking for a particular mineral he hoped would make his family rich. He bumped along backcountry roads in a jeep, stopping to drill holes in the ground. Many times, his 4-year-old son, Kurt Nielson MSc Min Ec ’83, tagged along.

“I had to babysit every once in awhile,” explains Irv. “I had a bunch of kids and I had to take my turns kind of entertaining ‘em, and kind of teaching ‘em what their father did.”

Irv was a geologist, paid to find oil shale. But in his spare time, he looked for nahcolite, which is used to make baking soda and soda ash (an ingredient of glass). He knew that millions of years ago a lake had dried up in the area and he suspected it left behind a huge deposit of nahcolite. In 1964, Irv confirmed his hunch. He took a sample from 2,000 feet below and hit nahcolite. “I knew exactly what we were looking at and knew we were within a major deposit,” Irv remembers.

Neilson thought the discovery would mean a much better life for his wife and seven children. The deposit was on federal land, though, so he had to get a lease from the U.S. Bureau of Land Management.

That turned out to be a substantial hurdle. “They never replied or gave us some other hoop to jump through,” he says.

Year after year, Irv tried to convince the BLM to grant the lease. He knew other families had amassed great wealth from mineral deposits and he thought nahcolite could do the same for the Nielsons. “I had envisioned that this was a rare opportunity and I would like to leave my family with something to remember me by.” Finally, Irv went to court and won the lease on appeal. But by then, 28 years had passed.

All this time, Kurt was keeping an eye on his dad’s progress. All those years wandering around drilling rigs as a child had left an impression and Kurt pursued a career in mining. “This has been in my blood, I suppose, since I was a kid,” Kurt says. “I went on to study geology like my father did and ended up actually writing my master’s thesis about the economics of nahcolite.”

After graduation, Kurt became an executive in an unrelated business. Then, in 1992, he got a call from his dad: The lease was theirs, but Irv no longer had the energy to keep going. For Kurt, the timing was perfect. “I was burned out on what I was doing, he says. ‘And this is really where my love was, my education. I think my wife was tired of me traveling and so we sat down over that weekend and decided to give it a go.”

Kurt packed up his family and moved to Rifle, Colo. He had the lease, but he still had the expensive task of figuring out how to mine the nahcolite, process it and get it to customers. Before long, he had used up all his savings. So he turned to his friends and business associates, looking for money.

“He is one of the most tenacious guys I’ve ever met,” says an early investor about Kurt Nielson. “He’s a visionary, too. He can see what he wants to build and what it will look like when it’s all done. And then he can just plow ahead until it gets done.”

Kurt’s vision started taking shape in 1996 when he found a major investor. He built a test mine, two processing plants and a pipeline. He also had to show his extraction system—injecting hot water into the ground—wouldn’t contaminate groundwater.

Today, the company employs 130 people. After all these years, the Nielsons are at the point where they should start to make money. The next challenge is to turn a profit, though analysts predict slow growth in the soda ash market.

Still, Kurt and Irv are optimistic and have plans to expand. Irv is thinking up new uses for soda ash. Since Irv’s last hunch turned out so well, Kurt is ready to go after this one. He just hopes it won’t take three decades to see it through.

Excerpted from a piece by Colorado Public Radio’s Laura Carlson, a reporter based in Grand Junction.
Timing, Communication, and Unrestricted Funds:
A Successful Prescription for Improving Mines’ Programs

Whether through the mail, over the phone, or on the CSM website, most people who know Mines know the Mines’ Annual Fund. Comprised of unrestricted monies, the Annual Fund can be used for an infinite set of purposes, such as accentuating support for the School’s established priorities. But the Annual Fund is perhaps better known for accommodating unanticipated needs and timely opportunities. This latter function was behind the CSM Foundation’s recent purchase of new housing facilities for The Guy T. McBride, Jr. Honors Program in Public Affairs for Engineers and for the Minority Engineering Program (MEP).

The programs moved into their new locations near campus earlier this year. The McBride program now resides at 1620 Maple Street, Golden, CO 80401. MEP is now located at 1215 Sixteenth Street, Golden, CO 80401.

Unrestricted dollars provided by Mines’ Annual Fund made the purchases possible, but the housing availability became an opportunity because of another important element: timing. “For McBride and MEP, the timing was just right,” said CSM President John Trefny. “The need for additional space surfaced just as the two houses near campus became available.”

The growth and success of the programs made the moves necessary. Program staff and operations remain the same; however, the new housing facilities better accommodate the programs’ many activities and services.

“The need for expanded facilities for the McBride program was obvious,” said Principal Tutor Steve Daniel. “In more than 20 years of operation, the program had never had its own dedicated space, and we’d reached a point where facilities were limiting what we could accomplish.”

The McBride Honors Program first began operating in 1979 to allow students to explore the ways in which applied scientists and engineers must interact with and are influenced by the political, economic, and cultural aspects of the societies in which they work. In its first year, the program included nine students. Since then the program has grown to accept approximately 50 freshman students each year, and today some 170 students are engaged in the seven-semester curriculum. The program exposes students to corporate and professional internships, public policy study, or international experiences. The international focus of the program expanded in 1988 to include student summer travel outside the United States. This allows students to experience firsthand a different society and learn something of its political, economic, and cultural climate for technological industry.

The new office facilities for the McBride Honors Program provide a home both for the program and for its students and faculty. “The new McBride house not only better supports our operations, but it’s more user-friendly for students,” Daniel said. The new space will accommodate seminars, support a computer laboratory and provide a place for students to meet, talk and study. In addition, the backyard will be utilized for student activities. According to Daniel, “the McBride home really allows the program’s students and faculty to interact intellectually and socially in an environment that fosters a cohesive, collegial experience.”

For Minority Engineering Program Director Judi Diaz-Bonacquisti, “the move reflects the expanded impact MEP has grown to make on campus and in underrepresented communities.” In 1988, one year before MEP was first established, 29 minority freshmen enrolled at Mines. In fall 2000, the School admitted 100 new minority undergraduates. The rate of graduation by minority students has also increased significantly since MEP began operating at Mines. In the fall of 1992, only 44 percent of the minority students who entered CSM remained at the School four years later. That rate increased to 64 percent in the fall of 1996.

“...the new house will help us further our efforts and help even more people experience Mines. We’re very fortunate and grateful for the opportunities that are available to us in our new location,” Diaz-Bonacquisti said. The new MEP office includes a conference room for student officer meetings, a “home-away-from-home” lounge area and kitchen, a larger computer lab, and office space for the program staff.
Mines has offered a premier technical education since it was first established in 1874, but the School has earned its current level of excellence by making that education available to all qualified students. "Without the flexibility of unrestricted funds, we could never accommodate the School’s immediate needs to help further Mines’ mission,” said CSM President John Trefny. “In this case, we’ve managed to do that by accommodating the operational needs of two essential student development groups.”

Generous support from Mines’ alumni, friends, and partners made those purchases possible. Together they contributed more than $1.6 million in unrestricted annual funds in 2000-2001. The program hopes to continue and expand upon that most notable achievement by raising $2 million before the end of the current fiscal year on June 30, 2002.

Participation is as important a goal for the Annual Fund as is the amount of money raised. “Raising support for the School is about more than raising funds for it,” Trefny said. In this context, “participation” refers to the percentage of alumni in particular who make gifts to the School. In ranking colleges, many organizations use participation as one measure of the institution’s success. In the 2001-2002 academic year, the Annual Fund program hopes to increase participation from 20 percent to 22 percent.

To support or learn more about the Annual Fund and other Foundation programs, visit alumnifriends.mines.edu. Information may also be received by calling 303-273-3275. For more information about the McBride Honors Program, call 303-273-3990. MEP may be reached at 303-273-3021.
Joseph Dunbar Establishes Wyoming Scholarship

Colorado School of Mines boasts a proud heritage as a world-class educational institution within a state school community. The School's strength lies in its ability to train students to productively contribute to industry, academia, and society regardless of where the opportunities to do so exist. Quite simply, the Mines education transcends geography.

Mines alumnus Joseph Dunbar PE 56 heralds the implications of that broad focus. After graduating from Mines and working for Ohio Oil Company and Public Service Company of Colorado, Dunbar purchased four rigs from Mier Well Service in 1964 and promptly moved to Gillette, Wyoming. He has said he “made a mental policy to only work in Wyoming. Wyoming is a good state.” Success followed him there, as oil discoveries were made in South Bell Creek, Recluse, Kitty Field and Hartzog Draw.

Now a Colorado resident, Dunbar prospered during his 35 years living and working in Wyoming. He recognized his 45th class reunion as the perfect occasion to share his good fortune with his community. In honor of that reunion in May 2001, he established the Wyoming Scholarship Fund with a generous contribution of $100,000.

Wyoming Scholarship Fund awards will be made to Wyoming residents who meet Mines’ academic requirements for admission and who are pursuing degrees in geology, geological engineering, geophysics, petroleum engineering, or chemical engineering. The scholarship will cover up to full tuition for an undergraduate or a student pursuing the combined bachelor of science/master of science degree.

