

Chemical and Biochemical Engineering
Nuclear Engineering Program
Commencement 2007

Mines

Fall 2007 Volume 97 Number 3

Colorado School of Mines Magazine

New Recreation Center
Challenges Students to
Greater Heights





The Colorado School of Mines Alumni Association is offering a fleece sport jacket and a fleece sport vest designed with the Mines community in mind! Made by Port Authority®, these items come in a True Navy color, with a full-zip front, deep front pockets and the CSM logo emblazoned on the left breast.



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These items are currently in stock at the CSMAA offices in Golden, CO for both men and women, in sizes XS - XXL. The price for a jacket is \$50 (XXL is \$55) and the vest is \$45 (\$50 for XXL). To order, please email Elizabeth Garcia, Associate Director of Campus Programs and Membership Services at elizabeth.garcia@is.mines.edu or call 303-384-2143.

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Thanks to a new law, you may now be able to make charitable gifts from your IRA while decreasing your taxable income from the account. Consider the following:

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Several conditions apply, so please contact Mines or your advisor before taking action. But don't wait too long—qualifying distributions are allowed only through the end of 2007.



For further information, contact:

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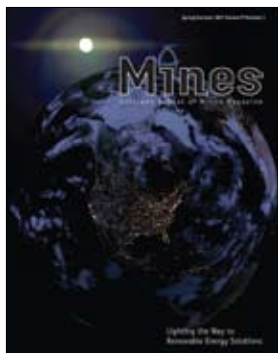
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Cover photo: Lightbox Images

Feedback on the New *Mines* Magazine Website and the Spring/Summer Issue

What an interesting contrast we have when discussing how to solve the problems involved with global climate change and energy utilization. On one hand we have the Chicken Little group (i.e.—Look, the sky is falling in) led by Al Gore and the media. While on the other hand you



have people like Professor Mark Eberhart who look upon the problem as an opportunity for mankind to solve. As a retired CSM graduate there is little I can personally do to solve such problems, but I can contribute to causes that I feel may benefit

mankind. Mines graduates have always had the goal to economically utilize the Earth's resources to benefit mankind. It seems to me to be natural that one way I can continue this endeavor is to put my money where my mouth is. It is for this reason I have been a regular contributor to the Mines Fund and my wife, Virginia, and I have named Colorado School of Mines Foundation as the major beneficiary of our Charitable Remainder Trust.

Robert Lee Kerwin '53

Reading the various articles on “Renewable Energy” in the Spring/Summer issue was interesting. However, I am surprised that Mines is jumping on the “man is the cause of global warming” bandwagon. Please allow the other side to speak to this issue. I am also disappointed in not hearing about other sources of clean energy—nuclear and photovoltaic. I am convinced that both offer a means of assuring energy independence and abundant energy which is so important to our living standards. They also offer potential for supporting a hydrogen fuel-based economy. Both these sources of energy are less harmful to the environment than the proposed carbon-based renewable energy programs. Both are in use and have demonstrated reliable

performance, but there are still technology challenges that Mines could address, such as economy of resource acquisition and suitable ecological disposal of waste streams.

Bill Gekler '54

Editor's note: Read on! The current issue includes a feature article on Mines' Nuclear Engineering Program launched this fall, as well as a New Frontiers article on photovoltaics. Our goal is to be balanced, but we can't get it all into one issue.

I really like the links to audio content on the new website for the magazine, but it would be really great if these were Podcasts, and that one could subscribe to a “Mines Podcast,” and get updates on these automatically whenever they were posted. It would also make it easier for some to listen to them by being able to store them up and play them when next on a plane, or cooking, or whatever. Thank you. I like the new site a lot.

John M. McLaughlin '01

Editor's note: Great idea. I hope to get to this when time permits.

We received the latest edition of *Mines* magazine containing the obituary for James L. Sampair '54. Thank you very much sending this. James was a very proud alumnus of the school. My mother and the rest of us are very grateful. Your edition of the magazine was wonderful! Keep up the good work.

Michael Sampair

The site looks great; what a huge step forward. Nicely done.

Heidi G. Loshbaugh, Associate Director, Center for Engineering Education

While I like your new layout OK, I wish you would return to showing the degrees the alum has earned when showing the name and info in “Fast Forward” and “Passing.”

Chuck Downing '62

After reading the current issue, I must compliment you overall on a very readable, informative publication. However, why do you not include the degree information? We worked hard for each of our distinctive degrees, and it helps identify sub-groups of alums and the background of each graduate. You are even leaving degrees off the obituaries, which are particularly useful as an historic record. Please, return to the tradition of honoring our earned degrees.

Charles O. Parker II '53

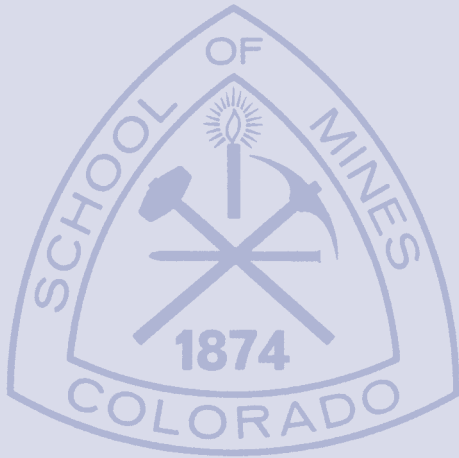
Editor's note: The obituary text has always included degree information as part of the chronicle of the individual's life. As for the rest of the Class Notes section, the objective is to save room for more class notes, while at the same time striving for a cleaner look. It is not our intent to slight your hard earned degrees.

I really enjoyed your article on my good friends the Plutts in your last issue concerning the Mines Fund. It is important to preserve the CSM's reputation, not only among the business community, but among ourselves and for future generations. I hope in the future my daughter can become a third generation Miner and feel proud to be a part of a legacy.

Matthew and Kelly (Lapinski) McAughan '97

Welcome, Nick. The *Mines* magazine is a treasure to us old alums, and I am sure you'll handle the responsibility as Editor with skill and dignity. My granddaughter is a junior at Peak to Peak Charter School, and her scholastic achievements far exceed my own at the same age. She has expressed an interest in attending Mines when she graduates, and I've been sending her my copy of *Mines* magazine for about two years, which she reads cover to cover. Time will tell, but both she and *Mines* could do worse than join up in a little over one year. Congratulations on your excellent Spring/Summer issue.

Morgan Townsend '48



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

Dear Readers,

Many thanks to all who wrote in response to the Spring/Summer issue and the launch of the *Mines* magazine website. Both were clearly well received and we were given several excellent suggestions. To further solicit your feedback, *Mines* magazine will be conducting a readership survey in the coming months. I know you receive many requests like this, and so I will take pains to make it very short and to-the-point. However, without broad participation, the results won't be meaningful. So *please*, when it arrives, take a few moments to share your thoughts. In return, I promise to review your responses with care.

This issue covers a number of interesting topics. If you haven't seen the new Student Recreation Center first hand, then turn to page 18 to see photographs and read about the Grand Opening. We will post a much wider selection of photos on the website. May Commencement saw the School's largest graduating class ever; You can read about the ceremonies on page 24. And finally, we offer two feature stories on Mines' latest degree programs, both of which are part of the School's evolving response to changing energy demands: the Nuclear Engineering Program is covered on page 26 and the Chemical and Biochemical Engineering Program is found on page 22.

Details and photos of this year's Alumni Association Award recipients are included in The Network, just ahead of Class Notes. Also featured in this section is Reunion 2007, some regional get-togethers and freshmen sendoff parties. In the Last Word you will find some Foss Drug-nostalgia—the store recently closed its doors after over 100 years of business.

You will notice we've stapled a Colorado School of Mines Alumni Association membership envelope in the center of this issue. *Mines* magazine relies on support from Alumni Association membership funds, so this is a particularly appropriate context for the solicitation. We are grateful to all those who continue to renew their Annual Membership or have invested in Lifetime Membership—for those who have yet to take this step, we hope this provides a convenient way of doing so.

Please keep the mail and email coming. Contacts information is found on the bottom left of this page, or you can simply click on "Contact Us" on the *Mines* magazine website.

Warm wishes for a productive and enjoyable fall,

Nick Sutcliffe

Editor and Director of Communications, CSMAA

P.S. If you have an idea for a Last Word submission and wish to get feedback on your idea before taking the time to write about it, please get in touch via the website or mail—the coming issue has nothing slated for that spot as yet.

Contributors

Larry Borowsky is a freelance writer and blog consultant based in Denver.

Lightbox Images, owned by Tom Cooper, provides photographic services in the Denver Metro region.

Jennifer Nekuda '05, ME '06 (New Frontiers, "Solar Opportunities") is a PhD candidate in metallurgy and materials engineering, and is working on a collaborative solar research project between Mines and NREL.

Christopher Peters, owner of Peters Photography LLC, is a student at Colorado School of Mines.

Campus News

Mines Kinetics Team Wins Trophy

The Mines Kinetics team made history with a series of firsts during the annual race held in May at the Boulder Reservoir.

Not only did the team actually finish the course, but came home with a trophy for winning the “Campus Cup” award as the first college team to complete the course.

Seven Mines seniors—Chris Germer, Jeff Hammer, Grant Hudish, Trey Rodgers, Dan Stackhouse, John Steinhoff and Dorgan Trostel—placed 15th overall in the KBCO/Miller Lite Kinetics.

“It was brutal,” said Julie Van Laanen, adviser and engineering adjunct instructor.

The course included 11 land-to-water transitions, a 6-foot mud hill and bogs. Out of more than 40 teams to enter the competition, Van Laanen estimated half were able to finish the course.

The race, which is both technical and performance-based, pits costumed competitors against each other in human-powered crafts built to navigate land and water. The Mines Kinetics team was contracted by Joel Bach, an engineering professor, to build a vehicle that required no pushing—it had to be ridden through all transitions.

Designed with simplicity in mind, the team’s tricycle device consisted of aluminum tubes welded to a tandem bicycle for the frame and two inflatable side pontoons for flotation. It carried two people and had a built-in propeller for water propulsion as well



Mines Competition on the Forefront of Space 2.0



as rotating arms that allowed the craft to lower the pontoons when entering the water and raise them when exiting.

Van Laanen said the Mines team was in fourth place when the front fork of its device crumpled. Anticipating the design's weak spot, the team came equipped with a spare. But the repair cost them about 30 minutes—the same amount of time between the team's finish and that of the overall winner, Van Laanen noted.

Each member of the team was assigned a unique role: Rodgers served as a judge, Hudish and Stackhouse were the pilots, Germer and Hammer operated as the pit crew, and Steinhoff and Trostel were photographers.

Funding for the annual design challenge is provided by Lockheed Martin and the Thorson Fund, a Senior Design endowment.



country, to integrate space technology into the global economy.

“Our strong field of finalists exemplifies where space commerce is heading,” said Angel Abbud-Madrid, director of the Center for Space Resources at Mines. “Each team provides a glimpse of what the coming new era of space business is going to look like and the very real possibilities for the next wave of development and practical application of existing and emerging technologies.”

In the first annual Lunar Ventures competition, held on campus in May, students competed as entrepreneurs before a national panel of judges with both technical and business expertise. The judges selected 10 finalist teams—three of which were from Mines—to compete for \$25,000 in cash and additional services to help launch their ventures, including an opportunity for a \$100,000 investment. A team from San Diego State University was declared the winner. The team's venture, Omega Sensors, Inc. (OSI), offers improved accelerometer technology. Applications range from increasing oil production to improving space vehicle navigation systems.

A team composed of Mines physics graduate students Darick Baker, Luke Erikson and William Rance, along with Erik Spahr from the College of William and Mary, placed as one of three runners-up. Their venture, Kronos, develops technology and commercial markets for collecting meteorites on the Earth and later on the moon.

The Kronos team won a \$3,000 prize, plus a chance to present their venture to NASA and to a Silicon Valley investor's forum on space technologies to be held this fall. The other runners-up included students from Massachusetts Institute of Technology, Georgia Institute of Technology, and Emory University.

“Each team's submission offers a unique vision for bringing space resources and technology into today's marketplace,” said Gary Cadenhead, Lunar Ventures director. “Many of these ventures, like grand champion OSI and the three runners-up, are fundable today.”

Mines will host the competition again in 2008. For more information on Lunar Ventures, go to www.8clunarventures.com.





Society of Women Engineers Partners with High School for Energy Sciences Week

As part of an ongoing effort to engage young women in the sciences, Mines professor Mark Lusk and five members of the School's Society of Women Engineers (SWE) visited St. Mary's Academy—a private, all-girl high school in Englewood—for "Energy Science Week" this spring.

The idea came about when Lusk and Mines SWE advisor Candace Sulzbach discussed the development of energy-related outreach programs for women in engineering sciences. For Lusk, the father of a five-year-old student at St. Mary's Lower School, it seemed an ideal place to start.

He was right. The SWE members—Andrea Stephens, Lauren Doyle, Carrie Knepe, Bailey Smith and Kristi Selden—and the energy-based subject matter were met with enthusiasm.

"The high school girls were very interested. They were keen to find out more about the energy sciences," Lusk said of the 15 students in the advanced chemistry class. "Our women were role models in the extreme. The connection between 17-year-olds and 20-year-olds was immediate and great to see. The girls peppered our SWE members with questions about the labs and about college in general."

Lusk said he'd like to continue the outreach and work

with other Mines groups, including the Society of Women Physicists, to conduct different programs each semester at a number of area schools.

"I have four sisters—all of whom are a heck of a lot smarter than I am," Lusk said, adding his mother was a high school calculus teacher. "Why didn't they all get excited about scientific research the way I did? That is something that has really bothered me—I think there was a bias. I think the classroom wasn't set up to engage them."

Exposing girls to the fun and exciting side of science at a young age is something Lusk thinks will encourage more to pursue futures in fields such as physics, chemistry or engineering.

The same group of St. Mary's girls that Lusk and the SWE team worked with subsequently turned around and taught a science lesson to some of the younger students at the school. Coincidentally, Lusk's daughter was among those getting such instruction, and that prompted her to start doing her own science experiments at home.

"My daughter now loves chemistry—she learned from those older students," Lusk said.

Foreign Journalists Tour Fuel Cell Center



A group of prominent international journalists visited Mines in May as part of a U.S. State Department tour focused on Colorado's emerging "new energy economy." The Colorado Fuel Cell Center on the Mines campus was one stop on the tour.

The 13 journalists, who represented major radio and television stations and newspapers in Switzerland, Germany, Korea, China, Finland, Sweden, Czech Republic and Estonia, listened to presentations by Robert Remick, Robert Kee, Tony Dean and Neal Sullivan.

"Meeting with the foreign journalists provided an excellent opportunity to get a different perspective on fuel cells," said

Remick. "In the U.S., we concentrate on the fuel efficiency aspects of fuel cells—for example, getting 50 percent more electricity for the same amount of fuel or getting twice the miles per gallon equivalent of a standard gasoline fueled vehicle. "The foreign journalists on our tour were much more interested in the 'green' aspects of fuel cells—like low carbon dioxide emissions and no criteria air pollutants. However, top on the list of questions asked by the foreign journalists were, 'When can I buy a fuel cell?' and 'How much will it cost?' and in that, they share common ground with their U.S. counterparts," Remick added.

In addition to visiting some of the state's top research institutions, the journalists met with Colorado business leaders and entrepreneurial start-up companies.

In Brief...

The new CTLM addition has been completed and the Academic Networking and Computing Department has moved there from its former home in the Green Center.

A team of three Mines engineers, Kong Han, Bernard Levy and Chester Van Tyne, received SAE International's Arch T. Colwell Merit Award during the recent SAE 2007 World Congress in Detroit. The team was recognized for their paper "Bauschinger Effect Response of Automotive Sheet Steels."

A research group in the Advanced Coatings and Surface Engineering Laboratory (ACSEL), consisting of John J. Moore, Jianling Lin, Brajendra Mishra, Sudipto Bhattacharyya, Malki Pinks and Sterling Myers, was presented with the best paper award at the 2007 Metal Casting Congress held in Houston in May. The award was the culmination of nearly four years of research work between ACSEL and the die casting industry.

Arpita P. Bathija, Haiyi Liang, Moneesh Upamanyu, Ning Lu and Manika Prasad from the Geophysics, Materials Science, and Engineering departments have been awarded a Clay Minerals Society Research and Travel Grant for their interdisciplinary work on "Elastic Properties of Clays" using nanoindentation and molecular simulation.

Distinguished Senior Scientist Warren Hamilton, Department of Geophysics, will receive the 2007 Tectonics and Structural Geology Career Achievement Award of the Geological Society of America at the Society's annual meeting in Denver in October. Hamilton received the Society's highest award for research, the Penrose Medal, in 1989 and is a member of the National Academy of Sciences.

Robert L. Siegrist has been awarded certification by eminence and welcomed into the American Academy of Environmental Engineers as a Board Certified Environmental Engineer.

Ambassador Mohd Azhari Bin Abdul Karim of Malaysia will spend fall 2007 in residence in LAIS as a Fulbright Visiting Scholar. The Malaysian Prime Minister's office has assigned the topic of energy policy in the U.S. for Azhari to research during his stay. Upon his return, Azhari will head an energy policy research center at the Universiti Sains Malaysia in Penang.

Ning Lu has received the 2007 American Society of Civil Engineers Norman Medal, recognizing his work in unsaturated soils as published in the *Journal of Geotechnical and Geoenvironmental Engineering*.

