

Tapping into geothermal

Blazing a Nepalese trail

Fresh look at urban water

Fall 2011 Volume 101 Number 2

Mines

Colorado School of Mines Magazine



New College, New Digs, Bright Future



EXPLORATION IS A NATURAL FOR US

At SandRidge, exploring for natural gas and oil is second nature. We use experience, creativity and the latest in cutting edge technology to find reserves in regions considered by many to be too difficult.

Although energy exploration is what we do, playing a positive role in the ongoing development of our local communities is what defines us. We believe the key to true success lies in the active participation of enhancing the quality of life for those around us.





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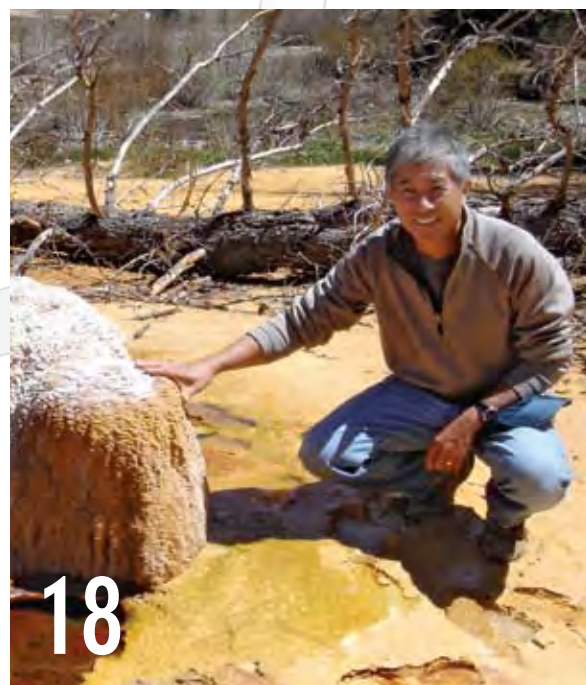
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With \$1.5 million in DOE funding, Mines is making important contributions to the revival of interest in geothermal energy, including helping to develop computer models of systems that could help harness energy from steam miles below ground.

22 New College, New Digs, Bright Future

What's that rumbling over at Brown Hall? It's the completion of a \$32 million addition and, for the first time in Mines history, the creation of a college. In our interview with the provost, read how these changes are aimed at securing the school's future.

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When he thought of what he could do to preserve and improve the way of life for the small village of his youth, Lhakpa Sherpa found willing aid in Mines alumnus David Pesek '09 MS '11 and 13 Mines students, who traveled to Nepal to help to restore a trail in the Khumbu region.

Cover: The photo of the Brown Hall addition was taken by Tyson Brown '08, a graduate student studying metallurgical and materials engineering.

Reader survey comments

Mines magazine emailed a readership survey in May, to which more than 1,600 alumni responded. To complement the analysis provided in *The Network* (p. 30), we offer a selection of comments that were provided anonymously by respondents in response to three survey questions.

Does any story from the recent past stand out for you? If so, which one?

I am a water lawyer and do a little oil and gas work, so the recent stories about the Hoover Dam bypass bridge [Fall/Winter 2010] and plugging Macondo [Spring 2011] were fantastic. I am not an engineer; my daughter attended Mines for three semesters.... I appreciate that the articles are nontechnical enough for me to understand. I even read the obituaries; the lives of your alumni are amazing.

I liked "A Sound Approach to Landmine Detection" [Spring 2011] because I spent many years in Libya where land mines are still a big problem.

I particularly enjoy the articles about new research and technology. Right amount of technical facts, insight and length. I have learned a lot from these articles that I don't think I could have learned from any other source!

Macondo plugging and Terry Fox story [Spring 2011]: Both showed that a Mines experience can lead to expertise in a chosen curriculum or the work ethic to pursue other challenging endeavors.

Please detail anything else you would be interested in reading about (optional).

It would be great to have a humor section, emphasizing Mines' unique traditions and history, or just contributions from readers.

Information about the mentoring program and functions involving current students meeting with alumni. I also would like to know more about the ethics curriculum.

I'd like to see more candid photos and articles about the students' everyday life at Mines.

If you have any other comments about *Mines*, you may provide them here.

Every article in *Mines* magazine is written with the right balance of technical facts, pride in the Mines community (without bragging), and sensitivity about people's lives and accomplishments. *Mines* always highlights the right new technology at the right time.

I would like to see less or no coverage on athletics... and a lot less on minorities and women in science—they are Miners just like I was (and a minority woman at that). I like to see the focus on academics and research, but still feature undergraduate training, as this is the core of Mines. I enjoy seeing alumni profiles and the contributions they've made in their fields and/or how a Mines education helped them.

Considering how well Mines' athletic teams have done in recent years, we don't give enough mention to those teams.

I think the magazine is great. I am a vascular surgeon now and completely out of the engineering field, but I enjoy reading through the magazine and seeing what is going on in the engineering world and with CSM graduates.

I was disappointed that you took the alumni updates out of the magazine and placed them on the Internet. The updates are the main reason for reading.

Ed.: *You're not alone; many readers want to see the Class Notes back in print. Unfortunately, we simply do not have room to list this level of detail for every alumnus/alumna. We are considering options for secure but simpler online browsing; for now, if you keep minesonline.net bookmarked and create a login, you'll find that searching for your classmates is quick and easy (instructions on p. 36).*

In my opinion the *Mines* alumni mag reads like every other college alumni rag. When I went to Mines, we weren't like every other college. Nerdy, maybe, but we were different. I'd find the magazine more interesting if it were more edgy.



Mines is about natural resources. Discuss them and eliminate articles about "green" energy, global warming and other such nonsense.

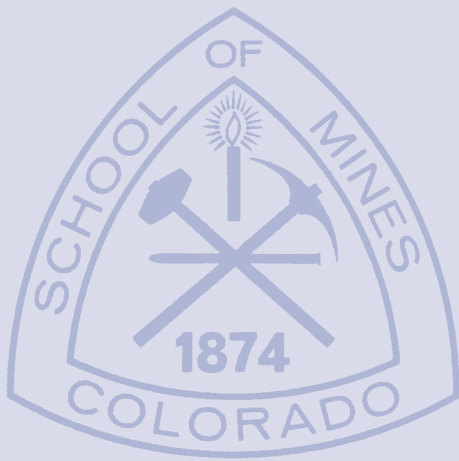
Ed.: *Our goal is to tell Mines' story in its entirety. While Mines' reputation in natural resources continues to be excellent, students and faculty study and work in fields that are not directly related to them. In particular, research in alternative energy is expanding and necessary.*

Alumni profiles seem to be directed at those who have succeeded in business and who give to Mines. There are a lot more alumni out there who are interesting and do not fit this profile.

Ed.: *While the value of donations to the school is indisputable, alumni featured in the magazine are chosen on the basis of interest to readers, not their level of giving. Transformative gifts to Mines are newsworthy and those who give them often have interesting stories to tell. However, we never reference a subject's giving history before deciding to pursue a story. If you know of anyone connected to the school whom you think we should write about, please let us know.*

If it is an alumni magazine, it needs to have some reasonable focus on alumni. I now consider it a school propaganda publication.

Ed.: *Since the school stopped publishing Mines Today in 2000, Mines magazine has been published for both the campus and alumni communities. Most issues include a feature story on an alum, as well as profiles, Class Notes, Passings and other alumni news. We find articles about campus are read with interest by alumni (see survey results). The bottom line is, thanks to an outstanding legacy and the combined accomplishments of the many connected to the school, it's a transformative period for Mines, and there is no shortage of good news. Please come back to campus and judge for yourself.*



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Dear Readers,



Innovation is a theme that runs throughout this issue.

While not everyone is driven to innovate, it's second nature for those connected to Mines, and the people and projects covered in the pages that follow provide an interesting cross section of the many ways a spirit of innovation permeates the Mines community.

"It's There for the Taking: Geothermal Technology Heats Up" is the most obvious example. If enhanced geothermal energy can be successfully engineered and scaled up, it's an immense resource that could offer an almost unlimited source of power with minimal carbon emissions. Too good to be true? Possibly, but where better than Mines to conduct such innovative research?

What is innovative about a student trip to Nepal featured in "Clearing the Road Not Taken"? I'm impressed

by David Pesek's spirit of exploration and adventure, and I think his approach to assisting less fortunate communities, while simultaneously providing a fulfilling experience to those he recruited for the trip, is interesting and, yes, innovative.

How about reorganizing two departments and the Division of Engineering into Mines' first college ("New College, New Digs, Bright Future")? It's a creative solution to a problem that has persisted for many years, and it demonstrates organizational agility and an ability to embrace change.

The profile of Brock O'Kelley (p. 42) discusses his meticulous overhaul of numerous extractive processes at Mountain Pass Mine, the nation's only substantial source of rare earth metals. Innovative? Definitely. Similarly, the profile of Fran Vallejo (p. 35) and our spotlight on Annette Bunge (p. 14) feature women who have met with outstanding success after stepping out on their own and pioneering new pathways.

"Reinventing the Nation's Urban Water System" (p. 10) describes an exciting NSF-funded partnership with Stanford, Berkeley and New Mexico State aimed at innovating new approaches to water treatment. And "Partnering with USGS, Expanding Opportunity" (p. 8) reports on the signing of a memorandum of understanding with the USGS that creates a new framework for expanding cooperation and student involvement with the agency, whose footprint on the Mines campus dates back to the early 1970s.

To represent such an innovative institution, *Mines* magazine is looking for new ways to better engage readers. If you haven't yet checked out our multimedia page at minesmagazine.com, please do so. It includes links to the Colorado School of Mines YouTube channel and other videos, and from there you can subscribe to our podcast, which includes a growing collection of audio recordings.

Helping to make all this possible is *Mines* magazine's new managing editor, Amie Chitwood, who joined the alumni association staff in August. With well over a decade of experience in publications, she's already made an impact on this issue, and there will be more changes and innovations to come, so stay tuned.

We hope you enjoy this issue, and encourage you to take a few moments to share your thoughts by commenting at minesmagazine.com on any of the articles that follow, emailing us at magazine@mines.edu or calling the number listed in the masthead to the left.

