

MINES

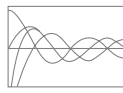
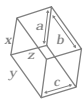
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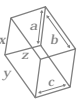
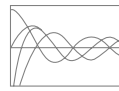
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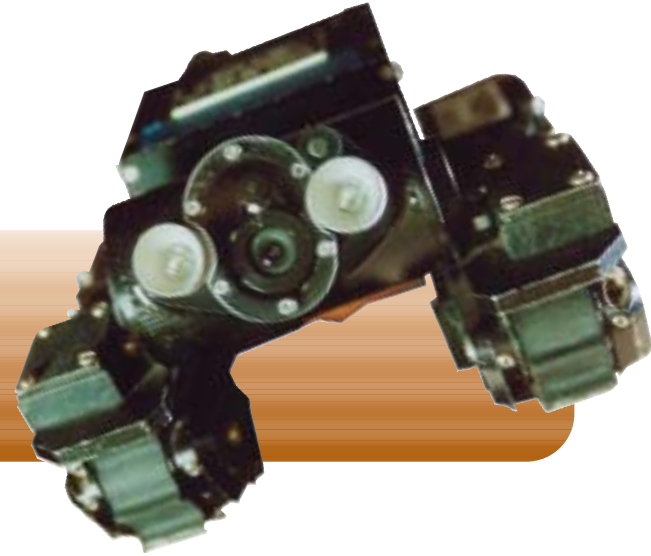
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About Our Cover:

About Our Cover: **John G. Blitch MSc Math '96** developed and deployed robots that performed search and rescue operations at the World Trade Center following the September 11 terrorist attacks.

Photo by Tom Cooper.

MINES SUMMER 2002

Mines is published quarterly by the Colorado School of Mines and the CSM Alumni Association for alumni and friends of the School. The magazine is a merger of *Mines Magazine* (founded in 1910) and *Mines Today* (founded in 1986). The merger took place in 2000.

Comments and suggestions are welcome. Contact us by writing to MINES, P.O. Box 1410, Golden, CO 80402; or call 303-273-3294 or 800-446-9488, ext. 3294, between 8 a.m. and 5 p.m., M-F, MST; or email magazine@mines.edu.

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Letter from the President

As a new school year unfolds, we take a glance back before bounding ahead.

The 2001-2002 academic year was a significant one in the history of Colorado School of Mines. The most visible developments included physical improvements to the campus such as the:



- Opening of the new Center for Technology and Learning Media (CTLM)
- Completion of the addition to the Student Center
- Start of construction on a new research building and home for the Geology Museum.

The year also marked the opening in Abu Dhabi of the Petroleum Institute, developed by Mines under contract with the Abu Dhabi National Oil Company and its industry partners. Other less visible yet vital developments have included improvements to the curriculum, the reorganization of sports and athletics, and a number of research breakthroughs.

Perhaps the most exciting of all are the prospects opened up by the passage of the "Exemplary Institution" legislation (Senate Bill 02-229) in June 2001 and the subsequent negotiations which led to its

full enactment this past spring. This pioneering effort to seek a new relationship between Mines and the state of Colorado now challenges us to take the School to higher levels of performance and accomplishment than ever before. A formal implementation plan is underway and should be completed by the end of this calendar year. Marketing strategies and a master plan for development of the campus will follow.

The negotiations, and the legislation itself, have given the Mines Board of Trustees unprecedented license to establish academic programs, set tuition, and request the governor's appointment of additional advisory members to the Board. In turn, we have pledged to the state that we will maintain and improve upon the quality of the Mines educational experience, open to all qualified Colorado residents as well as to non-residents, both domestic and international.

Last fall, the Board adopted a number of starting points to guide the strategic planning process. These include affirmation of the School's name—Colorado School of Mines—and its mission in "energy, mineral and materials science and engineering and associated...fields." The Board also reaffirmed our commitment to:

- Quality
- The success of every student, staff member, faculty member, and alumnus
- The importance of the traditional residential campus experience.

Based on these and other starting points, specific strategies are currently being developed around focus areas for pre-eminence. Each focus area draws from the School's traditional strengths and includes activities from across the campus. Foremost will be engineering education, for this is at the core of our mission. The Center for Engineering Education, along



Dr. and Mrs. Trefny ride in the annual homecoming parade. This year's homecoming will be celebrated Oct. 26 and 27.

with its "laboratory," the CTLM, has already attracted attention as a notable facilitator of leading-edge teaching and learning practices. Mines' leadership in engineering education is increasingly recognized throughout the country and the world.

Other focus areas will be anchored in various fields such as energy, natural resources, materials, the environment, and computational science and engineering. Individual departments or programs have established significant reputations in aspects of all of these areas. The current planning process will concentrate the strengths of the entire institution into an ambitious, aggressive approach to this century's challenges.

As we begin the 2002-2003 year, we are reminded that the role and mission of Colorado School of Mines relate directly to major societal issues. After all, what can be more fundamental to the world's future than the development of human and natural resources? When I address our new students at this year's freshman convocation, I will speak of the School's noble purpose. Later in the year when I address graduates at commencement ceremonies, I will again communicate that noble purpose: To graduate responsible citizens, and accept our institutional responsibility to develop and apply our enormous capabilities in the public interest and for the betterment of the world.

I look forward to the limitless possibilities this new academic year offers.

John U. Trefny, President, Colorado School of Mines

Annette Island Rocks

By Marsha Konegni

The experience? Priceless.

Recalling his research project for the Metlakatla Indian Community on Alaska's beautiful Annette Island, **Charlie Verdel BSc Geol '97** said, "I never thought I'd get to do anything like this. I was constantly saying to myself that I can't believe I get to do this."

Erik Ronald MSc Geol '01, who also conducted geological and engineering studies on the tribal land, said, "Even more wonderful than the natural beauty were the people I met and worked with in the community." Ronald went to Annette Island several times to do field work, as well as to present his thesis to the Tribal Council. "They are all really great people. I still try to keep in contact with them now."

The research that CSM students conducted for the tribe? Also priceless.

A population of approximately 1,700 live on the Annette Islands Reserve, a federal Indian reservation. For years the timber and fishing industries supported the Metlakatla Indian Community, but both industries have experienced a steady decline. When the Annette Hemlock Mill closed in 1999, 140 jobs were lost, and unemployment jumped to nearly 80 percent. Now the community is striving to diversify its economy and improve the quality of life for all residents, while maintaining sensitivity to its cultural values, land base and environment.

At the request of the Metlakatla Tribal Council, the Bureau of Indian Affairs (BIA) Division of Energy and Mineral Resources

funded a project to assess the potential of crushed rock resources on the island. Crushed rock is used for aggregate in the construction of buildings, bridges, highways and airports. Potential income from new development of natural aggregate



resources is significant, as the western region grows and infrastructure is developed. Seattle and Tacoma, Wash., and Portland, Ore., could be big markets, and the rock could be barged to the cities from Annette Island's deep water port.

So BIA contracted with CSM to complete the assessment of a possible quarry site. "It was cost effective. We got a lot done with a little money. In fact, we got a project done that was otherwise not going to get done. For the tribe, having the expertise of Jerry Higgins and students was a wonderful deal," said Steve Manydeeds, a BIA geologist.

Mines Professor Jerry Higgins supervised the students' work, which included an evaluation of the volume of rock available and the quality of the rock. Verdel explained that, in the





proposed quarry site, he surveyed and drilled about 5,000 feet of core to verify the type of rock present. He and Ronald crushed the rock from the core and did engineering tests to determine its resistance to abrasion. Ronald measured its compressive strength by placing the rock in a press and seeing how much pressure it would take before breaking.



The engineering tests are now complete, according to Faline Haven, manager of forestry and land resources for the Metlakatla Tribe. The results are positive, verifying that the quarry plan is geologically sound and economically feasible. "The school has been a lifeline for the project," said Haven. Not only does she credit the skills of CSM students, she also commends Higgins, who taught development courses in geology for the Tribal Council so they could interpret the engineering test reports. "It's been a challenge and a lot of fun," said Haven, "for forestry people to learn geology."

The next step in the process is to complete environmental documents. "We're extremely vigilant of our land and water," said Haven.

"It's an environmentally sensitive project. We all value the pristine area," added Higgins.

Verdel said, "To mitigate impact, they'll plan the quarry around an eagle's nest if necessary, and they'll re-vegetate as they go."

Economically the quarry would be a real boon to the area. According to Manydeeds, with multiplying effects, it could generate \$20 million



a year. So the Tribal Council is initiating talks with companies about a joint venture. The Metlakatla Indian Community is an Enterprise Community, a designation that offers multiple tax incentives to outside businesses.

For students, the project was also a boon. The six students involved in research work on Annette Island received funds from BIA to apply to their education at Mines. In addition, Verdel said that the work experience on his application helped in his acceptance to California Institute of Technology to pursue a doctorate. Ronald presented his work at the annual Northwest Mining Conference and published an abstract with the Association of Engineering Geologists. Currently he is a drilling engineer with Schlumberger in the Gulf of Mexico.

Their time on the island also provided unforgettable experiences. "The first weekend I was there I got invited to a potlatch (a ceremonial feast) with Native American dancers, so I got introduced to the culture immediately," said Verdel. "The people were so friendly that I got to know half the town. I worked seven days a week, but it was an interesting, memorable time, seeing humpback whales, bald eagles and other wildlife. It was tremendous."

Higgins and the students also rave about the fresh seafood dinners they enjoyed during their visits.

For a fabulous halibut or salmon feast, served in a stunning setting of snowcapped mountains in Metlakatla, Alaska? About \$15.



BOUNCING BALLS:

By Leah Kolt

Bouncing balls are a hot research commodity at Mines, according to Mark Lusk, an associate professor in the Division of



Dr. Mark Lusk

Engineering. Only, the balls the CSM researchers work with are viruses, colloid particles, pharmaceutical pills, and fuel particles.

“But they all still have much in common, whether they are millimeter-sized ball bearings, micron-size polymer suspensions, or iron atoms that make up steel microstructures” explains Lusk. “And being able to predict the behavior of very large assemblies of such balls is what we are after.”

Using two synergistic modes of scientific inquiry – traditional

laboratory experimentation coupled with computational science and engineering modeling – provides not just “pretty pictures” but also the hard numbers behind them. And the numbers are accurate.

For example, Dr. David Wu, associate professor of chemistry and chemical engineering, is harnessing viruses and turning them into little manufacturing plants. The hazardous components of a virus can be removed, leaving nano-sized, living balls. When these balls are placed on a sheet in ordered rows, they create a grid, which can be sprayed with a seed material. The material then grows in the spaces between the balls into tubular structures, only a few atoms in diameter – potential components of miniscule computers.

In another area called “optical trapping,” Associate Professor of Chemical Engineering David Marr is developing a micro-filter of colloidal particles that can be directed by a laser beam to behave in various ways. For instance, his “magic wand” can string them together to act as a valve, stopping the flow of their fellow particles. Possible applications include controlling the flow of blood cells or sperm, which are very difficult to handle otherwise. He can also spin or “snake” the particles, creating a pump or a mixer.

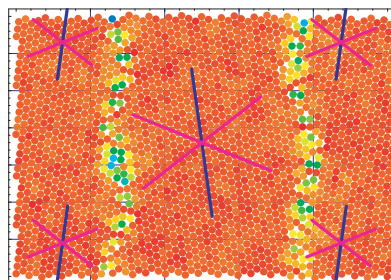
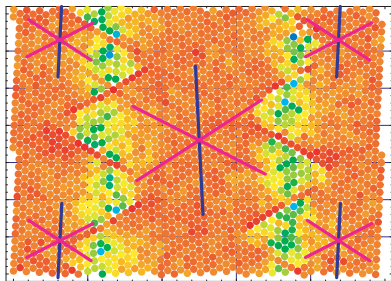
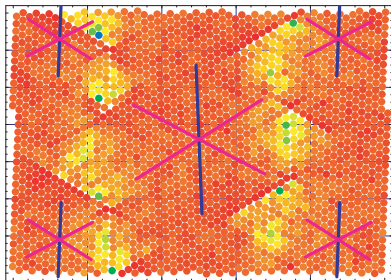
Another project of Marr’s involves micro-photonics, using light to create optical switches that work faster than current electrical ones. The end result could be a computer working at unprecedented speed. Other potential applications include sensors, narrow-band optical filters, photonic band gap materials, and waveguides.

When assemblies of “tiny balls” or mono-sized spheres are agitated, whether by direct shaking or by the thermal vibration we know as “temperature,” they create patterns with boundaries between them. The structure, shape and motion of these boundaries have direct industrial significance, since they often

A Hot Research Commodity



dominate the physical properties of the assembly or material that comprises the spheres. This is certainly true in nano-crystalline materials, where the boundaries separate small handfuls of ordered atoms.

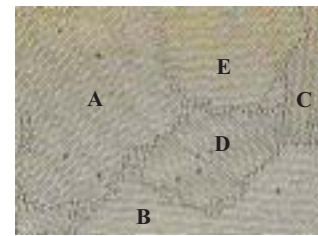


Computer simulations showing two vertical grain boundaries. Blue lines show the directions in which the balls line up. The coloring shows how much "wiggle space" these balls have, referred to as the "free volume" of the balls, which allows for measurement of the entropy of the "bouncing balls."

Although these boundaries look like defects when viewed with an electron microscope, they can actually make materials tougher. So predicting the behavior of these nano-grain materials could help create a stronger material, or help meet other design standards.

Teamed with Associate Professor Masami Nakagawa of the Mining Engineering Department, Lusk focuses on the structure and motion of such boundaries, using both computational and shake-table experiments to shake ball bearings and pharmaceutical pills between two flats plates.

The ensuing motion is filmed with a high speed camera. Measuring a few feet across, the apparatus affords a clear view of the



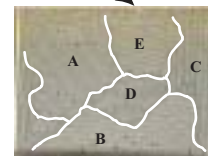
Grain structure at $t = 7$ sec



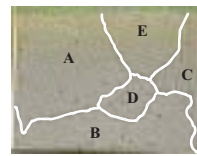
$t = 0$ sec



$t = 1$ sec



$t = 7$ sec



$t = 13$ sec



$t = 33$ sec

white lines added to more easily identify grain boundaries

A sequence of actual shots of shake table experiments, using pharmaceutical pills dyed black. White lines have been added for easier identification of grain boundaries.

patterns and boundaries with the naked eye. "The shaking motion is our way of giving the 'atoms' whatever temperature we want, and the camera allows us to see how grain boundaries form and move," Lusk explained.

This system is much simpler than working with a real nano-grain material, but the basic physics are the same. It serves as a steppingstone for figuring out what is going on in nano-materials at the atomic level. The two have also developed computer simulations of the same process, which provides information the camera cannot give.

Allard Visits Campus

U.S. Sen. Wayne Allard held a meeting with his staff members from throughout the state in March at the CSM Student Center.

Following welcoming remarks by President Trefny, staff members were given a tour of the campus. They heard presentations by Craig Van Kirk, petroleum engineering; Murray Hitzman, geology and geological engineering; and Terry Young, geophysics, who discussed their joint activities.

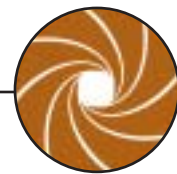
The group met with Tom Furtak in the custom-designed classroom in CTLM, where he explained that the Physics Learning Studio is an integrated, computer-assisted learning system.

Frank Schowengerdt discussed some of the activities of the Center for Commercial Applications of Combustion in Space, and Kent Voorhees talked about his biodetection research in the chemistry department.