Postdoctoral researcher Amy Clarke is the recipient of the eighth Willy Korf Award for Young Excellence. The award, named in honor of the late German steel industrialist, is given annually to one graduate student worldwide to recognize the contribution of the student's research to the steel industry. The award was presented during the Steel Success Strategies XXII: New World, New Opportunities, New Crises conference in New York in June.

Water Technology Center Launched

There is no human life without water. There is no human civilization without water. Throughout history, communities have settled and developed within easy reach of fresh and potable water supplies. However, today's population growth and increasing water demands are exhausting water supplies, especially in the western U.S. To meet rising demand, municipalities are increasingly looking to non-traditional sources, such as surface water impaired by domestic and agricultural wastewater discharge, treated municipal wastewater, brackish groundwater, seawater and co-produced water from natural gas explorations. To better access and treat these marginal water supplies, more efficient and cost-effective technologies will have to be developed.

Well positioned to assist in this effort, Mines recently launched the Advanced Water Technology Center (AQWATEC). The new center brings together state-of-the-art infrastructure and the expertise to enhance existing water processing technologies and develop new ones.

The center was officially launched at a ribbon cutting ceremony on campus on August 29 which included President Scoggins and Congressman Ed Perlmutter. Speaking at the ceremony, Congressman Perlmutter pointed out that the availability of water is the key limiting factor to growth and development in Colorado and the West. President Scoggins spoke of the interrelationship between water and energy production, emphasizing the relevance of AQWATEC's mission to Mines' strategic priorities. "The water needed to produce the energy used by the average household each day is five times higher than the water used for domestic purposes," said Jörg Drewes, professor of environmental science and engineering, and one of AQWATEC's directors.

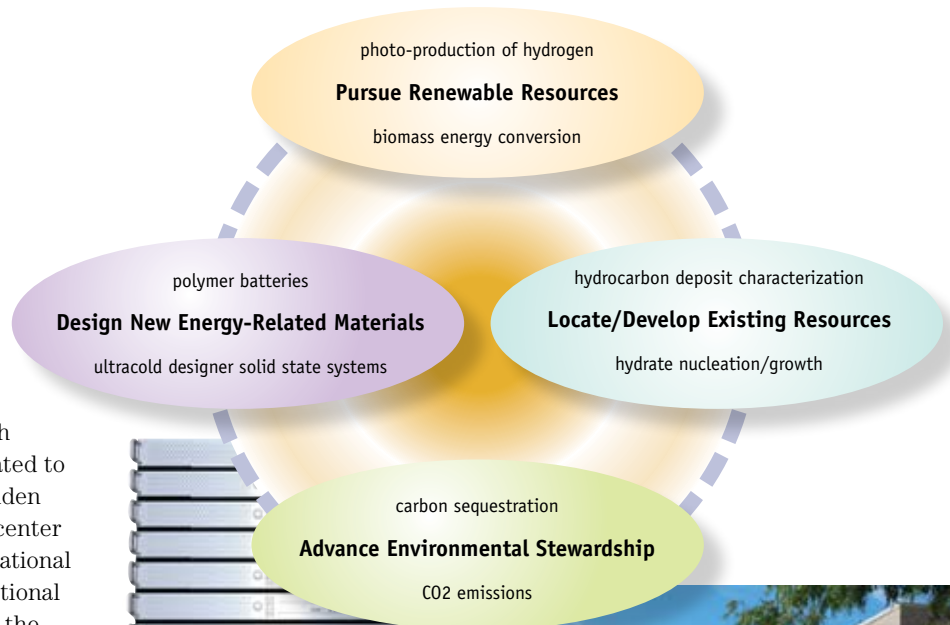
Initially, the center will focus on developing advanced natural systems for eliminating contaminants from the environment; traditional and novel membrane separation



processes for water purification, reuse and desalination; development of multiple-barrier hybrid processes to provide more efficient water treatment systems; decentralized water treatment facilities; and development of more efficient water treatment systems for the industrial and renewable energy sectors.

In addition to seeking new solutions, AQWATEC will explore ways to make existing systems more cost-effective. For example, AQWATEC is currently helping the City of Aurora increase its water supply by developing a riverbank filtration system that removes organic micropollutants prior to being piped to the city's treatment plant. Such a system would enable the city to use river water it was previously unable to process. For more information, please visit www.aqwatec.com, or contact Jörg Drewes or Tzahi Cath, who co-direct the center.

Four Priority Areas, Eight Challenges



Energy Center Brings Supercomputer to Campus

Mark T. Lusk, professor of physics and mechanical engineering, recently finalized arrangements to create a high performance computing center dedicated to energy-related science. Called the Golden Energy Computing Organization, the center is a partnership between Mines, the National Renewable Energy Laboratory, the National Center for Atmospheric Research and the National Science Foundation. Although GECO will operate as an independent research center, the director reports directly to Mines' vice president for research. The cluster facility, to be located in the new CTLM building at the southeast end of campus, will have a peak processing capacity of approximately 15 teraflops, making it one of the most powerful supercomputers on the Front Range and one of the top 100 supercomputers in the world.

Demand for high performance scientific computing has skyrocketed in recent years because a combination of hardware and software advances now give the computational horsepower to tackle a broad range of open questions in science and engineering. By specifically targeting energy-related questions, GECO will help Mines become a national hub for computational inquiries aimed at new ways to meet the energy needs of society.

GECO's explicit goal is to develop and maintain a balanced energy portfolio by pursuing specific challenges across the spectrum of energy-related research. There are currently eight targeted challenges that fall into four areas of need (see accompanying diagram). GECO's advisory board will build on this to base to identify and address issues critical to the advancement of energy science.

In addition to its core mission, GECO will benefit Mines in other ways. The center will draw researchers together



The supercomputer will be housed in the new wing of CTLM, which was completed this summer.

and is sure to attract substantially more and larger blocks of research funding to Mines. Several new educational programs in scientific computing are planned, including a PhD minor in high performance computing; the continued development of an

existing five-year BS/MS program between the departments of Physics and Mathematical and Computer Science; a certificate program in high performance computing for industry training; and a range of new elective classes at the graduate and undergraduate level. On top of all this, the center will sponsor outreach, providing support for educational programs in high performance computing, as well as hands-on learning opportunities, to colleges and organizations serving underrepresented populations.

Access to the supercomputer will be prioritized according to use and researchers' affiliated agency. Researchers from

the three partner agencies (Mines/NREL/NCAR) working on a primary challenge topic will get top priority. Mines researchers working on other energy-science topics take second place. Mines educational programs and other research requiring high performance computing take third and fourth respectively. Other academic institutions conducting energy-related research are fifth, and energy-related research by industry comes in sixth.

The cluster, which should be completed in early spring, will occupy a total area of only 80 square feet of densely packed computer processors. It will be linked to the Front Range GigaPop—a consortium of 16 government, educational and research institutions. With closer links among these institutions, GECO may enhance the regional synergy among agencies concerned with computational research, while providing a powerful new resource in support of Mines' mission in energy science.

Opportunities in Solar Power

Until you check the price tag, the appeal of solar power is almost irresistible—with modern technologies that enable homeowners to run their electric meter backwards during the day, an array of solar panels on a sunny roof can provide free electricity to that home for decades. But because of the high cost, solar energy only accounts for less than 1 percent of the total energy generated in the U.S. and there are good reasons why this is the case. Factors like performance, availability, material cost, and the toxicity of the materials used all play a part. Additionally, the ease, cost, and reliability of the processing techniques used for manufacturing are partly to blame.

However, despite these factors, solar energy is growing rapidly: Demand is at an all-time high, and development is being propelled by an increased number of research grants, state and federal government incentives, and investment from venture capital firms.

One of the most promising breakthroughs in solar energy is thin film technology, which researchers at Mines have been studying for several years. The current solar cell market is dominated by bulk or crystalline silicon with an average efficiency of 14 to 16 percent for commercially available cells. These cells are inherently expensive because of the relatively thick layer of crystalline silicon—about 100 microns—needed to convert sunlight to electricity. In contrast, thin film cells require a layer only five microns thick, thus drastically decreasing material costs. The three dominant thin film technologies currently under development are amorphous



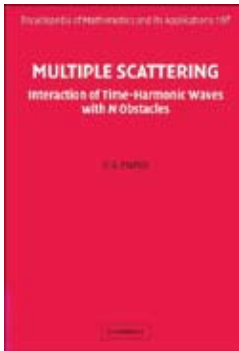
The 25-story CIS Tower in Manchester, UK, is clad in crystalline silicon photovoltaic cells. As thin film technologies mature, applications like this are expected to become much more economical and widespread.

silicon, cadmium telluride and copper indium gallium diselenide. Although the latter of these has achieved an impressive laboratory efficiency of 19.5 percent, amorphous silicon is the option with greatest

production capability, though its having laboratory efficiency levels is about 10 percent.

The basic structure of a thin film solar cell is similar to that of traditional solar cell technologies: there is an absorber layer and two contacts. When photons in sunlight are absorbed, electrons are excited and knocked loose from their atoms. These electrons then flow through a conductor band into the positively charged side of an electrical circuit, leaving behind an “electron hole” on the original host atoms. These holes are reoccupied by electrons returning to the cell on the negatively charged side of the circuit. This process of converting light to electricity is known as the photovoltaic effect.

The goal in solar cell development is to find a balance between the cost associated with manufacturing and the efficiency. Although thin film technologies are not, for the most part, any more efficient than crystalline silicon, they have the potential to be significantly more cost effective. Some of the most promising approaches being explored at Mines are spraying or printing thin film cells; plasma processing approaches; organic solar cells; the so-called “third generation” cells, such as silicon nanodots and nanowires; incorporating solar cells into building materials; tandem amorphous silicon/nanocrystalline silicon cells; and manufacturing cells that can be laminated onto flexible materials. With the considerable sums of money being channeled into each of these fields, progress has been steady and lower-cost solar cells are making their way to market. And given that the cost of utility-generated electricity is projected to rise, the economics may soon swing in favor of photovoltaics, resulting in a rapid expansion of this most alluring technology.



Multiple Scattering

When a wave hits an object, it is reflected or “scattered”. For example, waves on the ocean are scattered by oil rigs, electromagnetic waves are scattered by aircraft, sound waves are scattered by fish and seismic waves are scattered by faults. All these waves have a common mathematical theory, and this theory has been developed in a recent book by Paul Martin, professor of mathematical and computer sciences. Published by Cambridge University Press, *Multiple Scattering* is concerned with the calculation of scattering when there are several objects present. The methods described in the book have many important applications, especially in situations where waves are used to interrogate a system. For example, how can ultrasonic waves be used to detect cracks in a nuclear reactor or to provide quality control during the manufacture of fiber-reinforced composites, concrete or mayonnaise? To an applied mathematician, such as Martin, these questions are closely related, and they can be studied using similar mathematical techniques.

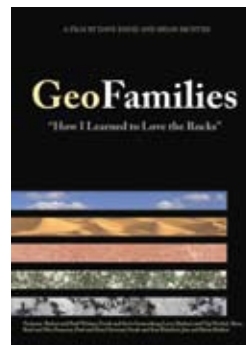
Statistics for Engineers and Scientists

McGraw-Hill recently published the second edition of the textbook, *Statistics for Engineers and Scientists* by William Navidi, professor of mathematical and computer sciences. This text is used at the Colorado School of Mines, and has also been adopted by more than 40 universities across the U.S., including Carnegie Mellon University, Rice University, the University of Texas at Austin, the University of California at Berkeley and at Davis, and the University of Wisconsin. Included in the book are examples of Navidi’s personal research, which currently focuses on the design of studies to estimate the health risks of exposure to air pollution.

K-12 Outreach: Identifying the Broader Impacts of Four Outreach Projects

The July 2007 issue of the *Journal of Engineering Education* includes an article contributed by Barbara Moskal, associate professor of mathematical and computer sciences (MCS); Catherine Skokan, associate professor of engineering; Laura Kosbar, IBM; Agata Dean, instructor in MCS; Caron Westland, University of Colorado Denver; Heidi Barker, Regis University; Que Nguyen '03, MS '05 (MCS); and Jennifer Tafoya '04, MS '05 (engineering). The paper documents four years of research, examining the impact of outreach programs offered through the Office of Special Programs and Continuing Education at Mines to middle school teachers from 11 school districts in Colorado. Each of the

programs is designed to illustrate the application of mathematics to science and engineering through hands-on activities. The programs are reinforced by a faculty member or graduate student providing support in the classroom to assist teachers with implementation of program strategies. The article documents the improvement in the instruction in mathematics and science in the participating schools. A surprising outcome is also documented—the impact of these projects on the culture of the participating schools, both the participating middle schools and Mines.



Geo Families

Two professors of geology and geological engineering, Steve Sonnenberg and Robert Weimer, are featured in a film that was released this year entitled “Geo Families: How I Learned to Love the Rocks.” The documentary interviews seven multigenerational Colorado families, all with close ties to the field of geology, four with close ties to Mines. The film is directed and produced by private film maker Dave Emme, and can be obtained from the RMAG website: <http://www.rmag.org/publications/index.asp>.



ISScapades: The Crippling of America's Space Program

A book by Don Beattie '58 covering the story of the International Space Station was recently published by Apogee Books, Ontario, Canada. Told by an insider, the book argues that powerful antagonists to the International Space Station delayed the program by six years and severely compromised the station in the process. In addition to several other positions with NASA between 1965 and 1983, Beattie was division director for NASA's Energy Systems Division and worked directly on the Apollo mission.

CSM Athletics Inducts 12th Annual Hall of Fame Class

The Colorado School of Mines Department of Athletics inducted its 12th Annual Hall of Fame class on September 21st, during a dinner and banquet in the Ben H. Parker Student Center. The group, which was comprised of three individual athletes, one coach, one team and a pair of outstanding supporters, was also recognized at halftime of the Orediggers' football game against Chadron State College the following afternoon. The inductees of the 2007 Class of the Colorado School of Mines Athletics Hall of Fame includes the following:

FLOYD CARR

A three-sport standout who played football, basketball and baseball, Carr was a four-time captain, four-year letterwinner and two-time all-conference selection as a halfback on the football team. A centerfielder and shortstop on the Oredigger baseball squad, the fleet-footed Carr earned three letters on the diamond. Carr, who was involved with the Athletic Council and the M Club, was a two-time letterwinner on the men's basketball team as well. A 1930 graduate of Mines, Carr was also the vice president of his freshman and sophomore classes.



BILL YOPP

The recipient of the Dave C. Johnson Trophy as the Outstanding Senior Athlete in 1959, Yopp played football, baseball and boxed at Colorado School of Mines. Yopp, who was selected as the Oredigger baseball team's Most Valuable Player, lettered four times as a right-handed pitcher and third baseman. Also a quarterback of the School's single-wing offense, Yopp was a four-time letterwinner in football. Yopp also lettered twice in boxing.

BRUCE ALLISON

The director of athletics at Colorado School of Mines from 1976-95, Allison served as the head men's lacrosse coach for the Orediggers from 1976-91 and again from 1992-94. Before arriving in Golden, Allison served as a coach and teacher at Camp Lejeune, Cortland State, Bethlehem Central High School and Union College. Allison, who earned his bachelor's and master's degrees from Cortland State, served as secretary, treasurer, vice president and president of the United States Lacrosse Association. Also the third, second and first vice president of the U.S. Intercollegiate Lacrosse Association, Allison was chosen as Man of the Year by that organization in 1970. A former president of the Rocky Mountain Lacrosse Association and Rocky Mountain Intercollegiate Lacrosse League, Allison was also the first-ever president of the Rocky Mountain Lacrosse Foundation. Allison has been enshrined into the Cortland C-Club Hall of Fame, the Colorado Lacrosse Foundation Hall of Fame, the National Association of Collegiate Directors of Athletics Hall of Fame, the Union College Athletics Hall of Fame and the Rocky Mountain Athletic Conference Hall of Fame.



JOHN COATS

A three-sport student athlete for the Orediggers, Coats played football, wrestled and competed on the track and field team at Mines. Coats, who earned four letters in wrestling, won the conference title as a sophomore in 1954-55 in the 177-pound weight class. Coats went undefeated in his bouts against conference opponents as a junior, but was unable to compete at the conference championships due to an injury. Coats would go on to claim second place in the conference wrestling championships as a senior in 1956-57. Coats, who ran the half-mile and two-mile relay events for the Oredigger track and field squad, graduated in 1959.

2002 MEN'S SOCCER TEAM

Coached by Frank Kohlenstein, the 2002 Colorado School of Mines men's soccer team captured the RMAC Regular Season and RMAC Tournament crowns. During a pair of victories in the RMAC Tournament, the team outscored its two opponents by a combined margin of 12-1. Despite narrowly missing out on a berth in their regional tournament, the School finished the season ranked 19th in all of NCAA Division II. Winners of a single-season school record 16 matches (16-4-1 overall), they amassed 9-2-1 mark in RMAC competition. The Orediggers, who defeated the defending national champions (University of Tampa) in their season-opening match, went on to be ranked as high as fourth in the country in 2002. In addition to compiling an 8-0-1 record over their final nine matches, the team established single-season school records for goals scored (60) and assists (43). Five players—Brian Blaskovich, Eric Talburt, Robbie Williams, Joel Flanagan and Scott Phipps—earned First Team All-RMAC honors in 2002, while Kohlenstein was recognized as the RMAC Men's Soccer Coach of the Year.



STEVE AND GAYLE MOONEY

Avid supporters of Oredigger Athletics, Steve and Gayle Mooney have endowed several scholarships at Colorado School of Mines. Steve, who earned a degree in geological engineering from the School in 1956, also received a distinguished achievement medal in 1990. Steve is currently the CEO of Thompson Creek Metals Company.