Dunbar is hopeful that his fellow alumni and businesses that have benefited from their enterprises in Wyoming will support the fund to maximize its benefit to students from the state. “Joe's extraordinary gift will make it easier for students from Wyoming to enjoy the same quality education that our in-state students receive,” said CSM President John Trefny. “The true gift is in seeing that one of our alumni appreciates the education he received from Mines enough to share it with others – a true benefactor indeed.”

Ultimately, it is the Mines community as a whole that benefits from a gift of this type. Trefny explained that “the more diverse our population, the more widespread our reach and our effectiveness. We are fortunate for Mr. Dunbar's generosity, and even more so for his vision.”

Klingensmith to Lead President’s Council for 01-02

Harvey R. Klingensmith BSc Geop BSc Geol 75, Senior Vice President of Exploration and Production at El Paso Production, will serve as National Chair of the CSM President’s Council for 2001-2002. Klingensmith assumes this role from Rob McKee, who served as National Chair from 1998 through 2001.

As National Chair of the CSM President’s Council, Klingensmith will provide leadership to the President's Council Regional Program. The program is designed to recruit support for the Mines Annual Fund and other CSM priorities, to honor the School’s friends and alumni who contribute $1,000 or more, and to promote widespread awareness about Mines.

Organized by regions, the President's Council program includes committees in Dallas, Denver, Houston, Los Angeles, San Francisco, and Tulsa.
Philanthropy at Mines

Colorado School of Mines received more than $25,000 from each of the following donors between 15 June 2000 and 20 August 2001. With their gifts, these individual benefactors will join or renew their membership in the Simon Guggenheim Society, a distinguished group of Mines alumni and friends who annually donate $25,000 or more to the School. In many cases, the donors’ gifts earn them membership in the Mines Century Society, which honors alumni and friends whose cumulative contributions to the School total $100,000 or more.

Individual Gifts

Hugh E M 49 and Ann Evans made an additional life income gift of $100,015 in appreciated securities. Their contribution renewed their membership in the Simon Guggenheim Society of the President's Council. They are also members of the Mines Century Society at the silver level.

The Broussard Family Engineering and Technology Management Scholarship Fund received a gift of $50,000 from Jerome T. Met E 63 and Rebecca Broussard. Already a member of the Mines Century Society at the gold level, he joined the Simon Guggenheim Society for 2001-2002 with this gift.


Corporate Gifts

The Petroleum Engineering Department received software donations last year from the following companies: Computer Modeling Group, Halliburton Company, Kappa Engineering, Maurer Engineering, NSI Technologies, Scientific Software Intercomp Inc., and Theta Enterprises.

The Denver Chapter of the ARCS (Achievement Rewards for College Scientists) Foundation has pledged $30,000 to support six scholarships for the 2001-2002 academic year.

With a gift of $25,000, the DuPont Company provided a Young Professor Grant in the Division of Environmental Science and Engineering.

The Environmental Studies Group contributed $100,000 toward a pledge by Infiltrator Systems to support Dr. Robert L. Siegrist’s research and educational activities in the area of onsite and alternative wastewater technologies.

Schlumberger is supporting the research of Professor Max Peeters in the Department of Geophysics’ Center for Petrophysics with a gift of $25,000.

The SEG Foundation made a gift of $25,000 to support the Center for Wave Phenomena, Seismic Unix Project.

With a gift of $37,341, Texaco is supporting a graduate fellowship for Marc Jager, who is doing research on gas hydrates.

Celebration of Mines

Many of the programs displayed at the annual Celebration of Mines event on Friday, September 7, 2001, are supported by CSM alumni, friends, and partners. Pictured here (left to right) are booths and visitors and Mines' Economics and Business program.
“We’re all in this together,” says Dr. David Matlock, director of the Advanced Steel Processing and Products Research Center (ASPPRC). Forging links between academia and industry, ASPPRC provides graduate students with an education both strong in fundamental skills and rich in opportunities to apply those skills.

One of the links is the center’s mentor program. For years ASPPRC has sponsored an interactive program in which sponsor organizations provided input about the industrial relevance of student research projects. In 2000 the mentor program was formalized.

Now, for each student research project, there is at least one mentor from industry. Mentors confer, by telephone and email, approximately twice a month with their students, who also spend time at sponsor companies. While graduate student Steven Cross was conducting some of his research at The Torrington Company, a critical part of equipment broke. “We got two or three people involved in the replacement of that part. Some worked overtime,” explains Torrington’s Alan Chidester.

“That’s the kind of support we get from our mentors,” Cross says with a smile.

“There’s a lot of technical horsepower out there,” says Metallurgical and Materials Engineering Department Professor John Speer, who came to the School from The Homer Research Laboratories of Bethlehem Steel Corporation, an active sponsor of the center. While CSM students and faculty are responsible for the research, it’s the industry leaders who keep them informed about current needs.

Research projects are often suggested by companies. They generate the questions, and our students get the answers,” says Dennis O’Neil Met E ’60, who retired from Caterpillar Inc. in 1999 and now volunteers to help coordinate the mentor program.

Graduate student Tricia Douthit BSc Met ’97 says, “Our projects are based on what’s going on in industry right now.”

Bob Cryderman of North Star Steel is one of Douthit’s mentors. He adds, “We ask where the research fits in the real world.” Many of the projects involve cost-saving and energy-conservation issues, so the research benefits both producers and users of steel.

ASPPRC has 21 sponsor institutions. Twice a year representatives from the organizations—many of them mentors—meet on the CSM campus. At workshops, students report on the status of their research and benefit from the experience of many who represent the steel and manufacturing industries. “It’s our function to ask questions. What does this mean? We make them think,” says Cryderman. Some joke that they become “tor-mentors” at this point, but the process is positive, as representatives of competing companies collaborate to offer students suggestions and alternatives.

Students know that the input they receive, and the associations they create, will help land them jobs upon graduation. Ted Majka MSc Met & Mat Engr ’00 of Colfor Manufacturing Inc. says, “My project, and the knowledge I gained in that research area, helped me get the job I have now. A future student will continue my research project. When that occurs, I want to be a mentor. I could tell the student how I left off with the project, where I’d like it to go next. That’s something I’d like to do.”

Mike Stringfield BSc Eng ’98, who plans to complete his master’s degree work this fall, reports that his mentor from Ispat-Inland retired at the first of the year. But mentor Bernie Levy has continued to participate, making two trips to Mines on his own initiative.

It’s obviously a commitment that the industry leaders enjoy. When asked about all the hours they spend advising students, Torrington’s Chidester says, “We would be willing to talk to students even more than we do.”
Not all inventions need carefully processed patent applications. Only the good ones. And for those, the stakes are high.

"Many inventors do not understand the subtleties of the patenting and licensing processes," says Dr. Patrick MacCarthy of the Chemistry and Geochemistry Department. "A lot of inventions come from engineers and scientists in university settings, and they have no formal instruction in patent issues."

Lack of knowledge can be costly. "In some cases it could mean hundreds of millions of dollars to corporations," notes MacCarthy. So MacCarthy developed a course for CSM’s Special Programs and Continuing Education. Then UCLA called. So have North Carolina State and other schools. Then Sony Electronics and other businesses. All want MacCarthy to present his course "Inventing, Patenting and Licensing." At CSM, it is now offered as a 3-week, 3-credit-hour course, available to both undergraduate and graduate students. "When students graduate from here and go to work, they will be well-informed about many aspects of protecting intellectual property," he says.

As MacCarthy explains, the patent procedure is complex, and the success rate scant. "Of all patents applied for, maybe about 60 percent result in patents. Of those patents that are issued, a relatively small number ever result in a commercial product or process. Of those, only a fraction are a financial success. Then, if you are one of the few successes, you can anticipate, as essentially a certainty, that the validity of your patent will be challenged. And there are many grounds for challenge."

With that dose of reality for a foundation, MacCarthy plunges his students into the details of a well-executed patent application. First and foremost, he tells them, plan ahead. "From day one, you have to be working defensively and looking five to six years down the road. When challenged, there is little you can do retroactively. You may already be doomed by the time your patent issues."

Record-keeping is key—what you did and when you did it. "Lack of properly maintained, witnessed documents can sink you," warns MacCarthy. "What you don’t do is also important," he continues. "You need to avoid the inappropriate disclosure of your invention prior to certain critical dates." In his course, he describes each stage of the patenting and licensing process, clarifies terminology, explains patent laws and presents case histories that illustrate critical points.

MacCarthy is quick to point out that he is not a patent attorney or patent agent. His course is based on more than 20 years of experience in inventing, patenting and licensing, and on his extensive studies of these fields. It is this “inventor’s perspective” that appeals to students in his course. His goal is to familiarize them with all nuances of the patent process.

“It’s relatively easy to get a patent,” MacCarthy says, “but it may not be worth a damn. To get a strong patent that has a high likelihood of surviving a challenge in a court of appeals, now that’s another thing.”

MacCarthy has firsthand experience with inventing, patenting and licensing. “I’ve always been an inventor at heart,” he says. He holds 13 U.S. and four foreign patents, and currently has several patents pending. A number of his inventions have been licensed to industry and marketed worldwide. His first invention to be brought to market was a ribbon yo-yo, which was simpler for children to work with than a traditional yo-yo.