Best wishes for a happy and restful holiday season.

Nick Sutcliffe
Editor and Director of Communications
Colorado School of Mines Alumni Association

Mines is published three times a year by Colorado School of Mines and the CSM Alumni Association for alumni and friends of the school. *Mines* magazine is a critical communication serving the Colorado School of Mines community. Its mission is to keep readers informed about the school, to further the goals of the school and the alumni association, and to foster connectedness.

Comments and suggestions are welcome. Contact us by email, magazine@mines.edu; mail, *Mines* magazine, P.O. Box 1410, Golden, CO 80402; or phone, 303.273.3294. Just need to update your address? Go to minesonline.net/edit_my_info.

Campus News

Maple Hall Opens Its Doors

On August 19, 291 members of the Class of 2015 moved mini-refrigerators, laptops and laundry baskets into a brand-new residence facility located north of 17th Street on the east side of Maple. The first residence hall built on campus in more than three decades, Maple Hall comprises 98,000 square feet of living space and is LEED Silver-certified for its energy-efficient and sustainable design features.

Mines magazine recently toured the \$27 million facility, beginning in the spacious lobby, where the school's logo is deeply etched into a 6-foot-square slab of sandstone. With large windows facing north, comfortable seating, a gas fireplace and a grand piano, the area is bright and welcoming. We continued through several lounges and study areas, a game room, a multi-purpose meeting room, two outdoor courtyards and a community kitchen.

Our guide pointed out thoughtful details en route:

Students have access to a sound-insulated room for music practice, and there's space for bikes, skis and snowboards

in a large storage space that doubles as a workroom for student projects.

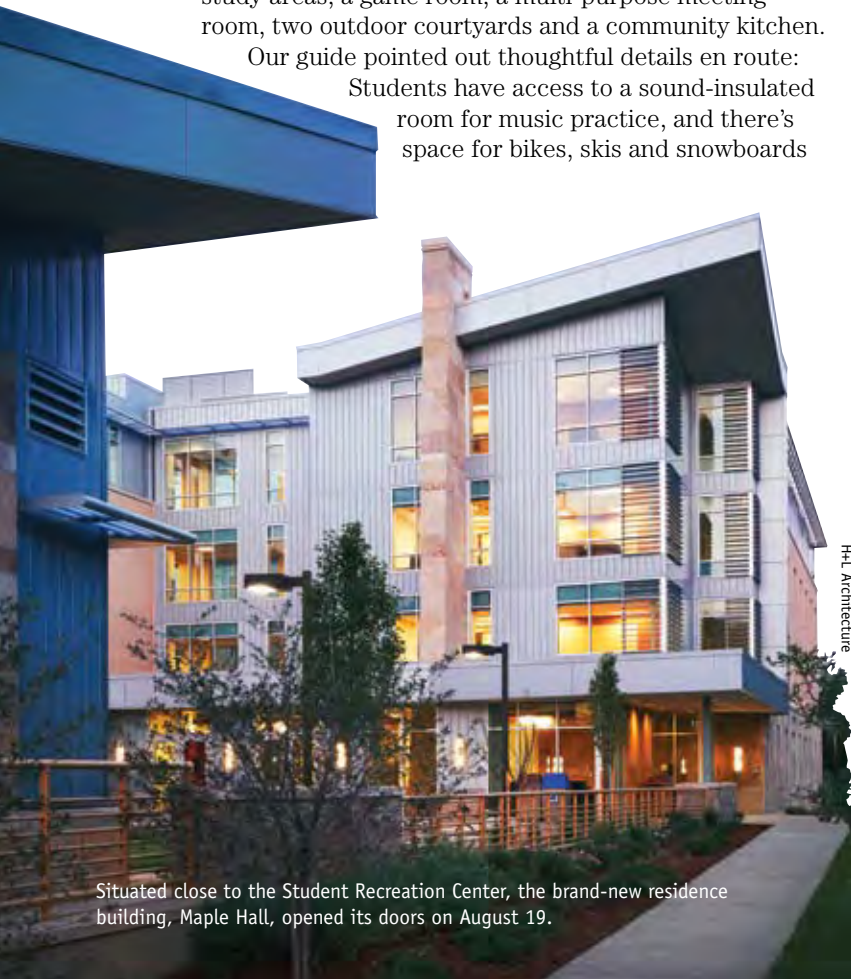
Students we met along the way seemed pleased by their new home. Geology major Schaefer Buchanan, one of just a few sophomore students living in the residence hall this year, likes the way suites share a bathroom with the next-door room instead of an entire floor accessing communal washing facilities. He also remarked on the amount of community space and natural light, and the fact that they have access to group study areas and multimedia technology. "Last year we would have to go to the library or another building to study or rehearse a presentation, but that can all be done in the building now," he said, adding that having a pool table right downstairs isn't bad, either.

The residence hall occupies an area of campus that has been transformed over the past few years: The Student Recreation Center that opened in 2007 is just across the street, and the Brown Hall addition next door also opened this fall. A little farther off, at the corner of Elm and 18th streets, ground will soon be broken on the \$2.8 million W. Lloyd Wright Wellness Center, a 9,000-square-foot facility that combines medical, dental and counseling services in a single modern facility.

Connecting these and other residential buildings to the heart of campus is a pedestrian plaza stretching south on Maple Street from West Campus Road to 17th Street, and along one block of 16th, between Maple and Illinois. Eliminating vehicles from an area that now attracts more pedestrians than ever has had a big impact. "That part of campus feels more integrated now—it's brought the surrounding buildings together," says Will Weiskopf, a sophomore majoring in mechanical engineering. "It's nice to move around and not have to think about cars."

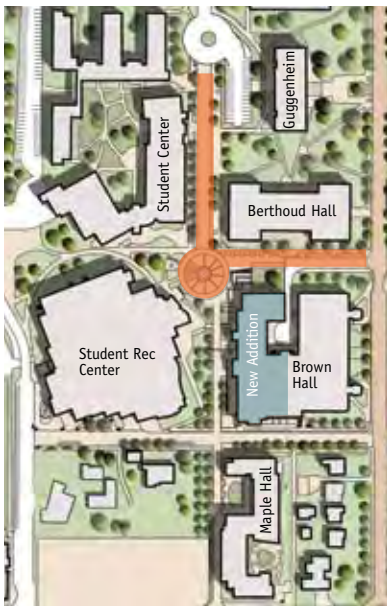
Multiple dividends

These investments bring Mines closer than ever to achieving the long-articulated goal of transforming the school into a truly residential campus. Starting this fall, all of Mines' first-year students are required to live on campus, bringing the total number of students in residential housing to approximately 1,000. With renovations to Weaver Towers ongoing and additional residential



H+L Architecture

Situated close to the Student Recreation Center, the brand-new residence building, Maple Hall, opened its doors on August 19.



HH Architecture

facilities in the works, the school may be able to offer modern and centrally located housing to both the freshman and sophomore classes within a few years, while reserving accommodations in Mines Park west of campus for upperclassmen, graduate student and family housing.

Vice President for Student Life Dan Fox explains the reasoning: “Investments in our residential and recreational facilities are aimed at creating a more expansive educational experience.” Fox says that concentrating freshman and sophomore students close to the campus core is helping to create a more cohesive student community, which in turn creates numerous leadership opportunities. At the same time, the school can offer more recreational sports programs and a broader spectrum of extra and co-curricular activities, and proximity makes it easier for students to collaborate on group assignments.

Admissions is seeing dividends, too: These changes help the school compete for high-performing applicants. “We target students at the top end of the bell curve. It’s a small group, and they have options. Now that we can offer a more traditional residential campus experience with



Above left New campus construction includes Maple Hall, an addition to Brown Hall and two pedestrian walkways (identified in orange).

Above The new residence hall’s spacious lobby provides a comfortable place for students to gather.

Left The modern accommodations are seen as a draw for top-performing students.

modern accommodations and recreational facilities, we are a more attractive option,” says Heather Boyd, director of enrollment management.

By several measures, this year’s incoming freshman class is the most academically prepared in decades. Their composite SAT score, which has increased 20 points each of the last three years, is the highest on record at 1290; their average ACT composite score is 29; and the average high school GPA is 3.8. Of the 970 incoming students, 40 percent are non-resident, the largest number ever admitted in a single class. It’s also a diverse group: Students hail from all corners of the nation and 16 foreign countries, women make up 25 percent of the class and 17 percent are ethnic minorities or multiracial.

Not surprisingly, the administration plans to forge ahead with a strategy that appears to be working, so in the future expect to see more efforts aimed at transforming not only Mines’ infrastructure, but also its academic and co-curricular programming, to foster a richer and more holistic student learning experience.

—Trisha Bentz Kendall

Hiring Frenzy

The caliber of today’s Colorado School of Mines students is reflected in continued high demand for graduates. Mines was again the top-ranked public university in the country for starting salaries of graduates with bachelor’s degrees, according to PayScale’s 2011–2012 College Salary Report. The report places median starting salaries at \$63,400 and mid-career salaries at \$106,000. Of last May’s graduating class, 81 percent reported placement within three months of graduating, and recruiting activity on campus continues to increase rapidly. Fall 2011 Career Day, which included 206 companies, sold out in only 10 weeks and more than 40 companies were on the waiting list for the event.



Explore more of Maple Hall in a photo gallery at minesmagazine.com under Web Extras.

Partnering with USGS, Expanding Opportunity

Located on the south side of the Mines campus, the U.S. Geological Survey's National Earthquake Information Center is one of the most advanced seismology centers in the world and the first place where many major media outlets turn for information in the aftermath of a major earthquake anywhere in the world.

While many Mines students and faculty have been involved in their work since they came to campus in 1974, many will graduate without having set foot inside their facility, located at 18th and Illinois streets.

However, thanks to a new agreement signed in May by USGS Director Marcia McNutt and Mines President Bill Scoggins, this should be less likely in the future. "The synergies between the USGS and Mines have been substantial for years, and the relationship has provided Mines students with hands-on research, internship and fieldwork opportunities," says David Wald, an adjunct associate professor of geophysics at Mines and a supervisory research geophysicist for the USGS. "This MOU facilitates more student involvement, and I hope it brings



David Tauchen

In May, USGS Director Marcia McNutt and Mines President Bill Scoggins signed an agreement that, in part, aims to equip scientists and engineers with the knowledge to address environmental issues.

additional avenues for collaboration."

