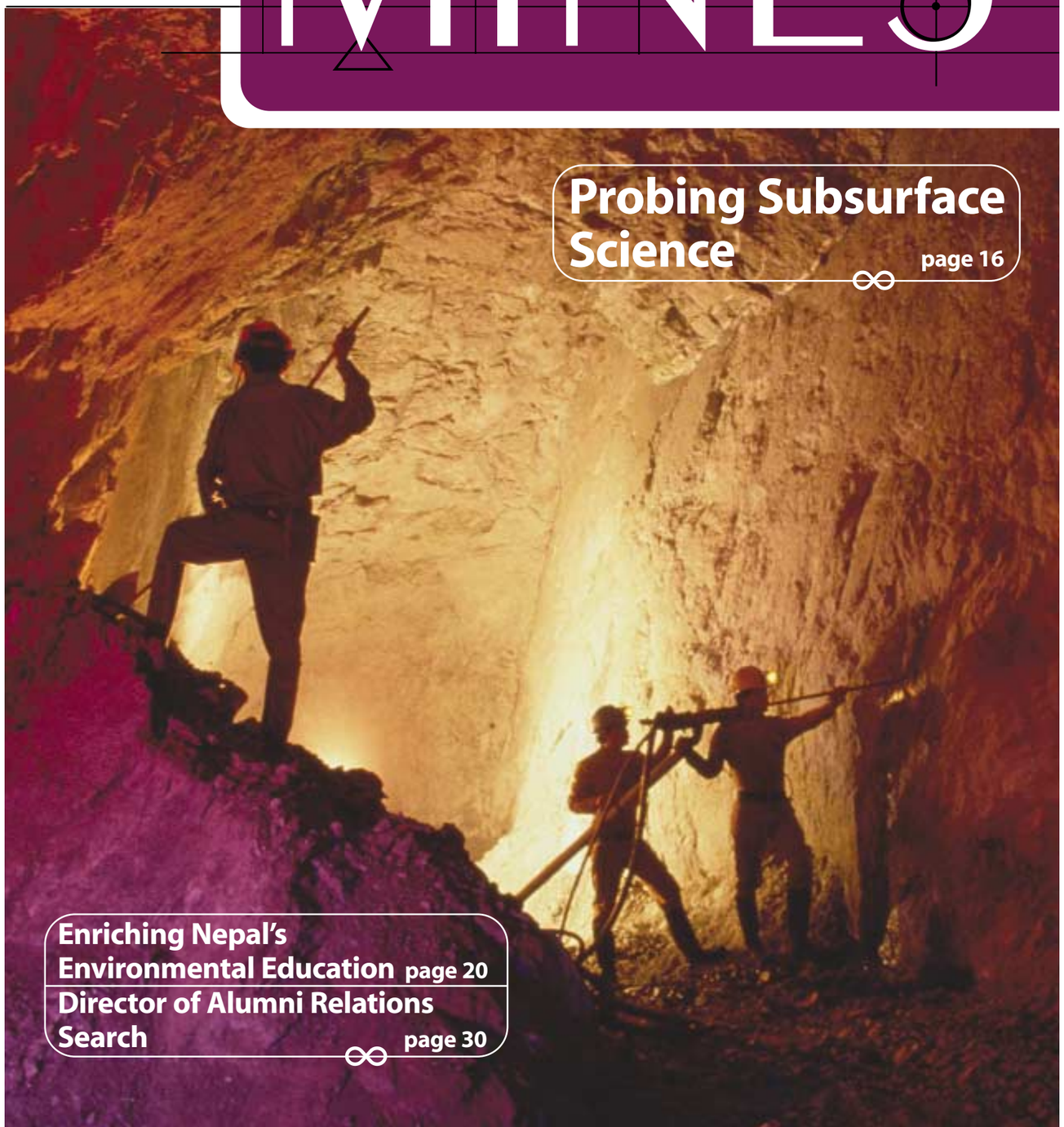
The Magazine of Colorado School of Mines

MINES

Volume 94 Number 2
Spring 2004



Probing Subsurface Science

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MINES
SPRING 2004

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 800-466-9488, ext. 3294 between 8 a.m. and 5 p.m. M-F, MST; or email *magazine@mines.edu*

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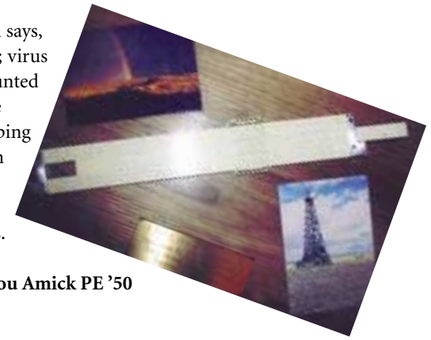
Letters to the Editor

Old-fashioned computing

I was visiting with my dentist a few months ago and the word "slide rule" came up. His young receptionist asked, "What's a slide rule?" Immediately I resolved to immortalize my slide rule. And I now respectfully dedicate it to all Miners (past, present and future) in honor of the class of 1950.



The slide rule, photographs and bronze plaque (which says, "Early Day Computer: operation required intelligence; virus proof and crash proof; batteries not needed") are mounted on a 1/8" slide of black walnut. The photograph in the upper left shows a rainbow coming down over a pumping oil well, circa 1953. In the lower right is a picture of an old wooden derrick in Montana about 1957.

The young receptionist now knows what a slide rule is. Mission accomplished!

Lou Amick PE '50

Tributes to professors

David Rein's article in the Winter 2004 *Mines* magazine about the Payne family's generous gift establishing scholarships honoring three old-time professors brought back a flood of memories. Paul Keating was the only one of the three that I had any personal experiences with and that was only for one course for one semester. Yet I have to rate him as the most influential teacher that I encountered at my years at Mines.

Irving W. Glater Met E '51

The article about the generous scholarship given by Jim Payne was great and the tribute to Dr. George Meredith evoked poignant memories. When I asked Dr. Meredith for career advice, he proceeded to analyze both my strong and weak points. His analysis was far from flattering but it sure seemed right on target. He suggested how some of my abilities might be helpful in some areas and showed me where some traits would be a hindrance in other areas. With these insights I was able to choose a branch of engineering that has kept me fascinated every day for over 40 years.

Richard D. Wyatt Geop E '61

Let's raise Colorado's infrastructure grade

Colorado's infrastructure cannot remain invisible any longer. Last October, the state of Colorado received an overall grade of C+ in the first-ever infrastructure assessment given by the Colorado section of the American Society of Civil Engineers. This Report Card provides us with a valuable understanding of the 12 aspects of our infrastructure including dams and water supply, aviation, transportation, energy and the environment.

Because Colorado is competing with other states and countries to attract commerce and industries, an average rating is not acceptable. Commercial businesses are not attracted to states with restrictions that limit their ability to produce and deliver goods and services efficiently. Without an attractive infrastructure to attract these businesses, Colorado also loses in the creation and preservation of jobs.

Richard D. Wyatt Geop E '61

Correction: In the Winter 2004 issue of Mines *magazine (Notes & Quotes, p. 29), we mistakenly referred to Wendall Fertig as a general. His rank actually was colonel.*

CONTENTS

About Our Cover:
Understanding the Earth's subsurface resources and infrastructure is key to planning for the future.

Voorhees Elected to National Board

Kent Voorhees, professor of chemistry and geochemistry, has been elected director-at-large to the Board of Directors of the American Chemical Society (ACS), the world's largest scientific society. Voorhees will serve the remainder of the 2004 term, as well as a three-year term that will run from 2005 through 2007.

Voorhees has been a councilor for the ACS Colorado section since 1982 and has leadership experience on the local and national levels of the society.

The ACS, founded in 1876, is a self-governed individual membership organization with more than 159,000 members at all degree levels and in all fields of chemistry. The organization provides a broad range of opportunities for peer interaction and career development.

Kent Voorhees

Name Changes by Degrees

The Board of Trustees has formally approved a name change for all graduate degrees offered in the Chemical Engineering Department. Master's and doctoral degrees offered by that department will now be in "chemical engineering" rather than "chemical engineering and petroleum refining." The undergraduate degrees were changed similarly several years ago.

Mrs. John Trefny joked with new CSM mascot Marvin the Miner, named for retiring Athletics Director Marvin Kay, following the mascot's introduction at a winter Silver & Blue luncheon.

Olson Honored for Innovation

David L. Olson, the John H. Moore Professor and professor of metallurgical and materials engineering, was honored by his peers as the year's Faculty Senate Distinguished Lecturer. Olson's lecture, "Transcending Degree Programs," suggested a framework for innovative programming and a unique, worthwhile educational experience at Mines.

David Olson (right) with Brajendra Mishra, professor and associate director of metallurgical and materials engineering.

Looking for New talent

Spring Career Day, held in February, featured a variety of exhibitors representing a cross-section of industries, including energy, defense, aerospace, manufacturing, steel, high-tech, transportation and government. About 65 organizations attended the annual spring event, looking for great engineering, applied science, economics and business talent.

Following Career Day was the first-ever recruiter reception—sponsored by Institutional Advancement, the Minority Engineering Program and the Career Center—to show appreciation to employers for their support of CSM students.

Career talk

Dr. Dag Nummedal

CERI Appoints Director

Dr. Dag Nummedal has been appointed executive director of the Colorado Energy Research Institute (CERI). The appointment will begin July 1, 2004. Currently Nummedal is professor of geology and geophysics and director of the Institute for Energy Research at the University of Wyoming. He has previously held industry positions with Unocal Corp., and he has an extended academic career record at Louisiana State University.

CERI's initial funding is through a charter partnership that includes Mines, the Colorado Governor's Office of Energy Management and Conservation, and the Gas Technology Institute. CERI promotes research and educational activities through networking among all constituencies in the Colorado energy industries and universities.

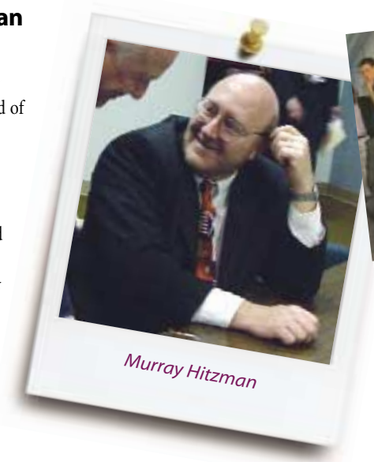
Nummedal responded to his appointment, saying: "I am very excited about this opportunity to join CSM, with its tradition of excellence in the energy and earth sciences, and to help build an energy research program around the strong core that already exists on the CSM campus. Logical areas of focus for a Rocky Mountains-based energy research institute include carbon sequestration and related enhanced oil recovery, the science behind natural gas exploration and production, hydrogen fuel cell development, and a diverse set of other issues both in fossil and renewable energy. Most important of all, CSM should continue its splendid tradition of looking for and exploring the newest and most promising ideas in our science. The world does not have an 'energy crisis' and we never will as long as we allow the best ideas to lead us into the future."

***Mohan Dangi BSc CPR '99, MSc Env Sc '02** received the National Student Award from Phi Beta Delta at the annual conference in Washington D.C. this March. Phi Beta Delta is an honor society dedicated to recognizing scholarly achievement in international education.*

SHORT STAKES

National Academy of Sciences Taps Hitzman

Murray Hitzman, Charles F. Fogarty Professor and head of the Geology and Geological Engineering Department, was recently appointed to chair the National Academy of Sciences Committee on Earth Resources.



Murray Hitzman

Students Challenged to Improve Water Quality

Student teams presented working prototype models of low-cost arsenic filtration systems to government officials in January. The project client was the International Center for Appropriate & Sustainable Technology, which challenged students to develop a feasible solution to arsenic contamination issues in the water supply of rural communities in the San Luis Valley of Colorado.

"Father" of Japanese Mineral Economics Is Visiting Scholar

Takashi Nishiyama

Takashi Nishiyama, known in Japan as the "father of mineral economics," is a visiting scholar in the Division of Economics and Business this spring. Until his retirement last year, Nishiyama was a professor in the graduate school of energy sciences at Kyoto University. He is a trained geologist who, over the years, developed a strong interest in the field of mineral economics.

"Can I Kiss You?"


Mike Domitrz

Author and lecturer Mike Domitrz spoke with students in March about intimacy issues based on his book, *May I Kiss You? A Candid Look at Dating, Communication, Respect, & Sexual Assault Awareness.* In addition to motivating individual students, Domitrz works with schools to help improve their overall campus culture. The presentation was sponsored by Student Life, Student Development & Academic Services, the Office of Student Activities, the Athletics Department and the Order of Omega.


Winter Carnival was sponsored by Blue Key with Michelle Moorman as chairperson.

Wintry Fun at Eldora

More than 800 students, faculty, staff and their guests participated in this year's Winter Carnival, held at Eldora in January. In addition to skiing, snowboarding, eating and drinking hot chocolate, the day included numerous games such as human bowling, cardboard sled derby, snow sculptures, treasure hunts and an obstacle course.


Catapulting at conference

Minority Youngsters Check out Engineering

The Minority Engineering Program hosted its seventh annual Minority Engineering Conference in February. The conference introduced 7th through 11th grade minority students and their parents to the post-secondary educational process. They attended workshops on Colorado higher education admission standards, financial aid and precollege programs. The students also worked on a hands-on engineering project, building a simple catapult to launch marshmallows.


Students celebrated the Asian New Year in February with a festival of food, traditional dances and other entertainment.

Alumnus Leads NSF

Arden L. Bement Jr. Met E '54 was named acting director of the National Science Foundation. Former Director Rita Colwell resigned in February. Bement was previously director of the National Institute of Standards and Technology. He has held senior positions at the Defense Department and was the head of the School of Nuclear Engineering at Purdue University.


At a winter performance of the Concerts in the Library series, Carole Smith on violin, Stephen Weidner on cello, and Professor Tyrone Vincent on viola entertained a noon crowd in the Arthur Lakes Library Boettcher Room.

To Cambridge on Scholarship

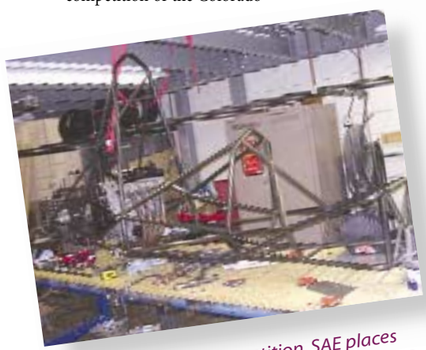
Vanessa Mitchell, Geophysics Department senior and McBride Honors Program member, has been awarded a Winston Churchill Foundation Scholarship to study next year at Churchill College, Cambridge University. According to Kay Godel-Gengenbach, director of the Office of International Programs, this is the first time a CSM student has been recognized by the Churchill Foundation. After her year at Cambridge, Mitchell plans to continue her studies at Stanford.


NASA astronaut James F. Reilly (right) visited CSM's Center for Commercial Applications of Combustion in Space (CCACS) in January. Talking with him about potential research at the center were (from left)President John Trefny, Assistant Research Professor Angel Abbud-Madrid, and Adjunct Professor ***Martin Castillo BSc Met & Mat Sci '99****.*

SHORT STAKES

Race to First

CSM won first place in the state for its formula-style race car presentation in the February competition of the Colorado student section of the Society of Automotive Engineers (SAE). Mines won third overall in the 11-team competition that included Formula SAE, as well as Aero Lift, Mini-Baja, Walking Machine and Clean Snowmobile presentations.


In the race car competition, SAE places restrictions on the car frame and engine so the students' knowledge, creativity and imagination are tested.

Formula SAE is an interdisciplinary engineering challenge to design, build and compete a small prototype race car that delivers reliability, ease of maintenance and high performance. The competition gives students the opportunity to work through an entire design process as an engineering team. CSM's team captain is Jared Dean.

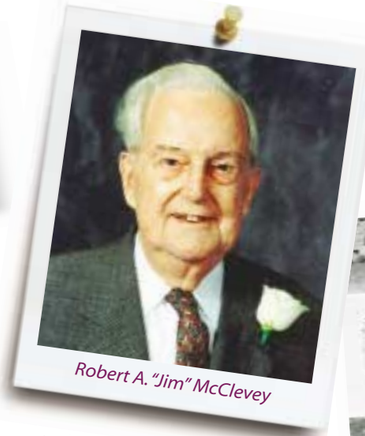
Presentations at the state competition provided an overview of project goals, approaches to overcoming obstacles, accomplishments and the management of budgets and schedules.


Eleven seniors designed the winning formula-style race car in the competition among Colorado universities.