His most successful product was an interactive kaleidoscope, marketed in the late 1980s by Ohio Art under the trademark Kaleid A Sketch, as a companion to their famous Etch A Sketch. He also patented a liquid kaleidoscope, a product that later became involved in a four-year patent dispute. His experiences from that legal battle are used as a case study in his course. His most recent patent is for a device to facilitate the use of transparencies on overhead projectors. And, he says, “I’m always working mentally on other inventions.”

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CENTER FOR TECHNOLOGY
The Center for Technology and Learning Media, the newest building on campus, is also an architectural and technological showcase. Not only are the building's design and art unique, but the educational technology is leading edge.
he very first learning experience was under a tree,” says architect Paul Haack. “At the new building, I picture students taking a laptop out under a tree.”

Informal spaces, both indoors and outdoors, promote interaction and study in CSM’s new Center for Technology and Learning Media (CTLM). The open building maximizes use of natural day lighting. “It is a building integrated with its site, connected with its environment,” says Haack.

The building, which opened its doors in August, makes use of natural materials—sandstone, patinated copper, brick and aluminum—to relate to the central campus and reflect both the history and future of CSM. “We wanted to develop a building that celebrated technology and also spoke to campus traditions,” explains Haack.

Inside, the building has a modular design of learning spaces for future flexibility. As Haack points out, “Technology is always changing. We have accommodated for future programs that we don’t even know about yet.” Current technology features in the 39,000-square-feet structure include:

- Projection systems in all classrooms
- Document cameras in many classrooms
- Interactive and electronic marker boards with rear screen projection
- Wireless network access
- Control systems that allow instructors to share data among computer stations
- State-of-the-art student computers with flat screen monitors.

CTLM’s tower is an important architectural element, according to Haack, because Cheyenne Street is expected to become a new gateway to the campus, making CTLM the focal point upon entrance to CSM. Inside, in the atrium created by the tower, is another feature that makes CTLM distinctive—its dramatic artwork.

Kate Leonard, artist and chair of the art department at Colorado College, created “Warnings of Daedalus: A Flight Imagined.” According to Leonard, “The artwork addresses three main topics: the connections between nature and scientific inspiration, the relationship between pure and applied sciences, and the consequences of the values we embody as manifested on the landscape. I have combined traditional painting techniques with new digital printing technology and used extensive sanding to mimic the natural forces of wind and water erosion to reveal the images and jewel-like colors.”

By Marsha Konegni
Leonard’s work is a public art project. The Art in Public Places program exists by state law, mandating that one percent of actual construction costs for specified state building projects be set aside for the acquisition of artwork. The program is administered by the Colorado Council on the Arts.

The art is massive. “One of the more interesting challenges was to figure out a way to design a piece of this size that could be painted off-site, and then, on installation, fit through a standard double door,” said Leonard. Fortunately for this, and other questions, she knew an expert. “I had my own personal aerospace engineer who consulted with me throughout the project—my father,” she said.

Her father was one of many who contributed to the successful completion of CTLM. Summing up the project, campus architect Paul Leef said, “From the beginning of design, we set our goals on an inviting and ground-breaking facility which was sensitive to our campus, responsive to our natural environment and rich in technology. We wanted to create many new opportunities for learning and study, and we expect that this building will propel innovative engineering education well into the 21st century.”
<table>
<thead>
<tr>
<th>November</th>
<th>December</th>
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<tr>
<td>21</td>
<td>Planned alumni outing in Colorado Springs in conjunction with women's basketball game at Colorado College.</td>
<td>A Christmas Carol, Denver Theater Company, The Stage Theater. 1:30 p.m. Adults $30; seniors and students (no children under 4) $23. Please RSVP by Nov. 26; 303-273-3295.</td>
<td>Four-corners section outing between-games buffet at Durango during Mines-Ft. Lewis basketball game. Lunch Bunch, an informal alumni get-together meets at the Buffalo Rose in Golden, Colo., 11:30 a.m.</td>
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<tr>
<td>29</td>
<td>Alumni wrestling reunion and Southern Nevada section event, Las Vegas, Nev. Call for details: 303-273-3290</td>
<td>Joint CSM and CSMAA Holiday Reception with President Trefny Lunch Bunch, an informal alumni get-together meets at the Buffalo Rose in Golden, Colo., 11:30 a.m.</td>
<td>Lunch Bunch, an informal alumni get-together meets at the Buffalo Rose in Golden, Colo., 11:30 a.m.</td>
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For the most up-to-date information, check the Web site: www.alumnifriends.mines.edu/news_and_events/default.htm

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Who’s Who at the CSM Alumni Association

Officers:

Ed Crabtree EM ‘60, a patent and trademark attorney in Denver, is CSMAA president for 2001-2002. His focus this year is membership. “I’m particularly interested in our Association working with the School in staying in touch with our young alumni,” he says. “Over three-fourths of our alumni have graduated in the past 20 years. We need to help them network with their peers, former professors, be aware of school activities and pass on information related to their fields of discipline. By being in touch with our young alumni, we hope as their careers blossom, they’ll remember to come back to Golden from time to time and help support the School.”

Jodi Menebrooker BSC CPR ‘91 is president-elect. She is a senior environmental engineer with Roche Colorado Corporation in Boulder, Colo. She lives in Longmont, Colo.

John Schwartzberg BSc Met ‘88, CSMAA treasurer, was originally a journalist with a degree from University of Colorado. He earned a second degree at Mines and then joined his father, also a Mines graduate, in the failure-analysis business at Rocky Mountain Engineering & Materials Technology, Inc., in Denver.

Art Biddle Met E ’61, CSMAA secretary, is a retired attorney. He recently served as executive director of Conciliation Ministries of Colorado, a Denver-based, non-profit group that provides mediation services and is currently on their board. He also is chapter counselor for the Sig Ep house on campus. He lives in Arvada, Colo.

Vicki Cowart MSc Geop ’77 is the Colorado State Geologist and Director of the Colorado Geological Survey. She earned a BSc Phy from Worcester Polytechnic Institute before attending Mines. While president of CSM AA last year, she led the Association in a strategic planning process that culminated in a new business plan. She lives in Denver.

Hugh W. Evans EM ’49, a retired mining engineer, is the representative from the CSM Board of Trustees. He lives in Boulder, Colo.

Roxann MacKenzie Hayes BSc Eng ’95, P.E., is Rocky Mountain regional director. She is a senior civil engineer for Larimer County and lives in Ft. Collins, Colo. She was Gulf Coast regional director for two years prior to moving to Colorado.

Blase Leven MSc Geop ’89, regional director for the central United States, is program manager at the Hazardous Substance Research Center at Kansas State University in Manhattan, Kan.

Kimberly Lewis BSc CPR ’92, a metro-Denver regional director, is a senior process engineer for Union Carbide Corp. She lives in Golden, Colo.

Ian Mackay DSc Geol ’53, Mines Medal ’99, Hon Mem ’89, is standing in for the international director, who has yet to be named. He is chairman of Red Rocks Resources Ltd. in Calgary, Canada.

Amy Inkell Pflaum BSc Eng ’95, P.E., a metro-Denver regional director for the past two years, is a project engineer in civil/infrastructure for Merrick & Co. in Aurora, Colo. She lives in Westminster, Colo.

Pat Phillips Met E ’61, a metro-Denver regional director, is a retired financial consultant who lives in Lakewood, Colo.

Laurence Preble PRE ’61, regional director for the West, is a retired attorney who lives in Los Angeles. He recently joined KUD International LLC, a subsidiary of Kajima Corp., in Japan.

Julie White BSc CPR ’93 is Gulf Coast regional director. She is a process engineer for Rohm & Haas and lives in Houston.

Board Members:

Scott Clark BSc Pet ’85, a metro-Denver regional director for the past year, is co-owner and president of Odyssey Exploration, Inc. in Denver. He lives in Westminster, Colo.


CSM AA OFFICERS: Front row from left, John Schwartzberg, treasurer; Vicki Cowart, past president; Jodi Menebrooker, president-elect. Back row from left, Art Biddle, secretary and Ed Crabtree, president.

CSM AA STAFF: Center front, Maureen Keller. Middle from left, Janet Blair, Kathy Breit, Jo Marie Reeves. Back row, Michael Watson, Gardy Van Soest.

The politics of energy. Once again alternative fuel sources are in the American consciousness.

CSM researchers are contributing to the effort with research on developing fuel cells that may be able to run appliances, cars, homes and power plants in the near future. Their research is being supported by several federal agencies, including the departments of Energy, Defense, and Commerce.

"Fuel cells are a step toward preserving natural resources. Increased use of these energies will allow the world to extend the current supply of hydrocarbons. By utilizing more efficient energy sources, less carbon dioxide will be expelled into the air, which may help offset the greenhouse effect," said Dr. Tony Dean, the William K. Coors Chair in the Department of Chemical Engineering.

Fuel cells have a number of advantages over conventional combustion generator systems, he explained. They can be twice as efficient as combustion engines at converting fossil fuel energy into electricity and therefore provide more power with less fuel.

Energizing the Battery

Soldiers of the future will have energy needs that are 10 times higher than those of current armed forces personnel. They will carry items such as computers, GPS devices and radios on missions.

Development of these small, efficient, personal generators for the electronically dependent soldiers is challenging. Initially the government has targeted development of a 20-watt device to demonstrate the feasibility of this concept. (See inset photo, right.)