The agreement, a memorandum of understanding, creates the Science and Engineering Collaborative, which opens the door for collaboration in numerous fields encompassed by the USGS, in particular the areas of rare earths and critical minerals; uranium discovery and utilization; multi-hazards, such as earthquakes and landslides; and un-

conventional natural gas and hydrates. In the past year, the USGS hired Mines students to work on four projects: petrophysics in the Tuscaloosa area of the Gulf Coast; debris flow impacts in the Great Sand Dunes National Park; dynamics of the world's largest oil and gas fields; and the environmental implications of uranium.

Tim Musgrove, a junior at Mines majoring in petroleum engineering, worked with Troy Cook of the USGS this summer on oil field characterization. "It gave me valuable exposure to a real-world work environment and a broader understanding of the petroleum industry," he says.

In addition to student engagement opportunities and jointly taught courses, a geo-hazard lecture series sponsored by Mines and the USGS began in August. The first of these featured Thomas Jordan of the University of Southern California, who spoke on earthquake forecasting; in September, Dalia Kirschbaum of NASA's Goddard Space Flight Center lectured on remote sensing of landslides; and in October, David Rogers



Joel Bach



Ryan Marshall

Love the smell of chain grease in the morning? A gorgeous day in Golden greeted racers for Stage 6 of the USA Pro Cycling Challenge, which took riders up and down Lookout Mountain, through the center of Golden three times and into Denver for the finish. Many members of the Mines community were present to cheer on the cyclists. American cyclist Levi Leipheimer won the race, and Durango's Tom Danielson finished in fourth place.



View more photos of the event at minesmagazine.com under Web Extras.

of the Missouri University of Science and Technology lectured on flood protection systems in New Orleans post-Hurricane Katrina.

Speaking at commencement last spring, in the aftermath of disasters that included the earthquake in Haiti and the Macondo well blow-out, Director McNutt said, “These challenges have underscored for me how dependent the USGS, the nation and, in fact, the world are on scientists and engineers to solve an ever-more complex tangle of man’s interaction with the environment. If we are to reduce risk, we must continue to attract scientifically and technically savvy researchers and technicians who ... acquire new skill sets and constantly remain relevant as problems wax and wane in importance and as new solutions present themselves.”

This partnership is one way to provide future generations of leaders every opportunity to do just that.

—Trisha Bentz Kendall

Geology Museum Welcomes the Empress of China

One of the largest, highest-quality rhodochrosite specimens ever mined was displayed in the Colorado School of Mines Geology Museum this summer. The arrival of the Empress of China, as it has been dubbed, was celebrated at a July 28 opening reception, and the specimen remained on exhibit until September 30. Valued at \$1.6 million, the specimen was discovered in April 2010 in the Wutong Mine in China’s Guangxi Province.

At its largest dimension, the specimen measures about 15 inches, with petals up to 7.5 inches across. The state mineral of Colorado, rhodochrosite (manganese carbonate) is a relatively soft stone (3.5 on Mohs scale) made of manganese carbonate. Until it gained popularity with collectors, it was discarded into tailings piles because it was detrimental to the silver mining process. The specimen came to Mines thanks to the efforts of Bryan Lees ’85, owner of Collector’s Edge Minerals in Golden. Lees leased Sweet Home Mine in Colorado in the early 1990s (now closed), which had been producing what some sources say were the finest rhodochrosite specimens in the world—until the Wutong extractions appeared.



Chris Pederson

Is it a flower or a mineral? Bryan Lees can't help smiling in the presence of the Empress.



Find a photo blog of the setup and reception linked in this article at minesmagazine.com.

In Brief...

Mines is the **top-ranked university in Colorado** in the 2012 edition of U.S. News & World Report’s listing of “America’s Best Colleges and Universities,” ranking 75th in the category of Best National Universities, both public and private, and 52nd in the publication’s listing for Best Undergraduate Engineering Programs at schools with doctoral programs.

Mining industry representatives from around the world traveled to Mines in August for a three-day course on rare earths, entitled, “**Introduction to Rare Earth Geology, Mineralogy, Mining, Mineral Processing, Extractive Metallurgy and Economics.**” This presentation of current technology in the field was a first of its kind in the United States, and included lectures from Mines faculty and executives from Molycorp Minerals and Rare Element Resources.

Assistant Research Professor **Eric Toberer** has been selected as the recipient of the 2011 Young Investigator International Thermoelectric Society Award. The award will be presented to him at the ICT2011 banquet in Traverse City, Mich., where he has been invited to speak. Toberer’s outstanding contributions have been documented in a number of journal publications on synthesis and transport properties of advanced thermoelectric materials with complex crystals structures.

The **Mining Engineering Design Team** (called Golden Aggregates) took first place at the Student Design Competition, which is jointly sponsored by the Society for Mining, Metallurgy and Exploration and the National Stone, Sand and Gravel Association. Golden Aggregates, made up of **Koehler Anderson, Greg Begalle, Michelle**

Harman, Douglas Low, Ben Reisinger and Logan Ronhovde, competed against 17 teams from around the United States.

Former Senior Vice President for Finance and Administration **Kirsten Volpi** left Mines in August to serve as chief administrative officer for the U.S. Olympic Committee in Colorado Springs. Replacing her beginning October 31 was **Joseph Trubacz**, who was previously vice president for finance and administration at the University of Alaska.

Mines’ **Physics Department** ranked fifth nationally in the number of degrees granted during the 2009-2010 academic year, according to a recent report by the American Institute of Physics covering data for 724 degree-granting physics departments.

Reinventing the Nation's Urban Water System

Most current urban water systems were designed and built in the first half of the 20th century and are ill-prepared to cope with the impacts of climate change, population growth and ecosystem demands. On top of that, the infrastructure is deteriorating.

That's the opinion of a team of researchers at Mines who have joined forces with colleagues at Stanford University, the University of California at Berkeley and New Mexico State University to form the NSF-funded Engineering Research Center for Re-Inventing the Nation's Urban Water Infrastructure (ReNUWIt).

Supported by a \$20 million grant, the ERC will work to develop new technologies, educate policy makers and the public, and evaluate water systems that integrate traditional and new technologies with natural processes and environments.

Water management systems don't make use of current technologies, says Tzahi Cath, assistant professor of environmental science and engineering and director for Mines' Advanced Water Technology Center (AQWATEC). "Everything flows in and out of centralized treatment plants across large networks of sewers and pipes. That uses quite a bit of energy," he says. "We purify most of our water to a high quality, but then use it for things like washing cars or flushing toilets. There is a lot of inefficiency."

Such inefficiency is increasingly hard to afford in an era of aging infrastructure, tight public works budgets and changing climates, all of which affect water supply. Smarter, more efficient water systems are desperately needed, and Mines is a key partner in the NSF's single largest initiative to address the issue.

"Ideally, we'd be able to tweak our systems so that you can produce water of different qualities for different reuse applications," explains Cath—an approach they refer to as tailored water reuse. Such an approach makes the most sense in decentralized treatment systems, where water is treated and reused without moving it long distances. Just such a system is already operating on campus at Mines Park, where a membrane bioreactor reclaims 7,000 gallons of wastewater a day and is capable of purifying it to 10 times the clarity of drinking water standards.

The beauty of the system is that you can also dial it back. The idea is to cleanse only to the quality needed for the intended use, which saves energy and money. Water for cooling towers doesn't need to be as clean as agricultural irrigation water, which doesn't need to be as clean as the water running to our kitchen sinks. "There are many applications where you don't need to meet the highest quality standards," Cath explains.

However, public health regulations don't yet permit water



ERC ReNUWIt 2011

The ERC and Mines' own Tzahi Cath place high value on educating young students about the importance of developing energy-positive water treatment systems.

treated by facilities like the one at Mines Park to be used for multiple purposes. So one of the goals of the ERC is to challenge such policies. "We're looking at a system-level approach and long-term impacts," says Jörg Drewes, the ERC's research director and a professor of environmental science and engineering at Mines. "This includes technology, policy, social perception and economic issues."

As they prepare for the years of research ahead, developing ways to measure the costs of different water systems is an important priority. These new metrics will gauge a broad range of factors, including water usage, finance, energy, carbon footprint, pollution and maintenance. To evaluate a range of different systems and approaches, we first need to have a basis for comparison, says Cath.

They will also be looking at how to generate potential revenue streams. Cath points to a line on a graph indicating the nitrogen levels of water coming out of the bioreactor at Mines Park over a two-week period. The line is relatively flat for several days, and then climbs to a much higher concentration, where it flattens out. "We made a small adjustment to the operating conditions inside the bioreactor and deliberately increased the nitrogen content of the treated water," says Cath. Nitrogen is an important fertilizer, so the ERC will be looking at the economics of using this resource in, say, urban landscapes. Another option the ERC will be investigating is converting nitrate into an energy resource such as nitrous oxide.

While there is a lot of hypothesizing at this point, the NSF wants practical engineered solutions from the ERC, and the team at Mines is keenly focused on delivering. "We want to be a game-changer," says Drewes. "We want new ideas that are actually implemented in practice. This has never been funded in the past, so the world's environmental engineering community is watching us. It's a tremendous opportunity for us, and for our students. I believe we have a chance to educate a generation of global leaders."



—Larry Borowsky

Watch the project in action in a video at minesmagazine.com; click on Web Extras.

KEEPING THAT OLD DOODLEBUGGER SPIRIT ALIVE!

Prospectiuni SA is a major provider of geophysical acquisition, processing and interpretation expertise, with over 55 years of experience serving the international Oil and Gas industry. Prospectiuni operates internationally and we are teamed with technical partners to provide specialised solutions. We have major plans for further expansion into the worldwide market.