Short takes

Lighting the Way, Then and Now

In the Winter 2004 edition of *Mines*, readers were informed of the efforts of a Senior Design team, the "M-posters," to automate the lighting of the "M" atop Mt. Zion. This year, improvements have continued under the auspices of a new Senior Design foursome, "The 'M' Team." Among other things, the team installed a security system and improved the graduation countdown lighting system.



Robert A. "Jim" McClevey

Support for their efforts has come, in part, from a particularly appropriate source. **Robert A. "Jim" McClevey Jr. EM '32**, a member of Mines' Century Society, donated $1,000 to help fund the ongoing refurbishment efforts.

McClevey was a leader of the group of Mines students who first illuminated the "M" 72 years ago. A Blue Key member in 1932, Jim was instrumental in, as the '32 *Prospector* reported, helping "the Miner's dream come true." Working at times in ankle-deep snow, McClevey and his classmates erected the original transformer, strung the wire, and in the end, created an enduring symbol of Mines pride.

Illuminating the "M" in '32

Miners on Tour

Petroleum students Grant Schluender, Ali Husain, Chris Stolte and Josh Chevalier traveled to the Middle East together recently. Husain, whose family hosted the group, is a native of Kuwait. "We all believed that we would never have an opportunity like this again: all of us able to take that much time off and traveling to the Middle east with a Middle-Eastern," said Schluender.

"I learned that to travel broadens your perspective on the world and clarifies a lot of things, ranging from traffic organization to religion," Chevalier added.

The four young men also traveled together to Dubai and Egypt. They are back on campus to finish their senior years.

Women's History Lesson

Mary Jane Duran performed as Augusta Tabor during a Women's History Month luncheon held at the Student Center. The National Renewable Energy Laboratory and CSM's Women in Science, Engineering and Mathematics Program sponsored the event. Augusta Tabor, born in 1833, was one of the first women to come west in the Pike's Peak gold rush.

"Augusta Tabor" talks about life on the Colorado mining frontier.

People watch

Alumni Abroad

Helbig '66 Helps Open New Frontier

Arthur F. Helbig EM '66 is production manager for Bogatyr Access Komir, LLP, a large open cast coal mine in Ekibastuz, Kazakhstan. He sends this report:

Kazakhstan was one of the republics of the old Soviet Union, which got its independence in 1992. The official language is Kazakh, but in the northeastern quadrant where I work, the primary language is Russian.

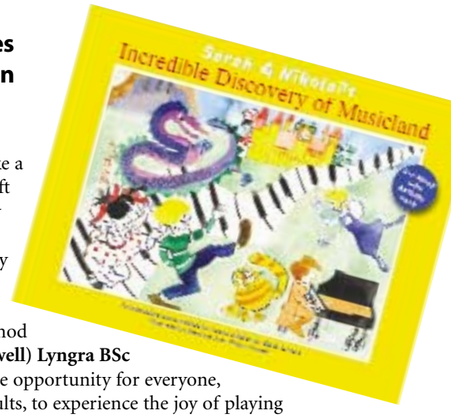
Kazakhstan has all types of landscapes from high mountains in the south to prairie land in the north to the Caspian Sea in the west. The city where I live is Ekibastuz, which in Kazakh means "two horse heads of salt." The city, population 140,000, was founded in the late 1800s at the site of a coal deposit discovery. Legend has it that the man credited with the discovery was on a trek to obtain salt from one of the many salt pans in this area. While sitting around his campfire, he noticed that the rocks near the fire started to burn. He left two large lumps of salt to mark the location of his discovery before returning to his village, hence the name Ekibastuz.

Underground mining was carried out here from the late 1800s until 1954 when open cast mining began. The city has some notoriety in that it was once the location of one of Stalin's gulags where Russian writer Aleksandr Solzehitsyn was interred. The landscape around Ekibastuz is prairie, similar to that of southern central Canada. There are few trees and the land is too alkaline to support extensive farming. In winter, cold winds come down from Siberia to the north. The climate is dry with only minor snow cover. Women dress in long fur coats and the men wear Russian shapkas, or fur hats. You can see people pulling small sleds to and from the shops on snow-packed roadways towing groceries or kids.

Many of the roads are paved in Kazakhstan and the stores have numerous consumer items. Kazakhstan President Nursultan Nazerbayev has high ambitions of turning his country into the commercial center for Central Asia. To this aim he is constructing an ultra-modern new capital city, Astana, about a three-hour drive west of Ekibastuz. Of the former Soviet republics, Kazakhstan is considered one of the most progressive new nations.

The coal deposit at Ekibastuz has some phenomenally thick coal seams. The three main seams total 570 feet in thickness. The largest seam alone is 340 feet thick. The mine utilizes bucketwheel excavators and electrified in-pit train haulage to direct-load the coal for shipment to power plants in both Kazakhstan and Russia. In 1988, the mine produced 88.1 million metric tons of coal while still under governmental ownership. This record production earned it a place in the *Guinness Book of Records*.

Lyngra '92 Makes Music in Dhahran



By Molouk Ba-Isa

There is nothing like a beautiful melody to lift the spirits on a dreary day. Unfortunately in Saudi Arabia not every child gets the chance to learn. But a new interactive piano method created by **Sarah (Powell) Lyngra BSc Pet '92** could bring the opportunity for everyone, both children and adults, to experience the joy of playing music.

"As a piano teacher for children as young as 4- and 5-years old, I became frustrated with the methods being promoted to teach new learners to read music," said Lyngra. "Young children cannot read. However, this does not mean that they should not play a musical instrument. In fact, to develop perfect pitch, enhance the synaptic connections in the brain and stimulate the nerve endings in the fingers, children as young as 3- or 4-years old should be playing the piano. Unable to find a piano method ideal for use with young children, I set out to develop one myself."

Lyngra began her quest to create the ideal piano teaching method in Copenhagen where she was teaching piano to 4- and 5-year-olds who spoke French. She hit on the idea to break down the complex process of reading music and combine the basic elements with colors to represent the individual notes and musical instructions.

"To read music in the standard way it is necessary to read notes represented by letters and to learn many words derived from Italian. This is difficult and boring for most young learners," explained Lyngra. "Consequently, many piano teachers won't take students younger than 7 or 8 years old and many students discontinue lessons quickly because they find the entire subject confusing. Even worse, parents cannot help in the learning process because they don't understand what's being taught. The method I have created overcomes all those obstacles."

Lyngra's interactive piano method uses an adventure story to teach all the fundamental concepts of reading music. Titled *Sarah and Nikolai's Incredible Discovery of Musicland*, the books take parent and child on a magical musical adventure into a fantasy land where the Purple Dragon, Red Giant and Brown Beethoven help new learners understand the core ideas in reading music.

Yellow Cat is the guide on the musical journey and from the beginning he gets the new learners off to a quick start, telling them that there are no more lefts and rights to remember. Instead they should think of the notes on the piano keyboard as moving up and down. As for the notes themselves, the white keys on the keyboard are assigned one of seven color-coded characters. These characters are permanent fixtures throughout the story.

"I teach piano to 55 students weekly, mostly in groups of three or four at a time," Lyngra said. "The children are quickly able to associate the keys and the colors. In my books the music itself is written with the required color superimposed over the body of the note instead of the music being printed in standard black and white. In this way the children instantly recognize which note to play. Using standard methods, new learners usually have to decipher the music rather than play it."

Lyngra added that her new interactive method works equally well with children, adults and even individuals with learning disabilities.

"By replacing the complex letter combinations and simplifying the music layout I have found that all new learners are able to immediately focus on the delight of making music, rather than the tedium of picking out the melody," Lyngra remarked. "The students learn the music concepts in the storybook and then they exercise their new knowledge in the accompanying practice book. As they move through the story, the layers of knowledge build one upon the other until, by the conclusion of the tale, the students are able to read music written in the standard form."

This was a very special project for Lyngra as she was not only able to involve her students in the development of the new learning method, but her mother, Beatrice Joan Wilson Powell, used her artistic talents to illustrate the story. The first two books in the series have just been printed and the next two books should be completed in fall 2004.

"My goal is to bring the pleasure of music to everyone," Lyngra said. "Parents don't even need a music teacher to begin using my method with their children. With my books and a simple electric piano, every parent can introduce their children to the joy of playing a melody."

Reprinted with permission from the *Arab News* (www.arabnews.com).

Paschis '73 on Training Mission to Egypt

Late last year, **Jim Paschis MSc Geop '73** traveled to Egypt for a training and scientific exchange mission for the International Atomic Energy Agency (IAEA). The purpose of the trip was to deliver technical training lectures including one about the Schwartzwalder uranium mine just north of CSM on Ralston Creek. Egypt has the Aswan dam for hydropower but slackwater sedimentation has stopped the addition of fertile springtime silt along the banks of the Nile. The lack of sedimentation to the Nile delta is beginning to allow Mediterranean salt water incursion into those critical arable lands. Being the most populous Arab country with limited hydrocarbon reserves, the government is trying to expand its search for potential nuclear raw materials. Paschis reports on his trip:

Egypt was incredibly interesting. Regarding travel, I made it over and back quite safely with gracious coordination by the Egyptian scientists to whom we presented the lectures. This was an excellent experience of a real developing nation for me. Egyptians have great respect for President Mubarak. I especially admire his diplomatic interaction with diverse factions in the Middle East and Europe.

The only travel incident I had was with my portable uranium scintillometer (which looks like a radar speed gun). EgyptAir, and then Lufthansa, had me ship it in baggage, but it survived quite well. I also had some concern for transporting uranium ore and microscope training and exhibit samples. I kept my total mass of radioactive materials limited and within the International Air Transport Association guidelines. The uranium ore samples were received by Egyptian scientists quite enthusiastically as were my uranium ore microscopy sections.

My associates included a French geology professor who is an expert on French uranium deposits in granites and an American technical training/teaching coordinator from the IAEA headquarters in Vienna, Austria.

Our lecture training sessions included about 50 Egyptian engineers, geologists and research scientists employed by Egypt's Nuclear Materials Authority. After the lecture sessions, I taught the basic methods of autoradiography to pinpoint the gamma-ray sources of uranium in slabs of ore and microscopy samples. I also taught introductory ore microscopy techniques and the interpretation of ore deposition sequences in various uranium ores, especially from the world-renowned Schwartzwalder mine.

The Egyptian Nuclear Materials Authority coordinated our program and back-up support quite well from internal air flight, lodging at the Red Sea, tour of the El Missikate exploratory uranium mine area, and cultural tours to Giza and the Luxor tombs and museum. We were restricted from examining in the field their most promising uranium exploratory site in the south near Sudan because of security concerns. Up to now, they have found very low-grade uranium but have promising granitic and structural terrains that are in need of additional geophysical delineation for the planning of exploration drilling programs.

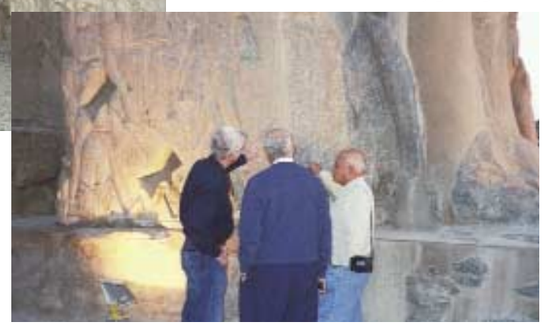
The Egyptian revenue base currently is as follows: third, tourism; second, Suez canal fees (the fee for a supertanker is $750,000); and first, U.S. aid. This is according to the French general manager of the fine hotel where we stayed in Cairo (the prime minister of Palestine was also in residence). As a U.S. citizen I was welcomed, although the U.S. war against Iraq was not by some of my contacts.

The colossi, pyramids, tombs and obelisks were the most awesome. The massiveness, transportation requirements and building of these quarried limestone and granite pieces are still a mystery to comprehend. For example, the intricacy of some of the fluting in the columns and the intricate 2mm x 2mm detail cutting of the hieroglyphs in Aswan red granite leads me to suspect metals other than mere hardened copper-tin bronze were needed to do the work. Did they possibly use Orange River or Indian placer diamonds? Did they make forged chisels from iron carbide meteorite falls, which are quite hard and tough?

I was given a guided tour of the pyramids by Shaimaa Mohamed Nasef, the public relations head of the Nuclear Materials Authority. When intact 4,000 years ago, the pyramid surface coverings (now mostly removed) must have been stunning in their polished limestone and red Aswan granite. These present-day stacks of stone are commendable for their size, but fail to do justice to the artistic and engineering accomplishment of the original structures by the ancient Egyptians.

Climbing on the pyramids is adequately discouraged by well armed, camel-riding Tourism and Antiquities police. From Aswan, the 100 million-year-old red granite (syenite) is unusual for its lack of fractures allowing large, single pieces to be quarried and, of course, meet the design quite well for the slender, tall obelisks. I hope to return someday and visit the Aswan quarry site of the red granite that is now used as a polished architectural facing stone media in the city of Cairo.

Top left, Jim Paschis at the Giza Pyramid. Left, Paschis (facing camera) at El Missikate uranium exploratory mine in eastern Egypt. Below, Paschis examines the massive Ramses II sculptures with Egyptian Nuclear Materials Authority geologists.



Engineering the Earth

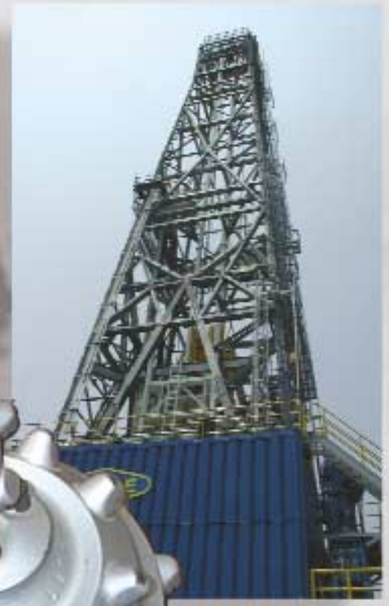
Subsurface science is a focus at Mines

Modern's civilization's quest for a sophisticated, constructed environment is creating immense challenges in the engineering of the Earth. Understanding the Earth's subsurface resources and infrastructure is key to planning for the future. We must balance our current needs for minerals, water and energy with the needs of future generations. Sustainable development is the goal—finding the balance between taking what we need today while at the same time protecting the resources for future generations. Promoting stewardship of the Earth for a sustainable global society is part of Mines' mission statement and one of its primary goals.

Subsurface science and engineering deals with the properties and presence of rock materials, minerals and subterranean water. At Mines, it also focuses on the depths that might be reachable with existing or imagined excavation or probing technologies. In addition to learning about extractable materials, the subsurface is studied to gain an understanding of how rock materials behave over time so that suitable below-ground structures can be built.

The advancement and development of the technology and engineering of extraction, construction and remediation is another facet of subsurface science and engineering. This includes identifying and delineating deposits, designing mechanical equipment for tasks like drilling, excavating and tunneling, and designing equipment for handling and transporting rock and minerals. It includes equipment and processes for cleanup as well as techniques to transport and support people working in harsh underground environments.

Much research on campus addresses these issues. For the coal-mining industry, Mines scientists and engineers are working to reduce coal dust, a dangerous pollutant for miners working underground. Redesigned cutting heads have resulted in a 20 percent to 30 percent reduction in the amount of dust generated. Another research project is developing new borehole mining technology for energy sources such as lignite, sub-bitumous or bitumous coal or uranium. The new technology is more environmentally friendly, will not create major disturbances on the Earth's surface, and can be applied to methane production or the natural gas industries.



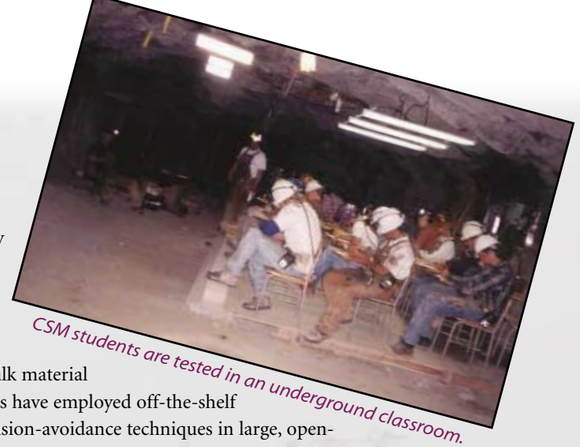
Drill bits

Researchers in various departments are working to produce methane from coal beds and from other non-conventional resources because natural gas burns cleaner than coal, the major source of today's energy. Coal-bed methane, which is formed during the conversion of biomass to coal, has gone from a low-value by-product to an actual target of exploration. Coal bed methane production is important for two reasons. First, if high quality methane is produced, it can be directly fed into the gas pipeline and contribute to energy needs. Second, producing methane from coal seams results in safer and less expensive mining activity if the coal seam is subsequently mined. Less ventilation will be required to dilute the excess methane and less methane will be released into the atmosphere. So, greenhouse gas emissions are reduced at the same time as additional energy is being produced.