The Defense Advanced Research Projects Agency (DARPA) is funding several projects to address this specific need. ITN Energy Systems, located in Littleton, Colo., and CSM researchers are heavily involved.

The goal of this team is to develop a compact, palm-sized, fuel cell that will run on diesel fuel. In addition to Dean, CSM researchers include Dr. Bob Kee, the G.R. Brown Distinguished Professor of Engineering, and Dr. Laxminarayan Raja, assistant professor of engineering. The team includes researchers from four other universities, as well as several companies.
“The objective of our research at CSM is to model a fuel cell design and find ways to allow the cell to run on diesel,” Dean said.

Some of the primary issues facing the team involve temperature management and durability. The cell will operate between 500 to 600 C, which requires thermal insulation and a cooling system. “Durability is an extremely important issue, because the cell will be exposed to extreme temperatures in a military environment and will be banging around on a soldier’s belt,” he said.

Another major issue is to develop a fuel cell—traditionally powered by hydrogen—that runs on diesel fuel. One problem is that when diesel runs through hot passages in the fuel cell, there is a tendency for the fuel to form deposits. “For the cell to be useful in the field, we must determine how to prevent these deposits,” Dean added.

Zero Pollution Alternative

Dr. Andy Herring of the Department of Chemical Engineering and Dr. Steve Dec of the Department of Chemistry and Geochemistry are also researching fuel cells. They share a grant with John Turner of the National Renewable Energy Laboratory (NREL) from the Department of Energy to investigate high-temperature proton exchange membrane (PEM) fuel cells.

Currently PEM fuel cells can only be used at low temperatures. Higher-temperature PEM fuel cells would be much cheaper to produce, more energy efficient, and usable with a larger variety of fuels than the current generation.

This research is part of a larger NREL project in which fuel cells will be used to generate electric power using a process that begins with a photovoltaic array that converts sunlight into electricity. It then electrolyzes the water into hydrogen, which is stored to power the fuel cell.

The unique aspect of this design is the utilization of the sun-derived hydrogen to produce electric power on demand, even at night when there is no sunlight.

“This is a zero-pollution source of energy that uses only renewable resources. Someday it may be able to run everything from handheld devices to power plants,” said Herring. “One of its primary purposes may be to power homes and businesses.”

In related research, Dr. Dennis Readey, Herman F. Coors Distinguished Professor of Ceramic Engineering in the Department of Metallurgical and Materials Engineering, is researching proton conductors for fuel cells, working with Protonetics of Golden to obtain funding.

Patenting Tomorrow’s Transportation Technology

The focus of Dr. Doug Way’s research is the fabrication and application of new material to separation processes. Way, associate professor in the Department of Chemical Engineering, uses new materials such as palladium to study the processes of membranes and absorbents.

How does this work? Why is he interested in palladium membranes?

According to Way, palladium has an unusual property that makes it a good catalyst for breaking the hydrogen molecular bond to form hydrogen atoms on the surface. Once those are formed, they easily dissolve in and diffuse across palladium. Hydrogen is the only compound that can be transported across the palladium membrane, making palladium a perfect membrane for hydrogen.

The major applications for this type of membrane are fuel-cell power systems and transportation.

Liquid fuel, such as methanol, can be re-formed into hydrogen, carbon, carbon dioxide and water vapor. Carbon is a re-former product, but it is poison for the fuel cell. Way uses the membrane for the hydrogen to permeate the fuel cell, feeding in pure hydrogen while rejecting the carbon.

This project is currently being patented, and several companies are interested. Way’s work is funded by the Department of Energy, Chevron, BP and Shell.
Staying connected

Southwest

Twenty-three Miners and family members gathered at the Francisco Grande Resort in anticipation of testing their survival and golf skills by playing at 105°+ temperatures. Everyone arrived the night before in time to enjoy a happy hour in Mary and Scott Gustafson’s penthouse suite. Conversations and discussions included recent events at Mines and the uncertainty many alumni feel about the school’s future.

Three foursomes and one threesome teed off in a best-ball scramble under the Arizona sun Saturday morning. We’re happy to report that everyone survived and enjoyed themselves. The scores were close with one stroke separating the top three teams. Everyone was a winner with prizes such as mugs, golf towels, caps, a Frisbee and even Mines Marbles. The non-golfers raided the nearby factory discount stores and returned with their own prizes. The committee of Gustafson, Richards and Jurasin look forward to planning the 2003 event.

Those attending included Jim McDonald EM ’48, Bobbie and Tom Warfield EM ’52, Delores and Newell Orr Met E ’54, Marion and Bob Kenrick EM ’54, Mary Jo and Andy Jurasin Geol E ’54, Kay and Bob Dalton EM ’57, Rhea and Dick Richards Geol E ’62, Kathy and Leon Munyan BSc Min ’76, and Mary and Scott Gustafson BSc Geop ’77, MSc Min Ec ’79.

Andy Jurasin Geol E ’54 hosted a send-off party in June, though none of the five incoming freshmen who were invited were able to attend. But a group got together anyway. Current CSM students Adam Goodworth, Gabe Florio and Kristina Gronberg attended as did a few parents.

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West

Alaska
Executive Director Michael Watson reported to about a dozen Anchorage, Alaska, alumni Sept 7. He discussed campus happenings over lunch at Don Jose’s Mexican Restaurant in Anchorage.

East

North Carolina
Fifteen alumni and family members shared a post-game meal at the Stock Car Cafe in Cornelius, N.C., with the Mines soccer team after its Aug. 24 match against Davidson College. The Orediggers played well but came up short in this exhibition match with the division I opponent.

International

England
Saturday, July 14, London coordinators Brenda Eckles BSc Geop ’94 and Tracy Vowel Wallace BSc CPR ’89 had lunch with Colin Engle BSc Geol ’89, Geol E ’96, his wife and daughter, and section coordinator Bob Pearson PE ’59 and his daughter at Navajo Joe’s Restaurant near Covent Garden in London.
Financial Planning

“Financial Planning” as affected by recent tax law changes was presented by Mark Fuhrman (no, not the O) sleuth of Allamerica Financial during lunch at Pitchers Riverfront in June. A lively discussion focused on education plans, IRA required minimum distribution, the death (Throw Mama From the Train) tax and qualified personal revenue trusts.


Alumni Baseball Night

Thirty Mines alumni and family members enjoyed Rockies vs. Giants baseball July 24 in Denver. The Rockies won in fine style!

Fishing Derby

Dick Mandel PE ’53 hosted 21 alumni and family members at his Cross D Bar Trout Ranch near Westcliffe, Colo. Thirteen contestants competed for prizes with Gary Hoffman BSc CPR ’78 catching the smallest fish and Bob Pearson PE ’59 catching the largest.

Annual Family Picnic

About 70 alumni and their families attended this year’s annual picnic at the Coolbaugh House on campus. George Breit MSc Geochem ’80, PhD Geochem ’86 and Mary Beth Beach PE ’69 acted as chefs. In addition to food, there were also games and prizes for the children.

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For more information, contact the managing director, CSM Foundation Inc. Linda M. Landrum at 303-273-3142.
In a rapidly changing and often chaotic world, the campus cherishes its fall traditions... the annual climb up to the M-Blem on Mt. Zion... the Minority Engineering Picnic... the freshman convocation... and other back-to-school rites and rituals.
Cowart ’77 elected AASG president

Vicki Cowart MSC Geop ’77, state geologist and director of the Colorado Geologic Survey, was elected president of the Association of American State Geologists (AASG). Cowart was appointed Colorado’s state geologist in 1993—the first woman to hold that position. She is also the first woman to head AASG, an organization whose membership consists of directors of geological surveys in 50 states and Puerto Rico. AASG’s primary objective is to coordinate the efforts of state geological surveys and to expand the areas in which state surveys work cooperatively with federal entities.

During her 2001-2002 term as president, Cowart will chair the AASG executive committee. She has also served as vice president and statistician for AASG. Cowart’s other professional activity includes being a board member and program chair of the Colorado Women’s Forum and she is the immediate past president of the CSM Alumni Association. She is a member and former president of the Association for Women Geoscientists and a member of the Alliance of Professional Women, the Denver Geophysical Society, the Society of Exploration Geophysicists, the American Geophysical Union, the American Institute of Professional Geologists and the Rocky Mountain Association of Geologists.

Tom Cruise to play Wendell Fertig

Word in Hollywood is that Tom Cruise will be playing the lead character of a new movie set in World War II. Tentatively titled Fertig, the film is a true story about Wendell Fertig Hon D Engr ’51, Hon Mem ’65, the American general who became a hero during the war. Fertig served as CSM Alumni Association secretary from 1960 until his death in 1975 and was also a Mines professor of military science and tactics. When World War II broke out, he was superintendent of the largest iron mine in the Philippines. After the fall of the Philippines, Fertig organized and commanded the Philippine American guerrilla forces. With 35,000 men and an army of natives, he held the Island of Mindanao for Gen. MacArthur. Fertig was also the subject of a best-selling book, They Fought Alone, by John Keats.