Kristi Pollard, an area representative for Sen. Allard, said, "We enjoyed your beautiful facilities and I've heard nothing but rave reviews on the tours."



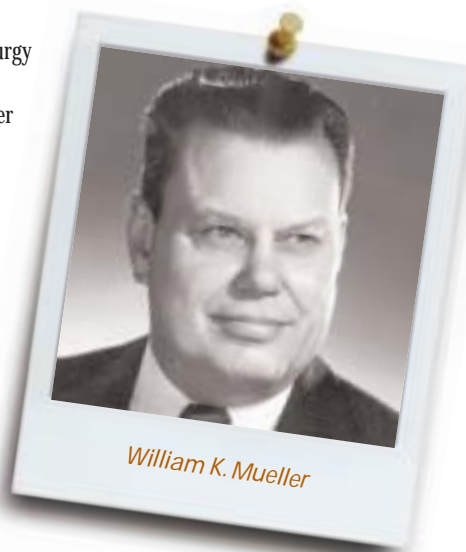
Sen. Allard (left) receives a CSM mascot from President Trefny.



CSM Remembers William Mueller

William K. "Bill" Mueller MET E, MSC MET, DSC MET, former CSM faculty member, dean and vice president emeritus, died April 27 at age 85. After graduation, the Denver native was a divisional metallurgist for the Aluminum Company of America in Pennsylvania. It was there he met his wife Kathryn. In 1945 he became an applications engineer with Gates Rubber in Denver. He returned to Mines as an instructor in metallurgy while pursuing graduate studies. After earning his Ph.D., Mueller became head of the metallurgical section at Rocky Flats for Dow Chemical Co. In 1957, he was named professor and

chair of the metallurgy department at University of Denver as well as head of the Metallurgy Research Division of the Denver Research Institute. In 1965, he moved to Ohio where he was director of education for the American Society for Metals. In 1971 he was a panel member of the National Academy of Science's workshop on industrial and technological research in Djarkata,



William K. Mueller

named professor and head of metallurgical engineering at CSM in 1974. Five years later he became vice president for academic affairs and dean of the faculty. He retired in 1983 but remained active in the Alumni Association, serving as executive director. Mueller received the School's Distinguished Achievement Medal in 1972, and in 1983, was made an honorary member of the Association and was voted Outstanding Alumnus. Mueller is survived by his wife of 62 years, two daughters, five grandchildren and one great-grandchild.

Indonesia. In 1972, he received DU's Distinguished Achievement Medal. Mueller was



Peter Han

Han New Vice President

President Trefny announced on May 13 the appointment of Peter Han as vice president of institutional advancement. Han became the assistant director of corporate and foundation relations at CSM in 1993. He has also held the positions of

director of corporate and foundation relations (1995 to 1999) and associate vice president for development (1999 to present) at the School. Han earned a bachelor of arts in economics from the University of Chicago and an MBA from the University of Colorado.

Exemplary Institution

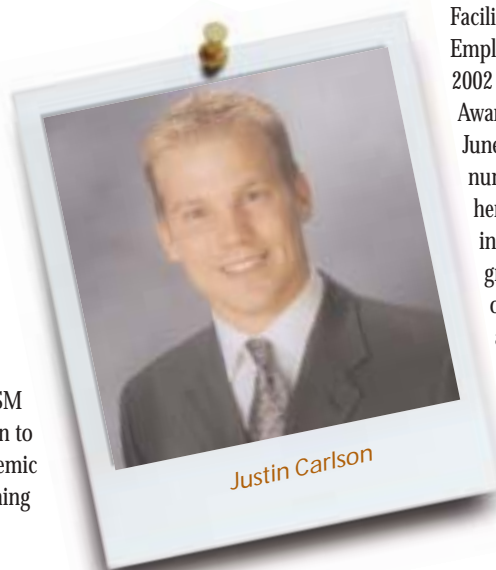
The Colorado State Legislature has approved the performance contract between the Colorado School of Mines and the Colorado

Commission on Higher Education. This approval was a condition for implementation of last year's Senate Bill 01-229. Mines is now officially the only "exemplary institution" of higher education in Colorado.

SHORT STAKES

New Student Trustee

Justin Carlson is the new student trustee on the CSM Board of Trustees. The senior from Littleton, Colo., was elected by the student body, which elects a student trustee annually. Carlson was the homecoming chair and the E-Days organizational chair in 2001. He is a McBride Honor Student and has been awarded the CSM Board of Trustees scholarship and a CSM soccer scholarship. In addition to receiving honors for his academic work, Carlson is a letter-winning defenseman on the varsity soccer team.



Justin Carlson

Employee of the Year

Betty Alexander of Plant Facilities was named CSM Employee of the Year at the 2002 Classified Employee Awards Luncheon held in June. She received numerous accolades in her nomination materials, including, "Betty is a great person who is one of the unsung heroes and unrecognized employees of the department. She deserves recognition as an outstanding employee for her overall great attitude and diligent work ethic."



Sharon Trefny, Betty Alexander and Teresa Hall



Ruth and David Coolbaugh

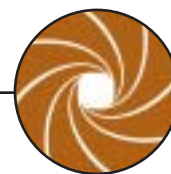
A Tribute to Dad

The brick in front of Coolbaugh Hall says it all. Recognizing his father as his number one mentor, **David F. Coolbaugh Geol E '43, EM '47, DSc Geop '61** and his wife Ruth purchased the brick in support of a Chemistry and Geochemistry Department fundraiser. Melville F. Coolbaugh, David's father, served as the president of Mines from 1925 to 1946.

2002 Faculty Award Winners

The following faculty awards were announced April 23 at the CSM Faculty Forum:

Dean's Excellence Award – For demonstrating “significant and meritorious achievement in teaching and scholarship,” F. Edward Cecil, professor of physics, was presented a cash award and a plaque. A member of the CSM physics faculty since 1976, Cecil was cited for being a student-centered teacher and a world-class research physicist. Founder and leader of the department's nuclear physics group, he is credited with providing “important basic astrophysical data needed to understand solar and big



High School Mines Medalists



This year's Mines Medalists were invited to campus in May for a reception in their honor. Each year, Colorado high school counselors are asked to select the best student in science and mathematics from the junior class. Those students receive Mines Medals at a school awards assembly, often presented by a

CSM alumnus. The awards, a joint program of the CSM Alumni Association and the Office of Financial Aid, also include a \$1,000

scholarship for each student who chooses to attend Mines. More than 80 high school juniors attended this year's reception, which was organized by **Mary Pott BSc CPR '83**.

CSM Faculty Published in *Science*

CSM faculty members David Marr, associate professor of chemical engineering; Roel Snieder, professor of geophysics; and John Scales, professor of geophysics, were recently published in *Science*.

Marr, with chemical engineering master's student Alex Terray and Ph.D. candidate John Oakey, wrote “Microfluidic Control Using

bang nuclear processes." As a teacher, Cecil has been described as "an unselfish, creative educator who challenges the most able students and at the same time offers compassionate encouragement to students who struggle. His enthusiasm is contagious – he makes learning fun." Cecil earned his B.S. from the University of Maryland, and his M.A. and Ph.D. from Princeton University.

Alumni Teaching Award – For "superior teaching at the undergraduate level over a period of several years," Eileen P. Poeter, professor of geology and geological engineering, was presented a plaque and a cash award from the CSM Alumni Association. A member of

the CSM faculty since 1987, Poeter was cited as "an excellent professor who reaches out to students and motivates them to learn," and as a role model for women in science. Teaching mainly senior level classes, she is one of the department's most active faculty members in undergraduate advising and assessment. She is recognized as a campus leader in developing active learning techniques and utilizing Web tools. Poeter earned her B.S. from Lehigh University and her M.S. and Ph.D. from Washington State University.

Emeritus Professors

Emeritus status was granted to the following retiring members of the CSM faculty:

Timothy A. Cross, associate professor of geology and geological engineering.

A member of the CSM faculty since 1984, Cross earned his B.A. from Oberlin College, M.S. from the University of Michigan, and Ph.D. from the University of Southern California.

John C. Emerick, associate professor of environmental science and engineering.

A member of the CSM faculty since 1980, Emerick earned his B.S. from the University of Washington and M.A. and Ph.D. from the University of Colorado.

Kenneth E. Kolm, associate professor of environmental science and engineering.

A member of the CSM faculty since 1984, Kolm earned his B.S. from Lehigh University and M.S. and Ph.D. from the University of Wyoming.

Karl R. Nelson, associate professor of engineering, P.E.

A member of the CSM faculty since 1974, Nelson earned his Geol. E. and M.S. from CSM, and his Ph.D. from the University of Southern Colorado.

SHORT STAKES

Colloidal Devices," which focuses on the creation of micro-pumps and valves using colloids. Snieder and Scales, with CSM graduate students Alexandre Gret and Huub Douma, discuss the "Coda Wave Interferometry for Estimating Nonlinear Behavior in Seismic Velocity." Their research features an improved technique to monitor volcanoes, radioactive waste disposal sites and fault lines.



Silva Promoted

Maureen Silva has been promoted to associate vice president for development in the Office of Institutional Advancement. Serving Mines since 1995, Silva was most recently director of major gifts and assistant campaign director. In her new role, Silva will ensure the integrated operations of several fundraising programs including annual giving, major gifts, planned giving, and corporate and foundation relations.



Maureen Silva

Tracing the Roots of America's

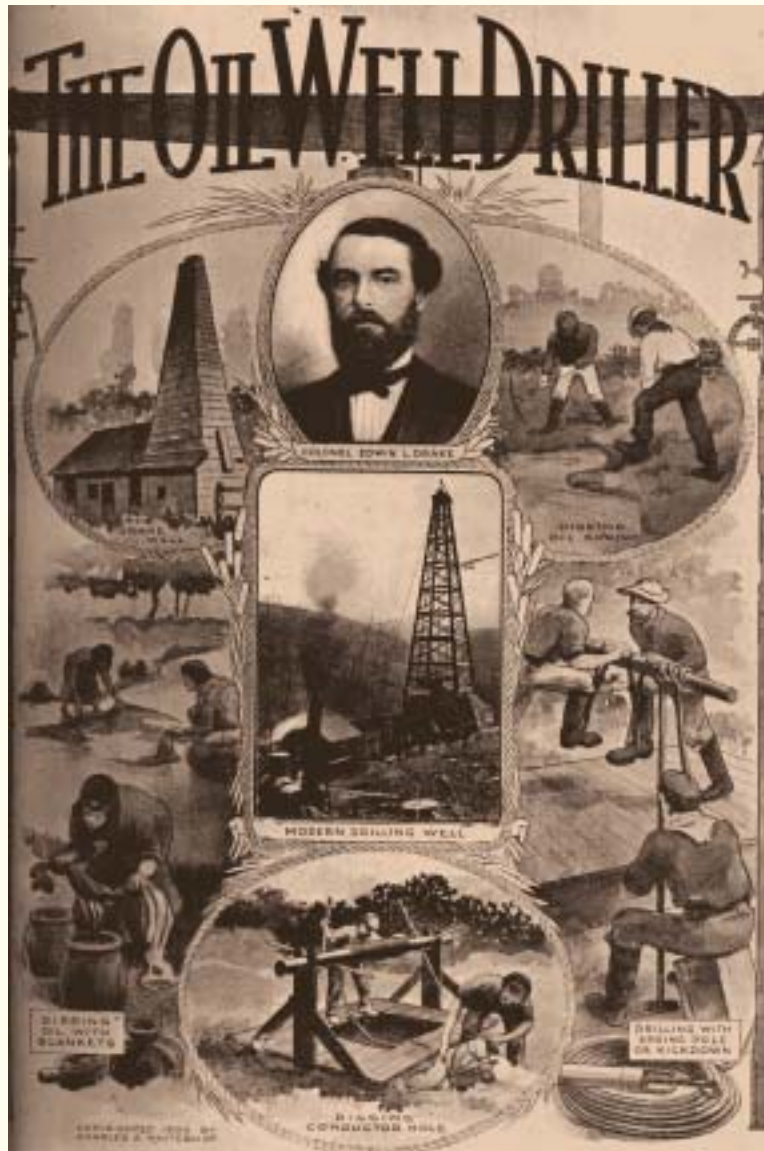
On a farm near Titusville, Pa., a salt well driller named William A. "Uncle Billy" Smith hit an oil spring in 1859. Although the first patent for kerosene was issued in 1854, the American petroleum industry began in earnest with Uncle Billy's strike.

It was Dartmouth Professor George Bissel who, realizing that oil could be used as an illuminant, gathered a group of investors. Bissel and Edwin L. Drake came up with the idea of hiring salt well borers to drill for oil. After two frustrating years and a number of unsuccessful attempts by the salt borers, Drake hired Uncle Billy and his two sons to build a derrick and drill the world's first oil well.

By 1859, Bissel and his investors were nearly out of money, and the drill had stopped working. Dejected, Uncle Billy and his sons went home for the weekend. Meanwhile, back in Titusville, Drake received a message from the investors to pay off Uncle Billy and shut down the operation. The next day Uncle Billy returned to inspect the drill site and saw dark fluid in the drill pipe. When Drake rode out with final payment and "shut her down" orders, he saw tubs, barrels and washbasins, all filled with oil. The boom was on.

At the time of the discovery, oil was just beginning to be used as an illuminant and an industrial lubricant. Prior to this time, "rock oil," which bubbled up in springs in and around the wooded hills of Oil Creek in northwestern Pennsylvania, had been popular as a liniment and as a tonic to treat headaches, stomachaches, worms,

rheumatism, dropsy and toothaches. It was also used as a poultice to treat saddle sores on horses and mules. No cure-all snake oil would be without it.



America's growing population required an inexpensive means of lighting their homes as long-preferred whale oil lamps had become too expensive. Increased demand resulted in the decimation of sperm whales by whalers and a \$2.50 per gallon price for the oil. In addition, the industrial revolution and the large machinery that came with it created the need for an effective lubricant.

By November 1860, 15 months after the first well was sunk at Titusville, 75 wells had been drilled and were producing in Oil Creek. In 1859, there was one kerosene refinery in the United States, producing and selling about 5,000 gallons of kerosene per day. One year later, 20 kerosene refineries had been built between Titusville and Pittsburgh, and 34 U.S. companies were producing \$5 million in "coal oils."

By 1862, 3 million barrels of oil were produced in Pennsylvania, but the price of oil had gone from \$10 per barrel in 1861 to 10 cents per barrel a year later. Titusville had swelled to a population of more than 10,000, and "liquor and leases" were the principal businesses in the area. Farms considered worthless the year before sold for \$1 million, and then quickly resold for \$2 million.

When demand caught up with supply again in 1863, the price of

Oil Industry

oil rose to \$7.50 per barrel. By the end of the Civil War, the price of oil reached \$13.75 per barrel, and Pennsylvania was producing 3.6 million barrels a year. In the meantime, barrel makers and Teamsters became rich and greedy. Teamsters charged more to haul barrels the few miles to the railroad than it cost to deliver oil from Pennsylvania to New York City. The increased costs caused producers to consider alternatives, which included pipelines and steel tankers.

Once again supply exceeded demand, and in 1867, the price of oil plummeted to \$2.40 per barrel. At the same time, greed and over-drilling resulted in depletion of the Pennsylvania oil fields.

Derived from English law, the “Rule of Capture” was applied to mineral wealth in the United States. Under English law, if game animals or game birds migrated from one estate to another, the owner of the latter was within his rights to kill the game on his land. Applied to oil, the law was interpreted to mean that surface owners atop a common pool could take all the oil they could get – even if they reduced output of neighboring wells or that the practice led to waste, damage and the reduction of overall production by as much as 75 percent. The law, which would not change for nearly 75 years, was responsible for much of the environmental damage created by over-drilling.