Other research focuses on ways to recover natural gas from coal seams. CSM research is developing specific methods of extracting gas from thin and deep seams. Previously, extracting gas from such coal seams was not economically feasible, but with rising gas prices, it now is. The main new use for natural gas is to generate electricity. During the 1990s, most new electricity generation capacity was natural-gas fired. This puts a tremendous demand on a relatively inflexible natural gas supply, which historically has been a by-product of oil production.

Joint efforts between various departments also have produced research that simulates bulk material flow through drawpoints, openings in the rock where material such as ore or waste rock is removed. A critical problem is to design the geometry of the drawpoint (i.e., its size and shape) so that the blocks of ore or waste rock will flow freely. If the rock gets clogged in the opening, its removal is extremely hazardous to miners.

Another extensive research program has been conducted with various mining companies and manufacturers to develop



CSM students are tested in an underground classroom.

A coal seam burns.

appropriate cutting tools and machinery for mechanical mining of high strength rocks. Mechanical mining of such materials would make the excavation process safer and less expensive by eliminating drilling, blasting and bulk material handling systems. Other researchers have employed off-the-shelf (GPS) technology to improve collision-avoidance techniques in large, open-pit mines.

Other CSM research has resulted in a practical new approach to determine the size of the pillars for deep coal mines. Utilizing the support action provided by crushing (yielding) coal, mines can be designed with smaller-sized pillars resulting in a safer and higher extraction of coal reserves. In many cases, it also will allow extraction of coal from those deep coal beds. Conventional design of mines at large depth (more than 1000 feet) would require excessively large, thus highly stressed, pillars, which can damage the mine roof. Some of the deep coal seams may not be mined safely and economically if the yield pillar design is not applied.

Mines researchers also are using remote sensing techniques and seismic imaging to more accurately determine where petroleum and/or natural gas reserves may be found. They can use data from drill holes to directly test the subsurface. Electromagnetics and gravity are other geophysical techniques used to do underground imaging. These techniques can help find water, as well as energy sources. Measurements from surface and boreholes can be used to predict water flow and quality.

Beverly Hills dressed up an oil derrick for a better look.

Water resources in fractured rocks are also important because as the world population is growing, water levels in wells around the world are declining. Some of these water systems may not sustain the current demand, but it is difficult to determine sustainability and manage these resources because evaluating ground water systems in fractured rocks is very expensive. CSM researchers are developing methods that use inexpensive, readily available data, coupled with computer modeling techniques, to characterize ground water systems and assess their sustainability.

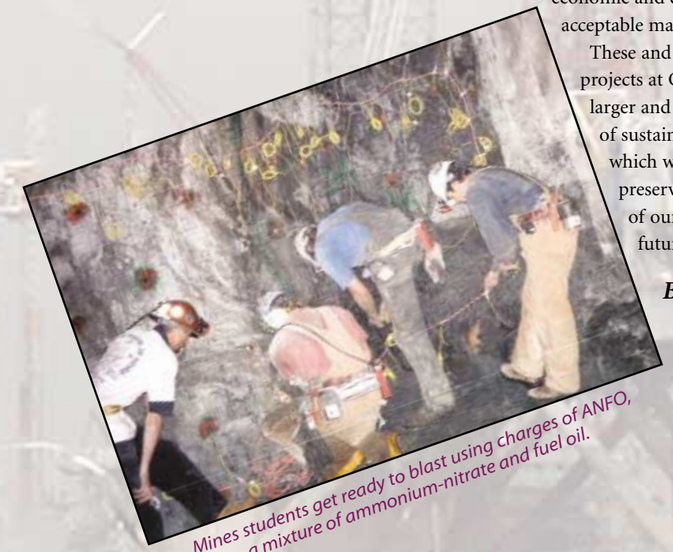
Other researchers experiment with ways to store carbon dioxide – greenhouse gases – underground to aid with potential global warming. And water research may find ways to store water underground rather than in surface reservoirs as is currently common.

How steep can an embankment be made before it starts to slide or cave in? How much load can be supported by the ground before some maximum settlement criterion is exceeded? CSM researchers are using computer models to assess the impact of statistically defined soil properties on geotechnical design. The statistical approach is particularly attractive in geotechnical analysis, because soil is one of the most variable of all engineering materials, yet site investigation data is often limited. Furthermore, there are other variable factors to be considered, such as drainage conditions and loading intensity. These more sophisticated approaches should lead to less conservative designs, which save money while preserving safety.

Researchers at CSM's Kroll Institute of Metallurgy are currently working on a variety of industry-sponsored research programs including: an investigation of gold heap leach solution-ore interactions, magnetic separation studies on a vanadium containing titano-magnetite ore, pyrometallurgical recycling of electronic scrap, studying secondary leach systems for precious metals extraction, cyclone reduction of taconite (iron ore) fines, and a research program to benchmark the Kroll process for titanium extraction from ilmetite/rutile ore and evaluate other upcoming processes for titanium extraction based on molten salt electrochemistry. Industry-driven, new and innovative mineral processing and extractive metallurgy technology is being developed that will help society develop needed Earth resources in an economic and environmentally acceptable manner.

These and other research projects at CSM contribute to the larger and multidimensional goal of sustainable development in which we seek a balance that preserves the sophistication of our own lifestyles for future generations.

By Maureen Keller



Mines students get ready to blast using charges of ANFO, a mixture of ammonium-nitrate and fuel oil.

Mines' Mission Statement

The Colorado School of Mines … shall have a unique mission in energy, mineral, and materials science and engineering and associated engineering and science fields … This mission is achieved by the creation, integration and exchange of knowledge in engineering, the natural sciences, the social sciences, the humanities, business, and their union, to create processes and products to enhance the quality of life of the world's inhabitants. The School is consequently committed to serving the people of Colorado, the nation, and the global community by promoting stewardship of the Earth upon which all life and development depend.

Global Pathways to a Better Environment


Garden at Lumni Hotel.


Polluted river in Kathmandu.


Societal school orphans.


Fish tail mountain in Nepal.


Buddhist temple.

By Carly Williams

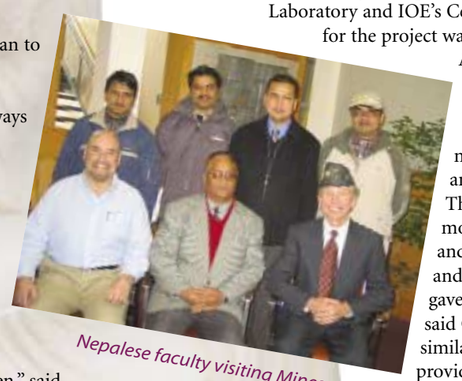
"Nepal was awe-inspiring, with so many contrasting images and feelings. In juxtaposition with the incredible warmth of the people and the beautiful mountain setting was the cold of the river polluted with raw sewage and the garbage in the streets," said CSM Associate Professor Ron Cohen.

The need for advanced environmental studies in Nepal led Cohen, of the Environmental Science and Engineering Division, and **Mohan Dangi MSc Env Sc '02** to Kathmandu in December. There they initiated the Environmental Pollution Control Engineering Global Pathways Project and signed a memorandum of understanding with the Institute of Engineering (IOE), Tribhuvan University (TU).

Dangi, the project's spearhead, grew up in rural Nepal in the town of Dhikpur and eventually moved to Kathmandu, which he said gave him different perspectives. "I want to transfer technology anyway, anywhere I can to help developing countries. I'm actively advocating it in Nepal," Dangi said. For the Global Pathways Project, Dangi said he was "interested in recruiting serious people who would make a promise and keep it."

Cohen fit that description. He and Dangi spent a lot of time working on the project and preparing for presentations before they left for Nepal. "Mohan wants so much to do something for Nepal. He is driven," said Cohen. They directed their focus toward four main goals:

- **Suggest alternative technologies to eliminate arsenic in the water supply**. The polluted runoff and rivers running through Kathmandu have created many environmental problems.
- **Build an environmental curriculum for IOE.** According to Cohen, the curriculum will be practical, advanced and complete.
- **Develop an environmental course that can be taken by all diploma students.** Every student needs to be educated on critical environmental issues in Nepal.
- **Decrease failure rates in math and science courses.** High failure rates are occurring partly because 80 percent of a student's grade is based on the result of one final exam, given by an exam "master." More exams or homework assignments would burden Nepalese professors who must work second and third jobs to augment their meager teaching salaries.


Nepalese faculty visiting Mines.

Partners with Mines in the project are Red Rocks Community College, the National Renewable Energy Laboratory and IOE's Center for Pollution Studies. Funding for the project was provided by the United States Agency for International Development and the Associate Liaison Office.

Once in Nepal, Cohen and Dangi met TU faculty, viewed the facilities and presented the new curriculum. They participated in meetings from morning to night, receiving critiques and suggestions about the new course and curriculum from the faculty. "They gave me good and pointed feedback," said Cohen. A hands-on approach—similar to the practical education provided by Mines—was taken in developing the new course for engineering students.

In addition, other steps were taken to help increase the retention of students. Texas Instruments™ donated 45 graphing calculators to be used as learning tools in the classrooms. Tom Niehoff, a Red Rocks Community College instructor, will teach math and calculus at IOE for a semester. A book drive in Colorado by Dangi and his brother, Kiran Dangi, resulted in a donation of 350 books to support the new curriculum, and demonstration kits are being developed. Dangi also raised $3,000, which will be matched in Nepal, to provide 10 King Biremdra Memorial Scholarships to poor and needy children, representing rural and hilly districts of the kingdom.

After returning from Nepal, Cohen and Dangi revised the final curriculum and integrated lab work into the course. They also hosted four Nepalese deans who visited Colorado in January to continue work on the project and receive training.

Although some of the environmental problems in Nepal may be buried too deep within culture and tradition to be solved immediately, the relationship between TU and CSM stays strong through continuous communication and commitment to kept promises.


Nepalese girls doing a welcome dance at societal school.


Cohen and Dangi receiving certificates of honor and appreciation.

Simpson Enjoys Historic Career

This year, only one person in the country qualified for both NCAA Division II Cross Country National Championships and NCAA Division II Swimming National Championships: Gretta Simpson, a CSM senior.

Simpson didn't begin her collegiate career at Mines, but she has certainly left her mark here. Following graduation from Grand Junction High School, Simpson went to the University of New Mexico. But after one year, she decided it wasn't right. "I wanted to come back home to Colorado to a smaller school where I could swim," Simpson said. "Mines was also a step down from Division I and enabled me to focus on my studies as well as swim."

Her first year here in 2001-02, Simpson became the first female swimmer to compete at nationals although she didn't earn All-American honors that year. But she did one year later, in 2002-03 by placing seventh in the 100 Fly in a time of 57.40.

"Mentally, I was more ready for nationals the second and third times around," she said. "I knew what to expect and had more confidence in my ability to swim."

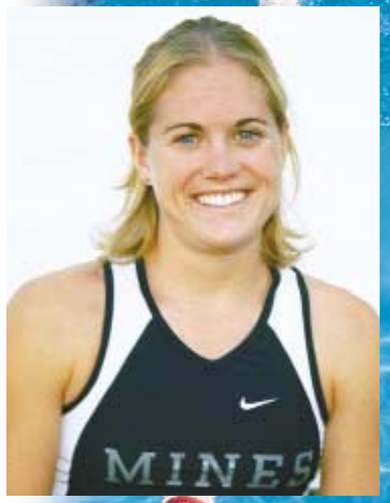
Simpson represented the CSM swimming program for the final time at the 2004 NCAA II National Championships in Buffalo, N.Y., from March 17-20. She swam in four events and earned All-American accolades by placing 13th in the 100 Freestyle and 16th in the 100 Butterfly.

Head Coach Dave Hughes knew this could be Simpson's best year, but it came with a price before the season started. Simpson and teammate Trisha Malberg were flirting with the idea of running cross country. Malberg decided she would and after much debate, Simpson decided she also would join the cross country team. "It was a tough decision for me because I felt like I wasn't being a good leader for the swim team," Simpson said. "But the cross-country team made me feel like my running was important, so I decided to join the team."

"I realized that being part of the cross-country team was important and didn't want to hold her back," Hughes said. "Gretta had a plan and I had to trust her judgment."

As it turned out, running cross country may have been the best thing to happen to Simpson. She helped the harriers to the NCAA II National Championships for the first time in School history. The team placed 14th at nationals and finished the season at 16th, the highest ranking in School history. In addition, Simpson learned several valuable lessons: "Running cross country helped me build my endurance and was great conditioning. It also taught me how to race in the pool and be more competitive because people are running right next to you. In the pool, it's harder to scope out your competition."

Hughes agreed. "Joining the swim team midway through the season helped Gretta keep her focus on qualifying for nationals in the pool. It is also the first time she swam an 'A' cut time." An "A" cut time automatically qualifies a swimmer for nationals.



When Simpson arrived at Mines, Hughes must have known he was getting a special athlete. Simpson's older brother, John, won a Wrestling National Title at 184 pounds in 1998. "I was extremely proud of John after he won that national title," Simpson said. "I also realized that I could qualify for nationals because I have always believed I could do anything he can do."

With her collegiate swimming career over, Simpson is now looking toward the future. She has one more semester at Mines and will again run cross country. She expects to graduate in December with a double major in civil and environmental engineering.

Then she would like to go to graduate school, but she also has Olympic aspirations in the triathlon (running, biking and swimming). Last summer, Simpson competed in several triathlons, won her age division and placed in the top 10 overall. "I've been working with a coach at the Olympic Training Center and think it is a realistic goal for me to attain," she said.

New Mascot Honors Marv Kay

Retiring Director of Athletics **Marv Kay EM '63** was given an early birthday/retirement gift at the Silver and Blue Luncheon Jan. 21 in front of about 80 people, including his family.

That's when the Athletics Department unveiled "Marvin the Miner," a mascot to honor Kay, who is retiring after 45 years of service as a student, athlete, coach and administrator to Mines athletics. He celebrated his birthday Feb. 17.

The new mascot entered the ballroom to loud cheers accompanied by the singing of *The Mining Engineer* and remained for the rest of the program. Marvin the Miner has already appeared at several Mines basketball games and will be able to be spotted at many more Oredigger home events throughout the year and during the 2004-05 season.

Retiring Athletics Director Marv Kay stands with Marvin the Miner

Brennecke Selected for RMAC Hall of Fame

Former Head Football Coach and Athletics Director Fritz Brennecke has been selected to the Rocky Mountain Athletic Conference Hall of Fame Class of 2004.

It marks the second consecutive year that Mines will be represented with a member of the Hall of Fame class as former Oredigger running back **Lloyd Madden Geol E '41** was elected to the Hall in 2003.

Brennecke will be honored at a dinner and ceremony in Colorado Springs July 10.

The head football coach at CSM from 1947-1969, Brennecke led his squad to Rocky Mountain Conference titles in 1951 and 1958.

He also served as the Athletics Director from 1947-1976 and was the National Association of Collegiate Directors of Athletics (NACDA) District 7 Representative from 1971-75.

Brennecke was inducted into the NACDA Hall of Fame in 1977 and served as an executive committee member for the NACDA as well. In addition, Brennecke was inducted into the Colorado Sports Hall of Fame in 1980.

By Greg Murphy, Sports Information Director

Beckman
Carves Birds for Fun

By Maureen Keller

Retired mining engineer **Robert T. Beckman EM '57, MSc Min '63** keeps busy in a variety of ways, but his most creative outlet is carving. He has carved more than 50 lifelike birds, a craft he's been honing for about 25 years.

Beckman starts with bass wood from a linden tree, which is as hard as pine but has a less prominent grain. He works from photographs and uses a band saw to outline the shape of the bird. He does power carving using Dremel-like tools and uses carving knives for the details. He also uses high tech wood-burning techniques to outline the feathers. The results are extremely detailed and lifelike birds.

Beckman starts by cutting a rough form of the bird, then works on the details.

Each piece can take up to 150 hours to make, but Beckman carves for the joy of it. Before he retired, carving was a hobby he could take on the road and do in his motel room at night. He has sold a few pieces, but carves for his own pleasure, not profit. It's mostly relatives who are the lucky recipients of his work. Beckman won a blue ribbon at a show at the Jefferson County Fairgrounds for a carved duck decoy with outstretched wings, but he hasn't shown his work publicly in several years.