Attention spouses of former students

Mona Moyer, wife of former Mines student William E. Moyer BSc Phy ’85, wants your college-years stories for a book she is writing about life’s funny moments as experienced by spouses of Mines students. Many of you have wonderful tales of your married years at Mines. Moyer would like to get enough material to keep the book’s focus on CSM experiences only, particularly with the engineering perspective in mind. She is looking primarily for funny stories, but interesting or poignant experiences during your Mines years are also welcome. She needs the following information: spouse’s major and year of graduation; graduate or undergraduate; where you lived; children; your job(s); anything else of interest. She needs the information by Feb. 1. Moyer can be reached at: 14012 NE 47th Ave., Vancouver, WA 98686-1691; 2moyer@home.com.

Bement ’54 up for federal post

President Bush has nominated Arden Bement Jr. Met E ’54, Medalist ’84 as director of the National Institute of Standards and Technology at the Department of Commerce. At press time, he was waiting for the full-Senate vote. Bement has worked as a professor of engineering at Purdue University since 1993. He is director of the Midwest Superconductivity Consortium and is also head of Purdue’s School of Nuclear Engineering. He was with TRW Inc. as vice president for technical resources from 1980-88 and as vice president for science and technology from 1988-93.
DAVID E. ARO EM ’52 died Feb. 5 in Midvale, Utah. He was 77. Aro’s half-century career included work as a mining engineer on diverse extraction and milling projects in Saudi Arabia, Uruguay, Mexico and throughout the western United States. He was a recognized authority on exploration, development and processing of metallic ores and phosphate deposits. In 1950, he married Joan Ann Hallett. They were later divorced. Aro is survived by two sons, two daughters, seven grandchildren, a sister and a brother. According to his family, “Dave Aro will always be remembered by anyone who knew him and worked with him as not only a competent and dedicated mining engineer, but as a ‘miner’s’ mining engineer.” His family dedicated his professional library to the Arthur Lakes Library in his memory.

KENNETH E. BODINE PE ’48, a Denver lawyer, died Sept. 2 of myeloma. He was an international oil lawyer and a member of the Colorado Bar Association. While at CSM, he was a member of Beta Theta Pi fraternity and attended his 50th reunion at Mines. He married Patricia Proulx in 1953 and she survives him along with two daughters, a son and four grandchildren.

JOHN W. CALDWELL EM ’50 died Jan. 30 in Idaho. He was 74. Caldwell worked for Humphries Gold Corp. in the ’50s in Florida. He moved west in the late ’50s working for Bunker Hill in San Francisco and as director of technical services in Seattle, where he developed the cathodic protection sector of the company. He was western region chairman of the National Association of Corrosion Engineers (NACE) in 1965. He held two patents in salt-water cathodic protection. After corporate retirement, Caldwell started Corrosion Techniques Co. in the ’60s and continued mining the family gold mining claims. He was a registered P.E., a corrosion specialist with NACE, a Mason and a member of the CSM Alumni Association. He is survived by his widow, Debbie, two daughters and two sons.

T. VINCEN CANNING Met E ’32 died May 23 at the age of 90. A native of Denver, he married Anne Smedley in 1943. She preceded him in death. He worked for an English mining company in Korea and on various mining projects in Colorado. He was a member of Kappa Sigma Fraternity, Mining Club of New York, Mining and Metallurgical Society of American and the American Institute of Mining, Metallurgical and Petroleum Engineers. He is survived by a son.

BRAD R. CATALDO BSc Geop ’81, a database manager for M & I Data Co., died Aug. 13 while diving in Wazee Lake in Wisconsin. He was 41. He previously had worked for the Internal Revenue Service. Throughout his life he was an avid diver and reader. He was a former acolyte and parishioner of Trinity Episcopal Church. Cataldo is survived by his mother, two sisters, and aunt and uncle, three nieces and a nephew.

ALBERT W. “BILL” CULLEN Geol E ’36 died of pneumonia Jan. 19 at age 88. He began his petroleum career with Seismonograph Service Corp., then worked for Lion Oil Co., and was the first manager for British American in Denver. In 1952 he became an independent exploration consultant and co-founded Colonial Oil Co. He worked on numerous geological prospects in the Rocky Mountain region and was involved with the discovery and development of several oil and gas fields. In the early 1970s, Cullen became blind, but continued working until fall 2000. He often said, “Blindness made me a better geologist because it required me to visualize and carefully analyze prospects in my head.” He maintained an extensive geological library and had an impeccable memory for details. Cullen is survived by his family, “Dave Aro will always be remembered by anyone who knew him and worked with him as not only a competent and dedicated mining engineer, but as a ‘miner’s’ mining engineer.” His family dedicated his professional library to the Arthur Lakes Library in his memory.

In memoriam

RALPH K. FOSTER EM ’43, MSc Min ’47, died Aug. 6 at the age of 80. He served in the European and Pacific/Asia theaters in World War II with the Corps and died at the age of 82. Foster was married to Janice Barry. He had four children, a son and three daughters, and two stepdaughters survive him.

ROBERT H. GALLAHER PE ’43 died of emphysema in Florida May 17. He was 81. Gallaher was a retired civil engineer and owned Gallaher Engineering and Surveying Co. in Evergreen, Colo. He was an officer in the U.S. Army during World War II and helped liberate Italy. After graduating from Mines and the University of Utah, he helped with the CROP Walk and United Way. He was a member of Beta Pi. Gallaher is survived by his wife of 53 years, Gwen, a daughter, two stepdaughters, a sister, 10 grandchildren and a great-grandchild.

HARRY EVANS Geol E ’49 died April 29 at the age of 75. Evans was a geophysical consultant working throughout the United States and Canada. He was a past chairman of the geophysical committee for the Canadian Petroleum Association, a member of the Canadian, European and American Societies of Exploration Geophysicists and a life member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta. Evans is survived by his wife of 54 years, Grayce, a son and a daughter.

ROBERT H. GALLAHER PE ’43 died of emphysema in Florida May 17. He was 81. Gallaher was a retired civil engineer and owned Gallaher Engineering and Surveying Co. in Evergreen, Colo. He was an officer in the U.S. Army during World War II and helped liberate Italy. After graduating from Mines and the University of Utah, he helped with the CROP Walk and United Way. He was a member of Beta Pi. Gallaher is survived by his wife of 53 years, Gwen, a daughter, two stepdaughters, a sister, 10 grandchildren and a great-grandchild.

JOHN WALTER HYER JR. EM ’42 died March 23 at age 82. He served in the U.S. Army during World War II, helping construct the training base for the 10th Mountain Division. He also led a company of landing troops who restored the water supply and airfields in Nagasaki, Japan, in the aftermath of the bomb. Following the war, he was a mining engineer for Great Western Sugar before joining the family automobile business in Denver. He later established Hyer Electronics and Hyer Associates and became a principal in a venture capital firm. He also founded a data processing center on the Gila River Indian reservation in Arizona. In 1975, he moved to Guam and raised vegetables and pigs while developing a tropical fruit orchard. Hyer moved to Washington in 1979 and wrote a weekly column, “Senior Sense,” for two local papers. Hyer is survived by his wife of 25 years, Beverly, a son, a daughter, two grandchildren, a stepson and a stepdaughter.
FRANCIS S. JACOBSON Met E '33 died July 5 at the age of 93. The son of Swedish immigrants, he was raised on a homestead ranch east of Colorado Springs, Colo. He married his wife of 66 years, Margot, in Michigan. He completed his 40-year career as chief metallurgist for Kaiser Steel in California. He and his wife attended Jacobson's 50th reunion at Mines. Jacobson is survived by two sons, a daughter, 12 grandchildren and four great-grandchildren. According to his widow, “Jake was always proud of his degree from Mines.”

GUSTAV J. KAMPTNER EM '41 died July 28 at the age of 84. During World War II, Kaptner served in Europe and participated in the invasion of Sicily and of Southern France, continuing into Italy, Germany and Austria with the 40th Combat Engineer Regiment. Afterward, he worked as a civil engineer for San Diego County. Kaptner is survived by his widow, Jean, two daughters, a son and three grandchildren.

HEINE KENWORTHY MET E '32 of Clayton, Ind., died May 20 at the age of 90. Kenworthy worked 31 years for the U.S. Bureau of Mines in Rolla, Mo. He retired in 1971 as head of research. He is survived by a sister.

GEORGE WILLIAMS KING Met E '42 died Dec. 10, 1999 at age 81. He was orphaned at 2 and was raised in a Denver orphanage. He worked his way through Mines and was a senior when Pearl Harbor was attacked, so he joined the Army the day after graduation. He was assigned to the 807th Aviation Engineers, then switched to the Army Air Corps and was stationed in the South Pacific. King made 32 missions over Japan as navigator and earned the bronze Battle star, the air medal, and the Distinguished Flying Cross. After the war, he moved to Houston where he met and married his wife, Ruth. He worked for Brown and Root Construction Co., in Belgium. King was an active member of St. Matthew Lutheran Church in Houston and served on the board of elders. He also was a life member of the Houston Engineering and Scientific Society. King played the French horn in school and in the National Guard band and occasionally played with the Denver Symphony Orchestra. He is survived by his wife of 49 years, a son, and a grandson.