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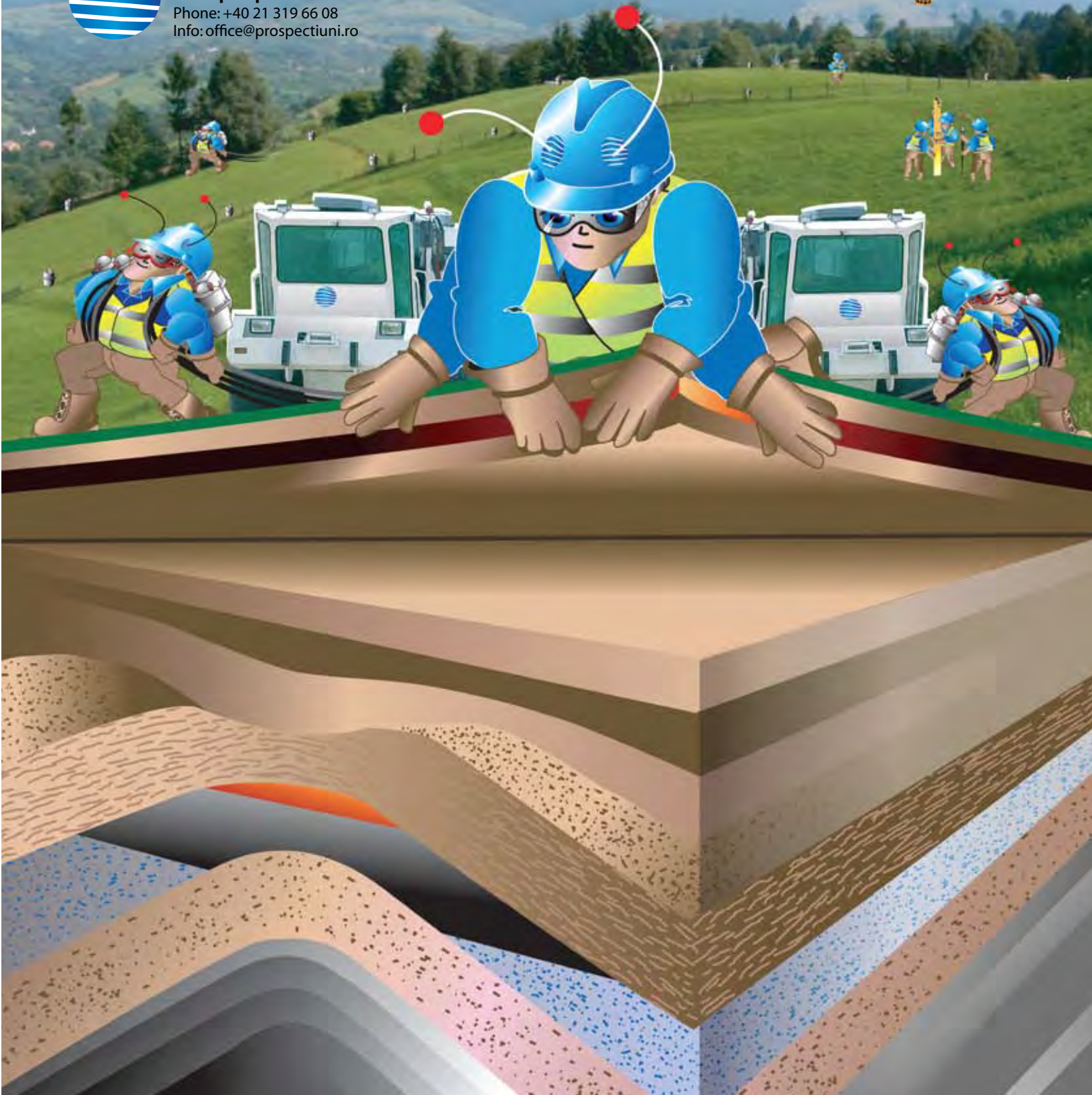


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Investing in Mines

An investment in knowledge always pays the best interest.

—Benjamin Franklin

Philanthropy Celebrated at the Mines Century Society Dinner

At the 2011 Mines Century Society Dinner on September 30, the university honored some of its most generous donors. This year's event was themed "Rio to the Rockies" to highlight Mines' many collaborative relationships in South America. Guests, who



Stuart Alden

Student tango dancers Ben Collins and Ashley Fish performed for more than 350 guests.

included members of the Century Society, President's Council and Heritage Society, enjoyed food, music and dancing reflective of the region. Held in Lockridge Arena, the program included an Argentinian tango performance by members of Mines' Student Ballroom Dance Club and the presentation of awards recognizing the outstanding philanthropic contributions of faculty and staff, young alumni and other members of the community. Franklin J. and H. Darlene Stermole were presented with the Tourmaline Award; two couples, James A. '99 and Louise J. Plutt '00 and Jack '02 and Lindsey '02 Sayers were given the Young Philanthropist Award; and Steven A. Sonnenberg '81 received the Faculty and Staff Philanthropy Award. Additionally, President Scoggins paid special recognition to the new and rising members of the Century Society listed below.

New and rising Mines Century Society members

Individuals whose lifetime giving to the school exceeds \$100,000 are honored as members of the Mines Century Society at Copper, Silver, Gold, Platinum and Diamond levels.

Diamond Level \$5,000,000+
John P. and Erika H. Lockridge***

Platinum Level
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Lawrence B. and Rose Curtis*
Warren L. and Ada B. Wright*

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\$100,000–\$499,999

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Scott A. Dickson
Hershal C. Jr. and Trudy Ferguson
Richard I. and Marie Kuehl
David W. Schlendorf
Ronald W. Scrivner
Robert H. Jr. and Judith A. Waterman

*Previously a Copper MCS member

**Previously a Silver MCS member

***Previously a Gold MCS member

Mines Community Welcomes New Executive Vice President for University Advancement

In June, the Colorado School of Mines Foundation named Brian Winkelbauer the new executive vice president for university advancement.

Brian came to Mines from the University of Colorado Foundation, where he last served as vice president for development for the Colorado Springs campus, assisting in launching a \$1.5 billion campaign for the CU system. While at UCCS, Brian led the campus to two of the best fundraising years in its history,



Lauren Urban

Brian Winkelbauer is the CSM Foundation's new executive VP for university advancement.

helping to name three facilities in the process. Prior to his tenure at UCCS, Brian was the senior director of development for campus programs at CU–Boulder.

CSM Foundation Maximizes Support for Mines

Each year, the CSM Foundation provides approximately \$12 million in private support for the university, one-third of which comprises funding made available through the Mines endowment. During fiscal year 2011, the endowment grew in total value from \$166 million to \$196 million. Over the last decade, \$117.5 million in foundation support has been made available to the school, including more



Visit giving.mines.edu/mcsdinner for event photos, videos and awardee bios.

than \$2 million annually in flexible funding raised through The Mines Fund and related initiatives.

In addition to cultivating private support for Mines among the university's alumni, friends and corporate partners, the CSM Foundation provides resources for priority campus initiatives:

- \$10.3 million in bond financing for construction of the GRL building
- \$3 million loan to Mines for construction of the Student Recreation Center
- \$2.2 million in private property purchases to foster campus growth
- \$800,000 for classroom renovations in Berthoud Hall
- \$350,000 to support Mines' technology transfer initiative

- \$200,000 toward Marquez Hall, in addition to \$26.4 million raised for its construction
- \$17 million in board-designated endowments to support professorships, programs and scholarships

Founded in 1928 as the official gift-receiving agency for Colorado School of Mines, the CSM Foundation was incorporated in 1951 and now holds and professionally manages the Mines endowment. Contributions to the Colorado School of Mines Foundation are tax-deductible as provided by the Internal Revenue Code.

The Colorado School of Mines Foundation promotes the university's mission and enhances its continuing excellence by maximizing support from the private sector and prudently stewarding its resources and relationships. Learn more at giving.mines.edu.

ConocoPhillips contributes \$700,000; Southwestern Energy continues support for Marquez Hall: Other recent gifts

Colorado School of Mines recently received 14 large gifts:

A \$100,000 gift from **Lonnie L. and Maria E. Abernethy** will provide continuing support for graduate fellowships in ceramics.

Anadarko Petroleum contributed \$200,000 toward its \$1 million pledge to the Marquez Hall Building project and the Department of Geology and Geological Engineering.

BP made gifts totaling \$200,000 toward student scholarships and petroleum engineering faculty support.

Harry D. Campbell '42 completed his \$700,000 commitment to the Marquez Hall building project with a final pledge payment of \$157,769. One of the university's most loyal and generous alumni, Mr. Campbell passed away May 6.

The CMG Reservoir Simulation Foundation contributed \$249,982 in continued support for the CMG/CSM Reservoir Modeling Research Chair.

Bequest distributions from the estate of **Gwendolyn Collins** totaling \$200,000 will establish the Haskell Ross and Gwendolyn Collins Endowed Scholarship Fund.

ConocoPhillips contributed \$700,000 toward the Marquez Hall building project, the ConocoPhillips SPIRIT Scholars program, the Minority Engineering Program, and several academic departments, faculty and programs.

Marshall C. III '67 and **Jane Crouch** gave \$172,500 to establish the Alumni Engagement Fund and support projects including the Marquez Hall building project and the Clear Creek Track Project.

Tim '70 and **Mary Haddon** contributed \$220,600 in continuing support for the school.

Vernon A. Jr. '64 and **Kaye Isaacs** gave \$103,224 in gifts and pledge payments to support the Marquez Hall building project.

John P. '52 and **Erika Lockridge** gave \$143,894 to the Blaster Scholarship Fund to support student-athletes participating in varsity basketball at Mines.

Pioneer Natural Resources made a \$100,000 gift in support of the Marquez Hall building project.

Southwestern Energy contributed \$416,666 toward its \$1,250,000 pledge to the Marquez Hall building project.

Franklin J. and Darlene Stermole gave \$250,090 to the Clear Creek soccer project.

Other gifts of \$25,000 and more from individuals, corporations and foundations:

The Adolph Coors Foundation contributed \$75,000 to support the Adolph Coors Foundation Opportunity Scholarship Fund.

Aqua-Aerobic Systems contributed \$40,000 in continuing support for the Advanced Water Technology Center (AQWATEC).

Baker Hughes contributed \$66,000 in support for a laboratory in the Department of Geology and Geological Engineering, the Minority Engineering Program and the Society of Women Engineers.