Birds are western meadowlark, a family of quails, house wren, mallard drake, hummingbird and flamingo.

Watson '50 is Mr. October

Carl Watson PE '50 is Mr. October in the 2004 *Gentlemen of Exempla Colorado Lutheran Home* calendar. According to his write-up, the retired petroleum engineer's perfect weekend is a gorgeous, sunny day on the road for a leisurely drive listening to Perry Como. "He'll usually end up somewhere breathtaking so he can indulge his passion for photography," we're told. "Then, after snapping a few pictures of the landscape, he'll cast his line into the lake or just relax with a good book."

Romero '90 Named Principal

Victor S. Romero BSc Geol '90 was named a principal with San Francisco-based underground engineering specialist Jacobs Associates. Romero has more than 12 years of experience with underground projects including transit, pipelines and highway tunnels. He joined Jacobs Associates in 1991 and is currently leading the firm's work on the Muni Metro New Central Subway in San Francisco.

Previously, Romero was tunnel design manager and resident engineer during construction of a $300 million transportation project in Puerto Rico. Other noteworthy projects include a $460 million project supplying water to greater metro Boston and a $400 million project linking the California and Colorado aqueducts in Southern California.

Strack '81 Wins SEG Award

Kurt M. Strack MSc Geop '81, president of KMS Technologies – KJT Enterprises Inc. in Houston, has received the Reginald Fessenden Award from the Society of Exploration Geologists in recognition of his instrumental role in the development and implementation of through casing resistivity and 3D induction logging, which allow identification of bypassed hydrocarbons behind casing and in thinly laminated sand-shale sequences. These technologies were made possible through the application of state-of-the-art seismic acquisition and processing principles to the borehole environment. Strack received the award during the SEG's 2003 International Exposition in October in Dallas.

Chuber '52 Named AAPG Honorary Member

The 31,000-member American Association of Petroleum Geologists has awarded **Stewart Chuber Geol E '52** honorary membership. The award is presented to AAPG members who have distinguished themselves by their accomplishments and through their service to the profession of petroleum geology.

Chuber explored for hydrocarbons with Mobil Oil in Libya and later joined FrancoWestern Oil Co., and then Buttes Gas and Oil and Five Resources. He also holds master's and doctorate degrees from Stanford University. He is presently an active independent geologist in Schulenburg, Texas.

Bednar '61 Wins Distinguished Service Award

The International Society of Explosives Engineers presented its Distinguished Service Award to **David H. Bednar EM '61** in February. The honor is given to an individual who has made an outstanding contribution to the field of explosives engineering. ISEE President Tom Watts (left) presented the award saying that Bednar (right) was an innovator and true entrepreneur of the explosives industry and a leader in introducing and pioneering significant advancements in blasting for both underground and open pit mining.

In 1969, Bednar founded Viking Explosives & Supply, Inc. Viking developed and patented systems for de-watering and lining blastholes. These systems were a vast improvement over the existing systems and offered significant blasting cost reductions to mines and quarries throughout the world.

Young '58 Retires from NASA

Stan Young Met E '58, a NASA materials scientist, recently retired after 45 years. He joined the NASA Glenn (then Lewis) Research Center in 1962. During his career he received numerous technical-innovation and special-achievement awards and patents in high temperature coatings for aircraft engines. He was a NASA cavitation research consultant for ERDA research programs, Bureau of Mines and Stanford Research Center. He also was a national and international adviser to crime laboratories on new spin-off inventions to restore obliterated serial numbers on guns and stolen items using ultrasonics.

In 1982 he transferred to the Kennedy Space Center (KSC) in Florida, where he participated in more than 2,000 problem-solving and failure-analysis projects. He also received a significant safety award for suggesting removal of metal staples from documents used in clean rooms, Space Shuttle and flight hardware areas. He received an award for basic research on a new superconductor coating method on copper tubing for possible use in magneto-electronic transportation systems.

At NASA, Young developed and improved scanning-electron-microscope and polarized-light-microscope analytical techniques, which have been applied to nearly every major event at KSC in the last 21 years, including cleanliness analyses for the International Space Station, Hubble telescope and Mars observatories. His accident investigations included Columbia, Challenger, Delta, Atlas, Magellan and others.

In retirement, Young plans to travel extensively and continue his life-long interests in mountain hiking, mineralogy, geology, astronomy, chemistry, computers and consulting.

Events calendar

May

18 Denver Young Alumni Pub Tour: McCormick's The Cruise Room, 1659 Wazee, Denver. 5-7:30 p.m.

20 Grand Junction, Colo., section luncheon: third Thursday of every month. Bookcliff Country Club, 2730 G Road, noon. For information call John Howe at 970-242-4903.

June

03 West Side Mixer in Golden, Colo. 5-7:30 p.m., Woody's, 1305 Washington. Get together first Thursday of every month. Look for the CSMAA banner. Pay own way.

07 CSMAA Annual Golf Tournament, 7:30 a.m. Fossil Trace Golf Course, Golden, Colo. $125 per person (includes lunch). RSVP to 303-273-3295.

10 Golden, Colo., Lunch Bunch: second Thursday of every month. Buffalo Rose, 1119 Washington, 11:30 a.m. Pay own way.

Downtown Denver Mixer: second Thursday of every month. Wyncoop Brewing Company, 1634 18th Street, Denver, 5-7:30 p.m. Pay own way. Go to second floor and look to the right for CSMAA banner.

16 Denver Young Alumni Pub Tour: West End Tavern, 926 Pearl St., Boulder 5-7:30 p.m.

June

17 Grand Junction, Colo., section luncheon (see May 20 for details)

24 Cirque de Soleil, 8 p.m., Pepsi Center. Call 303-273-3295 for details.

July

01 West Side Mixer in Golden, Colo. (see June 3 for details)

08 Golden, Colo. Lunch Bunch (see June 10 for details).

Downtown Denver Mixer (see June 10 for details)

15 Grand Junction, Colo., section luncheon (see May 20 for details).

17 Houston: Meet in the lobby of the Museum of Natural Science at 10 a.m. to see the Petroleum Exhibit (two-for-one coupons in the 2004 Entertainment coupon book). Those interested can head to a nearby restaurant for lunch afterwards.

22 Denver Young Alumni Pub Tour: Table Mountain Inn, 1310 Washington St., Golden. Happy Hour from 5-7:30 p.m. Half-off drinks + $4 menu.

August

05 West Side Mixer in Golden, Colo. (see June 3 for details)

12 Golden, Colo. Lunch Bunch (see June 10 for details.

Downtown Denver Mixer (see June 10 for details)

For the most up-to-date information on what's happening in your area, check the website at *www.alumnifriends.mines.edu* and click on "News and Events" (top of page). Scroll down to the calendar.

SEVEN HONORED BY CSMAA

Melville E. Coolbaugh Award

Frank Stephens Jr. Met E '42, chairman and CEO of Iron Carbide Holdings Inc., became interested in the potential of iron carbides as an iron and steel raw material while working as a research engineer at Battelle Memorial Institute after graduation. At the time, the material was not economically feasible. When Stephens returned to Golden, Colo., to become executive vice president for Hazen Research in the early 1970s, he worked on a way to make low-cost production of iron carbide. Helping him were CSM Professors Don Williamson and John Hager. In 1983, Stephens was ready to commercialize his idea. He obtained financing to buy back the patents from Hazen and licensed numerous major steel companies for building iron carbide plants. Because of his success, Stephens is known throughout the steel industry for his process developed with the assistance of CSM. Iron carbide has been used around the world as a substitute source of primary iron for steelmaking furnaces. Iron carbide provides an economical method of producing high quality, environmentally sound iron for steel production.

Stephens' father, **Frank Sr. EM '13**, and brother, **William Met E '39**, are also Mines alumni. Stephens was a Mines Medalist in 1981 and received an honorary doctor of engineering in 1996. He served as chairman of the extractive metallurgy division of the American Institute of Mining, Metallurgical and Petroleum Engineers (AIME). He is a registered professional engineer and a member of the American Institute of Chemical Engineers.

Outstanding Alumnus Award

Marshall C. Crouch III Geol E '67 is founder, president and geological engineer for White Eagle Exploration in Denver. The firm, founded in 1974, has been active for 30 years developing oil and gas exploration and development projects in the Rocky Mountain, mid-continent and Alaska regions. Crouch began working in the oil and gas industry in 1964 for Plains Exploration and later moved to Kansas-Nebraska Natural Gas. He has long been an active member of the Alumni Association and is currently serving his second two-year tour on the CSM Foundation Board of Directors and serving on the Alumni Association Board of Directors. In the past, he served on the CSMAA Board in all officer positions including president. He was made an honorary member of the Association in 1990, and he has helped plan all of his class reunions. Crouch has been active with the Rocky Mountain Association of Geologists (RMAG) and other geological and petroleum engineering societies, serving on numerous committees as a member or as chair. He received the Distinguished Service Award from the RMAG in 1995. He has also been active with CSM's Potential Gas Agency for more than 15 years.

Young Alumnus Award

Roxann Mackenzie Hayes BSc Eng '95, P.E., has volunteered many hundreds of hours to the CSM Alumni Association and the Alumni Admissions Representative Program. Both she and her husband, **Matthew B. Hayes BSc CPR '95**, P.E., have been active in the Association since graduation. Over the years, Hayes has attended college-night fairs at area high schools, presented Mines Medals and helped host freshmen send-off parties. She has served on the CSMAA board of directors two separate terms: one as Gulf Coast regional director and one as Rocky Mountain regional director.

Hayes was recently elected to serve as president of the Colorado section of the American Society of Civil Engineers, representing 3,300 civil engineers in the state. She is a senior civil engineer for Larimer County, Colo., and is the manager of the development review group for the engineering department. Roxann and Matt have an infant daughter, Breanna.

Honorary Membership Awards

Charles "Chuck" Baroch Met E '54, who also holds master's and doctorate degrees from Iowa State University, has about 50 years of experience in research and development, manufacturing, engineering, marketing and new product development for the mining, metallurgical, environmental control and nuclear- and fossil-power generation businesses. In addition, he has more than 20 years of executive management experience including profit and loss responsibility. He is a member of the American Institute of Mining, Metallurgical and Petroleum Engineers, the Colorado Mining Association and is a registered professional engineer in both Ohio and Colorado.

In addition to his career, Baroch has a long history of civic involvement. He currently is in his second term as mayor of Golden, Colo., and is working for better relations between the city and the School. Baroch has served on the Golden City Council since 1996 and before he became a politician himself, helped other candidates run for office.

Honorary Membership Awards continued

Paul B. Davis EM '39 set up Davis Engineering Service in Del Norte, Colo., in 1948 and has been serving the San Luis Valley ever since. His company has provided highly regarded civil and mining engineering and land and mineral surveying and consulting services since then. Davis is retired, but his son manages the Del Norte office and a branch office in Pagosa Springs, Colo., is run by his grandson, **Michael M. Davis BSc Eng '90**.

In addition to his degree from Mines, Davis worked in numerous mines as a laborer so that he could learn all aspects of mining. He is a registered professional engineer and land surveyor in Colorado and other states and is also a commissioned mineral surveyor. He surveyed, designed and supervised construction of the water and sewer systems of many of the towns in and near the San Luis Valley. He did preliminary studies and designs of many of the dams built by the state's wildlife division from the 1960s to the 1970s. Davis is also one of the most knowledgeable people of the history of mining in the San Luis Valley and the history of the land grants in southern Colorado.

Stanley Dempsey is chairman and chief executive officer of Royal Gold Inc. in Denver. He attended Mines for one year before transferring to University of Colorado where he earned degrees in geology and law. He is a renowned expert in mining law, which includes public lands, environmental ethics, mineral royalties and mining finance, and is a staunch supporter of CSM. Dempsey has operated small mines in Colorado and Montana and was employed for many years by Climax Molybdenum Company in various capacities including senior vice president. He also has served on various boards of directors including the Colorado Historical Society, where he has been chairman for three years, National Mining Association and Colorado Mining Association. His association with Mines includes serving on the board of directors of the CSM Research Institute and the Geotechnical, Energy and Materials Corridor and was a member of CSM's Trustee Development Council.

Bonney Sayre, the widow of **Robert H. Sayre Jr. EM '34**, who died in 2002, has always championed Mines. She was married to Bob for 62½ years. Over the years, Sayre spent a lot of time in tents and mining shacks while her husband staked mining claims in various areas throughout the west.

Sayre still faithfully attends CSMAA section meetings in Grand Junction every month. Once a year, she and others get together to clean litter from four miles of highway. Two miles are for the School and the other two are for SME. After the job is done, Sayre and the other volunteers have a picnic. Together, the Sayres endowed a Mines scholarship fund for students and after Bob Sayres died, Bonney donated his athletic equipment to the School.

WANTED: Director of Alumni Relations/CSMAA Executive Director

CSM invites nominations and applications for the position of director of Alumni Relations/executive director of the Alumni Association. The School has an enrollment of 2,600 undergraduate and 700 graduate students with approximately 16,000 alumni worldwide.

Responsibilities: The director serves as the chief executive of the School's Office of Alumni Relations and of the CSM Alumni Association (CSMAA), and reports directly to the School president. The director is also accountable to an independent Board of Directors of the CSMAA. The director supervises a small group of full-time professional and support staff, several part-time staff and volunteers.

Qualifications: Bachelor's degree, documented successful experience in progressively responsible management positions, and experience supervising staff and managing budgets. Excellent leadership, interpersonal and communication skills are required. Experience working in alumni relations is desirable as is experience recruiting and leading volunteers.

To Apply: Alumni and other individuals who are familiar with the School and its mission are encouraged to apply. Salary will be commensurate with experience. Please send letters of application or nominations, along with a resume and a list of three professional references with phone numbers, to: Colorado School of Mines, Human Resources, Search # 04-300400, 1500 Illinois Street, Golden, C, 80401. Review of applications will begin on June 15.

CSM is an EEO/AA employer and is committed to enhancing the diversity of its campus community. Women, minorities, veterans and individuals with disabilities are encouraged to apply.

Mines Acknowledges Individual, Corporate and Foundation Donations

Colorado School of Mines received gifts of $25,000 or more from the following individuals between December 1, 2003 and February 29, 2004.

A final distribution of $201,358 was received from the estate of **Allan Caplan** for the Geology Museum.

Steve '64 and **Dollie Chesebro'** made a gift of $500,000 to the Chesebro' Distinguished Chair in Petroleum Engineering.

Charlie Fitch '49 supported the Chemistry and Geochemistry Department through a $50,000 gift to purchase laboratory equipment.

Robert '68 and **Ann Irelan** made a gift of $25,000 as part of their four-year, $100,000 *Transforming Resources* campaign pledge. Their gift included $5,000 for the Mines Annual Fund, with the remainder designated for the Irelan Family Endowment for the McBride Honors Program.

A gift of $40,000 received from **Alfred Ireson '48** was matched with an additional $5,500. Of this, $5,000 was put toward the Mines Annual Fund and the remainder went to the Ireson Family Scholarship Fund.

Bob Lame '59 celebrated his 45th class reunion by contributing $25,000 to the Lame Endowed Scholarship Fund in support of undergraduate students.

Carolyn Mann made a gift of $50,000 to the Mann Endowed Graduate Fellowship in Geology.

J. Robert Maytag has made payments of $112,500 toward his $175,000 *Transforming Resources* pledge. Mr. Maytag's contribution will go to the Mining Department to fund the Max Bowen Mineral Processing Lab.

Renewing his Guggenheim Society membership, **Charlie McNeil '71** gave $25,000 as part of his $100,000 *Transforming Resources* campaign pledge. His gift will primarily support construction of the Recreation and Wellness Center, with $1,000 directed to the Annual Fund.

Steve Mooney '56, president of the CSM Board of Trustees and a Guggenheim Society member since 1996, made a gift of $25,000 toward his $100,000 *Transforming Resources* pledge to the Mines Annual Fund.

Edwin Peiker, Jr. '54 made a gift of $25,000 to the Mines Annual Fund in honor of the Class of 1954 50th reunion.

Charles '61 and **Louanne Shultz** made a $134,000 *Transforming Resources* campaign gift, creating the Charles and Louanne Shultz Athletics Scholarship Endowment Fund with $131,000 and designating the remainder to the Mines Annual Fund.

John and **Sharon Trefny** made a gift of $25,000 toward their $100,000 *Transforming Resources* campaign commitment to create the John U. and Sharon L. Trefny Endowment for Curriculum Advancement.