Oredigger News & Notes...

- During Homecoming weekend, the Oredigger football team will host Western New Mexico University on Saturday, October 13th, at 12 p.m. at Brooks Field. Game day tickets will be \$10 for adults, and \$7 for students and children (no advance ticket sales for this event). The volleyball team will also host N.M. Highlands University that evening at 7 p.m. at Lockridge Arena.

- Director of Athletics Tom Spicer has hired three new head coaches for 2007-08. Anna Van Wetzinga will be Mines' first full-time head softball coach in program history. Van Wetzinga, who spent the past two years as an assistant coach at Indiana State University, is a graduate of Central College, IA. Tyler Kimble will take over as the head men's golf coach after spending two seasons as the assistant coach at Colorado Christian University. Kimble also served as a Colorado PGA Foundation golf professional from 2001-02. Jerrid Oates will take over as CSM's first full-time head baseball coach after spending the previous four seasons as an assistant. Prior to his arrival in Golden, Oates spent two years as a graduate assistant at Fort Hays State University.



Jerrid Oates takes over as the new head coach of the CSM baseball team.

For complete schedules, rosters, results and statistics, please visit the Colorado School of Mines Athletics website at <http://athletics.mines.edu>.

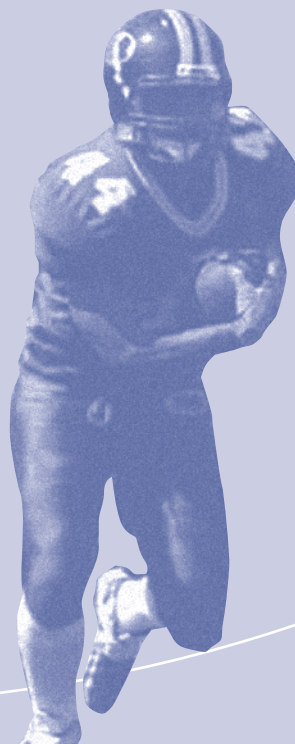
Fall Athletics Home Schedules

FOOTBALL

Sep. 1	Washburn University	12:00 pm
Sep. 22	Chadron State	12:00 pm
Oct. 13	Western New Mexico	12:00 pm
Oct. 27	Nebraska – Kearney	12:00 pm
Nov. 10	Western State	12:00 pm

WOMEN'S SOCCER

Aug. 24	Grand Valley State Univ.	7:00 pm
Aug. 26	Barry University	11:00 am
Aug. 30	Winona State Univ.	7:00 pm
Sep. 1	Minnesota State – Mankato	7:00 pm
Sep. 5	Colo. Christian Univ.	7:00 pm
Sep. 7	Dana College	5:00 pm
Sep. 9	N.M. Highlands Univ.	11:30 am
Sep. 21	Metro State	5:00 pm
Sep. 23	Regis University	12:00 pm
Oct. 6	Trevecca Nazarene	7:00 pm
Oct. 7	CSU – Pueblo	3:30 pm
Oct. 19	Adams State	4:30 pm
Oct. 21	Mesa State	2:30 pm



MEN'S SOCCER

Sep. 5	Colo. Christian Univ.	4:30 pm
Sep. 7	CSU – Pueblo	7:30 pm
Sep. 9	UC – Colorado Springs	2:00 pm
Sep. 21	Metro State	7:30 pm
Sep. 23	Regis University	2:30 pm
Oct. 5	West Texas A&M Univ.	7:00 pm
Oct. 7	Midwestern State Univ.	1:00 pm
Oct. 19	Fort Lewis	7:00 pm
Oct. 21	Mesa State	12:00 pm

VOLLEYBALL

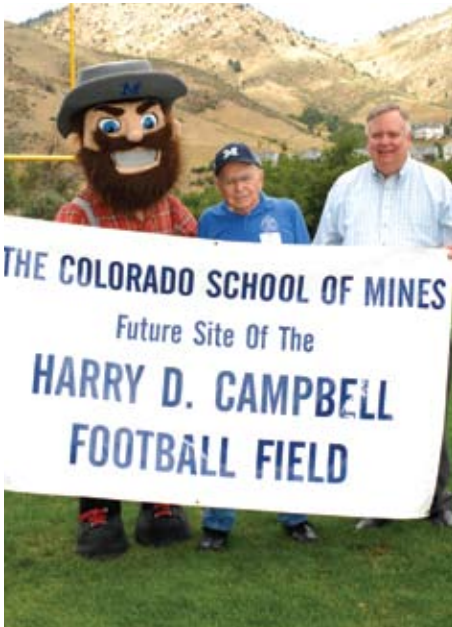
Aug. 31	MSU-Billings/Concordia-St. Paul	3:30 pm/7:30pm
Sep. 1	Merrimack/Missouri-Rolla	3:30 pm/7:30pm
Sep. 11	Colorado College	7:00 pm
Sep. 14	Colo. Christian Univ.	7:00 pm
Sep. 15	Metro State	7:00 pm
Sep. 25	Fort Hays State Univ.	7:00 pm
Sep. 27	Mesa State	7:00 pm
Sep. 29	Fort Lewis	7:00 pm
Oct. 11	Western New Mexico	7:00 pm
Oct. 13	N.M. Highlands Univ.	7:00 pm
Oct. 19	Nebraska – Kearney	7:00 pm
Oct. 20	Chadron State	7:00 pm
Oct. 24	Johnson & Wales Univ.	7:00 pm
Nov. 2	Regis University	7:00 pm
Nov. 3	UC – Colorado Springs	7:00 pm

Investing in Mines

An investment in knowledge always pays the best interest.

—Benjamin Franklin

Harry D. Campbell '42: Making a Mark on the Mines Campus



It isn't easy to summarize **Harry Campbell's** impact on the Mines campus. Having just celebrated his 94th birthday, the successful Mines alumnus has a long history of involvement with the School, which can be traced at least as far back as when he played on the legendary 1939 undefeated football team.

As a 1942 petroleum engineering graduate, Harry's career spanned a critical period for the oil and gas industry, during which he was able to make important contributions. Over the years Harry has made numerous substantial contributions to Mines

as well. He is a charter member of the President's Council and, in October, he will be inducted into the Platinum level of the Mines Century Society, with his lifetime giving now exceeding \$3 million. He has also maintained his membership in the Colorado School of Mines Alumni Association since the 1950s and has chaired several of his class reunion giving committees.

During his long career, Campbell served as an engineer for Unocal, the president of Franco Western Oil and general manager of the Western Division of Mobil Oil. In 1972, he founded The Campbell Company focused on petroleum exploration. He has remained an active and prominent member of several professional associations, including the American Association of Petroleum Geologists and the Society of Petroleum Engineers.

Harry's generosity over the last six decades has helped the School take great strides in both academics and athletics: "Harry Campbell and his family are among the strongest supporters of Colorado School of Mines' academic mission and athletic goals," said Director of Athletics Tom Spicer.

In particular, Campbell has given considerable assistance to the Mines football team, most recently funding the construction of a new playing field—the Harry D. Campbell Football Field—with a half-million dollar gift. In recognition of his involvement, he holds a place in the School's Athletics Hall of Fame, and Head Coach Bob Stitt attributes the football team's recent advancement in part to Harry's support. "We've been able to hire more talented coaches, increase our operating budget and offer more student scholarships as a result of Harry's longstanding generosity. All of this has enabled us to give our players a truly first-class football experience," he said. Mines' football program moved from the bottom of the Rocky Mountain Athletic Conference to a 2004 conference championship in just five years.

Harry has also extended his generosity to the Department of Petroleum Engineering at Mines. Last year, he gave more than \$1.5 million to establish the Harry D. Campbell Endowed Chair in Petroleum Engineering. An international search is currently underway to fill this position. Campbell has also contributed to the Marquez Hall project, the campaign to raise funds for the new state-of-the-art facility for petroleum engineering at Mines. "Harry has built a living legacy at the School," said Craig Van Kirk, professor and former PE department head. "Dedicated partners like Harry make it possible for Mines to reinforce our academic and research programs and maintain the standards of excellence for which we are known around the world."

Indeed, Mines wouldn't be the distinctive place that it is today without a dedicated community of supporters. Harry Campbell's outstanding philanthropic commitment to the School's people, programs and infrastructure will serve as an inspiring example for generations to come.

Reunion Gift

On behalf of the 2007 reunion classes, Reunion Giving National Chair **John Lockridge '52** presented a check to the School for more than \$2 million. Left to right: President Scoggins, John Lockridge, and Senior Gift Co-Chairs Jennifer Cho and Jenn Crites.





McBride Honors Program Students Donate Awards to Start Washington D.C. Fellowship

When McBride Honors Program seniors Bryan Caruthers, Nathan Hancock and Eirik Pyhtila spent time in Brazil and Washington D.C. studying public policy last spring, they noticed that there were very few policy interns with engineering backgrounds. Along with the rest of their class, they suspected that this was because public policy internships are typically unpaid, whereas most engineering students can secure paid summer internships in industry. To remedy this situation, the McBride students decided to create a paid public internship for Mines students.

When Eirik and Bryan found out they would both be receiving the McBride Philipose Outstanding Senior award, they immediately pledged their \$500 awards toward establishing the internship fund. Nathan, the recipient of Outstanding Graduating Senior award in Geophysical Engineering, also jumped on board, pledging his \$500 award as well.

“When I was told I would be receiving the Philipose Outstanding Senior award, I felt it was the perfect opportunity to put funding behind an important idea. The value of my award increased exponentially by starting a program that will support numerous future McBride students,” Bryan says.

Not only will a paid internship help future McBride students, it will benefit national public policy as well. “We met many political leaders

who expressed the importance of getting scientists and engineers into public policy, especially as our society becomes increasingly dependent on new technologies,” Eirik points out. “In fact, if we had a dollar for every legislator and lobbyist who said this, the money for the internship would already be in the bank.”

“Engineers and people with technical backgrounds are under-represented in public policy. Those with a critical and developed understanding of economics and technology are not contributing their share to the process. Policy suffers as a result,” Bryan adds.

Bryan, Nathan and Eirik hope that the donation of their senior awards will inspire other alumni, foundations and corporations to support the public policy internship fund. “While our ultimate goal is to build a \$100,000 endowment, we hope to at least raise \$10,000 in the next year or two. With this initial amount, we want to be able to award a small stipend to a deserving Mines student to help offset the cost of interning for the summer in D.C. Eventually we hope to make an award comparable to what one would earn in industry, about \$5,000 for the summer,” Nathan says.

*Editor’s note: Shortly before going to press, Mines magazine learned that **Jerry ‘68 and Tina Grandey** have given \$20,000 to the Washington Internship Fund that Bryan, Nathan and Eirik started. If you would like to contribute to the internship endowment fund, please contact the Office of Institutional Advancement at (303) 273-3275.*

ConocoPhillips Contributes \$250,000 to Mines; Other Recent Gifts

Colorado School of Mines recently received three large gifts:

ConocoPhillips contributed \$250,000 to support the ConocoPhillips SPIRIT Scholars Program; the departments of Chemical Engineering, Geology & Geological Engineering, Geophysics and Petroleum Engineering; geoscience graduate fellowships; the Minority Engineering Program; the Society of Women Engineers student chapter; the Society of Petroleum Engineers student chapter; the American Institute of Chemical Engineers student chapter; and the Career Center.

Frank and Dot Stermole gave \$132,157 in continued support of the Stermole Fund for Athletics.

Herb ‘38 and Dodie Young established a trust with a gift of \$104,000 to further benefit the Herbert L. and Doris S. Young Environmental Studies Fund.

Other recent gifts over \$25,000 from individuals, corporations and foundations:

The Adolph Coors Foundation continued its support of scholarships with a gift of \$75,000.

John H. ‘57 and Margo Barney donated \$70,000 to The Mines Fund in honor of Jack’s 50th Reunion, bringing them into the Mines Century Society.

BP contributed gifts totaling \$31,100 to support scholarships; the Minority Engineering Program; lab equipment for Chemical Engineering, Mechanical Engineering and Petroleum Engineering; the Society of Women Engineers student chapter; and the Society of Petroleum Engineers student chapter.

The Edna Bailey Sussman Fund contributed \$45,360 to support environmental internships.

EnCana Oil & Gas (USA), Inc. contributed \$35,000 to support graduate students in the Department of Geology & Geological Engineering.

Infiltrator Systems, Inc. continued its support of Dr. Robert L. Siegrist’s research and educational activities in wastewater systems with recent gifts totaling \$48,000.

With a \$25,000 gift, **Michael G. Long ‘72** established the Nations Petroleum Endowed Scholarship Fund in honor of the time he has spent in Kazakhstan working for Nations Petroleum. This scholarship will benefit students from that region who are majoring in petroleum engineering or one of the earth sciences at Mines.

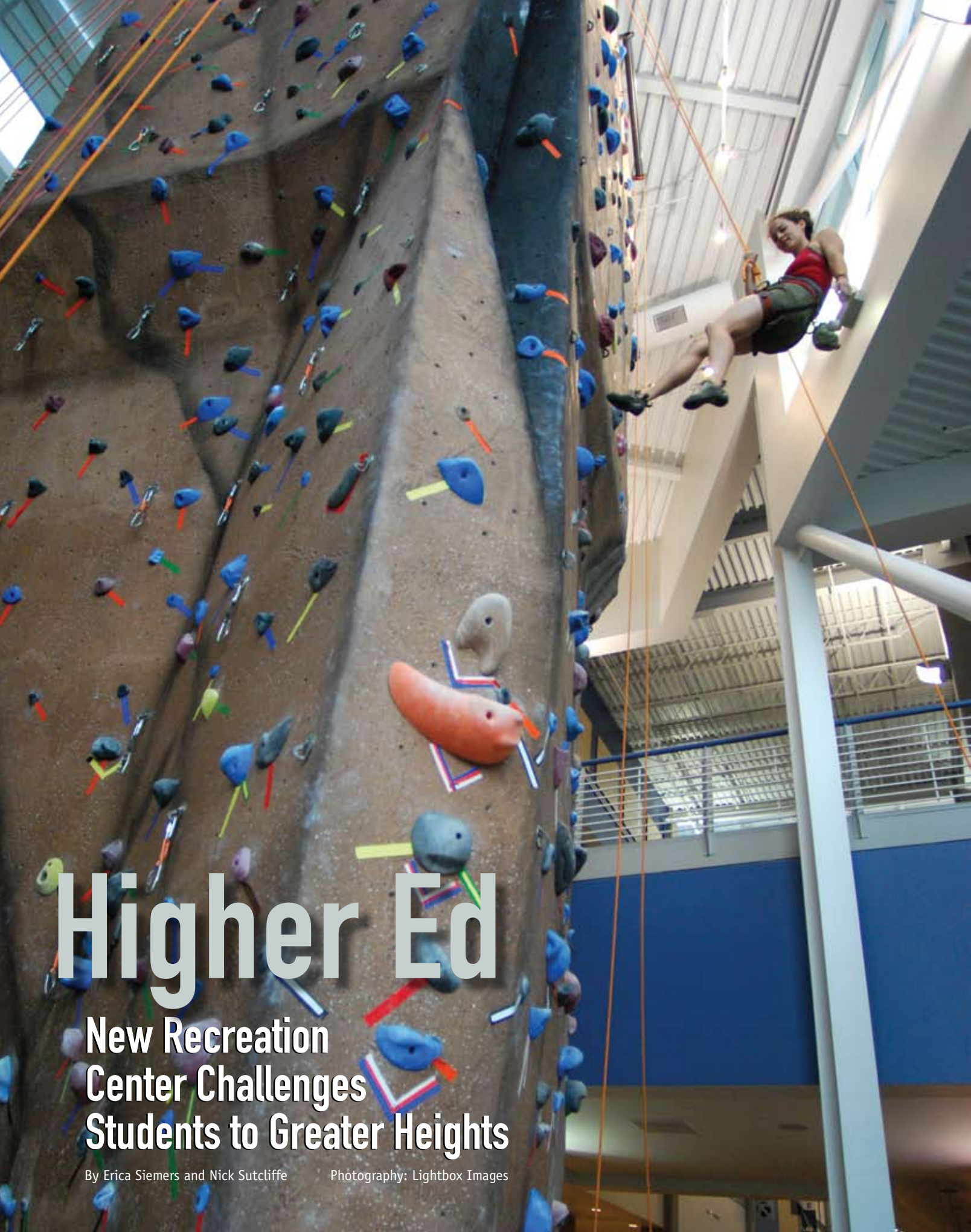
Phelps Dodge Corporation contributed \$71,827 to support a graduate student in the Department of Geology & Geological Engineering.

The Phelps Dodge Foundation contributed \$25,000 to support scholarships.

Harry A. Trueblood, Jr. contributed \$30,000 toward the Harry Trueblood Foundation Scholarship for students in the Petroleum Engineering Department.

Jeffrey Vaughan ‘82 made an unrestricted gift of \$25,000 in honor of his 25th Reunion.

Terry K. Young contributed \$25,000 to establish the Dr. Richard J. Carlson Endowed Rugby Scholarship Fund in honor of her late cousin.



Higher Ed

**New Recreation
Center Challenges
Students to Greater Heights**

By Erica Siemers and Nick Sutcliffe

Photography: Lightbox Images



On August 31, the Mines community celebrated the Grand Opening of its new Student Recreation Center with an afternoon of contests and fitness activities. At the ribbon-cutting ceremony Mines President Bill Scoggins said, “The Student Recreation Center is truly an accomplishment that the entire campus community can take pride in and it stands as a symbol of Mines’ forward momentum.”