Soon wells were drilled in nearly every state in the union, including California and Texas. With the addition of America’s love affair with the automobile, the oil industry exploded.



Man and Oil

Through History

Long believed to be “coal juice,” petroleum and asphalt have a long history of usefulness to man. Originally called “bitumen,” a semi-solid substance found oozing from the ground was traded throughout the Middle East 3,000 years ago. It was used for:

☞ Medicinal purposes – According to Pliny, a Roman naturalist during the first century, “It checked bleeding, healed wounds, treated cataracts, gout, cured aching teeth, soothed chronic cough, relieved shortness of breath, drew together severed muscles, relieved rheumatism and fever.”

☞ Waterproofing and mortar – It is believed to have bound the walls of Jericho and Babylon and would likely have been used to caulk Noah’s Ark and to waterproof the basket used to carry baby Moses down the Nile.

☞ Warfare – Homer wrote of “unwearied fire,” used by the Trojans to burn enemy ships. Called “oleum incendarium” or “Greek Fire,” it was mixed with lime and would burst into flame when brought in contact with moisture.



By Gene Tafoya

Murder and Mayhem, All In A Day's Work

Years ago, **Don R. Ledbetter BSc Min '81** exchanged his hard hat for riot gear, and has never looked back.

After graduation, Ledbetter became a safety inspector for a big mining company in Tennessee and worked up to safety director. He also volunteered with the Red Cross supervising first aid stations at Volunteer Stadium and the Tennessee state fair. "It doesn't sound like a big deal until you realize that Volunteer Stadium becomes the fourth-largest city in Tennessee on game day," he says.



Ledbetter and his daughter, Emma

His next volunteer interest became law enforcement. "Some of the people I met [at the Red Cross] were police reserve officers – volunteer officers who worked three or four shifts a month. I went on a few ride-alongs and

was hooked," he recalls. "I worked in the jail, drove a paddy wagon, and eventually started working a one-man car. I bought dope undercover, helped serve search warrants, and did plainclothes enforcement with Knoxville PD's repeat-offender project."

About that time, Ledbetter decided to change careers. He applied to various coastal police departments and Seattle was the first to call. "After the academy, I worked patrol for almost a year, then became a detective. Normally you don't even take the detective-eligibility test until you have five years on the street. I made it because of a set of special circumstances: SPD's Accident Investigation Squad had openings and they were looking for people with technical skills."

Ledbetter investigated auto, train and boating accidents for more than nine years. He worked everything from felony vehicular homicide to misdemeanor hit-and-run cases and taught accident investigation classes at the state academy.

"Eventually I realized that I wanted crime scenes that didn't have a bent car in them," he says, so he transferred to Seattle's gang unit working nights. "Unlike most detectives, we worked on the street. Instead of regular blue uniforms we wore black jeans and boots, and black work shirts with "GANG UNIT" across the back. We worked in two-man unmarked cars and our job was to go where the gangsters went. Seattle has Crips and Bloods from California, Black Gangster Disciples from Chicago, "wards" from New Orleans, Hispanic bangers from Los Angeles and El Salvador,

and Asian gangs across the board. We investigate everything from school truancy to attempted homicide – although once they die we lose the case to Homicide. Because we're out on the street, we can respond directly to gang fights, stabbings, shootings, and start investigating right away. On gang homicides, we're usually there before the Homicide detectives arrive, and we work closely with them."

Another of Ledbetter's assignments is "demonstration management" – formerly called the riot squad. "In summer 1999 we started training for the World Trade Conference [WTO] meetings in December," he recalls "The more time we spent on the Internet or reading flyers on the street, the more we knew we were in for trouble. When the WTO meetings started we were overwhelmed immediately."

Seattle had only about 450 officers compared to the 8,000 officers New York had on hand when the WTO meetings were held there. "We were so understaffed we couldn't even pull a full squad off the line for breaks. I didn't eat a hot meal until the fifth day."

During the eight days of protests, Ledbetter worked more than 140 hours and during street fighting, tore the cartilage in his wrist. After surgery and metal pins to repair it, he was assigned light duty and started working with the intelligence officer for the gang unit, eventually taking over the position. As intelligence officer, he maintains databases and is the liaison to other agencies from police departments to federal agencies to the Royal Canadian Mounted Police. "Our gangs have become so mobile it's not unusual for me to get calls about a suspect from Omaha, Los Angeles, Chicago or New York. I try and spot trends, write bulletins, and prepare briefing books on particular threat groups. I also write grant applications, teach a gang-awareness class to new recruits at the Academy, speak to citizens groups and anything else my captain wants."

Ledbetter is also one of 70 patrol rifle operators in a department of 1,250. "We've been through rapid-intervention training based on the Columbine school shootings, and we can respond to scenes before SWAT arrives, or to augment them if needed," he notes.

Over the years, Ledbetter has come to understand why young people are attracted to gangs. "Mostly, membership in a gang substitutes for membership in a family by providing support, guidance, respect and a sense of belonging. Gangs and the gang lifestyle are spreading because more and more kids aren't having those intangible needs met at home. I see dirt-poor kids from inner-city neighborhoods in gangs, but I also see children of wealth and privilege. A lot of people see a racist element to gang enforcement because so much of our time is spent on minority youth. But if you look at it, race isn't a good predictor of gang involvement and neither is poverty. There are poor minority youth who never join gangs, and rich white kids who do. A better

predictor of gang involvement is family status. Youth from single-parent families are much more likely to join a gang.”

Gang detectives are effective because they specialize in a small group, says Ledbetter. “We talk to gangsters on their turf and in their language, and we try and find out who’s active, who’s fighting with what other gang set, who has dope to sell and who has guns. By understanding their culture and their language you can get a real jump on solving gang crimes. Other detective units aren’t out there on the street to get that knowledge. Patrol is out there, but doesn’t have time to talk to gangsters or to sit on a house for a whole shift to see who shows up. It still makes me feel good to hear some gangster call out ‘GU’s in the house!’ when we roll up. They may not like us, they may not even respect us, but they are afraid of us, and I’ll take that as a compliment.”

Ledbetter has been married for three years to a Bellvue, Wash., firefighter and they have a 2-year old daughter, Emma. “If I won the lottery, all you would hear would be a soft ‘pop’ as the air rushed in to fill the hole where I had been standing,” he admits. “I would be out the door in a flash to spend time with my girls. In the meantime, being a cop is still fun. I get to do interesting work that has a real impact on peoples’ lives. A strong sense of ethics and a desire to serve are considered pluses and I can use a wide range of talents and abilities every day. Plus, my guns are all tax deductible. . .”

Arbuckle '98 leads Alaska platoon

After a year in Korea with the U.S. Army, **Brian Arbuckle BSc Eng '98** today finds himself in Alaska, still with the Army, but now in charge of an earthmoving platoon. His task is to build tank roads and trails and dig fighting positions in wartime and to build gravel roads, foundations, drainage systems, and remove snow in peacetime. So far his platoon has helped build a federal highway on Annette Island; built or upgraded seven road segments on Fort Richardson; constructed huge gravel storage pads for weapon’s storage and created a WWII memorial in Anchorage.

“My role is to do most of the planning and thinking for my platoon,” Arbuckle explains. “I work closely with the company commander to ensure my guys have plenty of construction projects to keep their skills sharp and plenty of field time to practice their tactics. I also focus a lot of my effort looking out for my soldiers. People join the Army for a lot of reasons but most are trying to find a better life. I have soldiers fresh off a Kansas farm working closely with ex-New York gang members. Some of my guys were ordered by a judge to join up or go to jail and others just want money for college. If for no other reason, I love my job because I can help steer these guys in the right direction. They learn valuable construction skills, discipline, respect, and teamwork. I feel that when they leave the Army,

they can positively contribute to our economy and culture.”

Arbuckle credits his education at Mines with helping him succeed. “My Mines experience greatly shaped who I am today,” he says. “The professors constantly challenged me with difficult problems and projects. They taught me how to teach myself and conduct meaningful research. I learned the importance of teamwork through all the group projects. I also learned how important respect is in the workplace. Whether trudging through a hard class or leading a platoon on a construction project, respect of others greatly increases the quality of life and work production. Mines was all about finding solutions to challenges that seemed insurmountable. By working through these obstacles in college, I felt like I was a step ahead of my peers in the workforce.”

Arbuckle seems to run into Mines graduates wherever he goes. In Korea, he served with fellow alumni **Travis Cooper BSc Eng '98**, **Alexis**



Arbuckle rappels up an Alaskan cliff

Kayanan BSc Eng '99, **Steven**

Merritt BSc Chem '99, and **Jason Yockey BSc Eng '98**. Kayanan is now also stationed in Alaska as are **Jess Kindler BSc Min '98**, and **David Bragg BSc Eng '98**. The former **Mindy Brown BSc Econ '01** is now Arbuckle’s wife. They were married last year.

Life in Alaska is much to Arbuckle’s liking. The scenery is spectacular and wildlife is everywhere. “Just last night, my wife and I were awakened by two moose eating bushes outside our bedroom window,” he says. “While mountain biking last summer, I was cruising down a steep trail while making a gradual right-hand turn. As I punched out of the forest into a clearing, I nearly ran into the hindquarters of a large black bear. I don’t know if he chased me because I didn’t turn to find out. I kept peddling as fast as I could until I felt safe.”

Colorado and Alaska are very similar except that everything in Alaska is much bigger. “The opportunities for outdoor recreation are endless up here,” Arbuckle says. “But you really have to know what you’re doing before going out because the consequences if something goes wrong are much greater.”



Mines Experiments: All Aboard

By Carolyn Reed

The first ever CSM payload to go into space will include water-mist, fire-suppression experimental hardware. The NASA Space shuttle, scheduled to be launched soon from Cape Canaveral, will orbit the Earth for 16 days. Four astronauts will serve as payload specialists for the experiment, which was developed at Mines.

Since flames behave differently in space than on Earth, NASA is interested in learning how mist works in microgravity conditions, which could lead to the development of an emergency fire-suppression agent in space.



The FAA is also interested in using a mist system in the cargo holds and cabins of aircraft, because it has a cooling effect, uses water more efficiently and does less damage than water. In the event of an emergency evacuation from an aircraft, the cooling effect would give passengers more time to exit.

The system could also be installed on the outside of structures to cool them in the event of a fire. Experiments have been conducted by the Center for Commercial Applications of Combustion in Space (CCACS) in microgravity on NASA's KC-135 aircraft and on the grounds of the Arvada Fire Department facilities.

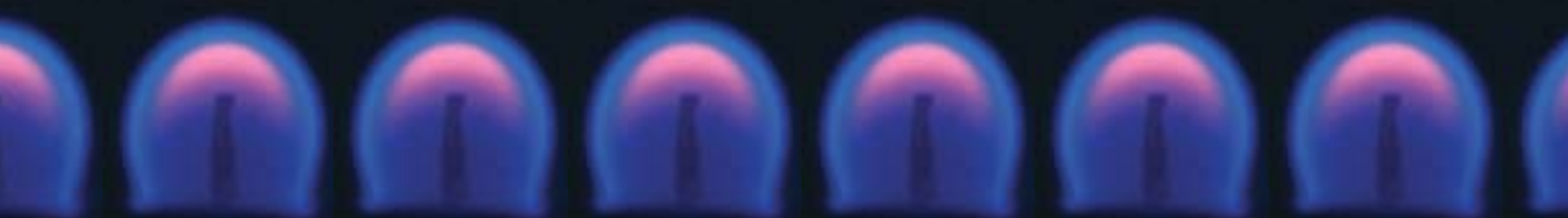
Why is microgravity an advantageous environment for fire-suppression experiments? Dr. Frank Schowengerdt, director of CCACS, explained that on Earth, the flame heats the air around it, which then rises and pulls in fresh air from further away. The air currents generated, called convection flows, make it difficult for scientists to study what is going on in or around the flame. By doing the research in microgravity, convection flows are reduced or eliminated and details of the chemistry and physics can be studied on how mist interacts with fire.

There are approximately 160 different chemical reactions in a natural gas flame. He said that they are interested in learning the effect of introducing a fine water mist into those reactions. In the absence of turbulence or movement of air, flames burn in a spherical ball, giving researchers using instruments time to measure what is happening.

The research is critical. With the elimination of halons (bromine-based compounds) as fire extinguishing agents because they destroy the stratospheric ozone and are not good in closed spaces, new or improved systems need to be developed to ensure the safety of homes, offices, factories, ships and aircraft.

Schowengerdt said that his center has been involved with research on generating fine water droplets and studying how differences in the size of the droplets, and the concentration of the droplets, affect a thin layer of flame, produced by burning a propane-air mixture, as it spreads.

He explained that fine mist is more effective than sprinklers because the droplets are smaller and don't get things as wet. The mist cools a fire as it evaporates, at the same time scrubbing out smoke. It robs fire of heat and oxygen. The system uses approximately 10 percent of the water used by sprinklers to quench the same fire.



Alumni Notes & quotes

Sonnenberg Voted President-Elect

Stephen A. Sonnenberg PhD Geol '81 has been voted president-elect by the 30,000+-member American Association of Petroleum Geologists. He took office July 1 and will serve as AAPG president in 2003-04.



Sonnenberg is manager of the DJ Sub-Business Unit for EnCana EnergyResources Inc. in Denver. He also holds bachelor's and master's degrees from Texas A&M.

AAPG, with members in 115 countries, has international headquarters in Tulsa, Okla.

HHS Secretary Appoints Waterman to Board

Robert Waterman Geop E '58, Dist. Achievement Medal '84 was one of six new members appointed to the National Advisory Neurological Disorders and Stroke Council by Secretary of Health and Human Services Tommy G. Thompson. The council is the major advisory panel of the National Institute of Neurological Disorders and Stroke (NINDS). The NINDS, one of the National Institutes of Health (NIH) in Bethesda, Md., is the nation's primary supporter of research on the brain and nervous system. Waterman is chairman and chief executive officer of The Waterman Group Inc.



The NANS Council meets three times a year to review applications from scientists seeking financial support for biomedical research and research training on disorders of the brain and nervous system. Members also advise the institute on research program planning and priorities. The 18-member council is composed of physicians, scientists and representatives of the public.

Waterman is an internationally known business executive, speaker and author. His best-selling books on business management and motivation include *In Search of Excellence*, *The Renewal Factor*, *Adhocracy: The Power to Change* and *What America Does Right*. After 21 years at the management consulting firm McKinsey & Company Inc., Waterman now directs his own company. He also chairs the RLS Foundation, the national non-profit organization

that sponsors research, raises awareness of, and looks for better treatments of Restless Leg Syndrome. He also serves on the boards of the AES Corporation (the independent power-producing company he helped found) and the World Wildlife Fund. In addition to his Mines degree, he holds an MBA from Stanford University.

Two Alumni Honored by SME

George J. Featherstone EM '43 and **Walter E. Heinrichs Jr. Geol E '40** were voted SME Distinguished Members in February. Featherstone, who also holds a master's degree from the Henry Krumb School of Mines, Columbia University, served three years in the U.S. Army Air Corps before joining American Cyanamid in 1947. He worked for 32 years in various engineering and management positions in explosives and chemical technical sales, retiring in 1979. He then served as professor and department head of mining engineering technology at Bluefield State College. In 1989 he was recognized by the National Independent Coal Mining



Association for his contributions to coal mining in central Appalachia. In 1988, he chaired the International Symposium for Modern Mining Technology at the Shandong Institute of Mining and Technology in China.