Herb '39 and **Dodie Young** established a charitable remainder trust with a cash gift of $67,000. The trust is their second at Mines, and both will support the Young Environmental Issues Symposium Fund.

Colorado School of Mines received gifts of $25,000 or more from the following corporations and foundations between December 1, 2003 and February 29, 2004.

Anadarko Petroleum Corporation's gifts totaling $45,000 support the Geology and Geological Engineering Department, the Geophysics Department, the Petroleum Engineering Department, and the School's Society of Petroleum Engineers (SPE) student chapter.

The Boeing Company has donated a portfolio of innovative laser technology patents to Mines' Center for Earth Materials, Mechanics and Characterization, housed in the Petroleum Engineering Department. The patents will help strengthen the Center's plans to develop and market a field-ready laser drilling system.

The **Viola Vestal Coulter Foundation** gave gifts totaling $108,000 to support the following: the Coulter Chair in Mineral Economics, the William Jesse Coulter Instructorship in Mineral Economics, the Viola Vestal Coulter Instructorship in Mineral Economics, the Mineral Economics Department Fund for Professional Development, the Mabel M. Coulter Student Health Center, Viola Vestal Coulter Foundation Graduate Fellowships, Viola Vestal Coulter Foundation Undergraduate Scholarships, and William J. Coulter Outstanding Undergraduate/Graduate Stipends.

Infiltrator Systems contributed gifts totaling $75,000 to support Dr. Robert L. Siegrist's research and educational activities in the area of on-site and alternative wastewater technologies.

Ivanhoe Mines Ltd. has made a gift of $32,955 to benefit the Department of Geology and Geological Engineering.

The **Li Foundation** contributed $42,000 for the 2003-2004 Li Foundation Fellowships.

The **Phelps Dodge Foundation** contributed $50,000 to the Phelps Dodge-Ansell Endowment for Excellence in Mining Engineering.

Shell Oil Company and the **Shell Oil Company Foundation** have contributed $130,500 for departmental support, the Career Center, the Minority Engineering Program's summer programs, and minority scholarships through the Shell Incentive Fund.

Ivanhoe Property Bequest to Benefit Petroleum Engineering Students

With over 50 years experience finding oil across the globe, exploration geologist L. F. "Buzz" Ivanhoe was noted for his interest in long-term trends in petroleum supplies. He was also concerned with the potential economic effects of such changes and felt that society should be thinking more seriously about what will happen when supplies begin to decrease.

Acting on this belief, he funded the creation of the M. King Hubbert Center for Petroleum Supply Studies at Mines in 1996. The Center assembles and studies data concerning global petroleum supplies and makes the information available to the public.

Buzz's generosity to Mines did not end with his annual gifts in support of the Hubbert Center. Upon his death in September 2003, he bequeathed nine rental houses located in Bakersfield, Calif., with a combined value of $936,500. These properties are being converted to cash to establish the L.F. Ivanhoe Endowment.

The real estate was received by the CSMF Property Management Corp., a tax-exempt entity that was established in 1994 to facilitate donations of real property for the mutual benefit of Mines and its donors. Liability issues prevent many nonprofit organizations from accepting potentially sensitive property gifts. The Property Management Corp. provides a vehicle for accepting and liquidating properties that many other organizations would be unable or unwilling to consider.

The Ivanhoe Endowment will support the information-gathering activities of the Hubbert Center and provide financial assistance to international graduate students in the Department of Petroleum Engineering.

CSM Alumni Association

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West

California

President and Mrs. John Trefny took a trip to Southern California in March and met with alumni sections in Los Angeles, San Diego and Bakersfield.

Metro Denver

The annual alumni association meeting was held in February and the new association president, **Art Biddle '61,** was inducted.

Other events in the metro-Denver area include a men's basketball reunion and a women's basketball reunion in January, a wrestling reunion in February, and a mixer at Woody's in Golden, Colo.

2004 CSMAA Executive Committee: from left, John Schwartzberg '88, Kathy Altman '80, Art Biddle '61, Roger Newell '71, Alan Mencin '79.

Men's Wrestling Reunion

Men's Basketball Reunion

Florida Bone Valley phosphate plant tour

East

North Carolina

The Raleigh section met at the North Carolina Museum of Natural Sciences to tour an exhibit of artifacts from the *Titanic.*

Gulf Coast

Florida

The Florida Bone Valley section met for its annual picnic March 28.

Florida Bone Valley picnic

International

Canada

Alumni in Canada met for breakfast at the Cordilleran Roundup in Vancouver in January.

Alumni in Canada met for breakfast.

Class Reunion on Mt. Whitney

by Richard Chinn BSc Met '84, MSc Mat Sci '95

Doug Chinn BSc CPR '79, **Dave Abbott BSc Geop '83, Geop E '99** and I had discussed an assault on California's Mt. Whitney for quite some time and last spring, we got a permit for a one-day attempt in August.

Doug was employed by Sandia National Laboratories and living in California at the time. Dave is a self-employed geophysics consultant and programmer in the Denver area. I work for the U.S. Department of Energy in Albany, Ore. We rendezvoused in Oakland and drove to Lone Pine, Calif., where we had reserved a spot at a campground. John Wayne and other screen legends have been filmed riding horses and shooting outlaws among the boulders between Lone Pine and the Sierra Crest. We slept under the stars and watched Mars move across the Milky Way, unfettered by city lights.

Arising at 3 a.m., we drove to the Whitney Portal trailhead at 8,300 feet to begin our hike some two hours before dawn. The trailhead parking lot was crowded; 200 permits are issued each day. We had headlamps but I turned mine off because I was among several other hikers with headlamps. Big mistake! I stepped too close to the edge of the dark trail and went down after barely half a mile. I gouged my foot and lost some hide on my shin, but after a few biblical words, we continued on with headlamps on full blast.

The well-blazed Mt. Whitney trail is 10.7 miles with more than 6,100 feet of elevation gain. My foot ached, but we had put a lot of time, money and effort into this trip and we weren't going to be denied! I took ibuprofen, applied a bandage and kept going. Doug and Dave were doing just fine. We used the pressure-breathing technique to ward off altitude sickness and we drank water frequently. As the sun rose, the eastern face of the Sierra Nevada changed from black to rust to gray. The boulders scraped off the mountains and into the valleys by Ice Age glaciers made a spectacular landscape.

We passed through two campsites, both equipped with solar-powered septic systems. Mt. Whitney, the most-climbed fourteener in the world, gets 10,000 hikers annually. The sewage treatment problem is formidable and helicopters are used to change the septic tanks. By mid-morning, we arrived at 13,777-foot Trail Crest, a saddle where the ridgeline of the Sierra Nevada intersects the eastern and western trails. The ridgeline is also the county line and the eastern border of Sequoia National Park. We passed scores of people in both directions.

The last 2.5 miles was a narrow, steep path among boulders and hard-packed dirt, but the snow was gone and the route was easy to see. We passed behind the summit of 14,015-foot Mt. Muir. The trail turned west as neighboring Mt. Russell came into view and the slope decreased. In the distance we could see the ramshackle hut built by scientists for the Smithsonian Institution in 1909. Altitude sickness was taking its toll but the summit was within reach!

The three of us spread out but all made it to the 14,497-foot summit shortly after noon. The skies were blue in every direction and the wind was negligible. We saw fourteeners to the north and south, Nevada and the White Mountains to the east and two national parks to the west. At any one time, 20 or so people stood on the summit – marked by six brass benchmarks and a plaque – all proud of their accomplishment. We took pictures and forced ourselves to eat. We were hungry and thirsty from the exertion, but at the same time nauseated by the altitude.

We had made the summit, but our hike was only half done. On the way down, we stayed together and maintained a good pace. We encouraged several other hikers who were on their way up.

When we arrived back at the car, it was nearly 7 p.m. Sore, tired and hungry we drove north to Bishop for supper and a hotel. I removed my boots to discover my badly swollen right foot had a palm-sized bruise. Doug and Dave were in good shape other than a few minor blisters. A shower and a bed never felt so good.

We had a very satisfying breakfast at Erick Schat's Bakkerÿ in Bishop. We admired the salt towers at Mono Lake briefly. The lakes in the Owens Valley have been greatly affected by the development in faraway Los Angeles. We drove back to the Oakland airport while listening to The Who and Pink Floyd CDs, in a throwback to our formative years, sort of.

We parted company at the airport and returned home satisfied with our all-Mines get-together at the highest point in the country outside of Alaska. We are already talking about doing it again on another state summit in 2004.

In memoriam

William "Bill" Allen Jr. Geol E '47 of Camano Island, Wash., died Aug. 3 after a year-long battle with brain cancer. He was 79. Allen was a geological engineer involved with copper mining exploration in Arizona and California. He trained in oceanography at Scripps Institute in San Diego and worked at the Boeing Company for many years in marine systems with hydrofoils. He also served for many years in the Washington State Guard. Allen remained active until the last two months of his life. He was a volunteer beach watcher in Island County, drove in the Island County sheriff's citizen patrol and enjoyed boating and building his family cabin on Shaw Island. He also built an HO gauge model train. Allen was predeceased by his first wife, Katherine. He is survived by his widow, Pamela Cooper, three daughters, four stepchildren, a granddaughter and six step-grandchildren.

Henry A. Babcock, who taught engineering at Mines for 36 years, died at home in Monterrey, Va., on Oct. 23. He was born in Illinois and moved to Colorado in 1932. Babcock enrolled at Mines in 1936 intending to major in civil engineering. But he transferred to University of Colorado where he earned his B.S., M.S. and Ph.D. degrees. Such was his love for Mines that he always regretted he had not earned his degrees at the School. It was a satisfying moment when the class of 1953 voted him an honorary member. He was a Mines Medalist in 1982 and an honorary alumnus. Babcock's teaching career began at CU in the 1930s when he became a lab assistant. After graduation, he joined the U.S. Bureau of Reclamation and later worked for American Smelting and Refining Company. In 1939 Babcock married Margaret Ann Taylor. In 1944 he enlisted in the U.S. Navy, advancing to petty officer as a radio technician. He was recognized as a world authority on the pipeline transportation of solids. In 1946 he began teaching at Mines and in 1970, became head of the basic engineering department. During his tenure, the department began granting degrees in civil, mechanical and electrical engineering, which he considered one of his major career achievements. Babcock retired in 1982. He loved his surveying classes in the summer, he loved teaching, but above all he loved Mines.

John S. Bradley Geol E '47 died Nov. 16 at the age of 80. In addition to his Mines degree, Bradley earned a Ph.D. in geology from University of Washington in 1953. During his career, he worked for Humble Oil Company, University of Texas at Marine Institute, Atlantic Refining Company and, finally, Amoco Production Company. He retired in 1992. Bradley is survived by his widow, Janet, three children and two grandchildren.

Bruce C. Clark Met E '48 died at home in Catalina, Ariz., Nov. 26 after a valiant fight with lung cancer. He was 76. His ashes were scattered and a balloon was released over the Catalina Mountains near his home. Clark was born in Abilene, Texas, and raised in Fort Worth. While at Mines, Clark was a member of Sigma Phi Epsilon. After graduation, Clark served as a second lieutenant in the U.S. Army Corps of Engineers, serving in Japan for almost a year. He then worked for U.S. Smelting, American Zinc, and then spent 25 years with St. Joe Lead Company (now Doe Run). He retired in 1985 and moved to Arizona. Clark was a scoutmaster for Boy Scout Troop 411, adviser for the DeMolay chapter, past-president and member of the Kiwanis Club and member of the Full Gospel Business Men's Fellowship. He also sang in church choirs and choral groups and was a member of Copper Mountain Assembly of God. He is survived by his widow, Vonda, two daughters, two sons and three grandchildren.

Joseph R. Gilbert Met E '42 died July 14. He was 83. Gilbert was a retired metallurgist who was very active in Alumni Association activities.

Charles P. Gough Met E '48 of El Sobrante, Calif., died Oct. 29, a few days shy of his 85th birthday. Gough was a metallurgist for American Smelting and Bunker Hill. During World War II, he was a captain in the Air Force serving as a bombardier. He flew 50 missions in Africa and once had to bail out. After retiring from metallurgy, Gough successfully sold real estate. In his spare time, he was active in the Church of the Nazarene, loved to golf and fish and, according to his wife of nearly 50 years, Bonnie, "He was a wonderful husband and father." Gough is survived by his widow, two daughters and a son.

Jack V. Hill Met E '44 died July 10 at age 82. Hill was born in Utah and raised in Oregon. After graduation from Mines, he married Patricia Batcheller in 1944. They had two sons. Patricia died in 1975. Hill remarried in 1982 and after eight years of RV travel, split his time between Tucson and Lakeside, Ariz. He enjoyed singing with the barbershop chorus, church activities, bridge clubs and especially fishing. He is survived by his wife of 28 years, Maria, five children, four grandchildren and four great-grandchildren. Hill's father, Frank C. Hill, was also a Mines graduate, class of 1904.

William H. Kohler EM '41 of Grand Junction, Colo., died Jan. 11 from pneumonia resulting from complications of Parkinson's. He was 85. Born in Buffalo, N.Y., Kohler moved with his family to Craig, Colo., as a small child. He was valedictorian of his high school and earned a scholarship to Mines. While working as an engineer of mining, Kohler lived in various places including Butte, Mont.; Bishop, Calif.; Uravan, Rifle and Grand Junction, Colo.; and Winnemucca and Reno, Nev. He also lived in Stamford, Conn., while working in New York City. In his long tenure of exploration work for Union Carbide, he traveled the world from Canada to South America and Africa. Kohler was a long-time member of CSMAA and his interests included crossword puzzles, music, geology, reading, carpentry, gardening and solving complex math problems. His wife of 51 years, Marian, two sons, a daughter and four grandchildren survive him.

Robert C. McCain Geol E '49, 78, died Jan. 14 of lung cancer. Bob and I roomed in a Lakewood boarding house when we started Mines in January 1946, right after World War II. We both wrestled for Mines. After graduation, McCain became a field geologist in Wyoming for Frontier Oil. There he met Rahlys Hitt, whom he married in 1955. From Wyoming, the McCains and their daughter went to Brazil for four years where Bob worked for Petrobas. After they returned to the States, they had a second daughter, but geological jobs were hard to find so Bob went to Denver University Law School and earned his degree in 1970. He practiced law in Lakewood until he died. He was a "Matlock"-type lawyer who did good things for people in many different circumstances, sometimes getting paid in land and livestock. McCain loved to hunt and fish. After he reached 70, he wanted to go skiing. "You know, I can ski free now," he said, always frugal. So I invited him to Keystone and he showed up in work overalls with a pair of ancient skis and we went to the top of the lift. As soon as we got off, I knew we were in trouble. Bob hadn't skied for years. We worked our way down and after many falls, finally reached the bottom. We did have a lot of fun, but one run was enough for Bob. I understand he was stiff as a pine tree for the next week or so. McCain is survived by his widow, two daughters, four grandchildren and a brother.

By Hugh W. Evans EM '49

Roland Eugene Morrison EM '41, 88, of Mililani, Hawaii, a retired civil service intelligence analyst, died in Hale Ho Aloha Nursing Home Dec. 30. The native of Golden, Colo., is survived by wife, Chizuko, of Mililani; sons Patrick of Santa Fe, N.M., Andrew and Alexis of Kaneohe, Hawaii; daughter Anita DeMello of Mililani; brother Kenneth of Rawlins, Wyo.; sisters Mary Ellen Johnston of Lafayette, Colo., and Mary Anne Arnold of Boulder, Colo.; and four grandchildren.

Paul M. Musgrove Jr. Met E '51 died Dec. 9 in Arizona. He was 75. During his career he worked for Inspiration Consolidated Copper Co., Heckla Mining Company, Noranda Mine and, finally, Kocide Mining Company, where he was general manager. Musgrove was a World War II veteran and was a past-president and member of the YMCA, Cobre Valle Country Club, A.I.M.E., Society for Metallurgical Engineers, Globe Lions Club and Y's Men's Club. He attended his 50th Mines reunion in 2001. He was also the recipient of A.I.M.E.'s fist annual Arthur F. Taggart award for his paper, "On-line analysis for grinding circuit control." Musgrove is survived by his widow, Jane, a son, a daughter, a sister and a grandson.