The campus’ newest landmark is located just south of the Ben H. Parker Student Center. Approaching the building from the east, your eyes are drawn to an impressive pinnacled feature clad in glass and aluminum. Stepping inside, you get a sense of the scale of the facility: Walkways and balconies encircle a high-ceilinged atrium-style lobby, and a climbing wall towers to the ceiling.

Walk a little further and you can see down the length of the lobby to a juice bar and lounge. Table-and-chair seating

near the bar, a large flat-screen TV, foosball, pool tables, and several sofas create a relaxing space where students can refuel, unwind and socialize.

Adjacent is the Lockridge Arena, a 2,500-seat venue for varsity basketball and volleyball—it can also double as a venue for special events and other sports activities. The arena accommodates three full basketball courts, each of which can be netted off for team practice—a vast improvement over the single court that three varsity teams have been sharing in Volk Gymnasium.

On the second floor, the 5,000 square foot Adolph Coors Fitness Lab is equipped with treadmills, exercise bikes, elliptical trainers, rowing machines, plate-loaded equipment and free weights. The room, which comes complete with TVs and a sound system, commands a spectacular view east toward Table Mountain.

Windows on the south wall of the



Placed near the entry of the Student Recreation Center, this sculpture of a North Plains Indian elder (top) welcomes all-comers to Mines. The bronze casting was a gift from John and Erika Lockridge. In addition to Marvin the Miner, the ribbon cutting ceremony included (above, left to right) Vice Chairman of Mines Board of Trustees and Foundation Board Chairman and President David Wagner, Student Trustee Aprill Nelson, Student Body President Casey Morse, Mines President Bill Scoggins, and Vice President for Student Life and Dean of Students Harold Chevront.



Coors Fitness Lab





Fitness Lab overlook the natatorium, which comprises an 8-lane, 25-yard pool with one- and three-meter diving boards, a hot tub in the shape of Mines' triangular logo and tiered seating for spectators.

Intramural and club sports will make good use of the multipurpose recreational gymnasium, where a 1/16-mile elevated jogging track encircles courts that can accommodate indoor soccer, floor hockey, basketball and volleyball. A nearby activity room provides space for a variety of fitness classes such as yoga, aerobics, Pilates and martial arts. Also on the second floor is a general purpose meeting room that looks out over the heart of campus and opens onto the top tier of the Lockridge Arena stands.


Access to the Student Recreation Center is fee-based: Along with all members of the campus community, current members of the Alumni Association are eligible for membership at competitive rates. (More information online: www.mines.edu/magazine.)

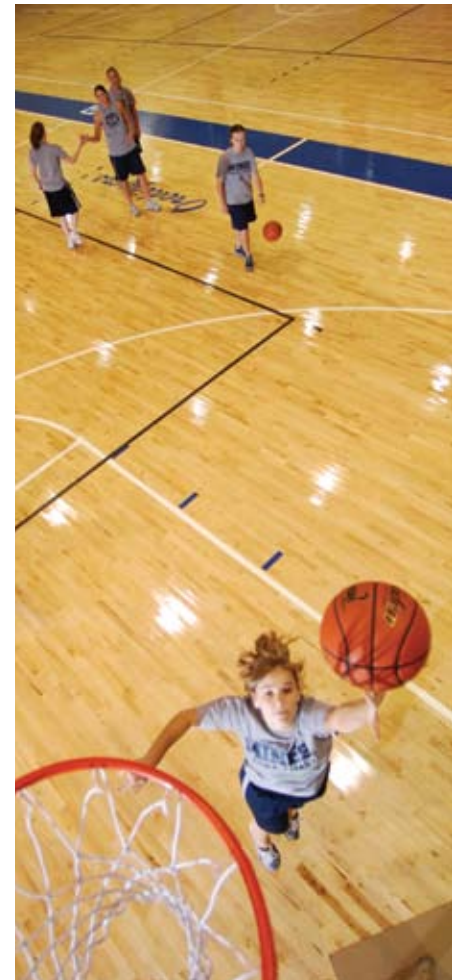
After plans for the Recreation Center were formalized in 2002, funding for the facility came through a number of philanthropic donations and bond financing linked to student fees, which were overwhelmingly approved in a campus-wide vote in 2004. Twenty-two months after ground was first

broken in August 2005, the facility's architects—Sink Combs Dethlefs—have received a design award from *Colorado Construction* magazine.

Since the beginning of the academic year, an average of 825 students and members have visited the facility each weekday, according to the director of recreational sports, Brandon Leimbach. "The Student Recreation Center has something for everyone when it comes to exercise. And the lounge areas have been incredibly popular for socializing, studying or surfing the web on our wireless network," said Leimbach.

In addition to enriching student life, the facility makes a big difference to the School's ability to recruit: "Competition among top-tier schools for high caliber students is intense," notes Vice President of Student Life Harold Chevront. "When academic quality and programs are relatively equal, access to extracurricular activities and recreational facilities often determine a student's college choice."

"Visitors to Mines are impressed with our campus and our location," says Bruce Goetz, director of admissions. "The Recreation Center is a crowning facility that demonstrates to both prospective students and their families that we take the quality of student life seriously." 



Coors Fitness Lab

A Degree of Change

By Larry Borowsky

Let's get one thing straight: Biochemical engineering has nothing to do with cloning.

"That's the sort of thing people automatically think of when they hear that buzzword 'bio,'" laughs Jim Ely, head of the Department of Chemical Engineering. "Cloning, protein manipulation, gene splicing—that's not what biochemical engineers do."

Nor is that the focus of Mines' new Chemical and Biochemical Engineering undergraduate degree program, which was launched this fall. Rather, the new curriculum emphasizes "industrial biotechnology," the most recent wave of a scientific revolution that is already transforming medicine and agriculture. "That's where the future of chemical engineering lies," Ely says, "and where today's students may find the best job opportunities."

So what, exactly, is industrial biotechnology?

Alternatives Offered
by New Biochemical
Engineering
Program



“Traditionally,” Ely explains, “chemical engineers have started with an extractable material such as petroleum, and processed it into a synthesized material—a polymer, for example. By contrast, a biochemical process begins with an organic material like corn and processes it into ethanol or some other light organic chemical. Both of these operations require chemical engineering expertise, but one involves biological raw materials and processes and the other doesn’t.”

The example is fitting because it applies to the energy industry, one of two sectors (along with materials) traditionally identified with Mines’ chemical engineering program. Both of those sectors are evolving, incorporating new biotechnological processes and techniques. Mines is evolving accordingly.

“By 2030,” Ely says, “thirty percent of liquid fuels will come from renewable sources. That translates into a current-day equivalent of 60 billion gallons per year of ethanol, although it is likely to be some other bio-based fuel. We currently produce about six billion gallons of ethanol a year, so we’re talking about a tenfold increase. Who’s going to build and operate all those new biofuel plants? Biochemical engineers. That’s what we’re training these students for. It’s a degree for the future.”

Biotechnology has taken on such significance, both financially and scientifically, that the Accreditation Board for Engineering and Technology recently altered its program guidelines for chemical engineering programs. ABET now requires all chemical engineering programs to include biological content.

“Any serious university in this day and age needs to be strong on the biological side,” says John Persichetti, a lecturer in chemical engineering. “That has been a missing component at Mines. The CBCE (chemical and biochemical engineering) program, along with supporting growth in other Mines’ programs, is one way to help us bridge that gap.”

“The idea is not to redefine chemical engineering at Mines,” Ely says. “The idea is to expand its scope and to better prepare our students for the workplace of the future.”

The new degree program will augment, rather than replace, traditional chemical engineering; Mines will continue to offer a standard CE degree along with the new CBCE major. The new degree entails a couple of curriculum changes. First, all chemical engineering students (whether pursuing a CBCE degree or a standard CE degree) will take a new required course called Biological and Environmental Systems. It will debut in the Spring ‘08 semester and replace a course known as Earth and Environmental Systems. Second, CBCE students will take a special version of EPICS 251 called Introduction to Biochemical Engineering.

Ely doesn’t think the new degree will be a tough sell.

“I surveyed more than 400 students,” he says, “both current Mines undergraduates and high school students who are consider-

ing Mines. Based on those surveys, I would expect an initial total of about 35 CBCE graduates a year. It’s going to be a great degree in terms of opportunities. Employers and recruiters consistently say they need help with biochemical engineering-type problems. The way companies currently deal with those problems is to take a biologist who works for the company and try to train that person in the basics of chemical engineering. But what they really want are chemical engineers who understand biochemical processes.”

“The whole food and beverage sector opens up to students with a CBCE degree,” adds Persichetti. “Anything that’s using enzymatic processes or microbes; anything involving fermentation.”

Persichetti’s own career illustrates the evolution that’s taking place in chemical engineering. During the 1980s and 1990s his work focused on straightforward chemical engineering operations such as petroleum refining and natural gas processing. But in this decade his focus has shifted; he now works on thermochemical conversions of biomass and the production of alternative fuels via enzymatic activity.

“One of my consulting clients, Coors Brewing Company, is actually selling ethanol that they produce from their waste—from sub-grade batches of beer,” Persichetti says. “Their energy recovery philosophy seems like a natural partnership for our program. We even have discussed with them the possibility of establishing a bioprocess engineering lab either on campus or at the Coors plant where our students can work hands-on with ethanol production, fermentation and other biological reactions. Our enthusiasm with the new CBCE program comes, in part, from the enthusiastic response we’ve received from Coors and several other companies.”

The program will also foster partnership opportunities with NREL, which is home to the National Bioenergy Center, while reinforcing the School’s own Colorado Energy Resources Institute. Similarly, this program naturally complements Mines’ participation in the Colorado Center for Biorefining and Biofuels (C2B2), a program that connects researchers at Mines, CU, CSU and NREL, whose common goal is to improve fundamental understanding and develop new technologies in these areas. Ely notes that there is only one ABET-accredited biochemical engineering program in the western United States, and only a handful nationwide. By rolling the new degree out now, Mines maintains its position at the head of the curve and reinforces its long-standing affinity with the energy sector.

“These changes are being driven by knowledge growth,” Ely says. “We’ve learned that there are other ways of doing things. Incorporating that new knowledge into our program is consistent with Mines’ mission. You could even say it’s necessary to fulfill our mission. There has been a paradigm shift in chemical engineering, and this degree program is going to help us stay on top of things.”

“Any serious university in this day and age needs to be strong on the biological side”

Gov. Bill Ritter



On May 11, Colorado School of Mines granted the largest number of bachelor's degrees in the School's history. Spirits remained jubilant throughout the two-and-a-half-hour ceremony, despite an almost cloudless sky and the mercury climbing to almost 90 degrees Fahrenheit.

Festivities had begun the evening before at the Graduation and Alumni Banquet, which had been planned for the Green Center's Friedhoff Hall, but had to be moved to Volk Gymnasium to accommodate the 550 guests who registered. A surprise visit from Colorado Governor Bill Ritter kicked the evening off with an exciting start. Repeating some of the themes from his March visit to campus, he congratulated graduates on their achievements and remarked on the key role Mines plays in the modern world, particularly in energy.

The keynote speaker for the evening was Stephen Bechtel, chairman (retired) and a director of Bechtel Group. Echoing some of the governor's ideas, he spoke of the critical role applied scientists and engineers play in modern society. Bechtel went on to identify three key factors that will keep this year's graduates busy in the coming decades: displacing dependence on foreign oil with environmentally sensitive energy solutions; mitigating the risk of natural disasters in a world made fragile by dependence on technology and complex systems; and the massive demands of "a Third World that wants to move toward a First World standard of living."

2007 Commencement

By Nick Sutcliffe




A packed program of brief speeches and awards followed Bechtel's remarks. Too lengthy to repeat here, a complete list of 2007 student and faculty awardees can be found on the *Mines* magazine website, along with a complete transcript of Bechtel's remarks.


The next day dawned clear and warm. As the faculty processed down the Commons in full regalia, a slight breeze rustled the flags of the many nations represented by 2007 graduates. President Scoggins opened the ceremony by welcoming families and friends of the Class of 2007 to campus. Daniel Ritchie, chancellor



emeritus of Denver University, CEO of Denver Center for the Performing Arts and one of this year's honorary degree recipients, delivered the commencement address, speaking on finding personal fulfillment through a life of service and integrity. He reflected on his own graduation from Harvard Business School more than 50 years ago, remarking on how his most successful classmates are those for whom service and integrity have remained core values, adding "most of the snakes have been run over." (A full transcript of Ritchie's remarks can be found at www.mines.edu/magazine.)

The senior class president, Jennifer Cho, reminisced on all that is unique about a Mines education—where else would you have to carry a 10-pound rock up a mountain, only to get covered with a bucket of whitewash when you got there? She ended by congratulating the class, saying, "We've made it through one of the hardest and most demanding technical institutions in the U.S. Let's go show them what we're made of!"

As Mines bade a fond farewell to its largest undergraduate class in its history, the Alumni Association welcomed that same class into the extended Mines community. 

As Mines bade a fond farewell to its largest undergraduate class in its history, the Alumni Association welcomed that same class into the extended Mines community. 

Faculty award winners



Candy Sulzbach '81 leads the procession

Honorary Degree Recipients

Daniel Ritchie, University of Denver chancellor emeritus and chief executive officer of the Denver Center for the Performing Arts

Stephen D. Bechtel, chairman (retired) and a director of Bechtel Group

Wayne Murdy, chief executive officer and chairman of Newmont Mining Corporation

Distinguished Achievement Medals

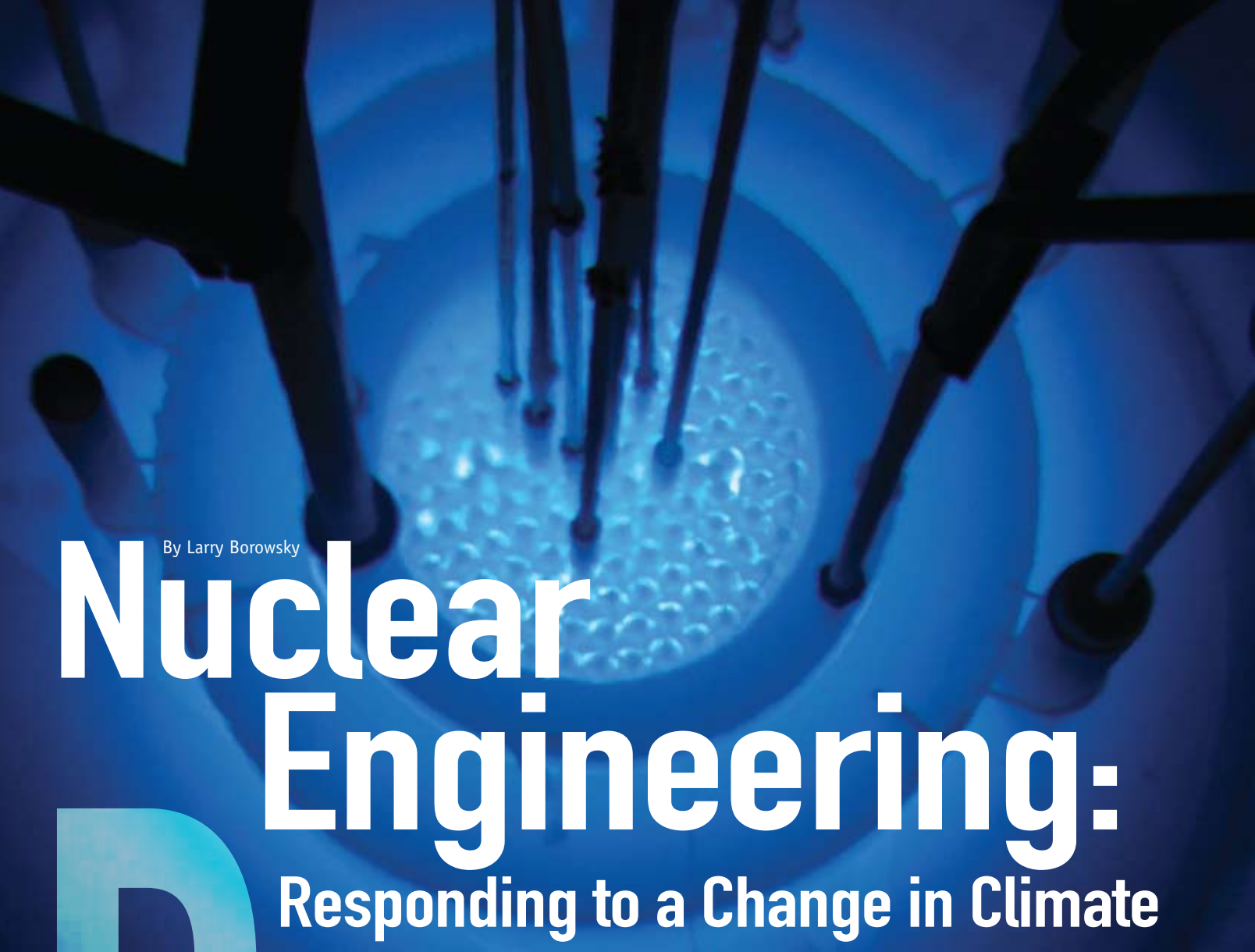
Harry Conger '77, senior vice president of South American Mining Operations and Development for Phelps Dodge

Timothy Marquez '80, founder, chief executive officer and chairman of the board of Venoco

Don Warner MS '56 PhD '61, dean emeritus, School of Mines and Metallurgy, and professor emeritus of Geological Engineering, University of Missouri-Rolla

Stephen Bechtel





By Larry Borowsky

Nuclear Engineering: Responding to a Change in Climate

Dangerous levels of fallout from the Chernobyl disaster didn't reach U.S. shores—not literally.