Chesapeake Energy contributed \$25,000 in continuing support for student scholarships.

Stan and Judy Dempsey gave \$25,000 to support Arthur Lakes Library and the Dempsey Endowment for Special Collections.

Devon Energy contributed \$35,000 toward scholarships.

The Edna Bailey Sussman Fund contributed \$56,280 to the Environmental Internship program.

William W. Fleckenstein '86, MS '88, PhD '00 gave \$25,000 to the Marquez Hall building project.

The Harry Trueblood Foundation contributed \$30,000 toward the Trueblood Foundation Scholarship.

Herrenknecht contributed \$49,975 in support for the Department of Mining Engineering.

Patrick M. James '68 gave \$25,000 to the Leslie S. James Memorial Endowed Scholarship Fund in memory of his father.

Howard E. Janzen '76 gave \$25,000 to complete the Young Alumni 2010 Spring Challenge Match and to support The Mines Fund.

Donald L. Kammerzell '71 established the Joe Davies Track and Field Scholarship Fund with a \$25,000 contribution.

Philip L. Lawrence '49 gave \$50,773 to the Department of Geophysics.

Michael G. Long '72 gave \$25,000 to the Long Endowed Scholarship Fund.

Robert E. McKee III '68 gave \$25,000 to the Robert E. and Margaret A. McKee Family Scholarship.

Charles S. McNeil '71 made a \$25,000 gift in support of the school.

Mintec contributed \$50,000 in support of the Department of Mining Engineering.

Ormat Technologies contributed \$26,520 for graduate student support.

Geraldine Piper gave \$25,000 to the Robert G. and Geraldine D. Piper Endowed Scholarship Fund in memory of her husband, **Bob Piper '49**.

QEP Resources supported scholarships with a gift of \$30,000.

Fred C. Schulte '68 gave \$25,000 to support the Schulte Endowment for the McBride Honors Program and The Mines Fund.

Bequest distributions from the estate of **Harriet L. Scrivner** totaling \$33,500 will benefit the Ronald W. Scrivner Endowed Scholarship Fund.

Shell Exploration & Production contributed \$90,000 for the Oil Shale Symposium and the Center for Oil Shale Technology and Research.

Charles E. Shultz '61 gave more than \$60,000 in support for the school and in honor of his 50th reunion.

SM Energy made a \$25,000 payment toward its \$125,000 pledge to the Marquez Hall building project.

Thomas C. '36 and **Mary Snedeker** added a \$50,000 contribution to their charitable remainder trust in honor of Tom's 75th reunion.

The Denver section of the **Society of Petroleum Engineers** contributed \$25,000 in support for a drilling simulator that will be housed in Marquez Hall.

Andrew P. Swiger '78 gave \$51,500 to The Mines Fund.

Christopher M.T. Thompson gave \$25,000 to The Mines Fund.

The acknowledgements listed in Mines magazine recognize single gifts of \$25,000 or more. Over the course of the fiscal year ending June 30, 2011, the following individuals gave multiple gifts that totaled \$25,000 or more:

Lawrence Curtis '49

Luanna Goetz

Joanne Lerud-Heck

Phuriphan Phirakijkusol

Bill and Karen Scoggins

Warren '62 and **Ada Wright**

Spotlight

FACULTY

Annette L. Bunge

Professor Emeritus

Chemical and Biological Engineering

Twenty-five years ago, a colleague mentioned to Annette Bunge that dermatologists at the University of Utah were finding strange results in their study of chemicals moving through skin. Boldly crossing the discipline barrier, Bunge took a sabbatical in Utah, where she applied an engineer's perspective to the biological problem, and quickly resolved the anomaly.

This initial collaboration led to 25 years of continuing interdisciplinary research in skin and membranes that has contributed to expanding how Mines and her department—recently renamed the Chemical and Biological Engineering Department—defines itself, as well as how governments, industry and regulators assess efficacy and risk in the absorption of chemicals through skin.

In her 2011 Faculty Senate Distinguished Lecture, Bunge paralleled the developments of her professional career to the developments at Mines since her arrival in 1981. One of the first women to join the Mines faculty, and one of the first professors to conduct research in the life sciences, Bunge was at the intersection of two movements that transformed the face of the institution during her 30-year tenure. In her lecture (available online), she offers her unique perspective on these changes.

Like Mines, her research interests have broadened over the years from her early investigations into oil and gas recovery technologies to work on absorption of chemicals through skin and other permeable membranes—research that combines chemical engineering with bioengineering and computer science. Bunge's work and collaborations were some of the first at Mines to receive major funding from life sciences institutions, and they have broad implications in medicine, environmental and occupational safety, and renewable energy.

The FDA sponsored her research into methods for evaluating absorption rates of different topical formulations of generic drugs in order to bypass expensive and time-consuming clinical trials. Similarly, the EPA has used her research to develop guidelines for assessing dermal absorption for contaminants in water at Superfund sites. And she is in the early stages of research with the University of Florida to help determine the safety of beaches in the event of an oil spill.

In addition to working across disciplines, Bunge's research bridges another gap between an experimental approach and mathematical modeling. While researchers tend to put themselves in either the theorist camp or the experimentalist,



Nick Sutcliffe

The energetic Annette Bunge credits her various lunchtime running partners—a list that includes Dendy Sloan, Jim Brown and Reuben Collins—with playing an important role in her career.

Bunge occupies a space somewhere in between. “Being

an experimentalist helps your theories be more meaningful,” she says, “and if you are a theoretician only, I think you don't appreciate what you can do experimentally.”

There is, in fact, little about Bunge that fits conventional norms. She had never met an engineer, nor knew what one did, when she decided to accept a generous scholarship to pursue a degree in chemical engineering at the University of Oklahoma. She later transferred to SUNY Buffalo and graduated summa cum laude as the only woman in her program. She went on to earn a doctorate from the University of California at Berkeley before joining Mines' Chemical and Petroleum Refining Engineering Department in 1981 as an assistant professor and the department's first female faculty member. In 1991, she became one of three female faculty holding the position of full professor at Mines, and the first woman in the school's history to achieve this through promotion; others had been hired directly to the position.

Bunge says that taking the title of professor emeritus is a bid to achieve a better work/life balance, yet her professional life is as busy as ever. “It is the latest in a series of failed strategies,” she laughs. Intensity is part of her makeup, and that includes her interests away from the lab, such as running, climbing and skiing.

“If I were going to define my passion all through my life, it is that I love learning,” says Bunge. “I get a real pleasure out of looking at something and saying, ‘Why does it work or how does it work?’ and then learning about it so I can understand that.” The desire to share this experience is what led her into academia, where she strives to inspire and nurture the same passion in her students. “Science and engineering make for a wonderful career,” she says. “You can be solving problems anywhere.”

So whether or not this professor emeritus manages to spend a little less time on campus in the future, expect her contributions to her field, her department and students to continue for years to come.



—Kristen Daly

See the video of Bunge's 2011 Faculty Senate Distinguished Lecture at minesmagazine.com; click on Web Extras.

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Sports Updates: Mines Football Garner Attention; Volleyball, Baseball Teams Welcome New Coaches

Results are in: Colorado School of Mines' final spring ranking was #18 out of 235 in the Learfield Sports Directors' Cup NCAA Division II standings. CSM accumulated

460.50 points during the 2010–2011 school year. (Complete standings and scoring structure can be found at www.directorscup.org.)



Joel Bach

Football. Getting a bit of positive local press, the Orediggers were mentioned in the September 2011 issue of 5280 magazine (read it at www.5280.com/magazine/2011/09/study-hall). The team tied for second in the 2011 RMAC Pre-Season Football Coaches Poll.

Cross country. The news coverage continued with CSM's cross country team highlighted in Running Times Magazine's NCAA Division II preview. (Visit csmorediggers.com and click on Cross Country for a link to the article.) In the pre-season poll released in August by the United States Track & Field and Cross Country Coaches Association, Mines was ranked fourth.

Men's soccer. Coaches of the RMAC selected Mines to win the conference in a pre-season poll, while Chike Sullivan was named RMAC Pre-Season Player of the Year.

Women's soccer.

Jessica Stark was selected CSM's Female RMAC Scholar-Athlete of the Year for 2010–2011.



Ryan Marshall

Volleyball. The team (19-10 in 2010) made its second consecutive appearance in the NCAA Central Region Tournament in 2010 and earned the #4 seed in the RMAC Tournament. Two new faces join the coaching staff in 2011: Chris Jonson, volunteer assistant coach, and Elizabeth Serra-Hsu, student assistant coach.

Golf. In the lead-up to qualifying for the NCAA Tournament for the second consecutive season, Jim Knous and Michael Lee earned PING All-Central Region honors last spring, while Cory Bacon garnered RMAC Academic Men's Golfer of the Year recognition. Lee also claimed the title at the 111th Colorado Golf Association Match Play in July 2011 at Bear Creek Golf Club.



Jeff Dugan

Softball. RMAC 2011 Pitcher of the Year Kelly Unkrich led the Oredigger squad to a berth in the NCAA Central Region Tournament last spring. Mines won the RMAC regular-season title and hosted the RMAC Tournament. Kristie Hawkins, who was elevated to head coach from interim head coach on July 1, was named RMAC Softball Coach of the Year.

Outdoor track and field. Four Orediggers competed for Mines at the 2011 NCAA Division II Outdoor Track and Field Championships, including Russell

Drummond, who garnered All-American honors with his fourth-place finish in the 1,500 meters. Michael Calhoun (400-meter hurdles) and Sean Gildea (5,000 meters) both earned RMAC individual titles when Mines hosted the 2011 conference championships in Golden. For 2011, Division II Track and Field All-Academic honors from the U.S. Track and Field Cross Country Coaches Association went to Drummond and Heath Butler.

Baseball. Jerod Goodale has been named head baseball coach at Mines. Goodale spent the 2010 and 2011 seasons as an assistant coach at Angelo State University in Angelo, Tex. On the player side, Tyler Phan Thornton and



CSM Sports Information

Elliott Riege both garnered First Team All-RMAC honors for the Orediggers. Thornton was also named to the Second Team on the 2011 ABCA Gold Glove list.