John R. Rayno Met E '62 died July 21 at his home in Southbury, Conn. He was 68. Rayno was employed at Ambel Precision Manufacturing. "I never had a true awareness of how well known and successful he was until we attended a convention together," said his wife, Joyce. "He was constantly getting calls from other companies trying to hire him. He was respected for being a man of principle who treated everyone the same whether it was the president of the company or the maintenance crew." Rayno enjoyed the outdoors and did sketches of landscapes. He was a woodworker who made birdhouses for family members and friends and cradles for his grandchildren. He worked with stone and was a gardener, creating a stone goldfish pond surrounded by gardens. He and his wife also raised mallards and pheasants. Rayno enjoyed teaching his grandchildren about nature and was active with the Boy Scouts. He also volunteered at the Connecticut Storytelling Festival annually. Rayno is survived by his widow, two sons, two daughters and seven grandchildren.

Harrison E. Stommel Geol E '41, DSc Geop '51 died Dec. 9 after a brief illness. He was 84. Born in Iowa, Stommel was raised in Golden, Colo. After graduation from Mines in 1941, he worked as a rodman, helper, observer, surveyor, computer expert and geophysicist, collectively referred to as a "doodlebugger," on magnetic, gravity and seismic crews for Magnolia Petroleum Co. While earning his doctorate, he worked as a geophysicist during summers. He joined Chevron-Calco after graduation and spent his first three years as a seismologist working on an

offshore seismic crew. Three years later he became manager of operations for Chevron-Geophysical. In 1956 he was made vice president and manager of operations for Chevron and remained in that position until 1963 when he became chief geophysicist in the exploration department of Western Operations. He later became assistant to the vice president and general manager. In 1969 he was named president of Chevron Geosciences, retiring in 1984. Stommel was active in industry and civic affairs and held membership in the American Association of Petroleum Geologists and the Society of Exploration Geophysicists. His hobbies included fishing, reading, investing, smoking his pipe, inventing household gadgets and fixing everything around the house himself. Stommel is survived by his wife of 59 years, Margaret, two daughters, two sons, 10 grandchildren and two great-grandchildren.

Harold "Hal" W. Stouffer EM '51 died Nov. 8 in Jeffersonville, Ind. He was 77. Stouffer was a projects manager for Essroc Cement Company, retiring after 30 years. A veteran of the U.S. Army, he served in World War II with the 10th Mountain Division. He received the Infantryman's Badge and Bronze Star while serving in Italy. He was also a veteran of the Korean Conflict, where he served as a first lieutenant with the 430th Engineers. He was a member of Spartans Lodge No. 70 of Freemasons in Spartanburg, S.C. While at Mines, Stouffer was a member of Sigma Phi Epsilon. He is survived by his wife of 52 years, Margaret, a son, three daughters and five grandchildren.

Louis D. Turner Met E '41 died Jan. 8 in Kennewick, Wash., a few weeks shy of his 90th birthday. He was born in Denver and graduated from South Denver High School. While at Mines, he lettered in tennis. After graduation, he married Edith Craig and they moved to Bridgeport, Conn., where he was a metallurgical engineer with Remington Arms Plant. Turner was then transferred to Lakewood, Colo. His next move was to University of Chicago where he was engaged in criticality measurements. From there he moved to Oak Ridge, Tenn., where he was a metallurgist. In 1944, Turner moved to Richland, Wash., to work at the Hanford plant. He also worked for Dupont, General Electric, Batelle Northwest and Westinghouse Hanford before retiring in 1977. Turner was a member of two bowling leagues and was an avid golfer. He was a past president of the Columbia River Basin Chapter of the American Society for Metals and a member of CSMAA, Kiwanis Club and Salvation Army Advisory Board. His wife passed away in 2000. He is survived by two daughters and a son. Turner's family members included a number of Mines graduates: father-in-law Allen Craig '14, brothers-in-law Clyde Penney '36, '40 and Donald Craig '48, nephew Bruce Craig '70,'75, '80 and niece DeAnn Craig, '73, '80, '02.

Filmore E. Van Voris Met E '39 died peacefully at his home in Austin, Texas, Dec. 8, at age 86. Van Voris was born and raised in New York. While a student at CSM, he was a member of the Rocky Mountain Swimming Conference championship team of 1937-38 and a member of Kappa Sigma National Fraternity. After graduation, he attended graduate school at MIT and earned a master of business administration from State University of New York at Buffalo in 1972. He worked for the Bethlehem Steel Company in Bethlehem and Johnstown, Pa., for 18 years, Union Carbide Corporation in Cleveland, Ohio, and Niagara Falls, N.Y., for 13 years and finished his engineering career in management with St. Joe Minerals Corporation and Gulf and Western Industries. Van Voris completed his professional career as executive director of the Center for Management Development at State University of New York at Buffalo School of Management from 1978 to 1984. Van Voris was an avid golfer, having been a member of Pine Valley Golf Club in Pine Valley, N.J., for over 20 years, and was an accomplished bridge player. He was a voracious reader and possessed a wealth of knowledge that transcended countless subjects. He was preceded in death by his wife, Jean, and his youngest son. His wife Thyrza Van Voris, whom he married in 1997, two sons, five grandchildren and numerous stepchildren and step-grandchildren survive him. Van Voris was a devoted husband, father and grandfather and he graced all members of his family with welcome guidance and loving care.

Also in Memoriam

William Allen Jr. Geol E '47	Aug. 8, 2003	Howard E. Itten Geol E '41	Sept. 1, 2003
Norman L. Amend PE '40	Oct. 16, 2003	Jesse O. Johnson Geol E '41	Unknown
John P. Dempsey Met E '49	April 27, 2003	Raymond M. Loeb Jr. PE '51	Nov. 3, 2003
Gerald A. Gieseker BSc Met '72	August 2003	George P. Sopp EM '35	February 2003
Edward J. Hammer EM '53	Oct. 5, 2003	Stanley A. Wickstrom PE '38	June 2003
Charles B. Hart EM '73	2003		

1939
Harold C. Templeton Met E is retired in Englewood, Fla.

1948
Roy F. Carlson PE is retired in Big Sandy, Texas.

M. Eugene Warren Met E is retired in Seymour, Conn.

1950
William L. Payne Jr. PRE is retired in Aurora, Colo.

1952
James H. Bright Geol E owns Jenzabar LLC in Reno, Nev.

Robert H. Chaisson EM is retired in Newton Upper Falls, Mass.

John C. Dingman Jr. PRE is president of Dingman Enterprises Inc., in Houston.

Joseph H. Kurz Geol E is a consultant for Ozuna, Briones, Cueva Consulting Engineers Ltd., in San Antonio, Texas.

1954
Frederick H. Campbell Met E is retired in Tucson, Ariz.

1956
Nathan M. Avery PE is president of Galveston-Houston Co., in Houston.

William G. Fischer EM is retired in Green River, Wyo.

1957
Charles A. Daugherty Met E is president of C. A. Daugherty Co., in Marina Del Rey, Calif.

Robert N. Johnson Met E is retired in Lakewood, Colo.

Gordon P. Taylor EM is retired in Chico, Calif.

J. Ed VanDell EM is retired in Yarmouth Port, Mass.

1958
Stanley G. Young Met E is retired in Titusville, Fla.

1959
Lary G. Cahill Met E is retired in Tucson, Ariz.

Mahmoud S. El-Khatib PRE is retired and lives in Lebanon and Phoenix, Ariz.

Larry R. Faulkner Geol E is director of marketing for High Country Engineering Inc., in Englewood, Colo.

1960
Ronald L. Bredehoft PRE is retired in Upland, Calif.

Artemas L. Holmes Jr. Geol E is retired in Lakeland, Fla.

Larry L. McCune EM is a principal engineer for the State of California in San Rafael.

Kent D. Pothast EM is retired in Lake Oswego, Ore.

1961
Carlton E. Gerity EM is principal of Pioneer Engineering in Littleton, Colo.

Robert A. Prescott Met E is retired in Moab, Utah.

1962


Don Wakefield Met E lives in Paradise, Calif., with his dog, Bo Diddley.

Robert B. Vickery PE is retired in Highlands Ranch, Colo.

1963
Gene H. Adams PRE is retired in Lubbock, Texas.

Ronald W. Clifton Geol E is retired in Peoria, Ariz.

Julian V. Copenhaver Jr. Met E is retired in Hendersonville, N.C.

Richard J. Evans Met E is quality systems manager for Carpenter Special Products Corp., in El Cajon, Calif.

1964
Terry L. Campbell EM is district director for southwest Missouri for U.S. Senator Jim Talent.

Weston K. Mauz PE is retired in Silt, Colo.

Barrett E. G. Sleeman EM is retired in Point Roberts, Wash.

Robert H. Writz Jr. Geop E is CEO of RHW Associates Inc., in Denver.

1965
Allen C. Randle PRE is president of Molycorp Inc., in Henderson, Nev.

1966
Khalil Odouli MSc Geol is geoscience manager for Tehran Energy in Tehran, Iran.

1967
Kandiah Balachandran DSc Geop is president of B&M Geophysical Research Co. Inc., in Portage, Mich.

Gary E. Butts Met E is retired in Arvada, Colo.

1967
Richard C. Clark Chem E is technical director of the Homan Corp., in Chicago.

James D. Covey Math E is retired in Houston.

Larry K. Elliott Met E owns River Properties in Anderson, Calif.

J. Michael Lacey PE, MSc Pet '69 is retired in Denver.

Robert D. Morris EM is a pilot for Continental Airlines in Edmonds, Wash.

Loren L. Pritzel PRE is a senior engineer for Giant Refining Co., in Gallup, N.M.

1968
Richard P. Crist Geop E is executive vice president and chief operating officer for Elk Petroleum Inc., in The Woodlands, Texas.

Daryl K. King EM is a partner for Diamond K. Development in Cape Girardeau, Mo.

David R. Peterson PRE, MSc Min Ec '82 is retired in Tucson, Ariz.

David J. Starbuck EM is a senior mechanical engineer for the Newmont Mining Corp., in Carlin, Nev.

Richard A. Weaver PE, MSc Pet '71 is retired in Newport Beach, Calif.

Carl O. Windels Geop E is a consultant specializing in mining geophysics in Arvada, Colo.

John R. Wise PRE is a product manager for Solomon Associates in Plano, Texas.

1969
Michael K. Dreher Met E is section head for Kaiser Aluminum & Chemical Corp., in Spokane, Wash.

on the move

Howard M. Gollnick Geop E was principal engineer for HGOLL, Inc., which closed Dec. 31, 2003. He now works out of his home in Sarasota, Fla.

C. Robert Grigg Geop E is president of Solus Resources Ltd., in Calgary, Alberta, Canada.

Thomas E. Martin Met E is a license implementation coordinator for Tacoma Public Utilities in Washington.

David L. Wacker PE is retired in Katy, Texas.

John D. Wright PE, PhD Pet '85, president and chief engineer at Questa Engineering Corp in Golden, Colo., announces that his Co., is merging with Norwest Corp. of Calgary, Alberta, Canada, to create one of the world's most fully integrated energy consulting firms.

1970

Thomas D. Likes BSc Phy is a field engineer for Everest Enterprises in Lamar, Colo.

George C. Strother BSc Pet is retired in Wasilla, Alaska.

Lee A. Turner Phy E is vice president of quality, health, safety and environment for Yukos Exploration and Production Division in Moscow, Russia.

1971

James H. Cowing BSc Geop is a consultant for Petrogulf Corp., in Denver.

Dennis E. Fagerstone BSc Pet is retired in Colleyville, Texas.

John Pfuetze BSc CPR is a senior member at Kinotakara in Centennial, Colo.

Steven D. Steffens BSc Min, MSc Env Sc '95 is president and owner of Steffens and Associates Inc., in Golden, Colo.

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

Daniel R. Walton EM is vice president and partner for Hill & Associates Inc., in Annapolis, Md.

1972

Nelson D. King BSc Met is chief process engineer for Pincock, Allen & Holt Inc., in Lakewood, Colo.

David L. Scott BSc Min is senior vice president of TIC-The Industrial Co., in Steamboat Springs, Colo.

1973

Richard K. Glanzman MSc Geochem is principal geochemist at CH2M Hill Inc., in Englewood, Colo.

1974

Richard D. Dunham BSc CPR is president of The Ashingdon Ltd. Co., in Midland, Texas.

Lewis B. Gray BSc Geol, BSc Min '76 is technical manager of Powder River mines for the Kennecott Energy Co., in Gillette, Wyo.

Gregg M. Moser BSc CPR is technical director for Randall & Dewey in Houston.

David J. Ponikvar BSc CPR is staff safety specialist for Kerr-McGee Oil & Gas in Houston.

1975

Thomas L. Breninger BSc CPR is plant manager for Marathon Oil Co., in Artesia, N.M.

Kenneth A. Larsen BSc Pet is a drilling manager for BG Trinidad & Tobago Ltd., in Westmoorings, Trinidad and Tobago.

James V. Taranik PhD Geol is director of the Mackay School of Earth Sciences and Engineering at University of Nevada in Reno.

Anthony J. Weber BSc Geop is president of Geophysical Data Analysis Inc., in Carencro, La.

1976

Kadri Dagdelen BSc Min, MSc Min '80, PhD Min '85 is a mining engineering professor at CSM.

Robert W. Handford BSc Min is plant manager for Dyno Nobel in Battle Mountain, Nev.

Rene R. St. Pierre BSc Pet is a senior drilling engineer for Hunt Oil Co., in Dallas.

1977

David W. Ashcom MSc Min is manager of field operations for Coastal Environmental Systems in Newcastle, Wash.

Mark J. Brown BSc BE is an engineering manager for Wolverine Tube Inc., in Decatur, Ala.

Michael K. Decker BSc Geol is president and owner of Black Diamond Energy LLC., in Castle Rock, Colo.

David E. Germer BSc Geol is vice president of JL Properties Inc., in Anchorage, Alaska.

John D. Lorimer BSc Geop is president of Lorimer Network Research Inc., in Ouray, Colo.

Michael E. Ward BSc Pet is a petroleum engineer for ConocoPhillips in Price, Utah.

Stephen C. Weston BSc Geol is a project manager for Weston Remodeling in Parker, Colo.

1978

Gary W. Baughman BSc Met is director of hazardous materials and waste management for the Colorado Department of Public Health & Environment in Denver.

Mark A. Jackson BSc Met is director of engineering for the National Nuclear Security Administration in Albuquerque, N.M.

1979

Richard G. Boyce BSc Geop owns DB, LLC in Dallas.

Robert W. Cramer BSc Met is an operations engineer for the Trane Corp., in Pueblo, Colo

Richard E. Fraley BSc Geol is vice president of operations for the San Juan division of Burlington Resources Inc., in Farmington, N.M.

David H. Holstein BSc Pet is a judge for Henderson County, Texas.

Dennis A. Pieters BSc Geol, MSc Pet '92, PhD Pet E '03 is senior technical reservoir adviser for Weatherford in Houston.

Michael E. Shade BSc Geol is a global account manager for Shell working for Halliburton Energy Services in Rijswijk, Netherlands.

Pete J. Weader BSc Chem is senior financial consultant for EI Dupont de Nemours in Wilmington, Del.

1980

David W. Baker PhD Min Ec is vice president of Hughes Electronics Corp., in Weston, Fla.

David A. Bouvier BSc CPR is a software project manager for EFI in San Carlos, Calif.

Jeffrey R. Corwith BSc Pet is a staff reservoir engineer for Conoco Phillips Alaska Inc., in Anchorage.

John C. Erven BSc Min is a plant engineer for Schauenburg Flexadux Corp., in Palisade, Colo.

Phyllis Fett Halvorson BSc Geop is consulting geophysicist for L and R Instruments Inc., in Incline Village, Nev.

James V. Mahoney BSc CPR is construction general manager for the Nations Energy Co., in Rapid City, S.D.

Robert A. Mees BSc Pet is a consulting engineer for Darita Enterprises Inc., in Cody, Wyo.

Jean-Jacques Newey BSc Geop is a petroleum engineering consultant in Boulder, Colo.

Diane P. Shellenbaum BSc Geop is president of Spurr Geophysical in Anchorage, Alaska.

Steven D. Smith BSc CPR is western manager of refining strategy for ConocoPhillips in Houston.

Steven J. Smith BSc Math is information systems chief architect for Raytheon in Aurora, Colo.

Danny M. Stone BSc Pet P.E. is a wellsite leader for BP in Houston.

Torrin S. Warrender BSc Phy is an engineer for Optimum Systems International Inc., in Lakewood, Colo.

1981

Bret G. Gunneson BSc Geop is a senior geophysicist for the Cimarex Energy Co., in Denver.

Stephen A. Johnson PhD Geol is technical manager for BrightFields Inc., in New Castle, Del.

Frank J. Marrone BSc Geop, MSc Min Ec '87 is a loan officer for NorthStar Lending in Houston.