Heinrichs worked in seismic exploration for oil after graduation from Mines. He then spent two years as an assistant geologist in the U.S. Naval Reserve's Office of Naval Petroleum Reserves in Alaska and Washington, D.C. He participated in the early Gulf Coast offshore aerial magnetometer experiments. Following this service, he worked for the U.S. Bureau of Reclamation, Newmont Mining, United Geophysical and Pima Mining. In 1958, he co-founded Heinrichs GEOEXploration in Tucson, Ariz., which he still owns and manages. In 1955, he was awarded CSM's first van Diest Award for outstanding work. In the 1960s, Heinrich served on CSM's board of trustees and in the 1980s, he served as president of Adit Resources, a private firm specializing in acquisition of material resources. He recently co-authored *Forerunner of the Mission Complex: The Pima Mine Story*.



Alumni Events calendar

September	September	October	November
<p>10 Colorado Rockies @ Houston Astros. 7:05 p.m. Details TBA.</p> <p>12 Lunch Bunch, an informal alumni get-together, meets at the Buffalo Rose in Golden, Colo., 11:30 a.m.</p> <p>Mines night at the Rockies-Dodgers game, Coors Field, 7:05 p.m.</p> <p>19 Grand Junction section luncheon at Bookcliff Country Club, 2730 G Road, noon. For information call John Howe at 970-242-4903 or Del Tolen at 970-256-1118.</p> <p>Alumni Mixer Downtown Denver. 5-7:30 p.m. Wyncoop Brewing Company, 1634 18th Street. Details TBA. RSVP at 303-273-3295.</p>	<p>28 Colorado Rockies @ Arizona Diamondbacks, Phoenix. Bank One Ballpark, Diamond Infinity and lounge area 1:05 p.m.; \$30 per person.</p> <p>Football, Chadron State at Mines, tailgate at 11 a.m. Game at 1 p.m. level and lounge area.</p> <p>29 Houston section: Offshore Rig Tour, Galveston Ocean Star offshore rig tour, 11 a.m. Details TBA.</p>	<p>10 Lunch Bunch, an informal alumni get-together, meets at the Buffalo Rose in Golden, Colo., 11:30 a.m.</p> <p>17 Grand Junction section luncheon at Bookcliff Country Club, 2730 G Road, noon. For information call John Howe at 970-242-4903 or Del Tolen at 970-256-1118.</p> <p>Alumni Mixer Downtown Denver. 5-7:30 p.m. Wyncoop Brewing Company, 1634 18th Street. Details TBA. RSVP at 303-273-3295.</p> <p>26 New Mexico Highlands at Mines football. Tailgate at 11 a.m. Game at 1 p.m.</p>	<p>14 Lunch Bunch, an informal alumni get-together, meets at the Buffalo Rose in Golden, Colo., 11:30 a.m.</p> <p>21 Grand Junction section luncheon at Bookcliff Country Club, 2730 G Road, noon. For information call John Howe at 970-242-4903 or Del Tolen at 970-256-1118.</p>
	<p>October</p> <p>5 Ft. Hays State at Mines football. Tailgate at 11 a.m., game at 1 p.m.</p> <p>8 Alumni geophysics luncheon, Salt Lake City, Utah. Site and time TBA.</p>	<p>November</p> <p>9 Port of Houston boat tour; 9:45 a.m., Details TBA.</p>	<p>December</p> <p>19 Lunch Bunch, an informal alumni get-together, meets at the Buffalo Rose in Golden, Colo., 11:30 a.m.</p> <p>24 Grand Junction section luncheon at Bookcliff Country Club, 2730 G Road, noon. For information call John Howe at 970-242-4903 or Del Tolen at 970-256-1118.</p>

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West

California

East Bay coordinators, **John Gabelman Geol E '43, MSc Geol '48, DSc Geol '49** and **Don Neuschwander EM '51** hosted a Spring Mexican Dinner in April in Danville. Twenty-nine people attended.



Rocky Mountain

Idaho

The Boise section enjoyed a dinner with the Mines ski team, which was in Boise for regional NCAA competition. The February event was hosted by **Jim Classen Geol E '57**.

Metro Denver

Golden

In February, CSMAA and the Athletics Department hosted a celebration of 25 years of women's athletics at Mines during halftime. The celebrants had brunch and then recognized the returning athletes and coaches during halftime at the last home game of the women's basketball team.

In April, soccer alumni joined the varsity soccer players, coaches and parents for the annual team banquet and varsity-alumni soccer match and picnic. Fourteen alumni enjoyed competing with and against varsity players followed by a picnic in Brooks Field.



Soccer Reunion

Denver

In May, a group of alumni gathered to cheer the Colorado Rockies to a big win over the San Diego Padres. Pictured from left are CSMAA staff members Maureen Keller and Kathy Breit and CSMAA President **Jodi Menebroker BSc CPR '91**, her husband Terry and their new son Trevor.





Southwest

Arizona



Bob Kendrick EM '54 hosted a group of alumni to a spring social at his home in Scottsdale, Ariz. Some of the group hiked up Lone Mountain and also toured the H.B. Wallace arboretum, across the street from the Kendrick home.

Oklahoma City, Okla.

CSM Athletic Director **Marv Kay EM '63** discussed CSM sports with alumni in Oklahoma City in June at Green's Country Club.



Central

Tulsa, Okla.



CSM Athletic Director **Marv Kay EM '63** discussed School sports in June with alumni who met for lunch at the Celebrity Club in Tulsa.

Gulf Coast

Houston



The 2nd annual Houston alumni golf tournament was held in April at The Club at Falcon Point in Katy, Texas.

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Robots Search Rubble

Within hours after the September 11 attacks on the World Trade Center, a small group of committed technologists gathered at Ground Zero to deploy a new generation of search-and-rescue robots designed to help emergency personnel search for survivors. In the days and weeks to come, the small but agile robots and their operators worked around the clock probing through the deadly rubble-filled underground pockets up to 90 feet below the surface, searching in places neither humans nor dogs could reach. Carrying cameras, lights, microphones and environmental sensors, the robots helped searchers find 13 buried victims. During later weeks of recovery, city engineers used the robots to inspect buried underground structures for damage. The event marks the first known use of robots in urban search and rescue efforts. Recently a robot has been assigned to search caves in Afghanistan.

On April 27, 2002, **John G. Blich** MSc Math '96 was awarded the 2001 Eugene Lawler Award for Humanitarian Computer Science at the annual Association for Computing Machinery (ACM) awards banquet at the University of Toronto. Blich was cited "for his leadership in the prior development and rapid deployment of the urban search and rescue robots used at the World Trade Center disaster." The award is given every other year for humanitarian contributions within computer science and informatics, and carries with it a \$5,000 prize.

Blich, a former Green Beret and a retired Lieutenant Colonel in the U.S. Army, earned his master of science degree in mathematical and computer sciences at CSM while on academic leave from the military. He is vice president and director for the Center for Intelligent Robotics and Unmanned Systems (CIRUS) in Colorado, and is founder and operations director for the Center for Robot-Assisted Search and Rescue (CRASAR).

Established on Sept. 1, 2001, CRASAR is a non-profit crisis response and research organization that maintains caches of robots for rapid deployment from centers in Littleton, Colo.,

and the University of South Florida (USF) at Tampa. Director of the CRASAR-East center is Robin Murphy, former CSM assistant professor of mathematical and computer sciences and Blich's master's thesis adviser.

Murphy is currently associate professor of computer science and engineering at USF, where CRASAR-East is headquartered. Murphy led a team of robot experts from USF at the WTC disaster site and participated in the search and rescue effort. Her current research with urban search and rescue robotics centers on development of hybrid tether systems.

While untethered robots would be ideal, Blich says environmental conditions make it impractical and almost impossible to maintain uninterrupted communications and data transmission deep underground. Called "marsupial or autonomous docking" operations, hybrid robots will be able to enter rubble using standard electronic tethers, then "unplug" themselves to conduct certain operations. Afterward, the robots reattach themselves to their tethers to re-establish contact with operators at the surface.

In all, six small robots were used at the WTC site. Some resemble toy tanks and use artificial intelligence (AI) software to make their way down rubble-strewn spaces, carrying images and information back to operators at the surface. Two-way radio conversations make it possible to relay critical information between survivors and rescuers, as well as transmit other data, including environmental conditions, blood type and number of victims.

ole at Ground Zero



All six robots were badly damaged during the WTC operation, according to Blicht, who has funded CRASAR using his personal savings. He is currently seeking funding to replace the robots, as well as to continue research and development of search-and-rescue robots. CRASAR has received no outside funding since September 11, although Blicht used his \$5,000 prize money from ACM to continue his work.



Mobile Robotics/Machine Perception Laboratory. The work began with the goal of developing AI software that would allow mobile robots to operate in hazardous conditions. The initial idea was to remove humans from dangerous situations, such as mapping toxic waste facilities, monitoring dumps and storage sites for spills, or the reclamation of environmentally hazardous areas.

Shortly after the search and rescue efforts at the WTC, Blicht was recalled to service by the U.S. Department of Defense and sent to Afghanistan where he deployed robots in the search for land mines and booby traps in al-Qaeda caves. Struck by the surreal aspect of being involved in searches at Ground Zero as well as tunnels used by the terrorists, Blicht was struck most by feelings of guilt over his retirement from the military at such a critical juncture.



The first CSM robot, dubbed Clementine, was an autonomous Denning MRV-III mobile robot controlled by an onboard Sun Microsystems computer, with AI software programs developed by CSM faculty and students that emulated basic human behaviors. Clementine's onboard equipment included navigational tools for maneuvering throughout obstacle-strewn spaces, ultrasonic sensors to help it "see," and video cameras, inclinometers, and a laser for estimating distances.

After he wrote and completed his master's thesis on the use of small robots for reconnaissance, Blicht returned to the Army's Special Operations Command in 1996. He then worked at the Defense Applied Research Projects Agency (DARPA) Tactical Mobile Robots program from 1998 to 2001.

The key to behavioral programming is allowing robots great flexibility under changing conditions. Unlike normal sequential programming, which dictates step-by-step actions, AI software allows greater flexibility and the ability to learn and react to changing environmental conditions.

"When I left DARPA, the world was a relatively sleepy place," he remembers. "There were no major crises happening, and had I known what was about to transpire, I never would have left the military." He is presently working as a part-time consultant with DARPA.

The momentum for developing search-and-rescue robots came in 1996 when Blicht, working on his master's thesis under Murphy, volunteered to help in rescue efforts after the bombing of the federal building in Oklahoma City. It was at the bombing site that he noticed the ineffectiveness of huge, 1,000-pound robots the size of office desks.

Recently interviewed by *People Magazine* for an upcoming article, Blicht finds his newfound celebrity somewhat disconcerting, particularly "after spending the last 20 years trying to avoid the media," but hopes the attention will help in the effort to replace the robots and continue badly needed research and development.



"They can't get anywhere humans can't, and anything they can do, a human can do with more dexterity and faster," Blicht told a *Denver Post* reporter recently. "Those clunky, clumsy things had no value, and they cost a half-a-million dollars each." The new mobile robots used in search and rescue efforts today cost between \$10,000 and \$50,000.

"The sum of all fears is a radioactive version of what happened at the World Trade Center," says Blicht. "It would be 10 times worse than what happened at Ground Zero when nearly all the highly trained first responders were killed when the towers collapsed. In the case of a nuclear strike, the only solution is robots hardened against radiation."

When Blicht returned to CSM after the Oklahoma City recovery effort, Murphy remembers, "John was very passionate about the potential for robotics technology to help in search-and-rescue efforts. After he returned, everybody in the lab immediately switched focus. It became a classic case of the student instructing the teacher."

The genesis of search-and-rescue robots occurred in 1992 when Assistant Professor Robin Murphy was named director of the CSM



By Gene Tafoya



▲ **Class of 1942**

Front row from left
Edward E. Bennett, Frank Stephens, Jack Starks, and Harry Campbell.
Back row from left
Roland Fischer, Bill Bousman, Dave Coolbaugh, and Eduardo Regalado.

▼ **Class of 1947**

Front row from left
Blair Burwell, Dick Van Horn and Charles Einarsen.
Back row from left
Richard Ganong, William Erickson, Frank Seeton and Norbert Hannon.



Class of 1952 Reunion
Covered on page 30

▲ **Class of 1957**

Front row from left
Jim Classen, Buddy Ratliff, Robert Johnson, Lee Brown, Harry Cunningham, Jerry Tuttle, Delbert Tolen, Jack Barney, and Bob Beckman.
Back row from left
Ralph Avellanet, Paul Kloberdanz, Mike Carr, Allen Spelman, Keith Thistlewood, Francisco Reis, Kai Ravnborg, Ellis Herrington, Cecil Craft, Tony Pegis, Dave Smink, Roland Pohler, John Coats, and Brad Pitney.



▲ **Class of 1962**

Front row from left
John Macfadyen, Miguel Kubes, Bill Sharp, Dick Richards, Henry George, Mary Edwards, Charles Vestal, Les Ludlam, and Jerry Berk.
Back row from left
Duncan Creed, Kenneth Kuxhausen, Stephen Force, Allan Provost, Clint Eddy, Will Pitman, Bill Flesner, Chuck Downing, David Geddes, and Larry Van Ryan.

CSMAA class reunions



◀ Class of 1967

Front row (seated) from left
Steve Tipton, Steve Collings,
Charlie Albrecht, and Phil Bowman.
Back row from left
Lou Harmon, Marshall Crouch,
Dave Delaney, Robert Jensen, and
Joe Stewart.



▲ Class of 1972
and their spouses and guests.



◀ Class of 1977

Front row (seated) from left
Scott Gustafson, William Colleary,
Terry Evans, and Stewart Sampson.
Back row from left
David Chazin, Tom Vorce,
David Glater, Joel Scott, and
John Robinson.



▲ Class of 1982

Front row from left

George Moseley, Barb Ganong, Pam Edrich, Sandie Sullivan, Marcia Talvitie, Karen Gumina, Winthrop Childers.

Middle row from left

Nancy Roberts, Lauren Evans, Judy Bolis, Cindy Humiston, Kristi Ormsbee, Stephen Bair.

Back row from left

Richard McClure, Rick Edrich, Chris Beck, Pat Gallagher, Kevin Conroy, Mike Kennedy, Eric Peterson, Eric Lauber, David Scolman, Doug Gallagher, and Dennis Caruso.



▲ Class of 1987

Front row from left

Mark Levorsen, Laura Levorsen, Theresa Wisda, Louise McClure.

Back row from left

Jeffrey Wilson, Fred Earnest, Samuel Allen, Allen Van Nest and Carlos Ballon.



▲ Class of 1992

Front row from left

Sheri Foos Rocha, Denise Thomas, Cindy Hoppe, Vicky Jackson Nielsen, Aimee Oltrogge-Tromble, Kimberly Lewis.

Middle row from left

Toni Clifton and Kathy Peltzer Hylton.

Back row from left

Calvin Feik, Hans Hoppe, John Strobel, David Kalman, Brian Yeagley, Pete Kowalewski, Brian Mielke, Jonathan Hopkins, William Beltz, and Greg Dewey.

CSMAA class reunion



Keith Kvenvolden Geol '52,
Distinguished Achievement
Medal recipient

Class of 1952's Golden Reunion

The Class of 1952 returned to the Mines campus in large numbers to celebrate their 50th reunion. President Trefny spoke at the annual 50-year reunion breakfast, taking the 80 class members back in time by recalling the most notable *and notorious* events of their years at Mines. Then, focusing on the extraordinary transformations in

States Geological Survey, was awarded a Distinguished Achievement Medal for his eminent contributions to the field of geology.