But for decades the 1986 meltdown at the Soviet nuclear power plant influenced public opinion, driving power companies away from the technology. However, nuclear energy is now making a comeback, and Colorado School of Mines is poised to make a substantial contribution to the industry's educational and research needs.

This fall the School launched the Nuclear Science and Engineering Program, an interdisciplinary graduate program designed to train scientists and engineers, and promote research for the next generation of nuclear power. The academic program will offer a suite of graduate courses leading to MS and PhD degrees. The research component of the initiative, tagged the Nuclear Science and Engineering Research Center (NuSERC), will solicit and coordinate industry-driven projects.

"It's a cradle-to-grave vision," says Jim McNeil, head of the Physics Department. "The nuclear program covers the entire process of nuclear power generation, from finding it in the ground; to processing it; to putting it in a fuel rod; to monitoring the changes in its chemical, material and physical properties; and, finally, to disposing of it responsibly. A detailed and comprehensive understanding of that entire cycle is necessary to generate nuclear power safely."

"It will be the only cradle-to-grave program in the country," adds Bruce Honeyman, a nuclear waste-disposal expert who teaches in the Division of Environmental Science and Engineering. "There's no other program that can train students in every phase of the cycle, so the School is uniquely positioned to capitalize on the increased demand for nuclear expertise."

That increased demand is being driven largely by the need to address

global warming by reducing carbon dioxide emissions from fossil fuels. As public alarm over climate change has mounted, opposition to nuclear energy has softened. Meanwhile, the costs associated with emissions control have made nuclear an increasingly attractive financial option for power utilities. The Nuclear Regulatory Commission is reviewing 17 permits for construction of new nuclear power plants, and it has announced plans to hire another 1,300 engineers by 2008.

A second factor is the graying of the current nuclear work force. In the 20 years since Chernobyl, universities have trained fewer nuclear engineers because there weren't many jobs waiting for them. So the current work force is approaching retirement age at just the moment that the industry's personnel needs are increasing.

The new program unites a wide variety of nuclear energy-related activities spread across almost a dozen departments that have prepared students for specialized roles within the industry for decades. McNeil points out that, "Mines has all the pieces of a comprehensive nuclear engineering program. The Physics Department has a strong nuclear science faculty, Metallurgical and Materials Engineering does extensive research into nuclear materials and fuels, Environmental Science and Engineering conducts research on nuclear waste disposal and containment, Mining has been involved in the Yucca Mountain nuclear waste disposal site and Electrical Engineering faculty have expertise in electric power. The only addition needed is expertise in nuclear systems engineering."

To complete the picture, Mines hopes to attract two nuclear engineering faculty members once the program gets underway this year. "In addition to instructional responsibilities, their job will also be to integrate all the disparate efforts that are underway across campus in the research center and connect them to the national and international research efforts in the nuclear engineering field," says Uwe Greife, an associate professor of physics and the interim director of the academic program.

Currently Greife is focusing on curriculum development and student recruitment. While he intends to recruit nationwide, Mines undergraduates will specifically be targeted. "A number of students have already expressed interest," he says. "For those who do, I am staying in contact and making sure that they take the appropriate undergraduate coursework."

In addition to coordinating existing research efforts, NuSERC will expand the scope of activities with support and collaboration from industry, national labs and federal agencies. "We will be covering mining, processing, synthesis and recycling of nuclear fuels; nuclear reactor modeling and design; materials science of nuclear materials; nuclear waste treatment, containment and disposal; applications of nuclear energy for hydrogen production; environmental health and safety; and environmental processing and policy," says John Moore, head of the Metallurgy and Materials Engineering

Department, who is also serving as NuSERC's interim director.

The program enjoys broad support among Mines' industry and public-sector partners, and it offers opportunities for collaboration with the University of Colorado, Colorado State and research institutions outside the state such as Los Alamos and Lawrence Livermore. One particularly fruitful partnership in place is with the U.S. Geological Survey, which operates a small research reactor at the Federal Center in Lakewood, just six miles from campus. The cost of building a nuclear reactor on campus would clearly be prohibitive. On the other hand, it would be hard to earn credibility as a first-class nuclear science and engineering program without giving students access to the

"Nuclear power generation is already less hazardous than its fossil fuel-based counterpart."


real thing. Because students can take classes on-site at the USGS reactor facility, the program will enjoy a distinct advantage.

Launching the program will not pose any safety concerns for students or the surrounding community, McNeil points out. "There won't be a great change to the use of radioactive material on campus," he says. "We already do research on nuclear materials, but that has been the case for years. The nuclear reactor lab will be taught at the Federal Center, and it is under strict NRC regulation."

McNeil hopes the program will help change the public's perceptions regarding the "dangers" of nuclear power. "We have to get past the politics of the Chernobyl era," he says. "The technology has evolved to a point where accidents like Chernobyl can no longer happen. Chernobyl turned people away from nuclear power, and that's a shame. We need nuclear power today to bear its share of solving the carbon problem."

"If the nuclear industry is to continue reawakening, we have to emphasize safety," agrees Honeyman. "People have a different view of risk vis-à-vis nuclear power than risk associated with fossil fuels. In the public's mind, the risks associated with nuclear power are perceived as greater than for the utilization of fossil fuels. However, if you evaluate and compare the risks of entire life cycles, from extraction to disposal, I'm not sure nuclear comes out so badly."

"It may take a while for perception to catch up to reality," McNeil admits. "But from a purely technological standpoint, nuclear power generation is already less hazardous than its fossil fuel-based counterpart. It's also cheaper," he argues, "once the environmental costs of coal-fired energy are accounted for."

"Historically, a large part of Mines' mission has been in the energy sector," McNeil says. "For many years, we've fulfilled that mission primarily in fossil fuels. For us to continue fulfilling it in the future, it's necessary for us to increase our presence in nuclear power as well. We absolutely want to support a revitalized nuclear energy industry, and we have an important role to play." 



Graduate student Marissa Riegel operates the reactor at the Federal Center during a lab this summer. Opposite page: The core of the Federal Center reactor viewed from above through 20 feet of water.

The Network

Reunion 2007

Reunion 2007 was held May 10–12. The first major event was the 50th Class Reunion Breakfast in the Ben H. Parker Student Center on Thursday morning. Speaking of the many changes the world has seen in the preceding half century, President Scoggins expressed appreciation for the group's many accomplishments.

The Graduation and Alumni Banquet, a new event taking the place of the All-Alumni Banquet and the pre-commencement dinner at Green Gables, was very popular, with 550 people in attendance. Read more about this festive occasion in the feature article on Commencement 2007 (page 24). Alumni Association Awards were presented at this event. (Details of the recipients can be found on page 32.) In addition to this dinner, returning alumni had a variety of activities to choose from throughout the three days. Tours were offered of the new Geology Museum; Arthur Lakes Library; the National Earthquake Information Center; the departments of Mining Engineering, Petroleum Engineering and Metallurgical Engineering; and the new Student Recreation Center. Students offered guided tours of campus, and the ever-popular Geology Trail walk was led by Professor Emeritus Bob Weimer. Other events included a lecture by **Mahdi Obeidi** '67, who headed up Saddam Hussein's nuclear weapons program during its most active years; two faculty symposia; several departmental receptions; a barbeque on Kafadar Commons; and live comedy on Saturday evening.

Class dinners took place on Friday evening at locations around Golden. For the first time the Mines Alumni Association invited "neighboring classes" to attend Reunion 2007, which gave alumni on either side of the "anchor class" an opportunity to reunite with contemporaries they hadn't seen in a while. Neighboring classes are again invited to Reunion 2008. **Make your plans now—Reunion 2008 will be held May 8-10.**



Class of 1957

(All names left to right)

Back Row: Charles "Scottie" Bruce, Jim Classen, Louis M. Bonnefond, Allen Spelman, Alex Chisholm, Tim Thompson, Robert Oliver, Ellis Herrington, John Munn, John Litz, Charles Wilderson. Row 4: Walt Tyler, Ed Van Dell, Gordon Taylor, John Coats, Cecil Craft, Bruce Eberhard, Robert Johnson, Jim Speck, Charles Hinrichs, Will Smith. Row 3: George Blake (with portrait of Dean Burger), Stan Beitscher, Rodney Smith, Buddy Ratcliff, Jim Sundquist, Robert Beckman, Leroy Brown, Ron Briggs, Ralph Avellanet, Roland Pohler, Jerry Tuttle. Row 2: Curtis Bryan, Bill Thompson, Michael E. Carr, Jack Barney, Gill Schoonveld, Bill Jackson, Dave Smink, Henry Gruver, Jim Petersen, Paul E. Kloberdanz. Front Row: Kai Ravnborg, Donald Thistlewood, Moe Orofino, Leroy Bovey, Anton Pegis, Donald Johnson, Charles Threewit.



1936, 1942, 1947, and 1948

Harry Campbell '42, James Mullinax '47, Earl Rau '42, Ben King '47, Frank Seeton '47, Ralph Bradley '47, Al Ireson '48, Bob France '36, Norbert Hannon '47.



1952

Back Row: Don Adams, Cecil, Thomas Young, John Lockridge, David Cole, Frank Fox, Weldon Frost, Gerald Jefferies, James Stroh, Robert Garland. Middle Row: Curtis Conley, Thomas Warfield, Jack Grynberg, Donald Brehm, Patrick McCall, Craig Malin, Norm Zehr, Bill Watts. Front Row: Robert Johnson, Richard Bolender, Drexel Lee, Carl Bieniewski, Stewart Chuber, Jack Cutter.



1997

Back Row: Ryan Bilson, Greg LaFave, Christoff Goss, Kirk Neuhaus, David Crichton, Scott Sheeley, Lee Blazek. Middle Row: Jennifer Van Dinter, Alex Raizman, Katie Hockabout, Jamie LaRocque, Jennifer Mager, Priscilla Thompson, unknown. Front Row: Brad Wolf, Lori Stucky, Veronica Rodriguez, Lisa Ferrario, Stacey Hunvald, Yoxa Mahathongdy, Janelle (Harpoottian) Neuhaus, Meredyth (Stevens) Crichton.

Additional reunion photos may be viewed online at www.mines.edu/magazine.

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John Howe '83
Harvey Klingensmith '75
Martin Kuhn '63, MSc '67, DSc '69

James Larsen '65
Barry Quackenbush '65
Brandon Segura '06
Candace Sulzbach '81
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Services

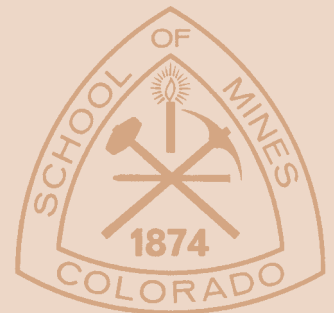
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Bakersfield BBQ

In May, a group of Bakersfield alumni organized a barbeque for Mines students, potential students and other alumni. For information about section events coming up in your area, email Serena Aernie (serena.aernie@is.mines.edu).



Lonnie Kerley '85



Glenwood Springs



Los Angeles

Fresh Faces

In early August, sendoff parties for incoming freshmen were hosted in several locations around the country. In Los Angeles, **Randy Ollmann '98** hosted a party for seven students and their families. In Glenwood Springs, **Glenn Vawter '60** helped gather 10 frosh, giving them a few pointers on what to expect when they arrive in Golden. If you would be willing to host a sendoff party in August 2008, please contact Serena Aernie (serena.aernie@is.mines.edu).

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Three Questions Every Job Seeker Should Answer BEFORE Beginning a Job Search



If you're looking for a job, resist the urge to shine up your resume and race off to the internet. Answer the following three questions first and you'll save yourself time and you could increase your earnings by thousands:

"What do you have to offer?" "What is it worth?" and "Who would pay you for it?"

Most job seekers never stop to consider these three questions, yet doing so can give them a distinct advantage. To answer these

questions for yourself, consider the following seven "clarity questions." Think of a job you've had in the past and answer each question within the context of that job.

1. What industry did you work in?
2. What was the name of the company you worked for?
3. What department or division did you work in?
4. What problem did you solve for that company? (Here's a quick hint. Problems only come in three flavors, regardless of industry, company or functional role. They are making money, saving money or increasing efficiency. It doesn't matter if you're a geologist or a petroleum engineer, the problem you solved for the company was how to make them money. And you did so by applying your skill set.)
5. What was the business impact of solving that problem? (i.e. How much money did you make or save the company?)
6. Who was the highest ranking person in that company who cared about solving that problem?

7. Who are five of that company's competitors?

Now let's pull back the curtain to discover how answering the seven clarity questions actually helps you answer the three time-saving, money-making questions.

Your answer to clarity question four (what problem did you solve?) is "what you have to offer."

Your answer to clarity question five (what was the business impact?) is "what it's worth."

And your answers to clarity questions six and seven (highest ranking person and five competitors) tells you "who will pay you for it."

Let's summarize so you can begin applying this information to land your next job and increase your earning potential. What you have to offer is your ability to solve a specific problem. It is worth as much as, but no more than, what the problem costs the company. The amount you receive to solve it depends on your ability to negotiate. (Now that you know what it's worth, that's easier.) And the person who will pay you to solve it carries a similar title to the highest ranking person who cared about the problem at your old company.

Next time we'll look at unlocking doors, in record time, using the answers to these seven clarity questions.

Richard Hewitt, a 20-year veteran of HR, recruiting, operations and IT, writes and lectures on his job search and career management concepts. Dr. Hewitt, through agreement with the CSMAA, makes his patent-pending job search system available to all CSMAA members as a free benefit of membership. Questions and comments can be sent to richard@impactcareer.com.

Seniors "Make Their Mark"

Eighty-nine generous seniors made gifts that ranged from \$2 to \$50, raising a total of \$2,351 for the Senior Class of 2007 Gift. This year's seniors elected to have their total gift split between The Mines Fund and Arthur Lakes Library.

Mines thanks the Senior Class of 2007 for their kind contributions and leaving their legacy for future Orediggers.



Leadership Level Donors:

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Alumni Association Awards 2007

Presented annually, CSMAA Awards recognize individuals who have made substantial contributions to the success of the Alumni Association and the School. We are proud to present the 2007 recipients, who received their awards at the Graduation and Alumni Banquet held the evening before spring Commencement.

Alumni Teaching Award: Professor Mark Lusk

Since joining Mines in 1994, Mark has demonstrated a profound commitment to student learning. He has taught every course within the undergraduate mechanics of materials curriculum at least once, fundamentally overhauling many of them. His use of technology to enrich learning is well known, as are his exacting standards. One student noted in a nomination letter that "Dr. Lusk is one of the hardest professors I've ever had, and one of the best."

Melville F. Coolbaugh Award: Professor Tom Davis

Tom Davis PhD '74, professor of geophysics and leader of the Reservoir Characterization Project, was selected for this year's Coolbaugh Award, which recognizes outstanding contributions to enhancing the School's reputation and competitive profile. During the last 20 years, Tom has held three key offices within the Society of Exploration Geophysicists, and he has been recognized nationally and internationally for his innovative contributions to seismology. His work for SEG has included organizing technical conferences, workshops and continuing education programs.

Coolbaugh Senior Awards: Brian Crawford, Derek Nash, Kelli Huls and Bryan Romero



By rewarding academic success with need-based financial support for rising seniors, the Coolbaugh Senior Award aims to reinforce academic excellence at Mines.

Kelli Huls plays the flute for the CSM Marching and Concert Band and is an officer for the Society

for Women Engineers. Professionally she is exploring the field of biomechanics and is drawn to technology related to children's rehabilitation.

Bryan Crawford was elected to the National Honor Society while playing varsity basketball at his high school. He once won a bridge-building competition with a structure weighing 70 grams that supported 87.5 kilograms. Since his freshman year at Mines, Bryan has maintained an impeccable academic record while remaining active in intramural sports, the Society of Mining Engineers and his own livestock business.

Derek Nash serves as joint session chair for the campus chapter

of the Society of Petroleum Engineers. He is a member of the American Association of Drilling Engineers and the honor society Pi Epsilon Tau. He is also an active member of the Colorado Aquarium Society.

Bryan Romero has maintained an excellent academic record while at Mines. He works as a teaching assistant for Physics II and as a tutor for Academic Services. While in high school, he was inducted into the National Honor Society, despite needing to hold two jobs. During the summer he participated in a highly selective computer science project in Hong Kong led by head of the Mathematical and Computer Science Department, Graeme Fairweather.

Outstanding Alumnus Awards: Kim Harden '74, Dean Stoughton '75 and George Puls '75



Recognizing service to the Alumni Association, the Outstanding Alumnus Award went to three individuals who played key roles establishing the CSMAA Houston Section endowed scholarships. Thanks to funds raised through the annual CSM Golf Tournament

held in Houston, the endowed funds currently total \$172,000. In 2006, the event raised \$29,000 and in 2007, it raised \$40,000. The tournament is now in its seventh year. During the award ceremony in May, the recipients' wives, Pat Harden, Lindsey Stoughton and Barbara Puls, were also recognized for the significant role they played in the tournament's success.