JOHN H. LEARY EM '38 died May 10 at the age of 86. Born in Denver, Leary moved to Portland, Ore. after graduation. He served in the U.S. Army during World War II, then returned to Portland and was a manager for Ingersoll-Rand for about 37 years. He retired as vice president in 1982. In 1941, he married Nancy Hilton, who preceded him in death. A son and daughter also preceded him in death. He is survived by three grandchildren.

T. WILSON LITTLE PE '54 died in March at the age of 68. Little was born in Long Beach, Calif., and after graduating from Mines, he earned a master of science in petroleum engineering from University of Texas. He worked in the United States with various overseas appointments. He was a member of Fort Worth Lodge 148 AF and AM. He enjoyed fine art, classical music, the humanities and traveling. His survivors include his widow, Belva, a son, a daughter and many other relatives and friends.

CLARK S. MINNICH PE '53 died June 24. He was 73. Minnich was a 45-year resident of Tulsa, Okla., having retired from petroleum engineering in 1991. His career involved positions in many Tulsa oil companies. His hobbies included fixing and building anything that required engineering. He is survived by his wife of 51 years, Sue JoAnn, two sons, a daughter and seven grandchildren.

ARTHUR C. MOST EM '38 died June 17, 2000, in Bethlehem, Pa. He was 87. Most was a sales manager for Traylor Engineering (later the Fuller Co.) in Allentown, Pa. He was also a member of the planning commission of Hanover Township in Pennsylvania, American Institute of Mining Engineers and Sigma Alpha Epsilon. Most is survived by his wife of 60 years, Margaret, two sons, a daughter, a sister and six grandchildren.

JOSEPH L. OBERLE Met E '40 died April 29. He was 82. Oberle was a heat treat engineer and manager at Caterpillar Inc. for 41 years, retiring in 1981. He also worked for Caterpillar in Glasgow, Scotland for two years. He was a member of the Society of Metals and was a World War II navy veteran. Oberle is survived by his wife of 50+ years, Elaine, a son, four daughters, 14 grandchildren and three great-grandchildren.

EVERTT M. PATTERSON JR. Met E '51 of New Mexico died April 4 at age 78. He had worked in the steel manufacturing business in management and as an engineer before retiring from Integrated Interiors. During World War II he was in the U.S. Navy. Patterson was a member of Rio Rancho Presbyterian Church and a senior member of the Alumni Association. He is survived by his widow, Ann, six daughters, a son, a sister, and four grandchildren.

WILLIAM CHARLES PENTILLA Geol E '56, MSc Geol '62 died of a heart attack Feb. 2 in Ulan Bator, Mongolia. He was 67. Pentilla was involved with successful Mongolian petroleum activities for a decade. Five years ago he was awarded "The Polar Star," Mongolia's highest award “for personal contributions to the formulation of legislation on oil exploration, the conducting of oil exploration surveys and for enhancement of Mongol-American cooperation.” He was featured in the June 1996 issue of the American Association of Petroleum Geologists as well as an author of the 50th Reunion history book of the American Mining Congress for the 1996 meeting in Ulan Bator.
Geologist's Explorer magazine. Pentilla was a captain in the Army Corps of Engineers and then worked in 26 countries on five continents. The past seven years he was president of Exploration Associates, Inc. of Houston. Pentilla is survived by his widow, Enkhmaa, two sons, two daughters, six grandchildren, a brother and a sister.

H. RAY POULSEN JR. EM '53 died Dec. 24, 2000 in Mesa, Ariz., at age 68. He was a member of the Army Corps of Engineers serving in the Far East. He was also an engineer for Peter Kiewit Sons Inc. for 28 years and a project manager for the Eisenhow Tunnel in Colorado. Poulsen is survived by his wife of 48 years, Joie, three daughters, a son, eight grandchildren, a brother and a sister.

GEORGE W. REED Geol E '35 died May 5 at age 88. After graduation, Reed began a career in the oil exploration business, joining Seismograph Service Corp., and working his way up to senior management. He later formed his own companies and operated in the United States, Canada and South America. He also pursued diamond exploration in Brazil and was awarded that country's highest civilian decoration. Later, in life he became involved in a sports development company, a carpet company, a construction and land development company, a carpet company and a nursery. In 1935 he married Frankie Adams and had two daughters. He was active in sports, was a licensed pilot, and was a Christian Scientist. Reed is survived by his widow and daughters, three daughters, a son, eight grandchildren, a brother and a sister.

FRED D. RICE EM '50 of Miami, Ariz., died Feb. 4 at age 73. He served in the Army Air Corps during World War II and in the Army Engineer Corp. during the Korean War. He worked throughout the west in different mining camps including Sunshine Mine in Idaho. He then worked for Inspiration Consolidated Copper Co. for 30 years. In 1956 he married Nancy Owen. They retired in 1986 and traveled and collected antiques. Rice was involved in many community activities and last year attended his 50th Mines reunion. He is survived by his widow, two sons, a daughter, a sister and nieces and nephews.

JOHN “JACK” SCHULTZE Met E '48 died Jan. 20 in Carthage, Tenn., following a brief illness. He was 78. Schultze was a Navy veteran of World War II and took part in the Normandy invasion of France. In 1952 he married Valera Willeford, who preceded him in death. Schultze was a metallurgical engineer, retiring in 2000 from Pasminco Zinc Co. He is survived by two daughters, and three grandchildren.

CARL W. TUTTLE EM '28 of Denver died Jan. 20 at the age of 97. He was a retired metallurgical engineer who had worked for U.S. Steel for 35 years. In 1927 he married Yvonne Work. She preceded him in death. Tuttle was a member of Sigma Phi Epsilon and his interests included fishing, reading and golf. He is survived by a daughter, a son, four grandchildren and six great-grandchildren.

BRUCE C. WENTNER Geop E '51, a geophysicist, died of a stroke at his winter home in England March 28 at the age of 71. In 1968 he formed GEO consulting Ltd., specializing in designing and implementing techniques for exploration of petroleum deposits. In 1978 he formed GEO Minerals Exploration Inc., concentrating on petroleum and mining in the United Kingdom, Norway and the Netherlands. He also was involved in gold mining in South Africa. Wentner belonged to several professional and community organizations and collected, restored and displayed Rolls Royces. He is survived by his widow, Knette, a brother, three daughters and grandchildren.
1950
Niles E. Grosvenor EM ’50, MSc Min ’52 has retired and sold Grosvenor Engineering Company to David E. Krebs EM ’66. The company continues to be Grosvenor Engineering Company at the same address in Littleton, Colo.

1952
John C. Dingman Jr. PRE is retired in Houston. Laurence H. Gardner II Geol E is retired in Charlottesville, Va.

1953
Howard C. Kaylor PE is retired in Fullerton, Calif.

1958

1959
John T. Chandler PE has retired as vice chairman of XCL-Ltd. and chairman of XCL-China. He plans to consult internationally.

1960
Robert L. Ferrite EM, MSc pet ‘73 is manager for Special Programs and Continuing Education (SPACE) at CSM.

1961
John B. Robertson Geol E is a principal with JB Robertson Consultants in Reston, Va.

1962
Gerald W. Berk PE is the Bohai Bay capital project manager for Phillips China Inc. He lives in Beijing, The People’s Republic of China.

Charles R. Vestal PRE, MSc PRE ’69, PhD CPR ’74 is an adjunct assistant professor in CSM’s Chemical Engineering and Petroleum Refining Department.

1964
Richard J. Erfurdt Met E, MSc Met ’74, PhD Met ’79 is a safeguard inspector for the International Atomic Energy Agency, United Nations in Tokyo, Japan.

Robert H. Writz, Jr. Geop E ’64 is CSM’s golf coach.

1966
Arezki Rekouche PRE, MSc PRE ’68 is adviser to the general manager for Holding Public Chimie Pharmacie Services of Algeria.

Richard T. Reash EM is a superintendent for American Civil Constructors in Littleton, Colo.

1967
Michael J. Barber Met E is retired in Kerrville, Texas.

Philip H. Bishop Geop E is vice president of DeGolyer and MacNaughton in Dallas.

1968
Steve W. Hackett Geop E is a secondary school teacher for Interior Distance Education of Alaska specializing in math, science, and environmental education. He lives in Homer, Alaska.

1970
D. Erik Spiller BSc Met is general manager, mineral process, for Washington Group International in Denver.

1971
James L. Lawler BSc Math is a senior petroleum engineer for Williams Production in Denver.

1973
Ervin E. Kukas BSc Geop is a senior product developer for Space Imaging in Thornton, Colo.

1975
Roger S. Gaide BSc CPR is an investment adviser for Cornerstone Capital Advisors in Lakewood, Colo.

1976
Dennis L. Casto BSc CPR is manager of process engineering for ONEOK Field Services in Tulsa, Okla.

1977
Randy D. Roberts BSc Geol is a program coordinator for Canon City [Colo.] Chamber of Commerce.

1978
William J. DeGooyer BSc Chem is a chemist for Akzo Nobel Inc., in Louisville, Ky.

Daniel E. Lowe BSc Geol is an engineer for Fairweather and a rig supervisor for BP Alaska. His address is in Brekenridge, Colo.

Peter H. Mueller BSc Pet is senior director, oil and gas services, for R. W. Beck Associates in Denver.