At the Mount Vernon Country Club later that day, the group gathered for a banquet arranged by the Class Reunion Committee. Various individuals spoke, many thanking the committee for



Class of 1952



Commencement presentations honor 50 years of service

modern life since their graduation, Trefny applauded the class for their many accomplishments. A slideshow of pictures from their school days accompanied breakfast, and as memories were shared and stories told, a colorful picture of life at Mines in the early '50s emerged.

During commencement ceremonies the following day, President Trefny personally presented commemorative diplomas to each member of the Class of 1952. The silver plaques inscribed with gold recognize the class' loyalty and dedication to the School over the past 50 years. One member of the Class of 1952 received special recognition. Dr. Keith Kvenvolden, who graduated at the top of his class in 1952 and continues to work for the United

arranging the program, others providing an update on the status of philanthropic class projects, and still others congratulating the Class Reunion Gift Committee whose hard work helped deliver the record-breaking class gift of \$2.7 million (see related story on page 31). Helped along by clear skies and a strong sense of fraternity revived, the weekend will be remembered fondly by all who attended.



2002 Reunion Gift Largest in Mines' History

At no other time of the year are the bonds between alma mater and alumni more evident than during reunion weekend. As friends reunite, share memories, and visit old haunts, the connections between former students, their past, and the School are palpable. One way this strength of feeling becomes evident is through

reunion gift ever. Remarkably, this year also saw the second largest class gift ever, with the Class of 1942's gift of \$1.5 million. While these amounts include significant individual gifts, overall participation rates among all reunion classes were very high and many individuals share in the accomplishment.

Much of the success of the Reunion Giving Program can be attributed to the

Faculty and Staff Campaign for Mines

Mines receives funding from a wide array of sources, but many are surprised by one donor group: faculty and staff. This year over \$375,000 was contributed by employees and former employees of the School in support of the Campus Campaign. Among this group, 50 have made donations of \$1,000 or more, making them members of the 2001-2002 President's Council. Dr. Bob Knecht, EPICS Program Director and Mines alumnus, has chaired the program for the past two years. This year, the program will expand by electing two chairs—one from the teaching faculty and one from campus staff.

The decision to elect two chairs reflects the success of the Family of Mines Scholarship, an initiative taken up by a team of administrative staff members. The scholarship will provide assistance to students whose parents are past or present employees of the School. A committee of six organized the kickoff fundraising event for the scholarship, the *First Bloom* luncheon and silent auction. They gathered over 40 donations from individuals and local businesses for the auction, and arranged an intriguing program featuring Channel 9 gardener, Bill Kuster.

The event raised over \$5,000 for the scholarship, an exceptional outcome for a first-year fundraising event. Over 100 guests representing departments throughout the School showed up to support the initiative. President Trefny commented, "Bearing in mind all that faculty and staff contribute to Mines professionally, the decision to give financially to this fund signifies extraordinary dedication." After such success, plans are already underway for 2003.



President Trefny accepts reunion class gift

generous reunion class gifts given each year to Mines. This year, the combined class gift of \$4.4 million was the largest in the history of the School. Applauded by over 300 alumni and guests, a ceremonial check for this amount was presented to President John Trefny at the All-Alumni Banquet on May 4 by Class of 1952 reunion gift committee co-chairs Ralph Anderson, Chuck Champion, and John Lockridge.

The check represents combined gifts from this year's eleven reunion classes: 1942, 1947, 1952, 1957, 1962, 1967, 1972, 1977, 1982, 1987, and 1992. Celebrating their 50-year reunion, the Class of 1952 donated a total of \$2.7 million, setting another record with the largest single class

hard work of volunteer class reunion gift committees. Each year, a team of volunteers from each class forms a committee devoted to calling fellow class members, inviting them to attend reunion and to participate in the class gift. This year, a total of 36 individuals contributed their time by serving on Reunion Giving Program committees. Phil Bowman (Min '67), who served on his class reunion gift committee, remarked, "A lot of things have gone well for me because I went to Mines. I feel as if the School is going in the right direction, and sitting on the committee is my way of helping it keep moving in that direction."

Philanthropy at Mines

INDIVIDUAL GIFTS

Colorado School of Mines received more than \$25,000 from each of the following individuals between February 23 and May 16, 2002.

An insurance gift of \$50,000 from the estate of **Robert H. Dunwoody** (Geol E '49) established the Robert H. and Evelyn N. Dunwoody Endowed Fund in Geophysics, providing unrestricted support for the Department of Geophysics.

Ben L. Fryrear Met E '62 contributed \$25,000 to the Dean Burger Memorial Endowment Fund honoring the former Dean of Students William Burger. The fund supports students who are in danger of withdrawing from Mines because of financial hardship.

Francis J. Met E '52 and **Mary Labriola** donated \$25,000 (to the Mines Annual Fund) to celebrate Frank's 50th reunion.

John P. Geol E '52 and **Erika Lockridge** donated \$229,200 in appreciated securities to the Blaster Endowed Scholarship Fund, which furnishes scholarship support for members of Mines' basketball team. The gift was a payment on the Lockridges' pledge of \$1 million to establish the fund.

J. Robert Maytag, CSM trustee from 1975 to 1978, added \$247,000 to his Andes Scholarship program, which fully supports three or more students each year who originate from the Andes Mountains of South America.

Paul R. Peel donated historical documents with an appraised value of \$33,401 to the Russell L. and Lyn Wood Mining History Archive in the Arthur Lakes Library.

A final distribution of \$53,277 was received from the estate of **Wilhelmina C. Siegert** for the William C. Siegert Scholarship endowment.

Trust Gift Expresses Gratitude, Provides Retirement Benefit for Alumnus

As a loyal financial supporter of Colorado School of Mines, J. Samuel Butler PE '68, has known for years that he wanted to make a special gift to express his gratitude for the education he received here. Sam has been a member of the President's Council every year since 1993-94, and several years ago he took the important step of establishing a bequest provision for Mines in his estate plan. "Mines is one of my top charitable priorities," he noted. "It's a remarkable institution that changes lives by creating opportunity. It certainly changed the course of my life."

Recently, Sam extended his commitment by establishing a charitable remainder trust that names the CSM Foundation as sole charitable beneficiary.



The trust was funded with appreciated securities valued at approximately \$1 million. In addition to enabling Sam to avoid capital gains taxes and lessen estate tax exposure, the trust will also provide income for his retirement. At his death, its assets will be released for scholarships and other purposes which he will specify.

The scholarship component is important to Sam—it was a scholarship award from the Jackson Foundation of Pueblo, Colorado, that enabled him to attend Mines. He made the most of the opportunity, and as a consequence has enjoyed a successful career in the petroleum industry. Currently, he is President of Trinity Petroleum Management and ST Oil Company, both located in Denver. He also serves on the board of the Energy Literacy Project, a nonprofit group that seeks to promote public understanding of the connections among energy, the economy, and the environment.

"Deferred gifts are critical to the long-term strength of Mines," President John Trefny commented. "This gift provides an excellent example of why the School can face a challenging future with confidence."

Thompson Honored as Part of Mines' Teaching Legacy

It's a common theme. In conversations with Mines graduates about their experience on campus, one frequently hears stories of a professor, dean, or coach who made a difference at a pivotal point in their academic careers. A dean who learned of a student laboring under financial difficulty—and went to extraordinary lengths to find additional resources. A professor who noticed a student struggling in class—and took the trouble to find out what was wrong. A coach who pushed the team further than they thought possible.

Throughout the School's history, such dedicated professors have cemented the Mines experience for generations of young men and women. By simultaneously caring for and challenging students, they have fostered vital qualities for success: confidence, perseverance, and enthusiasm. While they may never fully understand the impact they have had, their students remember and are forever grateful.

One such mentor was Robert Thompson, a deeply respected Petroleum Engineering professor who passed away unexpectedly last summer. During Thompson's 20 years in the department, he earned the admiration of students and colleagues alike. His sincere dedication to teaching, his insightful research, his quiet, focused intelligence, and his unassuming personality inspired confidence and trust.

In recognition of the influence individuals like Thompson had on their lives, an impressive number of graduates have chosen to create or contribute to endowed memorial funds. The Burger Memorial Fund honors the legendary Dean of Students **William Burger**, who served Mines from 1947 to 1964. The Class of 1952 recently established a scholarship in memory of **Fritz Brennecke**, Athletic Director and football coach at the School from 1947 to 1976. And an endowed fellowship fund memorializes **Francis Van Tuyl**, who was the Geology Department Head from 1917 to 1953.

So, too, has Dr. Thompson been remembered through the creation of the **Robert Thompson Memorial Fund**. Friends, family members, colleagues, and numerous former students have contributed in excess of \$25,000 to establish the fund (see sidebar story). Its purpose is not only to honor his accomplishments, but also to perpetuate the qualities he embodied by supporting students who exemplify them.

Describing why she donated to her former professor's memorial fund, Nicole Ybarra PE '00 responded, "I always admired and respected Dr. Thompson. He was completely devoted and dedicated to our success, and contributing to his memorial scholarship is my way of saying thank you."



*Dr. Robert Thompson, 1946-2001,
exemplified qualities admired in gener-
ations of faculty.*

CORPORATE AND FOUNDATION GIFTS

Colorado School of Mines received more than \$25,000 from each of the following corporations and foundations between February 23 and May 16, 2002.

The **Adolph Coors Foundation** continued their support of Minority Engineering Program scholarships with a gift of \$75,000.

Baker Hughes contributed gifts totaling \$50,000 to support Professor Max Peeters' research in the Department of Geophysics.

BP gave gifts totaling \$36,500 to fund the Minority Engineering Program; minority scholarships; a graduate fellowship in the Department of Geology and Geological Engineering; Chemical Engineering; Petroleum Engineering program support; and the Society of Women Engineers.

ChevronTexaco contributed \$105,000 to support campus diversity initiatives and the departments of Engineering, Chemical Engineering, Geology and Geological Engineering, Geophysics, and Petroleum Engineering.

Infiltrator Systems gave a gift of \$133,333 to support Dr. Robert L. Siegrist's research and educational activities in the area of on-site and alternative wastewater technologies.

Schlumberger gave a \$25,000 gift to support Professor Max Peeters' research in the Department of Geophysics.

Thompson Memorial Scholarship Challenge

Robert Thompson's fraternity brother, colleague, and lifelong friend John Wright (PE '69, PhD PE '85) has issued a challenge to triple the size of the current endowed fund. He will match up to \$25,000 in additional donations to the **Robert S. Thompson Memorial Scholarship Fund**, which provides an award to an upperclassman studying in the Petroleum Engineering option. *If you are interested in contributing to this scholarship, or you would like to honor the memory of another faculty member, please contact Maureen Silva at 303 273 3523/mcsilva@mines.edu.*

CSM Athletics

summer 2002

2002 Fall Schedules

Date	Opponent	Time
FOOTBALL		
Aug. 31	Oklahoma Panhandle	1:00 pm
Sept. 7	S.D. SCHOOL OF MINES	1:00 pm
Sept. 21	Western New Mexico	Noon
Sept. 28	CHADRON STATE*	1:00 pm
Oct. 5	FORT HAYS*	1:00 pm
Oct. 12	Nebraska-Kearney*	1:00 pm
Oct. 19	Fort Lewis*	1:00 pm
Oct. 26	NEW MEXICO HIGHLANDS*	1:00 pm
Nov. 2	MESA STATE*	1:00 pm
Nov. 9	Adams State	1:00 pm
Nov. 16	Western State*	1:00 pm

MEN'S SOCCER

Aug. 30	UNIV. OF TAMPA	7:00 pm
Sept. 1	NORTHEASTERN STATE	1:00 pm
Sept. 6	Regis*	4:00 pm
Sept. 8	METRO STATE*	1:00 pm
Sept. 15	Fort Lewis*	1:00 pm
Sept. 18	Colorado Christian*	4:00 pm
Sept. 20	CU-COLO. SPRINGS*	4:00 pm
Sept. 22	SOUTHERN COLORADO*	1:00 pm
Sept. 27	West Texas (@Midwestern State)	4:00 pm
Sept. 29	Midwestern State	1:00 pm
Oct. 2	COLORADO CHRISTIAN*	7:00 pm
Oct. 9	Denver University	3:00 pm
Oct. 11	St. Edward's (Austin, TX)	TBA
Oct. 13	Incarinate Word (San Antonio, TX)	TBA
Oct. 20	FORT LEWIS*	1:00 pm
Oct. 25	CU-Colorado Springs*	3:00 pm
Oct. 27	Southern Colorado*	1:00 pm
Nov. 1	REGIS*	7:00 pm
Nov. 3	Metro State*	2:30 pm
Nov. 8-9	RMAC Tournament	TBA

VOLLEYBALL

Aug. 30	West Texas A&M	TBA
Aug. 31	Lady Buff Classic Tournament	TBA
Sept. 6	Central Oklahoma Tournament	TBA
Sept. 7	Central Oklahoma Tournament	TBA
Sept. 13	Fort Hays State*	7:00 pm
Sept. 14	Nebraska-Kearney*	7:00 pm
Sept. 20	METRO STATE*	7:00 pm
Sept. 21	COLORADO CHRISTIAN*	7:00 pm
Sept. 24	CHADRON STATE*	6:00 pm
Sept. 27	Regis*	7:00 pm
Oct. 4	MESA STATE*	7:00 pm
Oct. 5	WESTERN STATE*	7:00 pm
Oct. 8	Northern Colorado	7:00 pm
Oct. 11	ADAMS STATE*	7:00 pm
Oct. 12	FORT LEWIS*	7:00 pm
Oct. 18	New Mexico Highlands*	7:00 pm
Oct. 19	CU-Colorado Springs*	7:00 pm
Oct. 20	Southern Colorado*	3:00 pm
Oct. 25	FORT HAYS STATE*	7:00 pm
Oct. 26	NEBRASKA-KEARNEY*	7:00 pm
Nov. 1	Metro State*	7:00 pm
Nov. 2	Colorado Christian*	7:00 pm
Nov. 5	Chadron State*	5:00 pm
Nov. 8	REGIS*	7:00 pm
Nov 15-17	RMAC Tournament	TBA

CROSS COUNTRY

Aug. 31	University of Colorado, Boulder, Colo.
Sept. 7	Colorado State University, Fort Collins, Colo.
Sept. 14	Colorado College, Colorado Springs, Colo.
Sept. 21	Western State College, Gunnison, Colo.
Sept. 28	SCHOOL OF MINES, Golden, Colo.
Oct. 5	Northern Colorado, Greeley, Colo.
Oct. 12	SCHOOL OF MINES, Golden, Colo.
Oct. 26	RMAC Championships, Gunnison, Colo.

*Denotes RMAC Match
HOME GAMES IN ALL CAPS

A Salute to 2002 Hall of Fame *By Greg Murphy*

As the weather cools, the leaves begin to change colors, and students migrate back to campus, it can only mean one thing: The Colorado School of Mines Athletic Department is ready to begin the 2002-03 athletic season.

To kick things off this year, the Athletic Department will induct four individuals, two outstanding supporters, one historic achievement, and four teams into the CSM Athletics Hall of Fame. The seventh Hall of Fame class will be inducted on Friday, Sept. 6, at a 7 p.m. dinner preceded by a one-hour social. The event will take place in the Ben Parker Student Center, ballrooms A, B and C.