Scott W. Shaw BSc Geop is a consulting technical manager for BEA Systems Inc., in Middle Park, Victoria, Australia.

Richard P. Smith BSc Geop, Geop E '86 is a project manager for Qwest Communications in Elizabeth, Colo.

Steve Sonnenberg PhD Geol is exploitation manager for the northern division at Westport Resources Corp., in Denver.

Eric J. Tuppan MSc Geol is president of Tuppan Consultants LLC, providing geology and environmental services in Lake Oswego, Ore.

1982

Lynn Boone Henry BSc CPR is a reservoir engineering manager for Bill Barrett Corp., in Sedalia, Colo.

Timothy J. Inks BSc Pet is a senior reservoir engineer for the Patina Oil and Gas Co., in Denver.

Gregory E. Lanham BSc Met is a metallurgist for Autoliv ASP in Ogden, Utah.

Jeffrey W. Rhodes BSc CPR is vice president of acquisitions for Meritage Energy Partners LLC in Denver.

Barbara Ringhofer BSc CPR and her husband John Crooks are the proud parents of twin boys, Dylan Charles and Brandon Grant, born Nov. 28.

Jon G. Walker BSc Geop is a project manager for Seismic City Inc., in Houston.

1983

Ramon T. Davila MSc Min Ec is a consultant in Durango, Mexico.

Brent K. Evans BSc CPR, MSc CPR '86, MSc Env Sc '91 is senior principal engineer for Los Alamos Technical Associates Inc., in Aurora, Colo.

Tanya L. Inks BSc Geop, MSc Geop '87 is president and chief executive officer for IS Interpretation Services Inc., in Denver.

Mark E. Kuchta BSc Min, MSc Min '86 is an associate professor in mining engineering at CSM.

William S. Schneider BSc Pet is managing director for BMO Nesbitt Burns Corp., in Houston.

John J. Smith BSc Geop is lieutenant colonel and commander of the 439th ENBN of the U.S. Army in Baghdad, Iraq.

Diana L. Visser BSc Pet is a principal engineer for Tetra Tech EM Inc., in San Diego.

David L. Wayman BSc Pet is chief operating officer for Pepperdine's Marking Products LTD in Denver.

Thomas P. Young BSc Min, MSc Env Sc '93 is a project manager for Tetra Tech FWI in Lakewood, Colo.

1984

Darren L. Brown BSc Geol married Swee Luan Joyce Teo July 26 at the Foothills Bible Church in Littleton, Colo.

William H. Dears BSc Min is manager for Patten Industries in Elmhurst, Ill.

Daniel R. Dexter BSc Pet is account executive of the Canadian region for Computer Modeling Group Ltd., in Calgary, Alberta, Canada.

Julie A. Dodd BSc CPR is lead payload analyst for the Lockheed Martin Corp., in Denver.

Brian D. Flinn BSc Met, MSc Met '86 is a professor at University of Washington in Seattle.

Gary D. Harris BSc Geop is a geophysicist for BP Trinidad & Tobago LLC in Port of Spain, Trinidad.

Brian R. Love BSc Eng is an assistant capital improvement program manager for Arapahoe County, Colo.

Bruce L. Niemeyer BSc Pet is Kern River area manager for ChevronTexaco in Bakersfield, Calif.

Paul R. Onsager BS Pet, M Eng Pet '97, vice president and senior reservoir engineer at Questa Engineering Corp., announces that Questa is merging with Norwest Corp. of Calgary, Alberta, Canada.

Andrew F. Rosenfeld BSc CPR is senior chemical and refining analyst for the Prudential Equity Group in Menlo Park, Calif.

Gregory Norman Smallwood BSc Min is section manager for Contech Control Services in La Porte, Texas.

Robert M. Sterner BSc Min is an applications engineer for Alabama Cad and Cam in Birmingham.

Brenda J. Wolfe BSc CPR is a product support engineer for Metso Minerals Inc., in Colorado Springs, Colo.

Paul H. Wolfe BSc Pet is environmental auditor for utilities of the City of Colorado Springs, Colo.

1985

Daniel G. Anderson BSc Pet is engineering manager for the Berry Petroleum Co., in Denver.

James A. Bollinger BSc Math is a network and systems engineer for Washington and Lee University in

on the move

Lexington, Va.

Joseph G. Ceurvorst BSc CPR, MSc CPR '87 is a consultant for Ceurvorst Consulting LLC in Golden, Colo.

John W. Flanigan BSc CPR, MSc CPR '87 is a process engineering supervisor for BSAF Agricultural Chemicals in Hannibal, Mo.

Richard E. Gaber Jr. BSc Geol, MSc Geol '92 is a geologist for Patina Oil and Gas in Littleton, Colo.

Glen M. Gallo BSc Met is a senior materials engineer for Project Task Force, Houston, for Shell Global Solutions Inc.

Michael G. Hill BSc Geop is president and chief operating officer for XAware Inc., in Colorado Springs, Colo.

James V. Ierubino M Eng Pet is regional planning adviser for ExxonMobil Production Co., in Houston.

Kirk L. Ketcherside BSc Geop is involved with natural gas trading for the BP Energy Co., in Houston.

Martin K. Lange BSc Geop is product manager of interpretation and visualization systems for Jason Geosystems in Houston.

Linda S. Tully BSc Geop is a software engineer for Northrop Grumman Information Technology in Colorado Springs, Colo.

Colleen R. Wilkinson BSc Geop is a nutrition consultant for Juice Plus+ in Golden, Colo.

1986

Richard A. Alexander BSc Met is a Fab11X process engineer for the Intel Corp., in Rio Rancho, N.M.

Gregory S. Floerke BSc Pet is a senior vice president for Mastec North America in Tulsa, Okla.

Mark G. Kittridge Geol E, BSc Geol is senior staff petrophysical engineer for Shell International Exploration and Production in Houston.

John M. Speidel BSc Pet, BSc Eng '87 is a project engineer for Quad Knopf Inc., in Visalia, Calif.

Scott A. Stephens BSc Geop is lead information technologies engineer for IBM Global Service in Denver.

Michael T. Tapia MSc Min Ec is a senior staff project engineer for the Lockheed Martin Corp., and lives in Longmont, Colo.

Robert N. Wagner BSc Pet is vice president of the reserve group for Quicksilver Resources Inc., in Fort Worth, Texas.

Charles G. Weakly BSc Geol is chief geologist of exploration for Barrick Goldstrike Mines Inc., in Elko, Nev.

Daniel S. Wilkinson BSc Geop is president of Wilkinson Research Inc., in Golden, Colo.

Charles P. Willis BSc Pet is president and general manager for Black Warrior Methane Corp., in Brookwood, Ala.

1987

Scott B. Daves BSc Pet is a district engineer for Samson Resources Inc., in Parker, Colo.

Laurie M. Flanigan BSc CPR is a contractor for Unicco in Hannibal, Mo.

Jeffrey W. Harwell MSc Geop is manager of seismic data processing for the Geophysical Development Corp., in Houston.

Chip Hodge BSc Geop is a senior geophysicist for Hunt Oil Co., in Dallas.

Samuel W. Newman BSc Eng is an airbus captain for Frontier Airlines in Denver.

Michael L. Richards BSc Eng is a senior systems engineer for Spectrum Astro Inc., in Gilbert, Ariz.

William A. Sawyer Jr. BSc Eng is an industry analyst for ExxonMobil Refining & Supply Co., in Ashburn, Va.

1988

Shelly R. Ceurvorst BSc Met, MSc Met & Mat Eng '99 is a consultant for Ceurvorst Consulting LLC in Golden, Colo.

Tama L. Funk BSc Eng is a mechanical engineer for Washington Group International Inc., in Denver.

John E. Larson PhD Geol is manager of operations of Latin America for BHP Billiton Ltd. in Santiago, Chile.

J. Scott Sammons BSc Eng is a regional manager for Scott-Kleinfelder Inc., in Colorado Springs, Colo.

William L. Wingle BSc Geol, M Eng Geol '91, PhD Geol E '97 is a senior software engineer for CorAccess Systems in Golden, Colo.

1989

Douglas G. Barr BSc Eng is a senior engineer and project manager for Short Elliott Hendrickson Inc. (SEH) in Denver.

Jody Helbling BSc Pet is drilling manager for Energy Drilling Co., in Nachez, Miss.

Trent R. Henderson BSc CPR is department manager for site evaluation and remediation for ARCADIS in Fullerton, Calif.

Tom R. Hergert BSc Met is a facility manager for Kaiser-Hill Co., LLC in Golden, Colo.

John J. Lenhart BSc Eng, MSc Env Sc '93, PhD Env Sc '97 is an assistant professor at Ohio State University in Columbus.

Paul E. Pastore BSc Eng is a senior project analyst for Qwest in Littleton, Colo. He also received an MBA from Regis University in 2003.

1990

Scott B. Berk BSc Min recently bought a warehouse in Paris, Maine, and is starting his own business.

Aldo Cataldi MSc Geop is president of TRX Consulting in Caracas, Venezuela.

Vincent J. Hamilton MSc Geol is director of Tethys Oil in Chancy, Switzerland.

Grant W. King BSc Eng is a professor in the Spokane Research Lab at Gonzaga University in Spokane, Wash.

Michelle E. Stanton BSc CPR is a reliability process engineer for Suncor in Arvada, Colo.

Richard A. Winters MSc Min Ec is vice president of RMB Resources (Cayman) Limited in Lakewood, Colo.

1991

Keith E. Cusack BSc Eng is a financial adviser for Raymond James Financial in Golden, Colo.

Brad Davis BSc Pet is a petroleum engineer for Questa Engineering Corp., in Golden, Colo.

Mikyong Hand BSc Pet, MSc Engr Sys '97 received her doctorate in medicine from University of Colorado Health Sciences Center.

Monroe B. Savage Jr. Geop E is retired in Vicksburg, Miss.

John Wendelburg BSc Eng is a project engineer for Ames Construction in Central City, Colo.

Kathryn A. Wickam BSc Eng is an engineering specialist for the Texas Department of Transportation in Lubbock.

Ahmed A. Zugail PhD Min Ec is assistant to the director general at Yanbu Cement Co., in Jeddah, Saudi Arabia.

1992

Mark S. Morgan BSc Eng is vice president of engineering for People's Electric Cooperative in Ada, Okla.

Steven Needler MSc Env Sc is a reliability engineer for Honeywell Inc., in Colorado Springs, Colo.

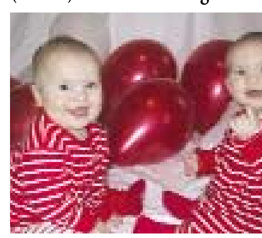
Paulo R. Pereira MSc Min is an independent consultant in Littleton, Colo.

Jefferson A. Potts BSc Eng is a project engineer for the town of Parker, Colo.

Antony D. Sumner BSc Min is a plant manager for the Celite Corp., in Fallon, Nev.

Natalie C. T. Van Tyne MSc Env Sc is senior project engineer for Shaw Environmental Inc., and is also an adjunct professor at CSM.

Timothy R. BSc CPR and **Angie (Iacino) Yearous BSc Eng '91**



welcomed twins Chloe and Nathan on July 18. Tim is plant manager for EOTT Energy Liquids, L.P., in La Porte, Texas.

1993

Bryan M. Christjansen BSc CPR is technical manager for the Broin Management Group at Sioux River Ethanol LLC in Hudson, S.D.

Chadwin F. Cox BSc Eng is president of Western Energy Consultants Inc., in Brighton, Colo.

Michael D. Robb BSc CPR is a senior category planner for the Clorox Co., in Danville, Calif.

Sinan Sahin BSc Eng is a staff manufacturing engineer for Maxtor Corp., in Longmont, Colo.

Yohan Sumaiku MSc Min Ec, PhD Min Ec '98 is an economics professor at Regis University in Denver.

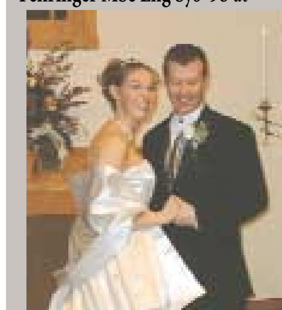
Tracy C. Wait BSc Geol, MSc Geol '01 is an engineering geologist for the Colorado Geological Survey in Denver.

1994

Gary M. Anderson MSc Env Sc is site project manager for the U.S. Army in Pueblo, Colo.

Robin S. Buchan MSc Met is founder and managing director for buchan-enterprises.com in Cambridge, United Kingdom.

Kristina "Tina" M. Daniels BSc CPR married **William "Will" V. Fehringer MSc Eng Sys '98** at



Foothills Wedding Chapel in Golden, Colo., March 21, 2003. They met at CSM in the fall of 1998 when they were both invited to speak to a CSM 101 class about life after Mines.

Carla M. Gustafson BSc CPR is a senior process engineer for Merrick & Co., in Los Alamos, N.M.

Daniel J. Ingelido II BSc Geop, MSc Min Ec '96 is a tanker and energy market consultant for Marsoft in Boston.

Mark Moseley-Williams BSc Min is an expansion project manager for Compania Minera Cerro Bayo in Santiago, Chile.

Fairuz Musa BSc Pet is a reservoir engineer for Petronas Carigali Sdn. Bhd. in Kuala Lumpur, Malaysia.

Michael R. Niznik BSc Pet is a drilling engineer for ExxonMobil in Aberdeen, United Kingdom.

Dean L. Tinsley BSc Eng is reservoir engineering manager for Williams Production Co., in Denver.

Theodore W. Wurfel BSc Eng is president of Corporate Compliance Inc., in Centreville, Va.

1995

Brian L. Haverland BSc Min is mine foreman for the Newmont Mining Corp., in Carlin, Nev.

Robert C. Hyta MSc Env Sc is an attorney for Wells St. John in Spokane, Wash.

Jennifer M. Jesseph BSc Eng owns Benoah Photography in Windsor, Colo.

Francois J.M. Laurans MSc Min Ec is manager of the Industrial Normandy branch for Veolia Water in Rouen, France.

Christopher P. Leone BSc Eng is lab manager for Advanced Coordinate Technology in Westminster, Colo.

Jillaura L. Noble BSc Eng is an electrical engineer for U.S. Filter in Colorado Springs, Colo.

David B. Price MSc Mat Sc is a materials and process engineer for Dynamet Technology Inc., in Burlington, Mass.

Daniel W. Shupp BSc Eng is an engineering manager for Texas Instruments in Dallas.

Brian L. Vialpando BSc CPR works with process metallurgists as a member of the group technical staff for Texas Instruments in Dallas.

1996

Jared A. Black BSc Eng, MSc Met & Mat Eng '99 is a metallurgical engineer for Caterpillar Inc., in Lafayette, Ind.

Douglas P. Collins BSc Eng owns OTB Designs & Engineering LLC, in Fort Collins, Colo.

Darron M. Harris BSc Met is a first lieutenant with the Washington National Guard's 81st Brigade.

Ilya Kats BSc Eng is equipment manager for Motorola Inc., in Austin, Texas.

Jonathan S. Keller BSc Eng is a senior program manager for the U.S. Department of Defense in Tinton Falls, N.J.

Christopher G. Locallo BSc CPR is manager of engineering design for Qwest in Salt Lake City.

Jeanne M. McGraw MSc Mat Sc, PhD Mat Sc '00 is manager of research and development at Infinite Power Solutions in Golden, Colo.

Ja'net L. Ogle BSc Met is a process metallurgist for Rocky Mountain Steel Mills in Pueblo, Colo.

Robin L. Schott BSc CPR is a senior engineer for the Davenport Co., in Torrance, Calif.

Robert D. Scott BSc Phy, BSc Math is in the U.S. Navy and is a student at the Massachusetts Institute of Technology.

1997

Kirk A. Austin BSc CPR is an operations planning engineer for ConocoPhillips in Sweeny, Texas.

Michael T. Barth BSc Eng is an equipment engineer for Atmel Semiconductor in Colorado Springs, Colo.

Susan Evers BSc CPR completed her master's in engineering management from Drexel University in December. She is a quality engineer for ALZA (a Johnson & Johnson Co.,) in Vacaville, Calif., and spent the summer of 2003 helping to start up ALZA's new pharmaceutical plant in Ireland.

Charles L. Farris MSc Math is senior software engineer for Jaleco Entertainment Inc., in Boulder, Colo.

A.Z. Scott Goldberg BSc Pet is an associate in the business

transactions section for Jackson Walker LLP in Dallas. Prior to law school, Goldberg was a petroleum engineer in the oil and gas industry. He earned his law degree from Southern Methodist University Dedman School of Law.