Alumni Association Honorary Membership Awards: Anthony Corbetta '48, Eldon Jay Mayhew '41 and Stephen Bechtel

A former Mines football player, a World War II Navy pilot and a retired metallurgical engineer, Tony Corbetta is one of the Orediggers' most faithful fans and has been a fixture in the special "President's Box" at Brooks Field for many decades. When he is not involved in Mines affairs, he enjoys playing golf, reading and listening to classical music and opera.

Eldon Jay Mayhew has also been a familiar face on campus for several decades. During his career in mining, he helped start five companies, two of which are still operating. He discovered the potash of the Paradox Basin, a number of uranium deposits and several deposits of rare clays in Nevada.

Stephen Bechtel Jr. is a chairman emeritus and board member of the Bechtel Group. A civil engineer and the leader of one of the nation's foremost engineering and construction firms, Bechtel was awarded an honorary degree at Commencement 2007. A transcript of his Graduation and Alumni Banquet speech may be read on the *Mines* magazine website.

Fast Forward

Class Notes Weddings Alumni Profiles Births Passings

1953

Kelsey L. Boltz recently resigned as president and chief executive officer of Neutron Energy, Inc. He notes that **Dr. Gary Huber '79** was appointed to his former position. He remains as chairman of Neutron Energy, Inc. in Phoenix, AZ.

Francis B. Wreaks, Jr. is retired and lives in Shingle Springs, CA.

1955

John F. Austin is a grower in Hotchkiss, CO.

1957

Zell E. Peterman is research geologist (emeritus) for the United States Geological Survey in Denver, CO.

1960

M. Hassan Alief is chief geologist for UR-Energy USA in Ken Caryl Ranch, CO.

1962

James W. Snapp is retired and lives in Brenham, TX.

1964

Frank J. Anderson retired in December, 2006 from his position as task lead, CH2M Hill, Hanford Group in Richland, WA.

Richard K. Doran is executive vice president for South American Silver Corp. in Denver, CO.

1966

Robert S. Glidden is executive vice president for Sipi Metals Corporation in Chicago, IL.

Roger H. Witte is a consultant for Combustion Performance Consultants, Inc. in Owasso, OK.

1969

Alexander H. Paul is semi-retired and lives in Woodlawn Park, CO.

Walter H. Pierce is director for StartExp in Cypress, TX.

1970

Larry A. Cramer is technical advisor for Independence Platinum. He lives in Zinkwazi, South Africa.

Robert K. Nichols is director of applications engineering for Ipseco Tubulars, Inc. in Houston, TX.

1971

C. Kent Gestrung is a consultant for Photoquest.net in Denver, CO.

Daniel R. Walton is head of coal sales for Hill & Associates, Inc., a Wood Mackenzie company, in Annapolis, MD.

1972

John R. Johnstone is project team leader for Chevron in Angola. His home is in Centennial, CO.

Robert A. King is a consultant for Robert A. King Consulting in Casper, WY.

Michael S. Kirchner is principal engineer for Invensys SIMSCI-ESSCOR in Lake Forest, CA.

1974

Arnaldo T. Leon is general manager for Arnaldo Leon & Asociados S.A., Promotion of Mining Investments & Executive Search, in Lima, Peru.

1975

Carl E. Cross is senior scientist for BAM in Berlin, Germany.

David A. Hoke is a reservoir engineer for ROC Oil in Beijing, China.

Paul J. Shattuck is business development manager for Runge Mining in Lakewood, CO. He is also the owner of Technology Transfer Associates (TTA).

Christopher T. Sheeran is a missionary for Wycliffe Bible Translators in Spokane, WA.

Thomas M. Wolke is a senior process engineer for Brush Wellman, Inc. in Elmore, OH.

1976

Gregory L. Brown is advanced senior geophysicist for Marathon Oil Company in Houston, TX.

Howard E. Janzen is CEO for One Communications in Waltham, MA.

Norman E. Kramer is project manager for PBS & J in Metairie, LA.

1977

Bill Colleary has joined BTA Oil Producers as a senior geologist in the company's Denver office, with a special focus on the Rocky Mountain's Williston Basin. Bill was previously the senior area geologist with GADECO and RSM Production Corp., both subsidiaries of Grynberg Petroleum, where he has been since 1998. Bill and his wife **Eileen (Bennett)** '78 celebrated their 30th wedding anniversary in August. Their four children, Mike 25, Jim 23, Shannon 18 and Tom 10, "can't believe they are this old and have survived each other for so long."

1978

Gerald C. Gilmore is senior explorationist for Crimson Exploration, Inc. in Houston, TX.

Frazer R. Lockhart is site manager for the U.S. Dept. of Energy, Rocky Flats Project Office in Denver, CO.

Richard A. Ruggiero is group management executive for Gaffney, Cline & Associates in Houston, TX.

Mitchell R. Whatley is an attorney for the Law Office of Mitchell R. Whatley in Southlake, TX.

1979

A. Chris Baldwin is general mine foreman for the US Steel Corporation in Keewatin, MN.

Eloise A. Golden is business manager for Patrick Allen Golden, M.D. in Fresno, CA.

Gary C. Huber is president and chief executive officer of Neutron Energy, Inc. in Phoenix, AZ.

David W. Kapple is production engineering manager for Anadarko Petroleum Corporation in The Woodlands, TX.

Anthony M. Meyers is director of engineering support for TXU Power in Dallas, TX.

Profile

Tarbel Honored for Leading the Way in Public Transportation

Brook D. Tarbel '50 has long been making tracks in the City of Tulsa, advocating for user-friendly and efficient public transportation options for people with disabilities. Brook and his wife, Jill, are well-known around town for their professional and



community involvement, and the city of Tulsa recently added another honor to the lengthy list of awards and recognitions the Tarbels share.

Earlier this year, Tulsa Mayor Kathy Taylor proclaimed January 29 "Brook D. Tarbel Day." Not only was Tarbel awarded a commemorative plaque, but Tulsa's main bus station was renamed in his honor. The bustling downtown station at the corner of 4th Street and Denver Avenue is now the "Brook D. Tarbel Denver Avenue Station." This public recognition reflects Tarbel's work raising public awareness of and engineering solutions to universal transportation challenges.

Tarbel is a longtime member and current board chairman of the Metro Tulsa Transit Authority and the first person with a disability to serve on the MTTA board. After a 1969 plane crash left him paralyzed from the waist down, Tarbel began using a wheelchair and developed a strong interest in public transportation. Through his passionate advocacy for people with disabilities, Tarbel met his wife Jill, who also uses a wheelchair as a result of polio she contracted in 1937. Both champion change in the Tulsa area, forming a dynamic team that has helped countless people access public facilities in their city.

After earning his bachelor's degree in petroleum engineering at Mines in 1950, Brook went on to work for Magnolia Petroleum Company, Helmerich & Payne, Inc., and White Shield Oil & Gas Corporation, before founding Tarbel Oil & Gas Corporation in 1971. Tarbel is a World War II veteran who received numerous recognitions, including two Purple Hearts. He is a member of the Society of Professional Engineers and serves on several boards, including the Oklahoma Multiple Sclerosis Society Board and the State Independent Living Council Board. He is also a co-founder of Ability Resources, Inc., a community-based center that assists people with disabilities in attaining personal independence through advocacy, education and service.

Weddings



Nicole Wasinger '01 was married to Christopher St. Jean on March 24, 2007 at Camp St. Malo in Allenspark, CO. They spent their honeymoon in San Francisco.



Adam Berig '02 and **Jennifer Ogawa '05** were married on May 5, 2007 at the top of Lookout Mountain in Golden, CO.



Dawn D. Smith '99 was married to Joseph Gaynor on Nevada Beach on the shores of Lake Tahoe on October 26, 2006.



Stephanie Schlosser '01 was married to Randy Stoeberl in Elko, NV, on February 14, 2007.



Robert Dalton '92 and **Alexandra "Sasha" Querard '93** were married at the Assumption Greek Orthodox Cathedral in Denver, CO, on May 19, 2007. Mines alumni attending the ceremony included (left to right): **Steve Bokros '92**; **Jon Osmond '92**; **Penny J. Pettigrew '92**; **Michael "Misha" Querard '90**; **Constantin Querard '92**; and **Anten Sakagawa '93**.

Douglas E. Thomas has taken early retirement from Saudi Aramco after 23 years in the Far and Middle East and is now consulting from Montville, ME. He may be reached at consulthomas@yahoo.com.

1980

Stephen C. Actis has moved to Beijing, China, where he is the chief drilling engineer for ConocoPhillips.

Charles D. Bushman is a staff reservoir engineer for Cimarex Energy Co. in Denver, CO.

Thomas L. Netzel is commercial manager for Sempra LNG in San Diego, CA.

Donald B. Ratcliff is vice president, marketing, and treasurer for Apex Silver Mines Corporation in Denver, CO.

1981

David R. Crutchfield is an independent consultant in Yukon, OK.

David A. Hill is assistant pastor at Jackson Hole Christian Center in Jackson Hole, WY.

Mark S. Strauch is process fitness lead for transportation for BP in London, UK.

1982

Daniel E. Kelly is Wattenberg business unit manager for Noble Energy Inc. in Denver, CO.

Todd M. Lasnik is a petroleum engineer for U.S. Bank in Denver, CO.

Stefan G. Magnusson is senior vice president of risk management for Cantor Fitzgerald, LP in New York, NY.

Mark A. Nord is a bridge asset management engineer for the Colorado Department of Transportation in Denver, CO.

Colin H. Wagoner is chief executive officer for Ridolfi Inc. in Seattle, WA.

Marcus T. Wichmann is service operations general manager for Lam Research Corporation in Soengnam-Shi, South Korea. His home is in Vancouver, WA.

Karl S. Zachry is enterprise architect & IT strategist for Haliburton in Houston, TX.

1983

Rex A. Bigler is production engineering advisor for Devon Energy Corporation in Houston, TX.

Paul A. Sease is chief geophysicist for Libya Occidental Oil and Gas Corporation.

1984

Jeffrey S. Childs is performance unit leader, GOM joint ventures for BP America Inc. in Houston, TX.

Randy R. Cox is vice president of engineering for WebPartner in Menlo Park, CA.

Steven C. Dunn is Shah Deniz business development manager for BP in Baku, Azerbaijan.

Craig A. Fulton is a commander and public works officer of NAVSTA Newport for the U.S. Navy in Newport, RI.

Scott D. Hamburg is area manager of Neff Rental in Littleton, CO.

Stephen G. Swinney is manager of technical services for Howco Metals Management in Houston, TX.

Grant N. Tucker is a GIS coordinator for Shell Exploration & Production Company in Houston, TX.

Ronald W. VanZandt is optimization manager for ConocoPhillips in Westlake, LA.

Profile

When Dreams Take Flight



Penny J. Pettigrew '92 knew she wanted to do space-related work long before coming to Colorado School of Mines. Back in high school in San Diego, she was captivated by the idea, but it wasn't until her sophomore year at Mines when she attended Space Camp in Huntsville, AL, that she realized it was a possibility. Pettigrew was inspired by the many different roles engineers play in the

space program and the level of teamwork required. Leading a team of astronauts through a simulated Shuttle mission left a lasting impression: "Everyone depended on everyone else to do their job effectively—it was exhilarating." Her experience in Huntsville took her back there for graduate studies at the University of Alabama, where her dreams started to become a reality. With NASA's Marshall Space Flight Center at her doorstep, Penny was able to involve herself directly in NASA research. When she graduated, she quickly landed a job there: "I'd been working with NASA engineers onsite for years. They knew my work and knew I was committed." Since then she's ascended the ranks rapidly and is now the Ares I First Stage requirements and verification team lead for the next generation space vehicle scheduled to replace the Space Shuttle in 2012. In charge of the team that defines the design specifications for thousands of First Stage components, Pettigrew shoulders a considerable amount of responsibility for the ultimate safety and reliability of the space vehicle. In recognition of her career accomplishments, Penny was recently inducted to the US Space Camp Hall of Fame as part of the inaugural class during a ceremony hosted by William Shatner—famous for his role as Captain Kirk in the original *Star Trek* series. In her comments at the ceremony, Penny recognized the support of the many who helped her realize her aspirations, her mother being chief among them: "It was she who first encouraged me to pursue my dreams by sending me to Space Camp, and she has continued to support me throughout my life." Penny lives in Huntsville with her husband, Kyle Hoover, and their one-and-a-half-year-old daughter, Aspen.

1985

John W. Anthony is principal scientist for Noblis in Greenwood Village, CO.

J. Scott Jolly is a test plant manager for Metso Minerals in York, PA.

Carl E. Lakey is senior vice president of operations for Delta Petroleum in Denver, CO.

Mark A. Montoya is president and principal for Visus Consulting Group, Inc. in Littleton, CO.

Mark O. Reid is vice president of engineering for Denali Oil and Gas in Houston, TX.

Michael J. Rosenberg is director for the materials handling market segment for Ballard Power Systems Inc. in Burnaby, BC, Canada.

1986

James C. Hickey received his PhD in earth science from Dartmouth College in 2007. Currently, he is an assistant professor of geosciences at Northwest Missouri State University in Maryville, MO.

Russell C. Schucker is petroleum engineer for Ellora Energy in Boulder, CO.

1987

Roger A. Jaramillo is senior product improvement engineer for Special Metals Corporation in Huntington, WV.

Bill Mallett writes that he and his family are "moving to Rumbai, Indonesia, a small camp about 20 minutes from the 'metropolis' of Pekanbaru on the Island of Sumatra. I will be managing a couple of oil fields for Chevron, the kids will be going to a school with less than 40 students, and Robbin will be learning how to quilt, speak Bahasa and golf, among other goals."

Melanie Marquardt Westergaard is Central North Sea field development manager for BP in Dyce, UK.

1988

Gary J. Lundberg is director of marketing for H&R Block's Digital Tax Solutions group in Kansas City, MO.

Patricia A. Stewart is senior corrosion engineer for Occidental Oil and Gas Corporation in Tupman, CA.

Profile

Revolutionizing Astronomy

Exploring the night sky isn't what it used to be: high-powered telescopes are more affordable than ever and an increasingly sophisticated understanding of the universe is readily accessed through print and electronic media. By heightening interest in the universe, these conditions have fueled a spectacular growth in amateur astronomy—a phenomenon that is explored in the Timothy Ferris film *Seeing in the Dark*, which premiered on PBS stations nationwide on September 19.

In his survey of amateur astronomy, Ferris' film features technology from Software Bisque, the Golden-based astronomy software and hardware company founded in 1990 by **Stephen Bisque** '80. In the film, Stephen, along with his three brothers, Thomas, **Daniel** '89 and **Matthew** '90, all of whom work for Software Bisque, are shown setting up a remote robotically controlled telescope.

Software Bisque's products cover a broad spectrum, offering everything from a student edition of their flagship product called TheSky Astronomy Software, all the way up to remote automated observatory control systems that include the necessary hardware and software. With technology capable of training a telescope



located on a mountaintop half way around the world onto a celestial object invisible to the naked eye, and then projecting the resulting image onto the operator's computer screen, the Bisesques have turned astronomy upside down in more ways than one.

Software Bisque has recently helped to throw open the gates to the universe a little wider, as their technology is incorporated into the *Seeing in the Dark* website (www.pbs.org/seeinginthedark), which enables students and teachers all over the world to view star charts of tonight's interesting objects, or stargaze on demand through the internet using the robotic telescope they setup at a high-altitude site in New Mexico. For future airings of the film, check the above website. For more information about the Bisque brothers' company, visit www.bisque.com.

Bambang Trigunaryah is an associate professor of project management at Queensland University of Technology in Brisbane, Queensland, Australia.

Todd M. Versaw is a services engagement manager for the Microsoft Corporation in Redmond, WA.

1989

Michael S. Lichtwardt is director of global supply chain for Cytec Engineered Materials in Havre de Grace, MD.

Paul E. McElligott is a project manager for ConocoPhillips Indonesia in Jakarta, Indonesia.

Mark J. Oberley is commander in the U.S. Navy in Virginia Beach, VA.

Eric S. Thurston is industry principal, oil and gas for SAP in Greenwood Village, CO.

Steve Sparkowich was recently promoted from corrosion laboratory manager to senior applications engineer in the Technical Services Group of Wah Chang in Albany, OR. Steve is also vice chairman for the ASM Oregon Chapter and a member of AWS Subcommittees A5K & G2D on Reactive Metals.

1990

Dorival C. Pinto is head of the Mining Engineering Department at the Federal University of Pernambuco in Recife, Brazil.

1991

Colin J. Basye is senior environmental engineer for Materials Testing and Inspection, Inc. in Boise, ID.



Thomas J. Harris, Jr. is a design engineer for ASML Optics US Inc. in Richmond, CA. On May 22, 2006, Thomas and his wife Gretchen welcomed their third daughter, Chesney. She joins Spenser (12) and Braeden (9). The Harris live in Marin County, CA.

Joann M. Menebroker is principal environmental engineer for Roche Colorado Corporation in Boulder, CO.

1992

Jere M. Crawley is process equipment engineer for Jacobs Engineering Group Inc. in Cincinnati, OH.

Robert Dalton '92 and Alexandra "Sasha" Querard '93 were married at the Assumption Greek Orthodox Cathedral in Denver, CO, on May 19, 2007.

Brian E. Spencer is process engineer for Huntsman Polymers in Odessa, TX.

Megan A.M. Sullivan is water resource engineer for Colorado State Division of Water Resources in Denver, CO.

1993

Bradley J. Horn works on wind energy development valuations for FPL Energy LLC in Juno Beach, FL.

1994

Kristina M.D. Fehringer is senior industrial hygienist for Bureau Veritas North America in Lakewood, CO.