The 2002 Hall of Fame Class includes Marv Kay Sr. (class of 1940), Lynne (Terre) Leone (1994), Dennis Ulrich (1971) and Mike Ziegler (1990), the soccer teams of 1993 to 1996, outstanding supporters John and Marilee Rossi, and the 2001 football team's overtime victory over Fort Hays State as a historic achievement.

Kay, a four-year letterman in football from 1936 to 1940, is widely considered the greatest lineman to ever don an Oredigger uniform. He was a three-time All Rocky Mountain Conference pick, as well as an Associated Press All-American pick and a Colliers All-American in his final season.

Leone earned four letters as a women's basketball player and is one of only five women to record more than 1,000 career points in CSM history as she finished her career with 1,061 points. In addition, she earned four letters as a softball player, earning First-Team All-RMAC and Second Team All-District accolades in her senior campaign.

Ulrich earned four letters as the quarterback of the Mines football squad. As a senior, he was named to the Rocky Mountain Division First Team, the AFCAA All-American Second Team and the KODAK Honorable Mention All-American team. He concluded his career with 13 school records, many of which have since been broken.

Ziegler lettered four times in basketball and was the first player in Mines history to score 2,000 points. He was also an All-District VII selection as a sophomore and junior, as well as a two-time First Team All-RMAC honoree. Ziegler made an RMAC-record 125 three-point field goals as a senior and helped lead Mines to conference championships as a sophomore and a senior.

The Mines soccer teams of 1993 to 1996 compiled an overall record of 39-26-2 over the four-year span. Under long-time Head Coach Bob Pearson, the squad captured four conference titles. Meanwhile, John Rossi and his wife, Marilee, will be inducted for supporting CSM athletics since John graduated from Mines in 1961. A three-year letter-winner in football, John was also a member of the 1958 Rocky Mountain Conference championship team.

The 2001 football squad produced one of the most dramatic wins in Mines history and will be inducted into the Hall of Fame for its Historic Achievement. Trailing 25-9 at the half against Fort Hays, the Orediggers tallied 43 second half points to produce a 52-45 overtime victory. It marked the first time Mines had won in Hays, Kan., since the 1972 season.

The Colorado School of Mines has a rich tradition and a proud history of athletic success spanning more than 100 years. Many teams and individuals have left their marks in the hearts and minds of Oredigger fans, and more excitement promises to come during the 2002-03 season.



Saving Millions

By Misti Brady

From boardrooms to beer lines, economics and business students have accepted the challenge of saving companies millions of dollars each year. To date, Mines graduate students have completed more than 100 projects, saving money for companies and agencies by reducing costs.

Currently in its 29th year and boasting more than 200 graduates, the operations research specialization has a following of students, agencies and companies from around the world. Companies such as American Airlines, Coors Brewing Company, COVIA, Delta Airlines, Jeppesen, Pillsbury, Sabre Inc. and United Airlines utilize the expertise of Mines students. Agencies that have benefited include the U.S. Army Recruitment Command, The Joint Chiefs of Staff, and state governments in Utah and Colorado.

Master's and Ph.D. students tackle practical, complex questions:

- Where's the best place to build a new fire station?
- Which gravel roads in the county should be paved this year?
- How can Coors Brewing Company reduce its packaging costs?

Students who pursue these projects are expected not only to solve the problem, but to do so by actually becoming a firefighter, construction road worker or can-line operator.

"If you want to solve a problem, you first have to shadow each step in the process until workers will take a day off and let you do their job," said Gene Woolsey, professor of economics and business and program founder.

The program's success is reflected in the two folders on Woolsey's desk. Both usually inches thick, one contains possible projects for students, the other potential jobs for graduates. "It's the attraction of the program. The demand for our students is high. Our placement record over the past 29 years is 98 percent, within six months of graduation," he said.



Outstanding Alumni and Friends



Melville F. Coolbaugh Award

David Coolbaugh Geol E '43, EM '47, DSc Geop '61 received this year's Melville F. Coolbaugh Award. For more than 50 years, Coolbaugh has been boosting, promoting and improving the image and enhancing the reputation of Mines. After graduation and a stint in the U.S. Navy during World War II, Coolbaugh served the mineral industry as a miner, mining engineer, geologist, geophysicist, professor, and consultant. After returning to Golden from his mining career in 1987, Coolbaugh continued his interest in the School. Highlights of his work include acting as a liaison between CSM and two universities in Mexico, chairing the Centennial Committee, being a member of awards and student financial aid committees and he currently chairs the CSM History Project.



Outstanding Alumnus Award

Two people were named outstanding alumnus this year. The husband-and-wife team of **Richard "Dick" Geol E '66** and **Mary Beth PE '69** Beach has been recognized for their years of dedicated service. Dick served on the CSMAA board of directors and held all offices including president. Mary Beth served for many years as CSMAA membership chair and has been actively involved in the School's Sister2Sister scholarship program since its inception. The Beaches have volunteered for everything from building Homecoming floats to serving food at the Senior Pizza Party to phoning fellow classmates to talk up the Alumni Association. The Beaches, individually and as a couple, have always shown their support for the CSM community.



Mines Medal

Robert W. Pearson PE '59 received this award in December. While a student, he participated in varsity track, basketball, football and intramural sports. After graduation he became a test engineer but in 1966, returned to Mines and spent 32 years as a teacher, coach and athletic administrator. As assistant basketball coach for 26 years, he won two conference championships. As soccer coach, his team won four conference championships in five years. Pearson has served on the CSMAA board of directors and currently is sections manager, organizing CSM alumni groups throughout the world.



*Young
Alumnus
Award*

Kimberly Lewis BSc CPR '92 joined the CSMAA board in 1999 when she became East Coast director while living in North Carolina. She helped host the CSM track team at a competition at North Carolina State. After returning to Golden, Colo., she became a Denver metro-area director and chairs the membership committee. She also has served as young alumni coordinator and organized successful monthly alumni mixers in the Denver area. Currently she is a graduate student at CSM and for an independent study course is evaluating the various relationships that exist between alumni associations and their respective institutions.



*Honorary
Memberships*

Michael J. Glade BSc Min '77, an attorney with Inman Flynn & Biesterfeld, P.C. in Denver, was named Outstanding Alumnus for his years of service to the School and the Alumni Association. Glade served on the CSMAA board of directors and held all offices including CSMAA president. He continues to maintain a relationship with the Association and provides help with legal questions. Glade also is active in the School's athletic department, helping to choose the football coach, among other things.



John P. Witwer, Colorado State Representative for House District 25, was awarded an honorary membership for his influence in passing important legislation that benefited the School of Mines. Witwer carried and passed legislation for the School's retention of fund interest earnings and for the creation of CSM as an Exemplary Institution. The retired radiologist also has been an invited lecturer at Mines, speaking on the "Impact of Science and Technology and Health Care and Health Care Costs."



*Melville F.
Coolbaugh
Senior Award*

Hans Wychgram, a petroleum-engineering junior, won this year's Coolbaugh Senior Award. He has a 3.79 grade point average and has worked in his family's oil field since age 10. At CSM, he has worked in the petroleum-engineering department since freshman year and won CSM student employee of the year in 2000/2001. Recently he served as joint session chair for the American Association of Drilling Engineers on campus. He is also active in the Society of Petroleum Engineers and was recently inducted to the petroleum honor society, Pi Epsilon Tau.

In memoriam

DONALD R. ALBIN GEOL E '57 died Feb. 4 at age 67. He served in the U.S. Navy and trained as a carrier fighter pilot. He then worked for more than 30 years at the U.S. Geological Survey specializing in hydrology. At the height of his career he was district chief of Minnesota. In his early years he was a Boy Scout leader and was inducted into the Order of the Arrow. He served as chairperson for the United Way, Combined Federal Fund, in the Twin Cities and Denver areas. In 1954 he married his high school sweetheart, Elsie E. Pace. Albin was an active member of Columbine United Church and sang in the choir. He also sang with the Colorado Symphony Chorus and toured Europe with the Columbine Chorale. In addition to his widow, survivors include three daughters, 10 grandchildren and three great-grandchildren.

TERRY D. BAUER BSC MIN '70 died Jan. 30 in Englewood, Colo. He was 53. Bauer's career spanned 30 years in the coal and gold industries. Upon leaving Pegasus Gold Corp. in Spokane, Wash., he was most recently employed by Behre Dolbear & Company as vice president and global director of environmental services in Denver. During his lifetime, Bauer served in many volunteer and teaching positions in the Christian church, and the education and business communities. He enjoyed golfing, fly-fishing, and downhill and water skiing. He is survived by his wife of 29 years, Claudia, two sons, his mother, a brother and two sisters.

JOHN T. CHANDLER PE '59 died March 20 in Lafayette, La., at age 69. He was a 1950 graduate of Koscivski High School in Koscivski, Miss., where he was a member of the 1949 Class A undefeated state



championship football team. He also was a letterman at Mines and was a member of CSM's 1958 Conference Football Championship team. While at Mines, Chandler was a member of Blue Key, Theta Tau, and was listed in *Who's Who in American Universities and Colleges* in 1949. He served in the U.S. Navy from 1951-54 during the Korean conflict. Chandler was a pioneer in the international oil business for 43 years. As a banker with Bank of New York and Deposit Guaranty National Bank, he helped finance oil projects around the world. He helped develop the North Sea while living in Norway, was involved in the first oil discovery in the Philippines, conducted operations in Lesotho, Africa, the Caribbean and throughout North America, and successfully negotiated the first-ever production-sharing contract with China National Petroleum Corp. Chandler's wife, Joyce, predeceased him. Survivors include two sons, a daughter and two grandsons.

RICHARD CHOJNACKI GEOL E '52 died April 23 in Salt Lake City after a year-long battle with cancer. He was 71. The same year he graduated he married the love of his life, Joyce Winebrener, when they eloped on Christmas Day. He was a manager for Mercury Business Services Inc., and also worked for Texas Gulf Sulphur and Union Pacific. In addition to his widow, he is survived by two sons, a daughter, and two grandchildren.



JOSEPH T. DARDE PRE '49 died May 1 at the age of 79. He was born in the rural ranchlands of Las Animas County, Colo., and attended Mines before World War II. He did basic training at Camp Abbott, Ore., with a group of ROTC students from Mines. After the war he returned to school on the GI Bill. His body has been willed to

the University of Texas Medical Branch, Galveston, for use in medical research. In



1950 Darde went to work for Stanolind Oil & Gas Company in Alvin, Texas. He worked for Stanolind and succeeding companies for 36 years, retiring in 1986 as operations superintendent of Amoco Gas Company. Darde is survived by a son, Jeffrey. His wife of 47 years, Pat, died in 1993.

CHARLES T. DRANEY PE '32 died March 28 in California at age 92 after a long illness. Draney, a Denver native, joined the Bechtel Corporation in 1937 and worked there for almost four decades. He was a senior vice president and member of the board of directors for many years. On retirement, Steve Bechtel Sr. wrote, "Charles, your formal retirement marks a very distinguished career the likes of which very few men have experienced. You have been a wonderful partner and friend." Draney was a member of the Bankers Club, the World Trade Club and the Commonwealth Club of San Francisco, the Burlingame Country Club of Hillsborough, the Morningside Club of Rancho Mirage, an investment club and the Burlingame University Club. He is survived by his widow, Mary Edna, a son, a daughter, a stepson, and three granddaughters.



WILFRED "BILL" HASBROUCK GEOL E '50, DSc GEOP '64 died Feb. 15 in Denver after a year-long struggle with complications from



a broken hip, pneumonia and pulmonary fibrosis. During World War II he served in the Pacific. After graduation from Mines, he married Barbara and joined a

seismic crew with Stanolind Oil and Gas working primarily in Oklahoma, Texas, and Arkansas. He returned to Golden to teach geophysics and pursue a doctoral degree. He then joined the U.S. Geological Survey (USGS) in Denver and began a long tenure of public service. As head of the coal geophysics section of the USGS, Hasbrouck worked on a variety of domestic projects and spent a year in England. For the past 20 years, he focused primarily on shallow, hammer impact, shear-wave seismic studies. After retirement in 1995, he continued working daily as a scientist emeritus until near his death. "Bill had an almost childlike curiosity and enthusiasm for geophysics," says a friend. "He wanted to know how and why a certain process worked, but also strived to ensure that his research could be applied to real problems." Hasbrouck was highly regarded professionally and personally. His love of geophysics was passed on to many of his former students, associates, and acquaintances and will serve as a lasting memory. Hasbrouck is survived by his widow, Barbara, a son, a daughter and three grandchildren.

LEE R. JAMISON PRE '49 died March 22 in Findlay, Ohio. He was 79. The Colorado native was active at Mines as a member of Tau Beta Pi, Sigma Gamma Epsilon and Blue Key. He also took part in football, wrestling and the M Club. During World War II, he served as a captain in the field artillery in Europe and received the Purple

Heart, Distinguished Service Cross, and Bronze and Silver stars. Following graduation he worked for Ohio Oil Company (later Marathon Oil Company) in domestic and international production in California, Wyoming, Ohio and Libya. He retired in 1984 as senior staff engineer. Jamison was active in the U.S. Army Reserve, retiring as a major in 1982. He was buried in



Arlington National Cemetery in Virginia. Jamison is survived by his widow, Muriel, a son, a daughter, two stepsons, nine grandchildren, seven great-grandchildren, three brothers and a sister.

JAMES G. JOHNSTONE GEOL E '48 died Feb. 10 at age 81 in Littleton, Colo. In addition



to his Mines degree, he also held a master's of science degree from Purdue University.

Johnstone was a professor of civil engineering at Mines for many years. He was made an honorary member of CSMAA in 1983, received the Mines Medal in 1986, and was named Outstanding Alumnus in 1992. He also was CSMAA president and attended many School events. He was a member of National Society of Professional Engineers, Jefferson County Housing Authority, American Society of Civil Engineers, Professional Engineers of Colorado, American Society of Engineers in Education and Tau Beta Pi. In 1946 he married Louise Moffit, who predeceased him. Johnstone is survived by a daughter, a granddaughter and a sister.

FREDERICK H. KELLOGG GEOL E '27 of Memphis, Tenn., died Nov. 6, 2001 of complications from leukemia. He was 97. In addition to his Mines degree, he held a master's and doctorate from Johns Hopkins University. During his 72-year career he was an engineering geologist on the Panama Canal, helped build two dams in India and one in Ghana, played a role in the development of the U.S. interstate system and laid the foundation for engineering studies at University of Memphis. During the Depression, he was an engineer with the Tennessee Valley Authority. After World War II, he became dean of the School of Engineering at University of Mississippi. In 1964 he became dean of the Herff College of Engineering at University of Memphis and built an engineering school from what was a technology school. After retirement in 1995, he devoted himself to a revision of one of his grandfather's books on theology. Kellogg was a member of the American Society of Civil Engineers and was appointed by President Johnson to the Mississippi River Commission. He is survived by his widow, Martha, two sons, a grandchild and two great-grandchildren.

C.V. "CHARLIE" MULLEN JR. PRE '51 died Oct. 21 following a sudden illness. He was 76. During World War II he served with the U.S. Army in the South Pacific and was awarded a Purple Heart. In 1952 he married Eula Belle Starkey. Mullen was a chemical engineer at the Idaho National Engineering and Environmental Laboratory. In his later years, he was a clerk and store manager for Maverick. Mullen was an active member of the Church of Jesus Christ of Latterday Saints and served in various positions. At the time of his death, he was serving a mission to the Idaho Falls Family History Library. He loved singing, family history and gardening. Survivors include his widow, nine children, three brothers, a sister and 37 grandchildren.