Men's basketball. Earning its second consecutive appearance in the NCAA Tournament in 2010–2011, the team was ranked 20th in the final Top 25 Poll, and



Katie Simons

won the RMAC regular-season title while setting new single-season program records for overall and conference victories.

Wrestling. Jordan Larsen qualified for the NCAA Wrestling Championships for the second time in his career last winter. Larsen (165 pounds), who was named RMAC Academic Wrestler of the Year, went on to be selected as the NCAA's Elite 88 Award winner and CSM's Male RMAC Scholar Athlete of the Year for 2010–2011.

Men's indoor track and field. The squad tied for 11th place at the 2011 NCAA Indoor Championships. Mack McLain won a national title in the mile, while the distance medley relay team recorded a national runner-up finish. McLain is now a 10-time All-American at Mines.

Swimming and diving. Andrew Zerwick earned All-American honors in the 100- and 200-meter backstroke at the 2011 Swimming and Diving Championships. The Mines men were ranked in the Top 25 in 2010–2011 and Jesse Dennis was named RMAC Men's Swimming and Diving Academic Athlete of the Year. Matt Bisping, Aaron Miller, Daniel Peter and Cayla Wood earned College Swimming Coaches Association of America Honorable Mention Scholar All-American honors.

For complete schedules, rosters, results and statistics, visit the Colorado School of Mines Athletics website: csmorediggers.com.

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'73 Geology
Kenneth L. Spalding '60
Dean Stoughton '75 and '78
Woodul Family—Doug '78, Susan,
Megan '10 and William

Total raised: \$48,916

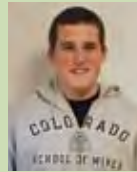
Total donations to date: \$329,650

Scholarship funds awarded: \$46,569

2010-11 recipients:



Jerrod Doucet
Year: Junior
Major: Petroleum
engineering



Matthew Cutt
Year: Freshman
Major: Mechanical
engineering



Marisse Vista
Year: Freshman
Major: Petroleum
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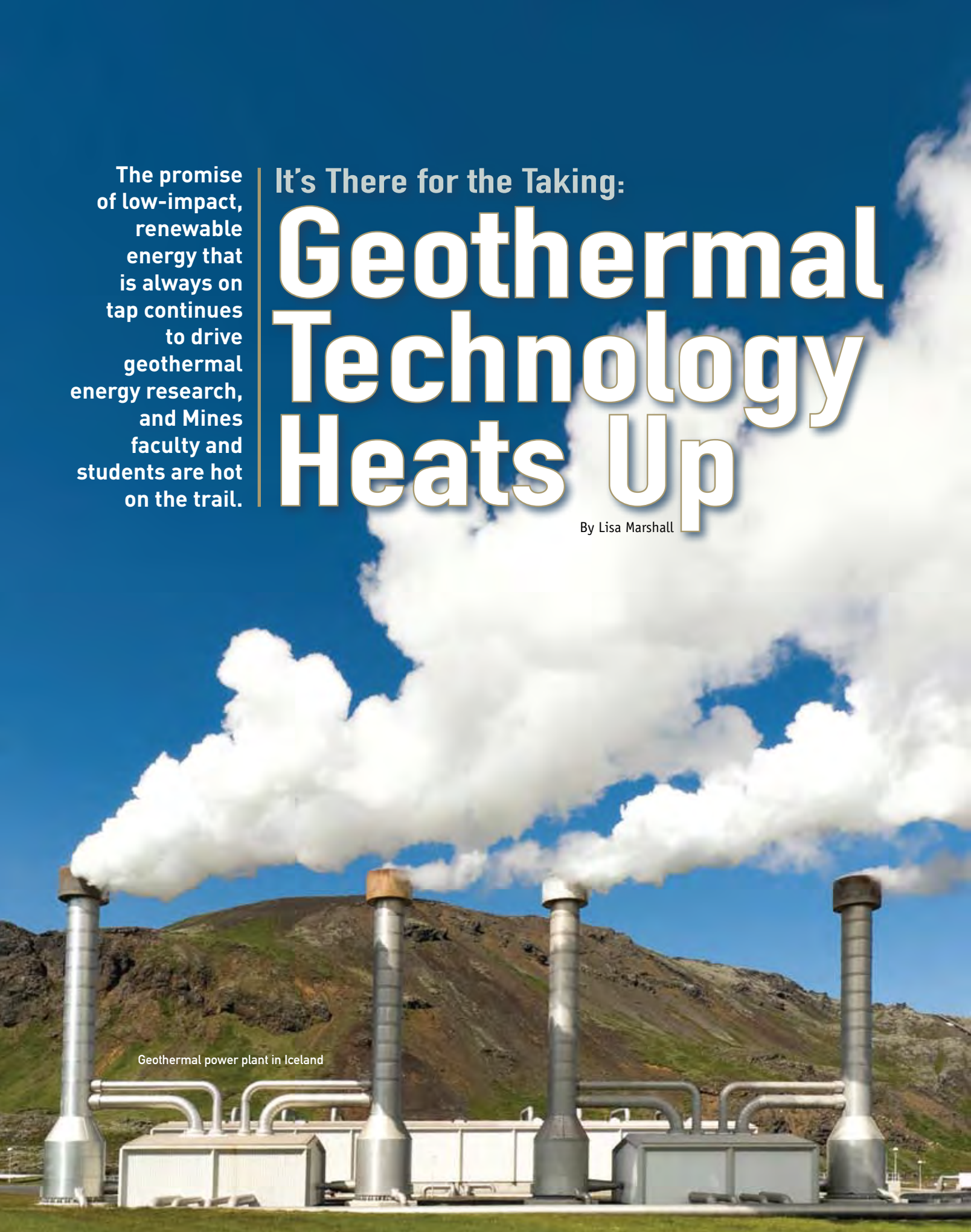
Save these dates for 2012: Houston—April 20; Oklahoma City—May 4; Golden—June 11

The promise of low-impact, renewable energy that is always on tap continues to drive geothermal energy research, and Mines faculty and students are hot on the trail.

It's There for the Taking:

Geothermal Technology Heats Up

By Lisa Marshall



Geothermal power plant in Iceland

For most, the term “renewable energy” conjures images of towering wind turbines, massive hydroelectric dams and rooftops glistening with solar panels. But to an increasing number of researchers, students and engineers at Mines and around the world, there’s another oft-overlooked resource: the heat beneath our feet.

“People know they can get hot water from the earth, but they have no idea how comprehensive this resource can be,” says Masami Nakagawa, an associate professor in the Department of Mining Engineering, who has been working with researchers on and off campus reviving interest and research in this long-neglected resource.

Over the last three years, he has won Department of Energy grants for geothermal research totaling \$1.5 million, some of which funded the creation of Mines’ Geothermal Academy, a national hub for research, data collection, education and public awareness efforts.

He has visited a dozen mountain communities to conduct workshops on how heat from the earth could be tapped to produce electricity, heat buildings, warm greenhouses and melt lingering snow. In May 2011, the school teamed up with the National Renewable Energy Laboratory (where Nakagawa held a joint appointment) to host the fourth-annual Geothermal Symposium on campus, which included attendees from Japan and New Zealand.

As the federal government grows increasingly interested in geothermal technology, and several communities across Colorado explore sites for what could be the state’s first geothermal power plant, Mines is playing an important role.

“In order to make a geothermal project possible, you need geologists, geophysicists, reservoir engineers, rock mechanics specialists, power plant and environmental engineers, and somebody who is familiar with policies. On this campus, we have people in all these areas,” says Nakagawa, who is teaching an introduction to geothermal class this fall for the third time, and hopes to develop a geothermal research center, as well as an interdisciplinary master’s degree program at Mines.

What is “geothermal”?

Depending on how far down it comes from, the word can mean different things. Geothermal energy can be as low-impact as using existing heat just a few feet below the earth’s surface, or as invasive as drilling down miles to create a network of energy-generating steam channels.

Perhaps the most common geothermal energy technology in use today is ground source heat pumps (GSHP), which tap the constant year-round 45 to 60 degree Fahrenheit temperatures found at depths of just 5 to 10 feet in most temperate regions.

Equipped with hundreds of yards of buried, liquid-filled tubes, these systems use basic refrigeration technology to source thermal energy in the ground during winter and shed it there during the heat of summer. Temperatures underground are generally closer to room temperature, so electricity consumption for year-round heating and cooling can be as much as 70 percent lower. About 1 million buildings in the United States currently use GSHP technology, says Nakagawa, including the Colorado State Capitol, where the Geothermal Academy monitors system performance, and the new IKEA retail store in Centennial, Colo.

“It is the most efficient way to heat and cool buildings available,” says Tom Williams, laboratory program manager for geothermal technologies at NREL, which is working closely with Mines to collect long-term data on GSHPs. “It’s a near-term, cost-effective technology with many applications in Colorado.”

Interestingly, at such shallow depths, the relative warmth has almost nothing to do with heat conducted from inside the earth—it’s a factor of average air temperatures on the surface. To tap the earth’s internal heat requires either just the right geography, such as natural hot springs nearby, or some very deep wells.