Dirk A. Kolnsberg is operations manager for ODS International in Houston, TX.

1995

Jeffrey S. DeFord is business analyst for Halliburton in Denver, CO.

Anna C. Hanley is senior project engineer for Veco USA, Inc. in Greenwood Village, CO.

Scott D. Kewley is senior account director for Protocol Marketing in Colorado Springs, CO.

Chris and Katryn (Green) '96 Leone are proud to announce the birth of their first child, Roslyn Sydney Leone on June 19, 2007.

Kara L. Martin is senior quality assurance engineer for Rockwell Collins in Cedar Rapids, IA.

Austina C. Matthias is senior technical consulting professional for Mustang Engineering in Houston, TX.

Pedro J. Ortega is senior process engineer for Albion Sands Energy in Fort McMurray, Alberta, Canada.

MacLean and Amber '97 Price, along with their daughter Ashlyn, announce the birth of Michael Alexander "Alex" Price on February 6, 2007.

1996

Justin M. Lankutis is senior electrical engineer for Kahuna Ventures, LLC in Westminster, CO.

Katryn (Green) and Chris '95 Leone are proud to announce the birth of their first child, Roslyn Sydney Leone on June 19, 2007.

Matthew B. Moore received his MBA from Harvard Business School in 2007. He is an associate for McKinsey & Company, Inc. in Houston, TX.

Nigel D. Phillips is senior geoscientist for Mira Geoscience in Vancouver, BC, Canada.

Jose R. Rodriguez Chacon is reservoir engineer for Total E&P Angola. His home is in Caracas, Venezuela.

1997

Joel C. Allin is senior control systems engineer for Applied Control Equipment in Centennial, CO.

Traci L. Case is project manager for Awwa Research Foundation in Denver, CO.

Aaron D. Close is managing director for Irvine Energy in Houston, TX.

Kirk and Regina (Cristofano) Johnson welcomed their first child, Sarah Ann Johnson, on March 30, 2007, in Anchorage, Alaska.

Yan E. Petchatnikov is energy trader for Fortis Energy Marketing and Trading in Houston, Texas.

Amber and M. MacLean '95 Price, along with their daughter Ashlyn, announce the birth of Michael Alexander "Alex" Price on February 6, 2007.

Tara C. Schenk McFarland is a civil engineer for the US Bureau of Reclamation in Denver, CO.

Kelly Nikel and Derek Reiber announce the birth of their son, Gideon Nikel Reiber, born June 27, 2007.

Michael E. Stahl is senior petroleum engineer for Questar Exploration & Production in Denver, CO.

Lisa D. Thieme is LD leader for exploration for Shell in Rijswijk, Netherlands.

Brent A. Wood is an independent software engineer in Arvada, CO.

1998

Randy R. Anway is principal sales engineer for the Timken Company in Irving, TX.

William V. Fehringer is staff software engineer for Lockheed Martin Corporation.

Jess L. Kindler is Elko store manager for Atlas Copco CMT USA in Elko, NV.

Frank E. Lousberg is process engineer for Behrent Engineering Company in Wheat Ridge, CO.

Robert M. Schulz and his wife, Kendra, announce the birth of their son, Christian Robert, on April 21, 2007. Bob is a business development manager for Golden Energy LLC in Denver, CO.

1999

James S. Golden is financial advisor for Edward Jones in Littleton, CO.

Kelly (Lapinski) and Matthew McAughan announce the arrival of their daughter, Brooke Morgan McAughan, on February 12, 2007, in Houston, TX.

Richard L. Parkes is geophysicist for Resource Solution, LLC in Denver, CO.

Dawn D. Smith was married to Joseph Gaynor on Nevada Beach on Lake Tahoe

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For more information, contact the Executive Director,
CSM Foundation Inc. Linda M. Landrum at (303) 273-3142



Class of 2028



Kip Findley '01 and his wife, Dawn, announce the birth of their son, Garrett Ryan Findley, on June 6, 2007, in Pullman, WA.



Kirk and Regina (Cristofano) Johnson '97 welcomed their first child, Sarah Ann Johnson, on March 30, 2007, in Anchorage, Alaska.



Kelly (Lapinski) McAughan '99 and her husband, Matthew, announce the arrival of their daughter, Brooke Morgan McAughan, on Feb 12, 2007, in Houston, TX.



Katryn (Green) '96 and **Chris Leone '95** are proud to announce the birth of their first child, Roslyn Sydney Leone, on June 19, 2007.



M. MacLean '95 and **Amber '97 Price**, along with their daughter Ashlyn, announce the birth of Michael Alexander "Alex" Price on February 6, 2007.



Kelly Nikel Reiber '97 and her husband, Derek, announce the birth of their son, Gideon Nikel Reiber, born June 27, 2007.



Glenda (Anderson) Rhodes '03 and her husband, Tristan, welcomed their daughter, Chloe Marie, born May 12, 2007.



Bob Schulz '98, and his wife, Kendra, announce the birth of their son, Christian Robert, on April 21, 2007.

on October 26, 2006. The Gaynors now live in Sacramento, CA, where Joseph is a statistician for the USDA.

Angela Runyan was recently married to Matthew L. Groeninger. They live in Erie, CO.

Michael D. Spruiell is in the Global Marketing Graduate Development Program for Chevron in San Ramon, CA.

Duane D. Stroup is an operations research analyst for the U.S. Army Recruiting Command in Fort Knox, KY.

2000

Robert B. Alexander is process engineer for IM Flash Technologies in Lehi, Utah.

Nikki M. Bautista is senior process engineer for Veco USA Inc. in Greenwood Village, CO.

Kim D. Blair is staff engineer for the City and County of Denver, CO.

Brian S. Crandall is principal software engineer for Emerson Process Management in Austin, TX.

Mischa N. Farrell is pipeline safety engineer for Williams Gas Pipeline in Houston, TX.

Karen M. Kronoveter is project manager for Arcadis - US in Golden, CO.

Matthew D. Lengerich is production superintendent for Rio Tinto Aluminium in Weipa, Queensland, Australia.

Mary Larson Troxell is a program manager for BAE Systems in Austin, TX.

2001

Craig M. Clasper is a metallurgy engineer for General Dynamics Corporation in Garland, TX.

Kip Findley and his wife, Dawn, announce the birth of their son, Garrett Ryan Findley, on June 6, 2007, in Pullman, WA.

Jonathan J. Kepler is account manager for Air Liquide in Houston, TX.

Jessie S. McKay is manager for Alvarez and Marsal. She lives in San Mateo, CA.

Michael D. Newton is a multi discipline engineer II for Raytheon in Goleta, CA.

Stephanie (Schlosser) Stoeberl was married to Randy Stoeberl in Elko, NV, on February 14, 2007. Stephanie is a hydrogeologist for JBR Environmental Consultants in Elko.

Nicole Wasinger was married to Christopher St. Jean on March 24, 2007, at Camp St. Malo in Allenspark, CO. They spent their honeymoon in San Francisco and now reside in Arvada, CO. Nicole works for JDS Uniphase and Chris works for Northrop Grumman.

Ricky A. Wibowo is senior petrophysicist for PT Pertamina (Persero) in Jakarta Pusat, Indonesia.

2002

Adam Berig was married to **Jennifer Ogawa '05** on May 5, 2007 at the top of Lookout Mountain in Golden. Adam is a project engineer for Cordilleran Compliance Services in Arvada, CO.

Tara R. Bump is process engineer for the Intel Corporation in Chandler, AZ.

Dale R. Clark is a mechanical engineer and materials scientist for GT Engineering in Redmond, WA.

Nathan R. Dutzmann has been accepted into the Harvard Business School MBA program. He starts in September 2007.

Benjamin D. Gould is a graduate student at the University of Michigan in Ann Arbor, MI.

Cynthia A. Davis Hicks is project engineer for Environmental Resources Management (ERM) in Holland, MI.

Tiffany L. Mensing is a strategic planner at the Pembroke Refinery in Pembrokeshire, UK.

Shira P. Paulson is a geologist for BP. She lives in Twickenham, UK.

Glenn G. Ross is a mining engineer for Texas Westmoreland Coal in Jewett, TX.

Joseph '02 and **Rachael Selby '02** would like to announce the birth of their son, Ireland Gordon, in Valdez, AK, on May 1, 2007.

2003

Andy Aakhus-Witt is field engineer for BCI Wireless in Boulder, CO.

Matthew H. Budin is an explosive consultant and project engineer for Dyno Nobel in Utah.

Angelo S. Gilmore is systems engineer for Raytheon Vision Systems in Goleta, CA.

Joshua M.K. Hodsdon is project manager for North Texas Contracting, Inc. in Keller, TX.

James C. Page is an engineer for Anadarko Petroleum Corporation.

John K. Reinsma is director of International Capital Partners in Denver, CO.

Profile

McNeils Honored for Service to their Community

At a Thornton fundraising event in March 2007, Charlie '71 and Judy McNeil were recognized as the *Arapahoe House 2007 Pillars of the Community*. The drug, alcohol and behavioral health services facility in Thornton, Colorado, chose to honor the McNeils for their widespread philanthropic commitment throughout the Denver metro area. The couple is involved with numerous community groups and Judy has volunteered her time with Arapahoe House for more than 10 years. The McNeils helped organize the nonprofit's Pillars dinner this year, which raised \$315,000 to support child and adolescent treatment programs.

Mines has also enjoyed a long partnership with the McNeils—Charlie has chaired both the national President's Council committee and his class reunion committee, and he currently serves as a member of the Mines Advisory Board. The couple has made significant contributions to the new Student Recreation Center and the facility's hospitality room bears Charlie's name. In 1998, Charlie was honored with the Mines Distinguished Achievement Medal.

A 1971 mining engineering graduate of the School, Charlie has worked in the energy and mining industries for 35 years. In 1993 he founded NexGen Resources, a privately held natural resource company which invests in an array of subsidiary companies also founded by Charlie. He is currently president and CEO. Before establishing NexGen, McNeil held board, president and senior positions with Kaiser Steel, Kaiser Coal, Perma Resources and CONSOL Energy. He is a co-founder of Trident Resources Corporation, a coal bed methane exploration and development company based out of Calgary, and serves as the group's director and board chairman.

Judy is involved with philanthropy in the Denver community, serving in leadership positions with the Denver Center Alliance, the Children's Diabetes Foundation, AWARE, the Central City Opera Guild and Arapahoe House. She presently serves on the Denver Area Public Affairs Council for the Church of Jesus Christ of Latter-day Saints. Both Judy and Charlie, along with the Barbara Davis Center for Childhood Diabetes and the Children's Diabetes Foundation, help chair an annual Halloween party in the Green Center at Mines with the help of the Phi Gamma Delta fraternity.



Glenda (Anderson) Rhodes and her husband Tristan welcomed their daughter, Chloe Marie on May 12, 2007.

Abigail E. (Roulier) Serven is reservoir engineer for Forest Oil Corporation in Denver, CO. She was married to **John R. Serven** on September 16, 2006, at the Stanley Hotel in Estes Park, CO. John is a senior developer for Junction Solutions in Englewood, CO.

Jessica V. Sigala is junior geophysical analyst for Fairfield Industries Inc. in Denver, CO.

Noriko Yao is an engineer II for Hitachi Automotive Products in Farmington Hills, MI.

2004

Michael H. Deneff, Jr. is systems integration and test engineer for Lockheed Martin Corporation in Colorado Springs, CO.

N. Jordan Dimick is a ground water engineer for CDM in Denver, CO.

Jo Ann Murray is a design engineer for Muller Engineering Inc. in Lakewood, CO.

Emily P. Yocom is test and validation engineer for Boeing in Everett, WA.

2005

Ryan P. Cadenhead is wellsite leader for BP. He lives in Golden, CO.

Kimberly H. Doupe is a geologist for Hilcorp Energy. She lives in Houston, TX.

Ikenna U. Egbuonu is senior consultant for Science Applications International Corporation (SAIC) in Houston, TX. He lives in Mississauga, Ontario, Canada.

Brian D. Glater is a reservoir engineer II for Anadarko Petroleum Corporation in Denver, CO.

Justin D. Keener received a master's degree in medical physics from Duke University in 2007. He is a medical physicist for Sherouse Systems, Inc. He lives in Danville, VA.

James L. Lind is a field engineer for BJ Chemical Services in Grand Junction, CO.

Jeffrey M. McDermott is a graduate student at Colorado School of Mines.

Rebekah R. Mullen is a database and .NET developer for Suhaka Consulting in Denver, CO.

Jennifer Ogawa was married to **Adam Berig** '02 on May 5, 2007, at the top of Lookout Mountain in Golden. Jennifer is a project engineer for Weston Solutions in Lakewood, CO.

Rosamond S. Parkhurst teaches math at Ranum High School in Denver, CO.

Jeffrey A. Reimer is a petroleum engineer for Anadarko Petroleum Corporation in The Woodlands, TX.

Emily C. Roland is a joint program student in the Department of Geology and Geophysics at Woods Hole Oceanographic Institution in Woods Hole, MA.

Miki J. Ushijima is a software engineer for the InfoPrint, a joint venture company formed by Ricoh and IBM, in Boulder, CO.

Tristan P. Wellman is a research hydrologist for the United States Geological Survey in Boulder, CO.

2006

Hafiz A. A Mohammed is a field engineer for Halliburton in Bakersfield, CA.

Robert Nichols Benson is in the Management Development Program for Precision Castparts Corporation in Garden Grove, CA.

Stuart T. Fehr is an associate software engineer for Spatial Corp. in Broomfield, CO.

Matthew J. Lannon is an engineer for CH2M Hill, Inc. in Englewood, CO.

Kaitlyn C. Mace is region engineer for BJ Services Company in Denver, CO.

Adam T. Monchak was married to Sarah Beck on December 9, 2006, in Loveland, CO. Adam is a staff engineer for TST Infrastructure in Englewood, CO.

Andrew C. Nobis is a mine engineer for Kennecott Utah Copper Corporation.

Derek W. Sarlo is a mechanical engineer for the RMH Group, Inc. in Lakewood, CO.

Jeremy T. Sell is a process engineer for Chevron Phillips Chemical Company LP in Borger, TX.

Carly E. Skinner is an engineer I for Martin/Martin Consulting Engineers in Lakewood, CO.

Amanda R. Stewart is a fiduciary services specialist for Lipper in Denver, CO.

2007

Laura B. Adessio is pursuing a PhD at the Colorado School of Mines.

Bridget A. Ball is a geologist for the U.S. Geological Survey in Denver, CO.

Richard M. Diaz is a management trainee for Boart Longyear in Salt Lake City, UT.

Gerardo J. Franco is a geophysicist for Chevron in Calgary, Alberta, Canada.

Ekeng I. Henshaw is a geoscientist for Schlumberger, Ltd. in Greenwood Village, CO.

Heather Jones is a production engineer for Petro-Canada, Inc. in Fort McMurray, Alberta, Canada.

Casey A. Korejwo is married to Katherine Korejwo. Their ceremony took place on June 30, 2007, in Colorado Springs. Casey is an engineer for EnCana Oil & Gas (USA) Inc. in Denver, CO.

Calix S. Laboy-Feliciano is a mining engineer for Kinross Gold Corp. in Toronto, Ontario, Canada.

Michael J. McGlynn is a metallurgist for Teck Cominco in Metalline Falls, WA.

Mark D. Nicholson is a geologist for EOG Resources, Inc. in Denver, CO.

Melissa L. Northcott is a geologist for ExxonMobil Corporation in Houston, TX.

Alex Nyarko is senior process engineer for Jacobs Engineering.

Chike E. Okoye is a production engineer for BP America, Inc. in Houston, TX.

Erik J. Pavlina is a research assistant and is pursuing a PhD at the Colorado School of Mines.

Manuel G. Paz is a geologist for Occidental Oil and Gas Corporation in Bakersfield, CA.

Jason D. Schmidt is production engineer for EnCana Oil & Gas (USA) Inc. in Denver, CO.

Rebecca A. Shircliff is pursuing her PhD at the Colorado School of Mines.

Mirna I. Slim is an intern geologist for Schlumberger Doll Research in Cambridge, MA.

Erik Soderstrom is pursuing a PhD at the Colorado School of Mines.

Nathan T. Switzner is a metallurgical engineer for Honeywell FM & T in Kansas City, MO.

Christopher K. Taylor is senior geophysical advisor for Occidental Oil and Gas Corporation in Houston, TX.

Passings

To live in hearts we leave behind is not to die.

—Thomas Campbell 1777-1844



DOUGLAS W. BAINBRIDGE (prof. 1954-1960) of Cortez, CO, died in May 2007, in Cortez. Following an undergraduate degree at Wisconsin and work with General Electric during World War II, he joined the Institute of Engineering Research at Berkeley, where he received an MS in 1952 and a PhD in 1957. The Colorado School of Mines was his first teaching position. He was later department chair at Oregon State University before retiring to Colorado in 1973. He is credited as being one of the pioneers of X-ray crystallography. Doug's wife of 61 years, Lucille, died with him. They are survived by their sons, Robert and David.



BLAIR BURWELL '47 of Rifle, CO, died on November 23, 2006, at Grand River Hospital in Rifle. Blair was born in Denver in 1920. He lived in Mexico with his parents until he was five years old, at which point they moved to Rifle Gap, CO. While attending the Rifle schools he met Virginia Bailey, whom he married in Golden in 1941. Blair enlisted in the Navy during WWII, serving with honors in the Pacific. A third generation graduate of Colorado School of Mines, Blair earned his degree in

mining engineering. Serving as a trouble-shooter for AMEX Mining, he traveled throughout the world and enjoyed sharing stories of his adventures, particularly of Africa, the Pacific Islands and the Arctic. Blair returned to Rifle 10 years ago. He is survived by his wife, Virginia; his daughter, Pamela Burwell; and five grandchildren. He was predeceased by his brother, Alan; his son, Blair; and his daughter, Peggy Kasik.