In memoriam

ROBERT E. MUNROE MET E '49, a retired senior vice president for the Great Western Sugar Company, died July 7, 2001 after a brief illness. He was 78. Munroe was a member of Beta Theta Pi and the CSM Alumni



Association and attended many of his reunions including his 50th. Munroe is survived by two sons, a daughter, six grandsons and numerous nieces and nephews.

ROBERT H. SAYRE JR. EM '34 died April 30 at the age of 88. He was a mining engineer/geologist/claimstaker and was very generous to the

School. Sayre was engaged in general mining and prospecting in the western United States and Central America until the outbreak of World War II.



During the war, he served in the 10th Mountain Division of the U.S. Army. After the war, he returned to mining and prospecting. He also named, designed and managed Powderhorn ski area. His exploration activities led to the discovery in 1970 of a New Mexico uranium ore body of 100 million pounds valued between \$4 billion and \$5 billion. The stake was sold to Gulf Mineral Resources. In 1980, Sayre and his wife, Bonney, established the Robert H. Sayre Endowment at Mines in honor of his father, also a Mines graduate. Sayre climbed

all 54 of Colorado's fourteeners, most after he turned 60. He was an active member of the Alumni Association and attended his 50th, 55th, 60th and 65th reunions. He received a Distinguished Achievement Medal in 1978 and the



Coolbaugh Memorial Award in 1996. His widow, a son, a daughter, three sisters, two grandchildren and two great-grandchildren survive him. His great nephew, Douglas Baldwin, is currently a Mines student.

SIGMND L. SMITH MET E '39, MSC MET '47 died March 6 in San Diego at age 89. In 1942 the Denver native married Zelda Sturm. After earning his master's degree, he worked establishing smelters for about two years. He then taught at CSM for 11 years and coached the ice hockey team. Next, he spent 23 years in the College of Mines at University of Arizona in Tucson. During his career he wrote and published various handbooks and articles such as *Handbook for Engineers* and *Ore Microscopy*. While in the hospital, he published his last text and models, *Introduction to Geometry* for the blind. In retirement, Smith did consulting work, was a volunteer teacher of the blind in the public schools, fished, golfed and traveled. At University of Arizona he received several awards including being named a distinguished professor. Smith was a member of Sigma Nu, Honorary Tau Beta Pi, Sigma Xi Honorary, CSMAA and Mining Institute of America. His brother, Paul W. Smith Met E '35, predeceased him.

E. DALE STROHMINGER EM '41 died Oct. 1, 2001 at age 85. He was born in Ohio, but raised in Colorado. He got through Mines by working in a grocery store, participating in ROTC and living in an old trailer park in the football stadium. After graduation, he joined the U.S. Army serving as a construction engineer in Alaska and Okinawa during World War II. Strohminger then teamed up with his father to own and operate Strohminger Electric Company in Denver. He retired in 1982. He was a true miner with the heart of a prospector. He owned several mining claims in Boulder County and for fun, spent weekends mucking out cave-ins, setting timbers and spiking track with a dream of proving up an ore deposit of gold, lead, zinc and silver. Other times he would set up the sluice box and just go for free gold in the creek. Several undergraduates from Mines remember visiting Sugarloaf Mine in the late 1970s and participating in activities from surveying to sampling. In retirement, Strohminger and his wife Frances (married since 1946) moved to Eckert, Colo., then to Vista, Calif. He is survived by his widow, a son, a daughter, three grandchildren and a great-grandson.

GEORGE B. WHITAKER EM '38 died Jan. 28 in Tucson, Ariz. He was 83. After graduating from Mines, the Denver native became a sales engineer with Ingersoll-Rand. He retired in 1965 and moved to Tucson. "George was a proud Miner, as was his father before him," says his widow, Marjorie. "He was wise, kind, proud and, above all, modest regarding his achievements." Whitaker was an active member of the Alumni Association, particularly in his local section. In addition to his widow, he is survived by sons Orvil and George Jr., and four grandchildren

Also in Memoriam

ALBERT M. CAVALIERE PET E '49 1991

JAMES C. MCKINLEY GEOP E '52 1992

Former student and post-doctoral fellow Howard L. Hartman died Jan. 12 at age 77. Although he didn't earn his degrees from Mines, he attended from 1942-44 and did post-doctoral work in the CSM mining department from 1954-1958.

1939

Robert O. Howell EM is retired in Denver.

V.A. "Bud" Vaseen Met E was named a "Blue Ribbon Member" of the Rocky Mountain Section of the American Water Works Association (RMSAWWA/RMWEA) as one who achieved an "outstanding level of commitment." He has been a member since 1947. He began his career as an engineer with the Colorado State Health Department. During World War II he trained survival skills to new cadets. After the war he became a partner with an environmental consulting group. In 1966 he joined Stearns-Rogers, retiring in 1979. He has written 72 technical papers, holds 33 U.S. patents and now writes poetry for fun. "As an environmental engineer, I was always involved with the laws of nature, as well as the wonders of nature, and the power and beauty that is found throughout the universe. My poems often take this into account," Vaseen says.

1940

Eduardo M. Villareal Bell EM is president of Panel Rey, S.A. and Zinc Nacional, S.A. in Monterrey, Nuevo Leon, Mexico.

1950

Earl H. Ramsey Geol E is retired in Dallas.

1952

Arthur J. Graves Geol E has retired from Anaconda Copper and lives in Tombstone, Ariz.

1953

George W. Mitchell Jr. EM is retired in Golden, Colo.

1959

William R. Mills, Jr. Geol E retired as general manager from the Orange County [Calif.] Water District. He lives in Fountain Valley. During his 14+ years with the water district, he increased groundwater

pumping from 70 percent to a sustainable 75 percent of the district's water needs. His plans for groundwater management have become the basis for California groundwater legislation.

1960

John J. Selters EM is principal consultant for John J. Selters y Compania Ltda., in Santiago, Chile.

R. Glenn Vawter PE is retired in Keystone, Colo.

1962

Robert C. Heath EM has retired from R. C. Heath Construction and lives in Fort Collins, Colo.

Miguel I. Z. Kubers PRE is associate director of engineering for Colgate-Palmolive Company in Piscataway, N.J.

1963

Dennis R. Sheehan EM has retired to South Padre Island, Texas.

Richard A. Walker Met, MSc Met '68 is retired in Keizer, Ore.

1964

David N. Harrison PRE is retired in Wichita, Kan.

1965

Roger L. Abel PE is president of Austex Production Company LLC in Austin, Texas.

1966

James K. Applegate Geop E, MSc Geop '69, PhD Geop '74 is president and geophysicist for Applegate Exploration, LLC in Lafayette, La.

Jerry C. Atwell Met E is retired in Gold Canyon, Ariz.

David Arthur Rice MSc Met, PhD Met '68 is retired in Wycombe, Pa.

Robert W. Warning, Jr. Met E is retired in Fairway, Kan.

John R. Weber Met E, MSc Met '68 is senior process engineer for PCS Phosphates in Aurora, N.C.

Cecil K. Winterowd Math E is a consultant IT specialist for Bank of

America in Charlotte, N.C.

1967

Kandiah Balachandran DSc Geop '67 is an assistant dean at Kalamazoo Valley Community College in Kalamazoo, Mich.

Stephen P. Collings Geol E, MSc Geol '69 is senior vice president of operations for Power Resources Inc. He also works for Butte Resources and both are located in Lakewood, Colo.

1968

Thomas M. Leonard EM is general superintendent for Bechtel Nevada in Las Vegas.

1969

Craig E. Moore Geop E is senior geophysicist/geologist for Mission Resources in Houston, Texas.

Norman A. Ross EM, MSc Min '70 is owner and president of Ross Mining Ltd. in Whitehorse, Yukon, Canada.

1970

Robert J. Dearing BSc Met is a managing partner for GSC ATM in San Rafael, Calif.

1971

Roberto Aguilera M Eng Pet, PhD Pet '77 is an adjunct professor in chemical and petroleum

engineering at University of Calgary, Canada. He teaches graduate-level courses and

conducts research on naturally fractured reservoirs. Aguilera is president of Servipetrol Ltd. in Calgary.

Marco V. Ginatta MSc Met, PhD Met '73 is general manager of Ginatta Tecnologie Titanio in Torino, Italy.

Nayan J. Lavingia BSc CPR, MSc CPR '73, PhD Min Ec '75 is a project management consultant for



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ChevronTexaco in San Ramon, Calif.

Edwin Dale Thompson BSc Pet is an engineer for Noble Energy Inc., in Houston.

1973

Kent M. Crites BSc CPR is sales manager for EnviroKinetics Inc., in Tulsa, Okla.

Robert G. Howard Jr. BSc Pet is vice president of the Alaska business unit for ChevronTexaco in Houston.

Donna R. Messer BSc Geol is a geological adviser for Occidental Oil and Gas Corporation in Houston.

1974

Richard G. LaPrairie BSc Min is a senior engineer for EEI in Reno, Nev.

Thomas H. Plate BSc Min is a sales specialist for REI in Albuquerque, N.M.

Patrick R. Taylor BSc Met, BSc Math, PhD Met '78 is a professor at CSM.

1975

John D. Fix BSc Met is business manager for Constellation Power in Dearborn Heights, Mich.

George W. Matthews BSc Min is an operations superintendent for U.S. Silica in Kosse, Texas.

James V. Taranik PhD Geol is a Regents Professor and Arthur Brant Chair of geophysics at the Mackay School of Mines at University of Nevada, Reno.

1976

Randal L. Bruno BSc Phy is a project engineer at ITSI in Walnut Creek, Calif.

William E. Richardson BSc Geol, M Eng Geol '92 is president and owner of ROEC Inc., in Denver, Colo.

Fred A. Schafer BSc Geop is a geophysicist for Weinman GeoScience in Dallas.

1977

Michael H. Portigal BSc Geol is

a consultant for Portugal Consultancy in Calgary, Alberta, Canada.

Mazen A. Shalabi PhD CPR is a professor at King Fahd University of Petroleum and Minerals in Saudi Arabia.

Kathleen M. Wiltsey BSc CPR is board president for The Discovery Center for Science and Technology in Westlake Village, Calif.

1978

Vincent M. De Bonis BSc CPR is operations manager for Schlumberger, Ltd. in Houston.

Mark H. Hilliard BSc Geop is a geophysical adviser for Burlington Resources in Houston.

1979

W. Scott Graeme BSc CPR is technical sales manager for Akzo Nobel Catalysts LLC in Houston.

William A. May BSc Met, MSc Met '80 is an independent consultant for Purmet Development, LLC in Longmont, Colo.

Ronald K. Powell Jr. BSc Geol is a 3A0SS commander for the U.S. Air Force in Monument, Colo.

James R. Sharpe BSc CPR, BSc Eng '84 is a senior mechanical engineer for Jacobs and lives in Lakewood, Colo.

1980

Jeffery S. Baldauf BSc Pet is senior reservoir engineering specialist in the business development group for Phillips Petroleum Company in Englewood, Colo.

Brooke S. Bell BSc Pet is a capital projects lead management analyst for the budget office of the City of Aurora, Colo.

Michael G. Maslowski BSc Geol is manager of engineering and geology at Coeur d'Alene Mines in Wallace, Idaho.

Danny M. Stone PE BSc Pet is a drilling supervisor for BP Deepwater Exploration in Houston.

1981

Charles R. Berg MSc Geol owns ResDip Systems in The Woodlands, Texas.

Daniel J. Cornette BSc Min is director of metals and industrial minerals for the John T. Boyd Company in Scottsdale, Ariz.

Golden [Colo.] City Council voted Ward 1 Councilman **Dave Ketchum BSc Phy, MSc Math '96** mayor pro-tem of the city. He began his four-year term in January.

Susan R. Jones BSc Min is a project engineer for Olson Engineering in Wheat Ridge, Colo.

Kevin S. Weller BSc Geol is corporate acquisitions engineer for Westport Resources Corp., in Golden, Colo.

1982

Mark E. Bush BSc Pet is a petroleum engineer for Forest Oil in Denver.

R. Keith Darnell BSc CPR is operations manager of Agrifos Fertilizer LP in Pasadena, Texas.

James A. Rice MSc Geochem, PhD Geochem '87 has been appointed director of the South Dakota Experimental Program to Stimulate Competitive Research (EPSCoR) program. EPSCoR is a statewide program to develop the state's academic research infrastructure. As director, Rice is responsible for all federal EPSCoR programs in the state including a three-year, \$13.5 million grant from the National Science Foundation. Rice continues to serve as head of the chemistry and biochemistry department at South Dakota State University.

Kevin R. Wayment BSc Min is vice president and general manager for PerkinElmer Fluid Sciences in Beltsville, Md.

1983

Lon M. Cooper M Eng Geol is a branch manager for Imaging Subsurface Inc., and a graduate

student at Michigan State University in Grand Rapids.

Gary L. Snyder BSc Geop is chief geophysicist for the gulf region for Unocal Corporation in Sugar Land, Texas.

1984

David A. Baska BSc Geol earned in PhD in civil engineering from University of Washington. He is office manager and associate engineer for Zipper Zeman Association, Inc. in Seattle.

Randy Cox BSc CPR is vice president of product development for Vivecon in Mountain View, Calif.

Jeffrey A. Frim BSc Met was named southern region vice president for Braddock Quality Metal Treating, Inc. He has responsibility for facilities in Anniston, Ala., Atlanta, and Tampa and Jacksonville, Fla.

Alan C. Jewell BSc Geop is a senior engineer for Short Elliot Hendrickson in Fort Collins, Colo.

Shari K. Kern BSc CPR is an associate director at Washington University in St. Louis, Mo.

M. Ward Polzin BSc Pet is vice president of business development for Independent Production Company Inc., in Denver.

David C. Raymes BSc Geop is vice president and regional manager for Marin Environmental in Haddam, Conn.

Derrick M. Sandberg BSc Geop is president of ResonantSonic International in Woodland, Calif.

1985

Brian E. Donovan BSc Pet is senior counsel for Peabody Natural Gas LLC in Golden, Colo.

James A. Russell MSc Min Ec is manager of Summit Data Services LLC in Golden, Colo.

Joseph R. Scarlett BSc Geop is an exploration geophysicist for ExxonMobil Exploration Company in Houston, Texas.

Tad M. Wheeler BSc Eng is a consultant for Tenderdyn in

Golden, Colo.

Erin M. Wilson BSc Geop is a partner with Leonard Rice Engineers, Inc. in Denver.

Robert F. Woods BSc Geop is an area geophysical manager for Gryphon Exploration in Houston.

1986

Regina M. Bochicchio BSc Geop, MSc Geop '88 is a physics and geology professor at San Diego Miramar College in San Diego.

Elizabeth L. Heatwole BSc Met is a metallurgical engineer for Caterpillar Inc., in Peoria, Ill. Husband **James F. Heatwole BSc CPR '84** also works at Caterpillar.

Kerry Hoffman Martin BSc CPR is a division engineer for Superior Energy Services in Lafayette, La.

Cynthia Anderberg Peratt BSc Geol is an owner of Prospector Village in Nathrop, Colo.

1987

Linda A. Battalora BSc Pet, MScPet '88 is a patent attorney with Dahl & Osterloth, LLP in Denver.

J. David Keller MSc Geop is a senior geophysicist for ExxonMobil Exploration Company in Houston.

Jim S. Kneedler BSc Math is a senior sales specialist for IBM Corporation in St. Louis, Mo.

Laura BeVier Levorsen MSc Geol is senior staff geologist for Williams. She and **Mark K. Levorsen, MSc Geol** live in Centennial, Colo.