1979
Marshall D. Clark BSc Met is a post-doctoral fellow with CSM’s Metallurgical and Materials Engineering Department.

Michael D. Van Horn MSc Geol is vice president of exploration for Enron Global E&P in Houston.

1980
Sharon L. Hart BSc Geol is director of institutional research in finance and operations at CSM.

Gerald P. Kelton BSc Met is general manager for Krebs Engineers Chile in Conchal, Santiago, Chile.

Roseann Jacobsen Morton BSc Geop is senior counsel for BP Exploration Inc. in Anchorage, Alaska.

1981
Robert W. Baird III BSc Geol is global leader, core technologies, for the Rio Tinto Procurement for Kennecott Energy Company in Gillette, Wyo.

David S. Burkhalter BSc Pet is vice president of DeGolyer and MacNaughton in Dallas, Texas.

Ann E. Hanson BSc Geop is vice president of marketing and sales for the Ford Motor Company in Ionia, Mich.

Frank J. Marone BSc Geop, MSc Min Ec ’87 is director of marketing for Seven Trent Systems in Houston.

Daniel L. Sikorski BSc Geol is a

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1988

Christopher W. Kruger BSc Pet is project engineering manager for Pacific Gas Transmission Co., in Portland, Ore.

Richard C. Lansdowne BSc Min is a financial analyst in the minerals department for the Navajo nation in Window Rock, N. M.

Kurt A. Miller MSc Geol is a senior geologist for the Marathon Oil Company in Oklahoma City, Okla.


1989

Gehrig S. Schultz BSc Geop is worldwide business development manager for PGS Onshore, Inc. in Houston.

Gysbert J. Wessels PhD Min Ec is principal of Deloitte Consulting in Hatfield, Gauteng, South Africa.

1990

Nick Battaglino BSc Geop and Dorene Battaglino BSc CPR '91 announce the home birth of their second child, Dagny Jean on July 19.

Thomas C. Jones BSc Eng is project superintendent for Granite Construction Company in Window Rock, N. M.

Weston M. Mikulich MSc Geop is a senior consultant for Delina in Houston.

Kathleen L. Sullivan BSc CPR is staff engineer and developmental editor for Professional Publications Inc. in Englewood, Colo.

1991

Tony C. Anast BSc Met is vice president of business for Ardesta in Ann Arbor, Mich.

John W. Arms BSc Pet is vice president of acquisitions for the Encore Acquisitions Company in Fort Worth, Texas.

Colin J. Baye BSc Geol, M Eng Geol '94 is an environmental engineer for the state of Alaska in Soldotna, Alaska.

Donald A. Cameron BSc CPR is the North America aromatic derivatives improvement leader for the Dow Chemical Company in Freeport, Texas.

Margery J. Lemieux MSc Min Ec is a budget implementation manager for the Peace Corps in Washington, D.C.

Chad A. Lensing BSc Met, MSc Met '95, PhD Mat Sc '01 is a metallurgy/welding engineer for BP Corporation (Challenger) at the UTG Deepwater Facilities in Houston.

Bryan Mortimer BSc Min has been transferred to Brussels, Belgium to work with Salfes Research and Technology. He is deputy to the director of mines, wells and quarries. His wife Lisa BSc Math '92 and their two children will go with him.

Philip T. Platt BSc Pet is a product planner for Microsoft Corporation in Redmond, Wash.

Todd A. Van Maaren BSc Eng was promoted to maintenance superintendent of the Oxy Vinyls plant in Deer Park, Texas.

Todd W. Wakefield MSc Geol is a consulting geochimist for Wakefield Geochemical, in Reno, Nev.

1992

Baharul A. Baharuddin BSc Pet is a business planner for PETRONIS Carigali in Kuala Lumpur, Malaysia.

Vicky Jackson BSc Pet married Erik Nielsen Jan. 20 at Rice University Chapel in Houston. The couple resides in Houston. Vicky is a senior project engineer for Well Dynamics. Front row, from left, Paul Williams BSc Pet '89, Rob Ward, Travis Reinf BSc CPR '93, Rob Welch BSc Met '98, MSc Min Ec '01, Hans Hoppet BSc Eng '92, Becky Brown BSc Math '92, Wendy Domeier King BSc Pet '90, Bryer BSc Eng '92, Kay Stowe BSc CPR '92, Laura Strange, Sara Thompson Brown BSc CPR '93, Michelle Chesebro BSc Pet '94, Cathy Reinf BSc CPR '93, Cindy Hoppet BSc CPR '92, Scott Chesebro BSc Pet '92, bride Vicky Nielsen, Melissa Haller and their two children will go with him.

1993

David J. Anderson BSc Eng is project manager for Brown & Root
GROSVENOR ENGINEERING COMPANY

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David E. Krebs E.M. 66
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Kirsten W. Dickhut BSc Geol is an environmental engineer for the IT
Corp and Wes Dickhut BSc Geol is a project geotechnical engineer for
BBCM in Cincinnati, Ohio.
S. Andrew Ottel BSc Eng, MSc
Engr Sys ’99 is a senior engineer with Maxtor in Longmont, Colo.
Howard A. Roepnack BSc
Eng is a mechanical engineer for
Medivance, Inc. in Louisville, Colo.

1994
Robert N. Ball BSc Eng is
director of IT Strategy for Fluor
Corporation in Aliso Viejo, Calif.
Perpetua M. Bandan BSc
Corporation is a flow assurance engineer for
Shell International Exploration and
Production Company in Houston.
She recently returned from Sarawak,
Malaysia.
Bryan J. Burinda BSc Eng was
promoted from field specialist to
log analyst by Sperry-Sun Drilling
Services in Broussard, La.
Alexander G. Cameron BSc CPR
Project manager for Kaiser Hill in
Golden, Colo.

Jonathan L. Nickell BSc Eng is
a strategic planner for Emerson in
St. Louis, Mo.

1996
Bradley W. Artman BSc Geop is
a graduate student at Stanford
University in California.
Jonathan M. Bloomfield BSc
Econ is a corporate finance analyst
for Westport Resources in Denver.

1999
Erdem Inc. PhD Math is
department head of information
technology for Uzel Park Consulting
in Istanbul, Turkey.

2001
Jessica C. Kaiser BSc Met is
a procurement engineer for Tosco
Refining Company. She and
Christopher M. Kaiser BSc CPR, is a process engineer for Anvil
Corporation, live in Bellingham, Wash.
Thaddeus L. Kostrubala Jr. BSc
CPR is a carpenter for Design West
Builders Corporation in Arlie, Mont.
Victoria E. Londono Hydrogeol
and husband David Londono MSc
Min ’00 work for World Minerals in
Lompoc, Calif. He is a senior mine
engineer and she is a lab technician.
Michael D. Lyon BSc CPR is
operations supervisor for BP.
Nicholas J. Newell BSc Eng is a
senior QA engineer for the Luxxon
Corporation in Mountain View,
Calif.

2002
Deborah L. Shaner BSc Eng is a
fire protection engineer for Shaner
Life Safety in Wheat Ridge, Colo.
Asher Allyn Woolverton BSc
Phy, PhD MSc ’01 works for Fiberguide Industries in Caldwell,
Idaho.

2003
Raymond W. Hathaway BSc
CPR is an assistant professor at N.-W. F.
University of Engineering and
Technology in Peshawar, Pakistan.
Donna S. Anderson PhD Geol is
a research assistant professor in
CSM’s Geology and Geological
Engineering Department.
Cheryl J. Augustin BS Met E
married Robert C. Foster BSc CPR
May 19.

2004
Scott C. Burbridge BSc Eng is a
project engineer for CBYCO in
Pueblo, Colo.
Tonya L. (Reed) Frazier BSc
Math is a senior analyst at Level 3
Communications in Broomfield,
Colo.

Jamie J. Happ BSc Eng is an
embedded audio applications
engineer for Sigmatek Inc. in Austin,
Texas.
Regina M. Johnson BSc CPR is
a facility engineer for BP Alaska
in Anchorage.

Skye Stock MacCarthy BSc Geol
Michael C. Driscoll Jr. BSc Eng and SimoM. Aiken BSc Math & Comp Sci ’01 have married. Aiken is a computer technician for the National Park Service. The couple lives in Golden.

Katie R. Eloe BSc Math & Comp Sci is an engineer for Level 3 Communications and lives in Thornton, Colo.

Sabrina L. English BSc Pet is a project engineer for Vecho Alaska in Fairbanks.

Hugh D. Green BSc CPR is a project engineer for Intel Corporation in Chandler, Ariz.

Dawn R. Kerr BSc Chem, BSc CPR is a project engineer for Compliance Partners Inc. in Golden, Colo.

William J. Likos PhD Engr Sys is an assistant research professor in CSM’s Engineering Division.

Tatum L. Mattix BSc Eng is a mechanical engineer/project manager for Air Control Science/ Solid Systems Engineering Company in Boulder, Colo.

Virdiansyah Permama BSc Eng is a graduate student at CSM studying engineering systems.

Jared M. Purdy BSc Eng is a staff engineer for Olsson Associates in Lakewood, Colo.

Mark A. Richards BSc Min is a marketing representative in mining for Caterpillar Inc. in Peoria, Ill.

Myriam Rivera BSc Phy, BSc Eng is a software developer for Eclipse Inc. in Boulder, Colo.