ROBERT DAVISON '43 of Englewood, CO, died on April 22, 2007. Robert was born on Valentine's Day in 1921 in Montgomery, AL. He graduated from Mines with a degree in geological engineering, before serving as a second lieutenant during World War II with the 977th Engineer Maintenance Company. After the war he remained in the Army Reserves. After his marriage to Stasia Wolak in 1945, he moved to Boulder to study law at the University of Colorado. After graduating at the top of his class, he was hired by the newly formed Holland & Hart law firm in Denver. During his 26-year career with the firm he became a nationally recognized expert in mineral law. During the Korean War, he was recalled by the Army Reserves and served from 1950 to 1952. He was a member of the Colorado Bar Association and the Denver Bar Association, and he served as both director and president of the Colorado Mineral Law Association. A member of the Board of Editors that wrote the American Law of Mining, Robert also served as a visiting lecturer at the CU Law School. He was a director of Mesa Fiberglass Corporation, QED Oil Company and Torchmark Insurance Corporation. He published the Telluride Times newspaper from 1975 until 1981. He was active in civic life, serving as mayor of Cherry Hills Village, CO, for three terms between 1960-1966. He was appointed president of the Denver Community College Development Program by Governor John Love in the 1960s, and from 1970 until 1985, he served as a trustee of Denver Zoo. He is survived by his wife, Stasia; his daughter, Nancy Wyman; his sons, Robert and Thomas; and four grandchildren. He was predeceased by his son, John.



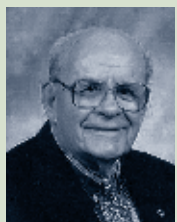
RICHARD DEVOTO '61 died in his home in Genesee, CO, on August 21, 2007. A native Californian, Dick graduated from Palo Alto High School. He attended Dartmouth College where he earned both bachelor's and master's degrees in civil engineering. He then moved west to begin work on his doctorate in geological engineering at Mines, supported by a National Science Foundation

scholarship. He enjoyed a 46-year career in natural resources exploration, development, management and education. He worked in the petroleum industry, first for Mobil Oil Co. in Libya and then Shell Oil Co. in Casper, WY. He returned to Mines as a professor in 1966 and retired in 1987. Following retirement, he worked full time for Canyon Resources as president and CEO, a company he co-founded in 1979. He was also a founding director of an affiliated company in Australia. Dick was a respected academic who published extensively. He was also a creative and enthusiastic teacher and graduate student advisor. His sporting interests included handball, tennis and mountain climbing—he ascended all 54 of Colorado's fourteeners. His passions involved exploring the natural world, history, traveling, reading, and being with good friends and family. Dick is survived by his wife, Judy; his three children, Rob, Julianne and John; Judy's three children, Jennifer, Jeffrey and Gregory; and nine grandchildren.



JOHN EMERSON '38 of Grand Junction, CO, died March 27, 2007, in his home. Born in San Jacinto, CA, in 1914, he came east to attend Mines, graduating with an engineer of mines degree. Following graduation he worked in the mining industry in Colorado, California and Nevada. John married Mary Hastings in 1941, with whom he had three sons. In 1956, he moved to Grand Junction to work for Union Carbide, where he eventually became manager of the

Colorado Plateau Operations, and from there was promoted to general manager of Western Mining and Milling Operations. In 1977, Union Carbide honored John for his many contributions and successes by renaming the second largest tungsten mine in the U.S., The Emerson Operations. John was a charter member of Bookcliff Country Club. He enjoyed tennis and golf. He was a member of the American Institute of Mining, Metallurgical and Petroleum Engineers; Colorado Mining Association; Mining Industrial Development Board, State of Colorado; Western Governors' Advisory Board; and Western Board of Governors, American Mining Congress. In 1972, he was awarded Mines' Distinguished Achievement Medal. He was on the board of directors for First National Bank from 1979 until 1985. He was also on the executive board of Grand Junction's St. Mary's Hospital from 1980 until 1986, serving as board president in 1986. His wife and three sisters preceded him in death. He is survived by his brother, Lee; his sons, Jack, Richard and Stuart; eight grandchildren; six great grandchildren; and his dog Jake, his loyal friend and companion.



JOHN E. HATCH '36 of Davenport, IA died on April 13, 2007. John grew up in Denver and attended Mines on a scholarship. After earning his degree in metallurgical engineering, he worked for Youngstown Sheet and Tube in Youngstown, OH for four years. In 1940 he began working for ALCOA, and simultaneously enrolled at Carnegie Institute of Technology to begin working on his MS in metallurgical engineering. Having earned

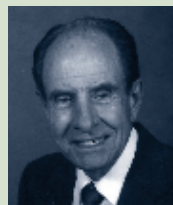
this degree in 1948, he went on to make a substantial contribution to the aluminum industry: in the fifties he helped develop alloys for the wings of the Boeing 737 and 747; in the sixties he worked on the aluminium beer can; and in the seventies he helped to develop large ingot capabilities for ALCOA, which represented a significant contribution to the aerospace industry. In 1956, he came to Davenport to direct the computerization of lot tickets, standard practices and order entry. His career with ALCOA culminated in Pittsburgh where he headed up the Primary Products, Forging, Rigid Containers, and Foil Division. After retiring from ALCOA in 1977, he began teaching metallurgy at Carnegie Mellon University. While teaching at CMU he edited the book *Aluminum: Properties and Metallurgy* (1984) for ASM, which remains an industry standard today. Beyond his professional life, John was active in church matters in both teaching and ministering capacities. His wife of 65 years, Alverta, predeceased him in 2002. He is survived by his three daughters, Carol Baldry, Judy Ashford and Ruth Haas; and six grandchildren.

JEAN PAUL MATHER (prof. 1938—1943, 1969—1980) of Amherst, MA, died on June 21, 2007. Born in 1914, in Del Norte, CO, he attended Mines from 1932 to 1935, before going on to the University of Denver where he earned his bachelor's degree in economics. He completed graduate work in economics at the University of Chicago in 1939 and received an MBA from the University of Denver, College of Business Administration in 1948. He also held a master's degree from Princeton, where he had completed study and research toward his PhD. He taught at Mines as a professor of economics from 1938 to 1943, before moving on to teaching positions at the University of Denver and Princeton's Woodrow Wilson School of Public and International Affairs. He served as president of the University of Massachusetts from 1954 to 1960. His legacy at that institution includes overseeing the establishment of its College of Arts and Sciences, the School of Education and the School of Nursing; increasing the university's emphasis on research; and increasing capacity for a boost in enrollment of 10,000 in advance of the Baby Boom generation. After leaving UMass, he served as president for the American College Testing Program, the Purdue University Research Foundation, and the University City Science Center in Philadelphia. In 1969, he returned to Mines, where he established the Mineral Economics program. He retired in 1980 and moved to Pittsfield, MA. He remarried in 1981 and subsequently moved to nearby Lenox. He is survived by his daughter, Barbara Johnson; his second wife, Harriet Roberts Mather; seven grandchildren; and two great-grandchildren. He was predeceased by his first wife, Marie.



DANIEL McFADDEN '63 of Greybull, WY, died on August 10, 2007 in Princeton, IN. He grew up in Indiana, attending Mount Vernon High School before coming to Mines on a football scholarship in 1959. Three years after he graduated with a degree in mining engineering, he formed Frontier Constructors with his partner Dyke Howell '63, launching the enterprise with a pickup and a \$500 loan. When he retired in 1995 from his position as founder and vice president of Frontier-Kemper Constructors, the firm was one of the top 400 construction companies in the U.S. Included in its portfolio of completed projects are the bridges and tunnels of the Glenwood Canyon section of I-70 in Colorado and the Hoover Dam visitors' center elevator shaft and tunnel, which is bored deep into the canyon wall near the dam. After retiring, he moved to Greybull with his wife, Sandy, to run a horse ranch. Along with ranching, he also helped to guide hunters, and regularly volunteered for the Body and Spirit Therapeutic Riding and Hippotherapy Program. In 1999,

he helped establish Engineering and Construction Innovations, Inc. with his son Shane and several other partners. He was a member of many organizations, including Safari Club International and the Elks Club. In 2002, Mines awarded him a Distinguished Achievement Medal honoring his many lifetime achievements. He was preceded in death by his sister, Yvonne Grabert; and his brother, Michael McFadden. Dan is survived by his wife of 43 years, Sandy (McGowen) McFadden; his son, Shane McFadden; his daughter, Kimberly McFadden-Effinger; and three grandchildren.



EMERY STEFFENHAGEN '41 of Nashville, TN, died on April 14, 2007. Born in Lake City, MN, in 1914, Emery attended high school in Lake City, MN before attending the University of Minnesota. He graduated from Mines with a geological engineer degree and went on to enjoy a 28-year career with Shell Oil Co, where he rose to the level of senior production geologist. He spent six years with USGS from 1975 to 1981 before retiring. After living in and around Louisiana for 39 years, he and his wife, Mary, moved to the mountains near Nashville, in the early 1980s—a region and topography he enjoyed. His interests included woodworking, gardening and bowling. He is survived by his wife, Mary; his daughter, Ann Schumacher; his son, Bill; his brother, Donald; and three grandchildren.



VESPER VASEEN '39 of Lakewood, CO, died on March 28, 2007. Born in the Denver area, he completed his degree in metallurgical engineering at Mines before taking the position of assistant sanitary engineer for the State of Colorado. He joined the U.S. Army in World War II and served until 1946 as a sanitary engineer at two Army bases. Leaving the Army with the rank of major, he went to work for a private engineering firm in Denver, where he was responsible for drawing up the original plat for what became the city of Thornton. He later platted a number of other town sites and subdivisions in the Denver area, and developed several water and sanitation districts. In 1966, he took a position with Stearns-Roger as a project engineer, where he nurtured his talent for invention. While at Stearns-Roger he filed a voluminous number of patent disclosures on a wide variety of subjects including lasers, solar power, odor scrubbers and auto emissions control. In 1980, he founded AVASCO Consulting Engineers and devoted himself full-time to his inventions. In the years that followed, he successfully developed new technologies in fields as far ranging as mining, power generation, medicine, educational games and brewing. He also authored more than 70 articles and technical papers—his personal papers and notes were donated to the School in 1996. He is survived by his wife of 66 years, June Novak Vaseen; his daughter, Gail Vaseen Hardesty; his son, Dale Vaseen; two granddaughters; two step grandsons; and a great-granddaughter. Editor's note: *Mines* magazine regrets that the photograph printed alongside Vesper Vaseen's obituary in the previous issue had been incorrectly identified as Vesper. We extend our sincere apologies to the family for the error.

Also In Memoriam

Eduardo J. Regalado '42August 21, 2005

Harold L. Mendenhall '38May 21, 2006

Foss' Doors Close—An Era Ends

After 103 years serving the Colorado School of Mines and Golden communities, Foss Drug closed its doors for the last time on Friday, August 24. Linked to Mines like no other Golden establishment, Foss Drug conjures memories for almost every Miner. Through an email sent out in July, *Mines* magazine invited alumni to share some personal memories of Foss. If you would like to add your memories to those below, send them to magazine@mines.edu for us to add to the website version of this article.

Foss timeline courtesy Rocky Mountain News

1903: E.L. Gallinger and Fred M. Root open the Gallinger-Root Drug Co. at 1219 Washington Ave. in Golden.

1913: Henry J. Foss buys the store and renames it Foss Drug

1918: Foss dies in the flu pandemic. His wife, Dorothy, assumes management of the store.

1920s: Foss opens a chocolate factory and ice cream soda shop, using excess butterfat that the Adolph Coors Co. generates after it stops making beer and switches to malted milk during Prohibition.

1937: Dorothy hands management of the store over to her son, Frederick Allen "Heinie" Foss, who has just received his pharmacy license.

1941: The store expands for a second time and renovates for a more art deco appearance, including a red neon sign.

1951: Foss annexes the whole building at 1224 Washington Ave., tripling the store's size.

1961: The lunch counter is upgraded to a full restaurant, the Carriage Room.

1982: Heinie turns 65 and cuts back to part time. Bob Lowry is hired as pharmacist and later becomes president and majority owner.

2001: The restaurant, which had become the Golden Ram, closes.

2007: Foss Drug closes, although liquor sales continue.



I learned to drink coffee at Foss Drug. I found it a nice supplement to No-Doze for 'all-nighters' and a boost for 'mornings/mornings-after.'

—Art Petersen '64

Foss Drug was our Sunday morning breakfast meeting ground. We partied Friday and Saturday and had to face up to the obligation of hard study on Sunday. We would gather for breakfast about 10:00 am and, after an hour or so, go hit the books. Heinie was a great supporter of Mines from Burros on up and catered to us students whether it was clothes, supplies or booze. What a passing in history that the store will finally close! Just like the passing of the Nugget!!!

—Jim Classen '57

My wife, Elva Jean McNeely, worked for Foss Drug 1948–1949 as a waitress. If it had not been for her employment there as an untrained but desperate wife of a hard-up Miner with two young children, we might have had to drop out of school.

—Wayne McNeely '51

We used to buy a keg of Coors every Wednesday in the alley and drag it up the hill on a dolly to 807 14th Street for poker night!

—Dave Wilson '84

Back in 1942, my dog Rex, a collie mix, lived with me at the Beta Barn and would follow me or other Betas to class. The Sig Alphas had a big St. Bernard who would follow them around. Rex was fast and agile. The St Bernard was not. Rex figured out that he could harass the St Bernard, but the St Bernard could not retaliate. One day when we were coming out of Foss Drug we met a couple of Sig Alphas and the St. Bernard, who promptly took after Rex. Rex retreated into the store with the big bruiser right on his tail. Rex did a quick 180 around a counter and out the door. The St Bernard did not make the corner and slid into another counter upsetting it and spreading merchandise far and wide. From then on, and perhaps forever after, there was a sign on the front door: "NO DOGS ALLOWED"

—Jim (Woody) Woodruff '48

From 1987–1991 my grandfather and I would meet at Foss almost every Sunday morning for breakfast. They had the best chicken fried steak ever!

—James Ruble '91

A coffee table in the Ram was reserved in the morning by Mr. Foss for a group of locals, including the Fleming and Co. lawyers, Tom Plummer, a professor, my classmate Dave Coolbaugh, and others. I crowded my way in to join the group. When the Ram closed, the group moved to the 13th St. Bakery, where some members still meet. Mr. Foss rarely shows up, but when he does, he always has a friendly greeting.

—Roland B. Fischer '42



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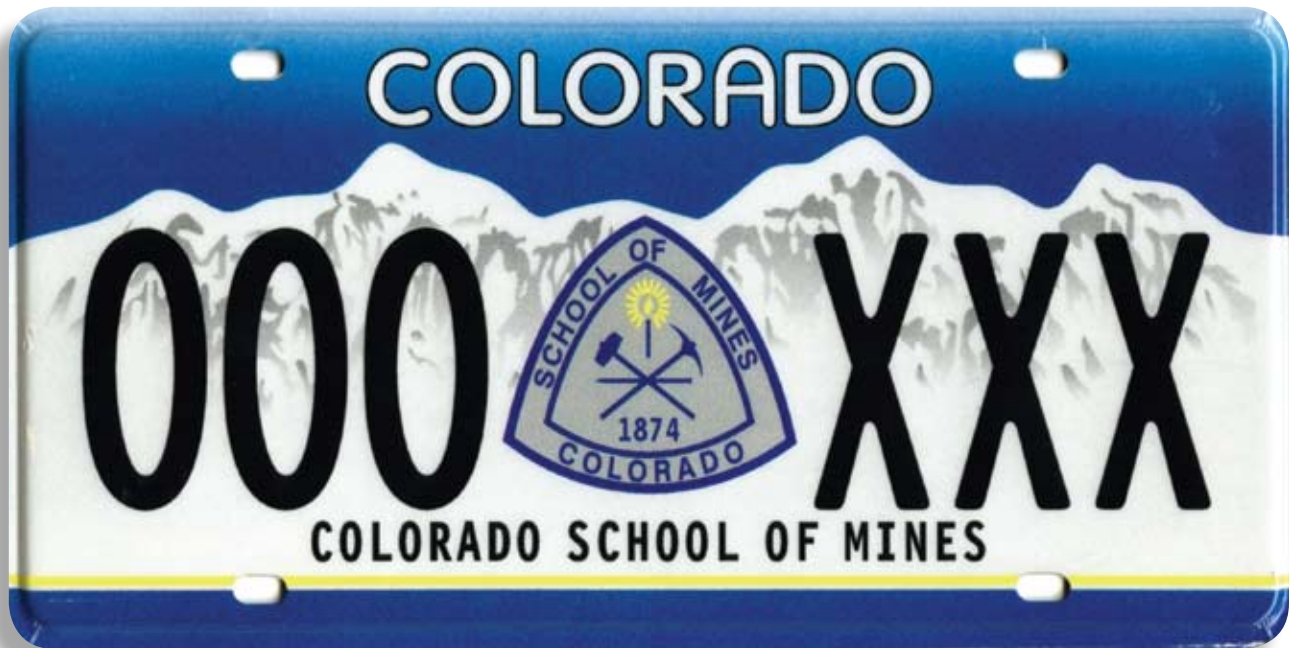


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