Craig D. Matthews BSc Math is a development manager for Baan CRM in Golden, Colo. **Laila Vannorden Matthews BSc Geop** is a product manager at Baan.

1988

Karl E. Hofmann BSc Met is president of Ryan Engine Exchange in Fort Collins, Colo.

James A. Malott BSc CPR is a commercial operations manager for Valero Energy Corporation in San Antonio, Texas.

Steven M. Muskal BSc Chem is vice president of informatics for Libraria in San Jose, Calif.

Marc S. Simmonds BSc Geop, MSc Geop '90 is a geology and geophysics manager at Forest Oil Corporation in Anchorage, Alaska.

1989

Shun-Ping Chau BSc Geol, MSc Min '96 is a development engineer for Orica in Watkins, Colo.

Kevin L. Midkiff BSc Pet is production supervisor for Burlington Resources Inc., in Calgary, Alberta, Canada.

Deidre A. Taylor BSc Pet has relocated to Abu Dhabi, UAE where she and husband **Paul Taylor BSc Pet '87** are engineers at ADMA-POCO, the offshore operating company for the Abu Dhabi Emirate.

Lloyd A. Torres BSc Eng, BSc Eng is a terminal supervisor for Phillips Pipe Line Company in Commerce City, Colo.

1990

Deborah Kang Gentzen BSc CPR does business development for Premera Blue Cross-Quality Solutions in Bellevue, Wash.

Dale R. Loveland Jr. BSc Eng is a project manager and **Elizabeth A. Cook-Loveland BSc CPR '91** is a process and controls engineer for Onyx Engineering in Corpus Christi, Texas.

Deborah I. Kang BSc CPR has married Mark Gentzen. The couple resides in Bellevue, Wash.

Ronald D. Nelson BSc Pet is a staff subsea completion engineer for Shell International Exploration & Production. He and **Janice Purfield Nelson BSc Math** and daughter Jessica live in Sechelt, British Columbia, Canada.

Janice Purfield BSc Math and **Ronald D. Purfield BSc Pet** announce the birth of a daughter, Jessica.

R. Keith Whitt BSc CPR is a staff distillation specialist for Shell Oil Company in Houston.

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1991

Colin J. Basye BSc Geol, M Eng Geol '94 is senior environmental specialist for Mantech Environmental in Ada, Okla.

Esa I. Kivineva MSc Met is general manager for Wartsila Corporation in Finland.

Jodi M. Menebroker BSc CPR and her husband Terry announce the birth of their first child, a son named Trevor, in March.

1992

Ricardo E. Ganoza MSc Min Ec is vice president of finance and administration for Empresas Hopsa in Panama City, Panama.

Jon E. Kelly MSc Min Ec is a manager of Nex Gen Coal Services, Ltd., in Amarillo, Texas.

Christopher M. Martinez BSc CPR is an environmental engineer for Bear Paw Energy LLC in Denver. He and **Gwen L. Barthel BSc CPR** live in Arvada, Colo.

David C. Morse BSc Eng, MSc Appl Mech '93, PhD Eng Sys '95 is president of MIRA in Sammamish, Wash.

Scott R. Werner BSc Eng is a senior engineer for Intel Corporation in Monument, Colo.

1993

Scott A. Baker BSc Geop, Geol E '00 is a geophysicist for Shell Exploration and Production in New Orleans.

Raymond M. Bateman Msc Math, PhD Math '94 is senior operations research analyst for the U.S. Army.

Denise Dihle BSc Eng, PE, was named president and chief operating officer of Integrated Planning & Engineering Inc., in Denver. She is responsible for the company's overall performance and the production of all company departments.

Dvid A. Gratson MSc Env Sc is an environmental chemist for Neptune and Company in Los Alamos, N.M.

Bryan L. Roberts BSc CPR is an advisory IT specialist for IBM Global Services in Boulder, Colo.

Howard A. Roepnack BSc Eng is an independent mechanical engineering consultant in Arvada, Colo.

1994

Bryan J. Burinda BSc Eng is a senior technical professional for Halliburton Sperry-Sun in Houston.

Joe H. Kelloff BSc Pet is a district engineer for Patina Oil & Gas Corporation in Denver.

Drew W. Kimery BSc Min is a mining engineer for Triton Coal Company in Gillette, Wyo.

Ron Kuehne BSc Met is assistant superintendent of melting and casting at Sheffield Steel in Sand Springs, Okla.

Michael D. Osmus BSc Eng is a territory supervisor for Contech Construction Products in Castle Rock, Colo.

Michael T. Vess BSc Eng is project manager for Rocky Flats Closure Site Services in Golden, Colo.

1995

Toni A. Bowden BSc CPR is a dentist in the U.S. Navy in Aurora, Colo.

Sean D. Esslinger BSc Eng, BSc Eng '95 is a software engineer for Ball Aerospace & Technologies in Boulder, Colo.

Kristin A. Oldham BSc Pet is a water management specialist for Crown Engineering in Plano, Texas.

1996

Daniel J. Cutting BSc CPR is a process engineer for Alaska Anvil Inc. in Anchorage, Alaska.

Norman L. Dannemiller BSc Eng is a design engineer for Allied Systems Company in Sherwood, Ore.

Jonathan E. Furda BSc Eng is president and owner of ELC in Colorado Springs, Colo.

Shannon L. Johnson BSc Eng '96 married Jason Francios. She is vice president for Bannan Energy

Inc., in Houston.

Paul V. Salaz, Jr. BSc Pet is a field engineer for BJ Services Company in Rock Springs, Wyo.

Dawn J. Gieck BSc CPR is a teacher at Janitell Junior High in Fountain, Colo.

Joan Tilden MSc Pet is a senior engineer for Malkewicz-Hueni Associates, Inc., in Golden, Colo.

1997

Patricio J. Amuchastegui MSc Min Ec is an analyst for CMS Energy in Buenos Aires, Argentina.

Juan Martin Bulgheroni BSc Pet is a graduate student at University of Virginia Darden Business School in Charlottesville, Va.

Carol Holmes Butero BSc CPR is a staff engineer for CH2M Hill, Inc. in Englewood, Colo. She and **Wesley C. Butero BSc Eng '98** live in Lakewood, Colo.

W. Christopher McAnarney BSc CPR is a process development engineer for Columbian Chemicals in Jasper, Ga.

Kevin T. Nemeck BSc Met is a senior development engineer for Caterpillar, Inc., in East Peoria, Ill.

Sacha B. D. Wolff BSc Eng is an electrical engineer for McData Corporation in Broomfield, Colo.

Elizabeth J. Young-Dohe BSc Met, PhD Mat Sc '01 is a senior coatings engineer for AVX Corporation in Myrtle Beach, S.C.

1998

Osama A. Al-Bofersen MSc CPR, PhD CPR '02 works in the chemical engineering department at Kuwait University in Safat, Kuwait.

Jennifer C. Biesterfeld MSc Env Sc, PhD Env Sc '01 is a senior consultant for RTW Professional Engineers & Consultants Inc., in Denver.

James Allen Casey BSc Phy is senior process engineer for Alcatel Optical Fiber Division in Claremont, N.C.

David R. Jacobsen BSc Eng is a systems engineer for Jacobs

Engineering Group in Golden, Colo.

Shannon Miller Jacobsen BSc CPR is a project engineer for Jacobs Engineering Group in Golden, Colo.

Ian C. Long BSc Eng is a disaster recovery architect for Corio. He and **Erin M. (Dillin) Long BSc CPR** live in Glendale, Ariz.

Frank E. Lousberg BSc CPR is a senior process engineer for Cemex Cement Company in Knoxville, Tenn. He is married to **Natalie Altberg Lousberg, BSc CPR '00**.

W. Tom White BSc CPR is a compounding supervisor for DTP Laboratories in San Antonio, Texas.

1999

Chad M. Bieber BSc Eng is a first lieutenant in the U.S. Air Force at Vance Air Force Base, Okla.

John J. Brinks BSc Pet, MSc Pet '02 is a graduate student at CSM.

Matthew T. Halker BSc Pet is a facility engineer for BP in Durango, Colo.

Julie M. Nolan BSc CPR is a process engineer for the Harris Group Inc. in Denver.

Tara M. Saunders BSc Pet has married William West. She is an engineer with Marathon Oil Co. in Lafayette, La.

Michael D. Spruiell BSc Eng, BSc Econ is a portfolio valuation analyst for Reliant Resources in Houston.

Danna Turner BSc CPR has married Sean Eckerty. The couple resides in New Orleans.

Lisa M. Wurster BSc Geol, MSc Env Sc '00 is a project engineer for Paul J. Stokes & Associates Inc., in Kalispell, Mont. She and **Eric M. Wurster BSc Econ '97, BSc Met '97** live in Kalispell, Mont.

2000

Natalie Altberg BSc CPR married **Frank E. Lousberg BSc CPR '98**. They live in Knoxville, Tenn.

Brian S. Crandall BSc Eng is a process automation engineer for Emerson Process Management in Austin, Texas.

Shivayam Ellis BSc Eng is owner/operator of Ellis Research and Development, a contract engineering and renewable energy company in Golden, Colo.

Joseph J. Engr IV MSc Env Sc is a project manager for Analytica Environmental Labs in Thornton, Colo.

Dean A. Feller BSc Geol is a geological engineer for Gustavson Associates in Wheat Ridge, Colo.

John A. Flory BSc Math & Comp Sci is an operations analyst for the U. S. Air Force in San Antonio, Texas.

Joseph Humm BSc Eng married **Karla Koop BSc Met & Material Eng** in Las Vegas, Nev., April 5 at Our Lady of Las Vegas Catholic Church. Karla and Joe were joined by many CSM alumni and friends from the Denver office of Accenture, where they both work.

Jennifer L. Miskimins MSc Pet, PhD Pet E 02 is a graduate student at CSM.

Derick Ofori-Kuragu BSc Min, MSc Eng & Tech Mgmt '02 is a graduate student at CSM.

Alban E. Reboul-Salze MSc Min Ec is an engineer for Total Fia Elf in Pau, France.

Michelle M. Roberts BSc Phy is a student at University of Wisconsin - Madison.

Ian A. Shalosky BSc Pet is a field engineer for Pathfinder Energy Services in Lafayette, La.

Myriah R. Shanks BSc Eng is an electrical engineer for Given & Associates in Denver.

Peter J. Varney PhD Geol is a professor at Metropolitan State College in Denver.

2001

Waleed A. Al-Shalfan PhD Met & Mat Eng is a research engineer for SABIC in Al-Jubail Industrial City, Saudia Arabia.

Victor H. Arana PhD Pet E is a special studies engineer for PEPEX in Villahermosa, Tabasco, Mexico.

Bryana G. Bamford BSc Eng is a

project engineer for Sellards & Griggs Inc., in Lakewood, Colo.

Sverre Brandsberg-Dahl PhD Geop is a research geophysicist for BP America Inc., in Houston.

W. Chris Braun MSc Geol is a drilling services engineer for Schlumberger Technology Corporation in Youngsville, La.

Hoyt A. Brown BSc Eng is a project engineer for Burns & McDonnell Engineering in Greenwood, Colo.

Bozkurt N. Ciftci MSc Geol is a geologist for Turkish Petroleum Corporation in Ankara, Turkey.

Sean A. Dickey BSc Econ is a financial adviser for American Express Financial Advisors in Colorado Springs, Colo.

Tsepho M. Falatsa MSc Min Ec is deputy director for the department of minerals and energy in Beaufort West, South Africa.

Conor M. Feeney BSc Eng is an engineer-in-training for the W.G.M. Group in Missoula, Mont.

Kimberly A. Fleming BSc Eng is an embedded software engineer for Lockheed Martin in Denver.

Anthony J. Fraioli BSc Chem is an analytical chemist for the Newmont Mining Corporation in Greenwood, Colo.

Brian V. Garrison BSc Met & Mat Eng is a plant metallurgical engineer for TCA, Grantprideco in Muskogee, Okla.

Aaron K. Horiuchi BSc Eng is an electrical engineer for Hewlett-Packard Company in Thornton, Colo.

Clinton M. Johnson MSc Min Ec is a financial analyst for Vectra Bank Colorado, N.A. in Denver.

Christopher T. Karbach BSc Eng is an electrical engineer for Air Liquide in Houston.

Jessica F. Kralicek BSc Eng is a civil engineer for the Kansas Department of Transportation in Lawrence, Kan.

Amber J. Larson BSc Eng, BSc Eng is an engineer at the National Renewable Energy Laboratory in Golden, Colo., and a graduate

Petroleum cont.

Peter B. Jones, D.Sc. '66
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student at CSM.

Michael G. Magill BSc Phy, BSc Eng is a failure analysis engineer, mobile products, for Seagate in Longmont, Colo.

Craig R. McClung MSc Geol is a graduate student at Pandse Afrikaanse Universiteit in Auckland Park, South Africa.

Kelda L. McFee BSc Pet is a production technologist for Shell International Exploration and Production in Houston.

Gwenola Michaud PhD Geop is a senior research scientist for Schlumberger in Cambridge, England.

Stephanie J. Onorofskie BSc Eng is design engineer for Sopris Engineering in Carbondale, Colo.

Christopher M. Reidinger BSc Eng is an electrical engineer for Black & Veatch Engineers in Aurora, Colo.

Diogo R. N. Rosa PhD Geol is a post-doctoral researcher for the Instituto Geologico e Mineiro in Beja, Portugal.

Amy L. Sirois BSc Eng is a maintenance engineer for Holcim (Texas) LP in Midlothian.

Nicole M. Wasinger BSc Phy, BSc Eng is optoelectronic design engineer for Cielo Communications Inc., in Broomfield, Colo.

Binxian Wei MSc Math & Comp Sci is vice president of Pharmasource Inc., in River Edge, N.J.

Anthony K. Yeboah M Eng Pet is a reservoir engineer for Tom Brown Inc., in Denver.

Jie Zhou PhD CPR works at the National Renewable Energy Laboratory in Golden, Colo.

2002

Meherab N. Amaria MSc Met & Mat Eng is head media engineer for Maxtur Corporation in Longmont, Colo.

Jose Cantillo M Eng Pet is a reservoir engineer for Ecopetrol in Bogota, Colombia.

Jonathan B. Casten BSc Min is a mining engineer for Walnut Creek Mining Company.

Jessica M. Clark BSc Chem Eng is a second lieutenant in the U.S. Army.

Benjamin A. George-BSc Geol is a graduate student at CSM.

Qiang He M Eng Engr Sys is a graduate student at CSM.

Kazuhiro Kawahata MSc Min is a graduate student at CSM.

Alena L. Leeds PhD Engr Sys works for the U.S. Geological Survey and lives in Morrison, Colo.

Cheowchan Leelasukseree MSc Min is a graduate student at CSM.

Kristen A. Lewis PhD Geop is a geophysicist for BP in Houston.

Scott A. Peonio BSc Min is project manager for LaFarge - North America in Windsor, Colo.

Magaly C. Quintero A. MSc Geol is a sedimentologist for PDVSA Intevip in Los Teques, Venezuela.

Donald B. Sult MSc Min Ec is a graduate student at CSM.

Saffet Yagiz PhD Min is an assistant professor at the Gebze Institute of Technology.

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Flight A winners, from left, John Bauer '84, '90, Troy Liesenring, Greg Steele and Bob Francisco.



Flight B winners, from left, Brian Dwyer, Mike Cohen, Joel Day '95 and Mike McGill.



Flight C winners, from left, Marv Kay '63, Roy Banks, Hugh Evans '49 and Dan Lewis.

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Hugh Evans EM '49 on a recent visit to Abu Dhabi.

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