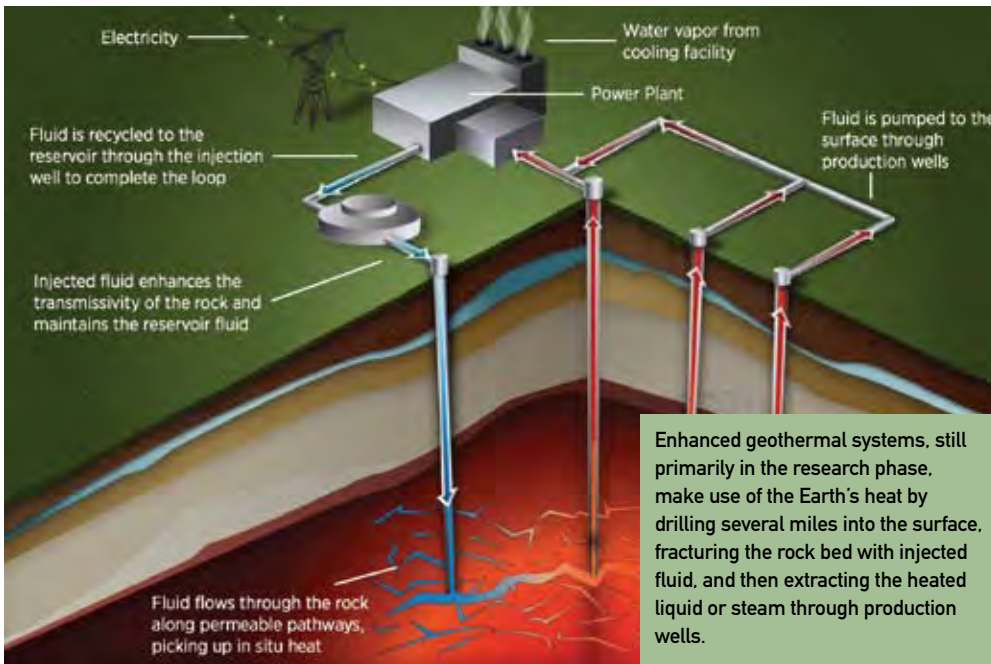
Enhanced Geothermal

Enhanced Geothermal Systems (EGS) involve drilling several miles deep into hot, dry basement rock. Hydro-shearing, a process that is analogous but not the same as conventional rock fracturing, is performed by pumping fluids in at extremely high pressure, creating a network of fine fissures that extend far beyond the well bore. Fluids pumped into the system pick up energy from the surrounding rock, which can be tapped by production wells intersecting the system. In the case of water, production wells would vent steam, which can be used to drive traditional turbines, then condensed, and pumped back into the injection well in a closed-loop system.

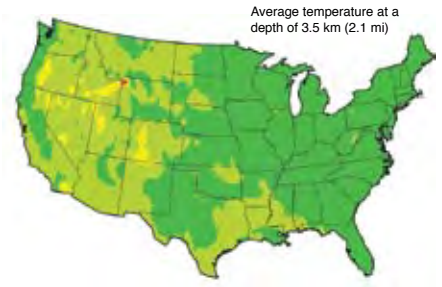
Nakagawa explains that, in theory, opportunities to generate electricity using EGS technology are widespread. “No matter where you are on this continent, if you can drill 5–10 kilometers deep, you can get a very high quality of heat,” he says. One 2006 MIT study led by Jeffrey Tester and sponsored by the Department of Energy estimates that EGS could yield 2,000 times the nation’s 2005 electrical consumption—in theory.

In reality, the technology is in its infancy, with one pilot plant operating in Soultz, France, and a small commercial plant operating in Landau, Germany. But exploration is under way across the globe, with a company called Geodynamics in Queensland, Australia, planning to drill as many as 90 wells in the coming decade, according to a recent story in *The Economist*. Worldwide, according to the DOE, untapped

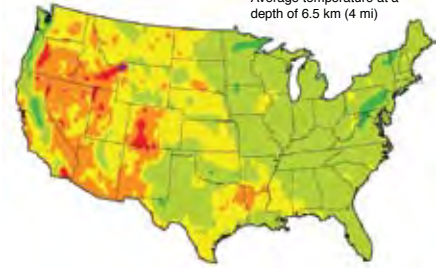
“EGS is the holy grail.”



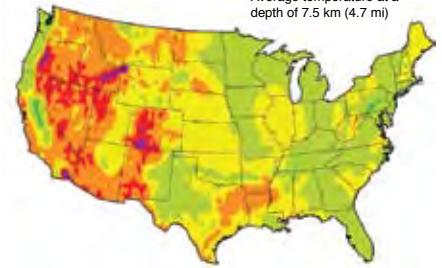
DOE's Office of Energy Efficiency and Renewable Energy



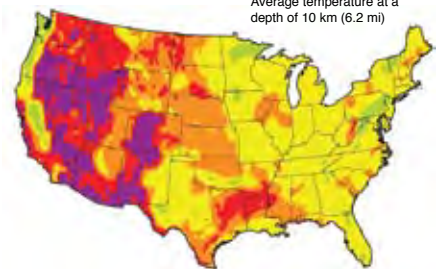
Average temperature at a depth of 3.5 km (2.1 mi)



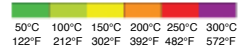
Average temperature at a depth of 6.5 km (4 mi)



Average temperature at a depth of 7.5 km (4.7 mi)



Average temperature at a depth of 10 km (6.2 mi)



geothermal resources contain 50,000 times the energy of all oil and gas resources on the planet.

Technological and economic challenges abound when it comes to safely and effectively drilling and fracturing rock miles below the earth. While concerns about induced seismicity seem to be overblown, there's a lot of science to conduct and numerous engineering problems to resolve before power companies are willing to put their shareholders' assets on the line.

With \$1.5 million in DOE grant money, Mines researchers are currently developing computer models that can be used in EGS planning and design. Google recently invested \$10 million in EGS research specifically to help companies and universities research ways to improve deep hard-rock drilling techniques and better assess the country's geothermal resources. "EGS is the holy grail," says Williams. "Everyone is doing research on it, but we don't have all the pieces in place yet."

In the meantime, existing geothermal reservoirs at more easily accessible depths are already providing clean, 24/7 electricity to communities across the western states—and many believe Colorado should be next.

The revival of geothermal power

According to the Geothermal Energy Association, conventional geothermal plants (which use rising steam or hot water from underground sources to produce electricity) already produce 3,102 megawatts of power in nine states, or enough to power roughly 3 million homes. The vast majority was built in the 1970s and '80s in California, Nevada and Utah, when soaring oil prices prompted a surge in investment in renewable energy. Today, The Geysers—a 45-square-mile collection of geothermal energy plants north of San Francisco—produces 725 megawatts of electricity. And the Caithness Dixie Valley Geothermal Power

Plant, built in 1988 and still Nevada's largest, produces 66 megawatts. But as oil prices declined, so did interest in geothermal energy.

By 2007, geothermal energy accounted for just 4 percent of renewable-energy-based electricity in the United States, according to the GEA, and a minute fraction of overall energy consumption. But in recent years, thanks to concern about global warming, carbon emissions and skyrocketing energy prices, geothermal has enjoyed a renaissance.

"What makes it stand out among renewable energy technologies is that it operates around the clock. It is not tied to when the sun is out or the wind is blowing," says Williams. In 2009, as part of the federal economic stimulus package, the DOE funded \$338 million in grants for 129 geothermal energy projects in 39 states: \$18 million went to Colorado and \$3 million went to Mines to, among other things, explore drilling methods, create models of how to inject fluids into rock and develop technologies for tracking subterranean water flow.

According to the GEA, 772 megawatts of new geothermal capacity is expected to come online in a few years, some of it in Colorado. To help make that happen, the Governor's Energy



Masami Nakagawa is working with researchers on and off campus to revive interest and research in harnessing geothermal energy production.

Office appointed a Geothermal Working Group, which held a series of meetings over the summer to discuss where to drill exploratory wells and how to pay for them.

“Colorado has the fourth-highest average heat flow per acre in the United States,” says mining geologist Fred Henderson, founder of Mt. Princeton Geothermal. “There is a lot of potential here.”

From Mount Princeton to the town of Rico

When in 2008, Henderson proposed developing a 10-megawatt geothermal power plant in the Upper Arkansas Basin near Mount Princeton (home of the hottest springs in the state), Mines geophysics professors Mike Batzle and Andre Révil were among the first to be called in.

“It can cost millions of dollars to drill a single well, so before you do it, you really need to understand the plumbing system below,” explains Révil.

To do that, they have returned every summer with students for month-long field camps on how to use seismic and geophysical techniques for underground mapping. Batzle’s team used a massive hydraulic hammer to produce sound waves below, and then tracked their movement to map the structure of the underground plumbing. Révil and his students then laid hundreds of yards of specialized cable on the surface, using electromagnetic mapping techniques that he developed to trace the movement and pressure of water thousands of feet below.

The project was not without opposition. Hundreds of residents, concerned about how such a plant would impact their wells and the local tourist-driven economy, turned out at Nathrop town meetings to protest. At one point some Mines equipment was destroyed. Thanks to lingering dissent and a series of regulatory hang-ups involving public lands, the project has largely stalled.

Henderson is optimistic that ultimately the differences will be sorted out, and geothermal energy will come to the Upper Arkansas (he is currently looking at another site at Poncha Springs). But Révil, who prefers to stay clear of the politics, says the greatest value of such projects is to give Mines students hands-on experience in working with geothermal systems.

“Our primary goal there was to do good science and provide a good education for our students,” says Révil, who took students to a potential site in Oregon this summer to do similar work. Meanwhile, having learned about the potential of geothermal from Nakagawa’s visits, residents of the tiny former mining town of Rico (population 300) near Telluride are beginning to explore a comprehensive geothermal plan of their own, in the hope that it could not only decrease their reliance on coal-based electricity, but also ease their heating bills and help them grow food in winter.

“Masami is one of the more visionary people I have met in my life. Not only does he grasp the engineering side of things, he understands the human components and that has allowed us to develop a great relationship with Mines,” says Rico resident Rebecca Levy, now a self-proclaimed “geothermal advocate” who visits other communities, touting the promise of geothermal technology.

Both Levy and Nakagawa concede it could be years before a geothermal system is in place in Rico, but already Mines students are there, taking measurements.

“You could generate electricity, and use the spent hot water to heat the school house or town hall, melt snow, or help produce local vegetables in the greenhouse,” says Nakagawa. “This could be a national model for the broad potential of geothermal.”

That could happen if the current swell of interest in geothermal remains hot. [M](#)



**Q&A with Terry Parker,
Executive Vice President
and Provost**

New College, New Digs, Bright Future

By Nick Sutcliffe and Amie Chitwood

Along with moving into the functional and attractive \$32 million addition to Brown Hall, the Division of Engineering underwent a major reorganization this year.



Division of Engineering students returned to campus this August to some big architectural changes—not only to the bricks and mortar, but also to the division itself.

As expected, the 78,000-square-foot addition to Brown Hall had been completed; but along with the new configuration of the building, their division had been reorganized into Colorado School of Mines' first college.