Thomas Q. Roussel BSc Min is a senior analyst for Asian American Coal Inc., in Richmond, Va.

Valarie L. Salaz BSc Geop is a project geophysicist for Western Geco in Calgary, Alberta, Canada.

Derek T. Webb BSc Geol is a construction inspector for Burlstone Inc., in Arvada, Colo.

1998

Jennifer Huber BSc CPR married Scott Eckels Nov. 8 in Colorado Springs. The couple resides in Monument, Colo. Jennifer is an engineer with Colorado Springs Utilities and Scott is a firefighter/paramedic in Castle Rock.

Cristy Emmons Meacham BSc

CPR and husband James announce the birth of their second daughter, Ashley Marie, born Sept. 19 in Framingam, Mass.

Daniel J. Riedel BSc Pet is an operations engineer for Oxy USA Inc, in Liberal, Kan.

S. Thyda Tsai BSc Eng is a digital systems consultant for Agilent Technologies, Inc., in Portland, Ore.

1999

Aaron J. Atherton BSc CPR is a sales engineer for GEA Integrated Cooling Technologies in Lakewood, Colo.

Chad M. Bieber BSc Eng is a captain and pilot in the U.S. Air Force at Vance AFB, Okla.

Michelle Catlett MSc CPR and

Torsten M. Lyon BSc Eng '93, MSc Engr Sys '96 were married in Nederland, Colo., Sept. 6.

Jonathan G. Cook BSc Phy is a salesman for Sears in Littleton, Colo.

Larry A. Covert BSc Eng is a process engineer for Cemex in Malvern, Pa.

Steffanie A. Crabtree BSc Eng is an automation and controls engineer for Mustang Engineering in Houston.

Jessica M. Dixon BSc Chem and

her husband, Bob, announce the birth of their first child, Robert "Esten" Dixon III, born Sept. 7.

Stuart S. Ernst BSc Min is assistant quarry manager for Staker Parson Companies in West Haven, Utah.

Ryan C. Holgate BSc CPR is a control systems engineer for the Anvil Corp., in Bellingham, Wash.

Christopher A. Jarratt BSc Eng received an MBA from Oklahoma City University.

David M. Loring BSc Min, MSc Eng & Tech Mgmt '02 is an engineer for Mine Ventilation Services Inc., in Fresno, Calif.

Philip S. Marsh BSc Geol is an engineer for Cameron-Cole LLC in Boulder, Colo.

Matthew J. Showalter BSc Pet is director of business development for Summit 5 in Littleton, Colo.

Jamie L. BSc Eng and **Jason S. Spears BSc Eng** own and operate 32 Bleu Restaurant in Colorado Springs, Colo.

Robin L. Taylor BSc Phy is a climate change analyst for Science Applications International Corp., in Washington, D.C.

R. Kevin Thompson BSc CPR is an account representative for Baker Petrolite in Downington, Pa.

Nathan A. Wanstrath BSc Min is vice president of drilling for New Point Stone Co., Inc., in Greensburg, Ind. He and his wife, Natalie,

announce the birth of their first daughter, Alyssa Jean, born Oct. 21 in Cincinnati, Ohio.

2000

Francine Amon MSc CPR, PhD CPR '03 is a mechanical engineer in the building and fire research laboratory for the National Institute of Standards & Technology in Gaithersburg, Md.

Jonathan J. Bennett BSc Geop is a defense systems engineer for Lockheed Martin Corp., in Lakewood, Colo.

Jason A. Brucker BSc CPR is a senior project analyst for Qwest Services Corp., in Denver.

Andrea M. Capra BSc Eng is a pharmacy tech at Belmar Pharmacy in Lakewood, Colo.

Hsi-Yuan Shawn Chen BSc Eng is a product manager for ezFit Technology Inc., located in Tainan, Taiwan.

Javi Guajardo was born Sept. 28, 2003 to **Andrea (Trujillo) Guajardo BSc Eng** and her husband, Marcel in

The Woodlands, Texas. The family resides in Tulare, Calif. Marcel works for ChevronTexaco and Andie works for Kraft Foods.

Kristin R. Hallam BSc CPR is a process engineer for the Intel Corp., in Colorado Springs, Colo.

Grant W. Kaster BSc Eng is a design engineer for Obermeyer Hydro Inc., in Wellington, Colo.

Tricia D. Kletke BSc CPR is a pharmaceutical engineer for JM Hyde Consulting Inc., in North Andover, Mass.

Josh Lau BSc Eng and **Sarah Marchwick BSc Eng** were married

Sept. 20, 2003 in Pequot Lakes, Minn. The couple lives in Portland, Ore., where Josh works at Precision Castparts Corp. and Sarah works at Intel.

Jared M. Purdy BSc Eng, MSc Min '03 is a geotechnical engineer for Vector Colorado LLC in Golden, Colo.

Micaela Reddy PhD CPR is an assistant professor of toxicology at Colorado State University in Fort Collins.

Tatum Lee Smith BSc Eng is a project manager for the Kerry Corp., in Golden, Colo.

Katherine E. Thompson BSc CPR is an engineer for Environmental Resource Management in Greenwood Village, Colo.

Edwin W. Walton BSc Eng is a mechanical engineer for the Lockheed Martin Corp., in Denver.

2001

Daniel D. Adams BSc Eng is a reliability engineer for Kennecott Energy in Meeker, Colo.

Laura M. Brubaker BSc Chem married Steven R. Saba June 15 in Denver.

Jordan Alana Cates, daughter of

Misty (Jackson) Cates BSc Eng, was born October 2001. "Being only 2 years old, her abilities of finding ways around the rules have her well on her way to becoming the next Mines student in our family," says her mother.

Ibrahim S. Al-Kharusi BSc Eng is a civil engineer for Royal Court Affairs in Muscat, Sultanate of Oman.

Aaron E. Bufmack BSc Eng is an assistant plant manager for Ash Grove Cement in Nephi, Utah.

Albert J. Colianni III BSc Math & Comp Sci is an information management database specialist for Think Federal Credit Union in Rochester, Minn.

Biljana Djoric BSc Chem Eng is a consultant for MSI in Houston.

Andrew M. Haney BSc Pet is a reservoir engineer and **Jaclyn B. Haney BSc Chem Eng** is a flow assurance specialist for Shell International Exploration and Production in Houston.

Holly D. Hindle BSc Geop is a surveyor for CLC Associates in Salt Lake City.

Nicholas R. Kimball BSc Eng is an applications engineer for Valve and Filter Corp., in Arvada, Colo.

Russel P. Lannin BSc Eng is an engineer review coordinator for Harris County Flood Control District in Houston.

Michael P. Megorden BSc Min, MSc Eng & Tech Mgmt '02 is production engineer for Perenco, S.A.

Botosan O. Omatsola BSc Geol is a geologist for BP in Houston.

Marcela Rosas MSc Min Ec is an associate of North American Gas for Cambridge Energy Research Associates in Cambridge, Mass.

2002

Michelle Anderson BSc Met & Mat Eng married Rafael Rodriguez Dec. 27 in El Paso, Texas. Michelle is a pipeline engineer for the El Paso Company.

Kathryn E. Greenarch Brown BSc Phy, MSc Eng & Tech Mgmt '03 is a project leader at the National Renewable Energy Laboratory in Golden, Colo.

Charles B. Burris BSc Chem Eng is a drilling services engineer

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- Publishes the *Network* annual directory
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- Maintains the alumni database daily
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for Baker Hughes INTEQ in Broussard, La.

Eric Dillenbeck MSc Geol is a geologist for the ExxonMobil Corp., in Houston.

Michael W. Eaton BSc Chem Eng, MSc CPR '03 is a guest researcher at Brookhaven National Laboratory in Upton, N.Y., and a graduate student at Stony Brook University.

Christina L. Finch BSc Chem Eng is a products optimization engineer for Suncor Energy USA in Westminster, Colo.

Brandon L. Gleeson BSc Eng is an engineer for the Southwest Research Institute in San Antonio, Texas.

Christopher J. Good BSc Eng, MSc Eng & Tech Mgmt '03 is a project engineer for The Alpha Group LLC in Golden, Colo.

Matthew S. Griego BSc Chem Eng is an IMP engineer for the Public Service Co. of New Mexico in Albuquerque.

Dayven H. Johnston BSc Min is a marketing representative in mining marketing for Caterpillar Inc., in Decatur, Ill.

Dana M. Kulbacki BSc Eng is a civil engineer for Applegate Group Inc., in Denver.

Matthew H. Pinner BSc Math & Comp Sci is a software engineer for Accruent Inc., in Santa Monica, Calif.

Mark A. Ruthven MSc Eng & Tech Mgmt is a project engineer for Summit Technical Resources Inc. in Denver.

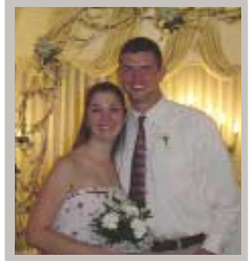
Elizabeth M. Towley BSc Chem Eng married Jay Moore Nov. 16, 2002 on Lookout Mountain in Golden, Colo.

Jesse M. Warman BSc Chem Eng is a staff process engineer for Mono Products Corp., in Thornton, Colo.

Carrie R. Wittkopf BSc Pet is facilities engineer for Pioneer Natural Resources USA Inc., in Irving, Texas.

2003

Amy Lynn Bean BSc Geop and **Brandon Shepard Schrenk BSc Chem Eng '02** were married March 26 at the Chapel of the Bells in Las Vegas. Amy currently works for Ingersoll-Rand in San Diego. Brandon is an ensign in the U.S.



Navy stationed in Gulfport, Miss. The couple spent four days in Las Vegas before returning to work.

Courtney F. Beard BSc Eng is a design engineer for Carter Burgess Inc., in Houston.

Matthew R. Bird BSc Eng is a mechanical engineer for Bison Engineering in Kingwood, Texas.

Andrew A. Blaisdell BSc Eng is a safety engineer for the U.S. Army in Texarkana, Ark.

Rosemary D. Blosser BSc Chem Eng is a metallurgist for Phelps Dodge Mining Co. in Morenci, Ariz.

Margaret G. Churchill MSc Env Sc is a superfund remedial project manager for the Environmental Protection Agency in Denver.

John B. Cooke BSc Pet is an engineer for Kerr McGee.

Darcie L. Dennis-Koller PhD Mat Sc is a staff postdoctoral researcher for Los Alamos National Laboratory in New Mexico.

Ronald M. Drake II Expl Geosciences is a geologist for the U.S. Geological Survey in Golden, Colo.

Ethan R. Erickson BSc Chem Eng is a lab technician and application chemist for BonaKemi USA, Inc. in Aurora, Colo.

Angel P. Gonzalez MSc Geol is an exploration geologist for PDVSA in Puerto La Cruz, Anzoategui Province, Venezuela.

XiangCheng Jia M Eng Pet is manager for the ShengLi Oil Field Corp.

Jill M. Kent BSc Eng is a staff engineer for URS Corp., in Houston.

Chelsey L. Mead BSc Chem Eng is a junior engineer for Parsons Engineering Science in Denver.

Mohammed A. Meetani MSc Chem, PhD Applied Chem is a postdoctoral researcher for the National Renewable Energy Laboratory in Golden, Colo.

Alexis K. C. Navarre MSc Geochem is a geosciences graduate student at Pennsylvania State University.

Carlos A. Pereira MSc Pet is a reservoir engineer for Questa Engineering Corp., in Golden, Colo.

Montgomery C. Rivers BSc Eng is an engineering intern for Wadsworth Control Systems in Golden, Colo.

Brian W. Romans MSc Geol is a research assistant in the department of geological and environmental science at Stanford University.

Abigail E. Roulier BSc Eng is an analyst for Accenture LLP in Denver.

Begona Ruiz Pineiro MSc Eng & Tech Mgmt is a research assistant in the Center for Commercial Applications of Combustion in Space at CSM.

Fabio E. Sanabria Serrano MSc Min Ec is a planning department engineer for Ecopetrol in Bucaramanga, Colombia.

Debashish Sarkar PhD Geop is a geophysicist for GX Technology in Houston.

Keith N. Snively BSc Eng is a quality engineer for Raytheon in Aurora, Colo.

Anne-Kristine Stolz MSc Pet is a research scientist for SINTEF Petroleum Research in Tronheim, Norway.

Ruthie Coors Swartzlander BSc Met & Mat Eng is an engineer for CoorsTek Inc., in Golden, Colo.

Joanna Szynakiewicz BSc Min and **Eric Poeck BSc Eng** were married Dec. 13 at Mother Cabrini Shrine in Golden, Colo.

William Asa Vandermeer BSc Chem Eng is a procurement quality engineer for ATK Thiokol Propulsion in Brigham City, Utah.

Building the ALCAN Highway

By Fred Nagel EM '40

The Alaska-Canada (ALCAN) Highway, an inland route, came about because of the Japanese threat to Alaska during World War II. Because it was wartime, the road was a military project.

The construction of a military road is vastly different than that of a civilian road, even back then. A military road is not a four-lane highway or even a two-lane road with respectable grades, curves and drainage. It's merely a passageway through which you can push, pull or drag military vehicles and equipment.

One of the military units involved in the construction of the highway was the 35th Combat Engineers, of which I was a member. Our task was to construct a military road from Dawson Creek, British Columbia, Canada, to the Elmendorf airbase in central Alaska near Fairbanks – a distance of about 1,500 miles or roughly the same as the distance between Denver and Buffalo, N.Y. My unit was responsible for constructing the south end of the highway.

I ended up working on the highway by mistake. When, while taking my ROTC refresher course at Ft. Leonard Wood, Mo., I learned volunteers were being sought for an assignment in the Pacific Northwest, I signed up. I had asked around and the consensus was that "Pacific Northwest" meant Washington or Oregon.

To my dismay, I found our destination was, inescapably, British Columbia, Canada. My group of 30 or so second lieutenants traveled north and west by train for about six days, arriving in Dawson Creek, B.C., in August 1942. From there we traveled by 4x6 trucks 450 miles north to a construction camp on the Liard River.

At the camp, the 35th Engineers were divided into units that were smaller than a regular company, but with about the same equipment a full company would need. During the winter, the units were sent to sites about 50 miles apart along the tentative highway route. When the spring thaw came in 1942, it was each unit's job to construct a military road section 25 miles to the north and 25 miles to the south to meet with the units ahead and behind them.

One challenge was the numerous bridges and culverts that needed to be built. The entire stretch of highway required 133 bridges and 8,000 culverts. Temporary log piling and pontoon bridges were put in place over a 10-month period to open the highway in late fall of 1942.

By the dead of winter 1942-43, there existed 1,500 miles of military road, but not a single gas station along the way. Then in the spring of 1943, the thawing river ice pulled up the bridge piling like toothpicks and deposited them, unusable, downstream. Work had to begin all over the following spring.

Winter temperatures that year were severe. One week the temperature never got above -50 degrees F and one of those days was -62 degrees F. That day I was at Watson Lake when a trucker came into our Quonset hut cussing and holding a bottle of whiskey practically frozen solid.

In early spring 1943, I was put in charge of a dump truck detachment and a small truck-mounted power shovel to locate gravel pits and apply the gravel as a base and road surface. It seemed a losing battle: the spring thaw caused mud up to one foot deep along sections of road built over muskeg. But work did progress and slowly the ALCAN road began to become year-round passable. Not great, but passable. In late spring, the U.S. Bureau of Public Roads took over maintenance of the highway and began hiring private contractors to improve alignment, grades and drainage.

During my stay in the frigid north, I ran into a former Mines classmate who was with an engineering ordnance maintenance company. While renewing our friendship, he broke out some 180-proof alcohol that we mixed with powdered orange juice to make a very social drink. Afterward, I returned to my tent, climbed into my arctic sleeping bag, and became violently ill. I left the tent to go outside, but as soon as the below-zero cold hit me, I forgot why I had come out and crawled back inside to sleep it off.

Later spring 1943, my battalion moved above the Arctic Circle to the Yukon Territory near White Horse to begin construction of another road that was to connect the ALCAN Highway with a gasoline source at Norman Wells. It was called the CANOL project because it was built to be a Canadian oil source. Our 35th Engineers took over from another outfit and I was talked into signing for a tractor that was stuck on a frozen lake, but still in good condition. A few days later I learned that it was IN the lake, not on it. It's probably still there.

Later that year, our company was pulled off the Canadian highway project and sent to Camp White, Ore., where we were assigned to pick potatoes – but that is another story.

Colorado School of Mines
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A dance and drum performance set toes tapping at the National Society of Black Engineers cultural celebration, held in the Student Center during Black History Month.

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