Rolf B. Ronnekleiv-Kelly BSc Geol is a reservoir engineer for ExxonMobil in Anchorage, Alaska.

Andrea M. Trujillo BSc Eng is a project engineer for Kraft Foods in Houston.

Jason C. Verley PhD Appl Phy is a semiconductor/meiroelectronics engineer at Sandia National Laboratories in Albuquerque, N.M.

Mayumi Fukushima BSc Eng is a graduate student at Georgia Institute of Technology.

Tadatomo K. Nishi BSc Min is a measurement development engineer for Hughes Christiansen in Houston.

Daniel S. Baker BSc Met & Mat Eng married Stacy Hirsch June 9 at Orchard Hill Church in Cedar Falls, Iowa. He is a process metallurgist for Viking Pump.

Jacob J. Benson BSc Pet is a field engineer for Baker Hughes Inteq in Lafayette, La.

Arthur B. Brown BSc Min is an operations/management trainee for Vulcan Materials Company in Chandler, Ariz.

Laura C. Burke BSc Econ is a systems administrator for Electronic Data Systems in Louisville, Colo.

Seth A. Busetti BSc Geol is a graduate student at University of Oklahoma in Norman.

Chad D. Canfield BSc Math & Computer Science is an analyst for Accenture.

Shannon B. Canfield BSc Chem is an analyst for Accenture.

Matthew J. Cannon BSc Met & Mat Eng is a second lieutenant in the U.S. Army.

Amelia C. Carus Met & Mat Eng is a process engineer for Intel.

Eric S. Cepull BSc Eng is a graduate student at Georgia Institute of Technology.

Bruce Cinkai Chow PhD Mat Sci is a measurement development engineer for Corning Inc. at the Center for Fiber-Optic Testing in Painted Post, N.Y.

Jonathan B. Cowan BSc Eng is an engineer for Williams Communications.

Shawn M. Craig BSc Math & Comp Sci is a software engineer for Lockheed Martin Mission Systems.

Sara L. Cutts BSc Chem, BSc Chem Eng is an associate engineer for Thriokol Propulsion.

Brian D. Davis BSc Met & Mat Eng is production supervisor for Davis Wire Corporation in Irwindale, Calif.

Mark G. Elder BSc Chem Eng is an engineer for Conoco Inc.

Linda M. Ferguson BSc Math & Comp Sci is an IR system technician for Sun Microsystems Inc. in Broomfield, Colo.

Kip O. Findley BSc Met & Mat Eng is a graduate student at Georgia University of Technology.

Mayumi Fukushima BSc Eng is a graduate student at CSM.

Aaron G. Gabler BSc Math & Comp Sci, BSc Econ is a senior systems engineer for Accenture in Denver.

James R. Genotte BSc Phy is a test engineer for Gaming Labs Inc.

Elaine M. Googly BSc Pet is a field engineer for Schlumberger Ltd.

Matthew P. Gronebos BSc Chem Eng is a project engineer for Air Liquide.
John J. Happ BSc Math & Comp Sci is a software engineer for Motorola in Scottsdale, Ariz.
Donavon A. Harmon BSc Met & Mat Eng is a graduate student at CSM.
Brian K. Hayden BSc Eng is an electrical engineer with AMC Engineers in Anchorage, Alaska.
Sarah L. Herron BSc Eng is a sales development engineer for Agilent Technologies in Colorado Springs, Colo.
Robin V. Infeldt BSc Chem Eng is an engineer for Micron in Boise, Idaho.
Christopher N. Jenkins BSc Pet is a production engineer for BP in Anchorage, Alaska.
Donald A. Kelly BSc Eng is an electrical engineer for Powernet, Inc., in Hayward, Calif.
Jonathan J. Kjos BSc Eng is an ALLEX engineer for Air Liquide in Hayward, Calif.
Jodi L. Kiefer BSc Math & Comp Sci is a programmer for Level 3 Communications.
Philip Kim BSc Eng is an engineer in training for KSA Engineers Inc. in Lufkin, Texas.
Krista A. Kircher BSc Pet is an engineer for Pacific Operators Offshore.
Erin R. Kock BSc Geop is a geophysicist for Occidental Oil and Gas Corp in Houston.
Jennifer A. Kram BSc Min is a second lieutenant in the Ordinance Corps of the U.S. Army.
Kristen M. Kraynak BSc Chem Eng works for Earth Tech Inc. in Long Beach, Calif.
Renee M. Lagutaris BSc Chem is a graduate student at the University of Colorado at Boulder.
Lisa A. Lasner BSc Math & Computer Science is a graduate student at the Massachusetts Institute of Technology.
Jeremy K. Lee BSc Eng is an engineer for Vulcan Materials Company in Atlanta.
Rachel H. Leenhouts BSc Chem is a graduate student at University of Colorado.
Benjamin M. Liu BSc Eng is a Peace Corps volunteer in Jamaica.
Jessica L. Lolley BSc Eng is an associate design engineer for Merrick & Company in Los Alamos, N.M.
Jeremiah P. MacSlean BSc Met & Mat Eng is a nuclear engineer at the Puget Sound Naval Shipyard in Washington.
Azy Madani BSc Chem Eng is a process engineer for the Air Liquide America Corp.
Wesley S. Marian BSc Math & Comp Sci is webmaster for Denver Online Development in Denver.
Alan S. Masters BSc Eng is an engineer with Xcel Energy Inc.
Jason T. Max BSc Met & Mat Eng is a mechanical engineer at the Puget Sound Naval Shipyard in Washington.
Jaclyn B. Mayercak-Haney BSc Chem Eng is a contact engineer for ExxonMobil Corp.
Brandon S. McCready BSc Eng is an associate engineer for Galloway, Romero & Associates in Greenwood Village, Colo.
Ryan T. McHugh BSc Met & Mat Eng is an analyst with Accenture.
Jessie S. McKay BSc Chem Eng is an analyst for Accenture.
John M. McLaughlin BSc Pet is a reservoir manager for the ExxonMobil Corporation in Houston.
Jason A. Medina BSc Eng is a mechanical engineer for Bechtel National in Richland, Wash.
Bryant M. Mook M Eng Pet is a drilling engineer for Anadarko-Schlumberger in Casper, Wyo.
Martin D. Muggli BSc Math & Comp Sci is a customer applications engineer for Xilinx.
Eulaalia Munoz M Eng Pet is a reservoir engineer for Nitec LLC in Denver.
Justin K. Murray BSc Chem is a graduate student at California Institute of Technology in Pasadena.
Kathleen Obrecht BSc Eng and Kyle Obrecht left Aug. 6 to teach in a Christian school in Costa Rica for a year. Kathleen will teach science and Kyle will teach math.
Botosan O. Omat Lola BSc Geol is a graduate student at University of Oklahoma.
Dawn M. Paling BSc Eng is a structural engineer for Schmidt & Story in Lakewood, Colo.
Kerry L. Petranek BSc Econ is a process engineer for the Harris Group, Inc. in Denver.
Scott E. Pringle BSc Chem Eng is a nuclear engineer for Puget Sound Naval Shipyard in Bremerton, Wash.
Ali S. A. Raba’a PhD Pet E works for Saudi Arabian Oil Company in Dhahran, Saudi Arabia.
Norainulhuda Mazniz Nor Rahmat MSc Geol is an associate geologist for the ExxonMobil in Kuala Lumpur, Malaysia.
Bryan N. Ramirez BSc Eng is an applications engineer for Xilinx in Longmont, Colo.
Derek L. Richard MSc EnV Sc is an environmental engineer for TRC Solutions in Littleton, Colo.
Mark D. Richards BSc Met & Mat Eng is a graduate student at CSM.
Yoshhiro Sagawa MSc Min is a mining engineer for Sumitomo Metal M ining Co. Ltd. in Isagun, Kagoshima, Japan.
Michael T. Seman BSc Chem Eng is an engineer for ITN Energy Systems in Littleton, Colo.
Angeline C. Southcott BSc Geop is a geophysicist for Condor Exploration in Englewood, Colo.
Geoffrey A. Strait BSc Pet is an engineer for Kerr-McGee Oil & Gas.
Derek D. Swanson BSc Eng is an engineer for Motorola Inc.
John D. Swanson BSc Math & Comp Sci is a software engineer for Lockheed Martin in Denver.
Samuel T. Trask BSc Eng is a performance engineer for Rolls-Royce Corporation in Indianapolis, Ind.
Richard M. Truitt BSc Chem Eng is an engineer for Thiokol Propulsion in Brigham City, Utah.

Support the Alumni Association’s Student Financial Assistance Program by purchasing CSM license plates. The one-time fee of $50 per vehicle goes directly to the assistance program, which provides loans, grants and scholarships to CSM students. Once your application and fees have been received, CSM will send you the paper work you need to take to the motor vehicle department AT THE TIME OF YOUR YEARLY RENEWAL to receive your plates. If you have questions, call CSM at 303-273-3295. Send completed form, along with check made out to CSMAA ($50 per vehicle) and mail to: CSMAA License Plates, P.O. Box 1410, Golden, CO 80402-1410.
The white "M" on Mountain Zion was changed to red, white, and blue in honor of those who died in the September 11 tragedies.