It's mostly coincidental that both happened at the same time, linked only by the fact that both changes are long overdue, says Terry Parker, executive vice president and provost, who came to the position in January, having chaired the Division of Engineering since 2006.

He explains that after almost three decades of growth, the division was chronically overcrowded, with more than one-third of all Mines students enrolled in programs administered by the division. In addition to running out of space, the administrative burden of leading the program had become overwhelming.

Kevin Moore, who took over from Terry Parker in January as division director and is now interim dean for the new college, puts it this way: "A single person in charge of three degree programs that included 1,350 undergraduate students and 220 graduate students was simply untenable. A unit of this size needs a more robust leadership structure."

Along with the former Division of Engineering, the yet-to-be-named college comprises the former Division of Environmental Science and Engineering, and the former Department of Mathematical and Computer Sciences. The three units have been organized into four departments: Mechanical Engineering, Electrical Engineering and Computer Sciences, Civil and Environmental Engineering, and Applied Mathematics and Statistics.

With department heads in place to manage each of these units, the difference from Moore's point of view is significant, although the administrative reorganization has little immediate impact on students.

Eventually, however, the names of undergraduate engineering degrees will be changed to be more discipline-specific.

Currently, undergraduates earn a bachelor of science in "general engineering," with civil, electrical, environmental or mechanical "specialties," or a degree in "mathematical and computer sciences" with a concentration in applied computer sciences, computational and applied mathematics, or statistics. In the future, students will graduate with a BS in civil, electrical, environmental, or mechanical engineering, a BS in computer science, or a BS in applied mathematics and statistics.

While this sounds like a big shift, it won't require major curriculum changes, Moore explains. Degrees will simply bear a name that more accurately characterizes coursework already in place for the existing degrees. But it's something students have been requesting for years, and faculty in the college are happy they may soon be able to confer degrees that align more closely with mainstream practice and the expectations of industry.

Groundwork for growth

Another goal of the reorganization is to provide administrators with the ability to strengthen their programs strategically over time. "Many of our current students in the college came here because it's Mines—the best university for technically oriented students in Colorado," says Moore. "They decided what to study after they arrived. In five or 10 years, we'd like to see more students here because of a reputation for excellence in our engineering disciplines. The college structure helps us to move forward strategically to achieve that in ways that were impossible before." Moore adds that, right out of the gate, the newly formed Civil and Environmental Engineering Department is likely to be nationally ranked among the top-20 programs.

Discussions about restructuring the Division of Engineering actually began in 2002. Since then, initiatives have included several proposals by the division, a reorganization task force and a faculty senate committee. When Terry Parker—who knew from personal experience how urgent the situation had become—took over as provost in January, President Bill Scoggins and the Mines executive leadership were in support of the change, and the pathway had, to some extent, been cleared. The college was officially formed seven months later on August 3, when Moore was appointed interim dean.

In the context of the school's history, it's a historic change. Ever since Mines was founded in 1874, the institution has operated as a collection of departments administered by a central academic dean. "This reorganization was long overdue," says President Scoggins. "It is strategically driven, will provide competitive alignment in terms of departments, research and degree programs relative to our peers, and has put in place a leadership structure and team appropriate for such a large unit. For Mines, I think it represents a great model going forward."

Wanting to hear more about the creation of the new college from Parker, who's made it his top priority since his appointment, we visited with him one day in early September. He had just returned from a meeting with human resources, attending to one of the hundreds of steps involved in forming the college.

During our conversation, we asked him to explain why the



Greg Sprenger



college needed to be formed, what it means for today's and tomorrow's students, and how it can help Mines become more competitive in the future.

Mines: Clearly, this is a significant change in the school's structure. Can you give some background to the decision?

Parker: If I dial back several decades—to say 1970—Mines supported 33 degrees. We had about 1,800 students on campus in nine degree-granting departments. Back then, Mines was the premiere extractive earth sciences school. Graduates went off into those industries, and a degree from Mines was kind of a gold certificate.

The Division of Engineering was created after these industries crashed in the 1980s and campus enrollment started to drop off. Since then, the student body has broadened its focus and grown. Today, we have about 5,000 students and, before August 3, 13 degree-granting units supporting 60 degrees. A large proportion of this growth has been concentrated in the Division of Engineering, which was more than one-third of campus prior to the creation of the college.

Mines: What are the key drivers for creating the college?

Parker: We've been unbelievably successful with our recruiting in recent years, with dramatic increases in our admissions metrics. This year's incoming class is the most academically prepared we've seen in decades, and it's the most diverse, with 40% coming from outside Colorado, and higher numbers of women and minorities than ever before.

We obviously want to sustain this kind of momentum, but to continue to compete for students around the country when we have an organization that doesn't look like any other school is hard. The engineering division offers a general engineering degree with specialty. There's no other school in the country that has that construct, that accreditation, and also offers an MS and a PhD.

We need to position ourselves for degrees that are more strongly in demand. Students, employers and peer institutions all view us through a lens of civil, electrical, mechanical, and environmental engineering, and that's what we need to deliver to them. Our mathematical and computer sciences degree similarly needs to evolve to the applied mathematics and statistics degree and the computer science degree.

Before the reorganization, we had 13 departments sitting

“Students, employers and peer institutions all view us through a lens of civil, electrical, mechanical, and environmental engineering, and that's what we need to deliver to them.”

around the Academic Affairs table. With 13 units going in 13 different directions, there is no capacity to be strategic. In addition, we need to maintain cross-disciplinary efforts that have been present for a couple of decades in the engineering division. They're part of the quality that our employers have come to expect. The way to maintain them is through a college and a dean.

If we didn't have to worry about being competitive, then we would have no strong driver to change. But we do. Our students

expect an extraordinarily valuable degree.

Mines: What are the short- and long-term effects of this realignment?

Parker: In the short term, we have changed the academic structure that supports our degrees, but our degrees remain the same. In the long term, with timing yet to be determined, we will have a degree structure that is more in line with national norms. We're not creating a new focus and going off in a new direction. We're already there. We're just adjusting our degrees to represent who we are, and adjusting the administrative structure to a more sustainable model.

Mines: What was the process for creating the college?

Parker: In March 2011, we went to the department heads in the affected units with the proposed changes and asked them to respond with their critique, including input from their faculty. In May, we went back to the department heads and asked if there were any other showstoppers, and there weren't. The reason we were able to get it done so quickly—about six months—is that there's broad recognition within the faculty of those units that it's overdue.

Mines: What concern have you heard the most?

Parker: The department heads have expressed worries about the asymmetry in structure. You now have 10 units that are not part of the college and four units that are, so they question how they can compete for resources. However, although the creation of the college puts a formal asymmetry in place, it's been this way for a good decade, and we simply haven't responded to it.

Mines: Some of our readers might wonder if this means their department is going to get less money at the end of the day.

Parker: We didn't fund the college by taking anything away from departments that are not a part of the reorganization; however, we did collect the budgets from the departments in the college and redistribute them. We have also asked the departments that were not reorganized to consider using some of their operating budgets in a collaborative manner, and in the coming years, we will respond to the strong faculty needs within the college by supporting new hires to the college. We all benefit from a stronger campus. A stronger portfolio of mainstream engineering programs has derivatives that bleed off into other units.

Mines: We have to mention it: Moving into the position of provost having led the engineering division for so long, the criticism might be raised that you're favoring engineering.

Parker: The criticism has been raised. One of the things I'm trying to do is move to data-driven resource allocation. Think of it this way: If we are heavily resourcing a department with a low undergraduate-student-to-faculty ratio, we better understand that we're doing it and make peace with why we're doing it. That department could have a large research volume that brings us stature. But a different unit with the same ratio that is resourced in a similar way without bringing stature may need to be reprogrammed a bit. Bottom line is, the data needs to reflect a return on investment.

Mines: Everyone wants to know: What will be the name of the new college?

Parker: In a school that included an English department, an arts department, and so on, this would just be the College of Engineering, but with so many specialized engineering departments outside the college that obviously doesn't work. So we are in the midst of a campus discussion. I have formally asked the interim dean, Kevin Moore, for three recommendations from the college, and I will put those names in front of the faculty senate for a recommendation.

Mines: What are your immediate next steps?

Parker: One of the key aspects of implementing a structure like this is ensuring you have the leadership in place. We anticipate making at least two appointments for department heads soon, and we have an internal process under way to name the dean.

Mines: What do you see ahead for the departments outside of this new college?

Parker: We need to get the college up and running and operating smoothly, and find out what lessons are to be learned. Then, if it's appropriate, and we think there's the appetite on the campus, we can start discussions about creating additional colleges. [M](#)

George R. Brown Hall, then and now

In 1976, a \$4.4 million gift from The Brown Foundation funded the construction of Brown Hall to house the newly established engineering program. By 2002, the Division of Engineering had grown to comprise one-third of the campus undergraduate population, and a proposal was submitted to the foundation for funding a \$10 million, 38,800-square-foot addition to handle swelling student needs. When this proposal was denied and state funding for the construction was reduced from \$8.7 million to \$6.7 million due to the FY 2008-2009 economic downturn, students voted to increase fees, which paid for the majority of the addition.

Recently completed expansion details:

- Project start date: February 15, 2010
- New construction: 78,200 square feet
- Renovated area: 22,130 square feet
- Brown Hall addition and Maple Hall are the first LEED-certified buildings on campus.
- What's inside: an auditorium, three classrooms, six seminar rooms, 12 laboratories, seven graduate and 28 faculty offices, senior design space, 10 study rooms, a machine shop, a wood shop, a video conferencing room, and a Starbucks kiosk.
- Designed to incorporate plenty of natural light
- Regional chiller plant with capacity to serve six nearby buildings



Greg Sprenger

By the numbers:

- 35,000 cubic yards excavated
- 4,000 linear feet of building caissons
- 3,700 cubic yards of concrete
- 290 tons of rebar
- 525 tons of steel
- 2.5 miles of HVAC duct
- 9 miles of HVAC/plumbing pipe
- 304 plumbing fixtures/devices



See more photos of the stunning, sleek Brown Hall addition at minesmagazine.com in Web Extras.

Clearing the Road

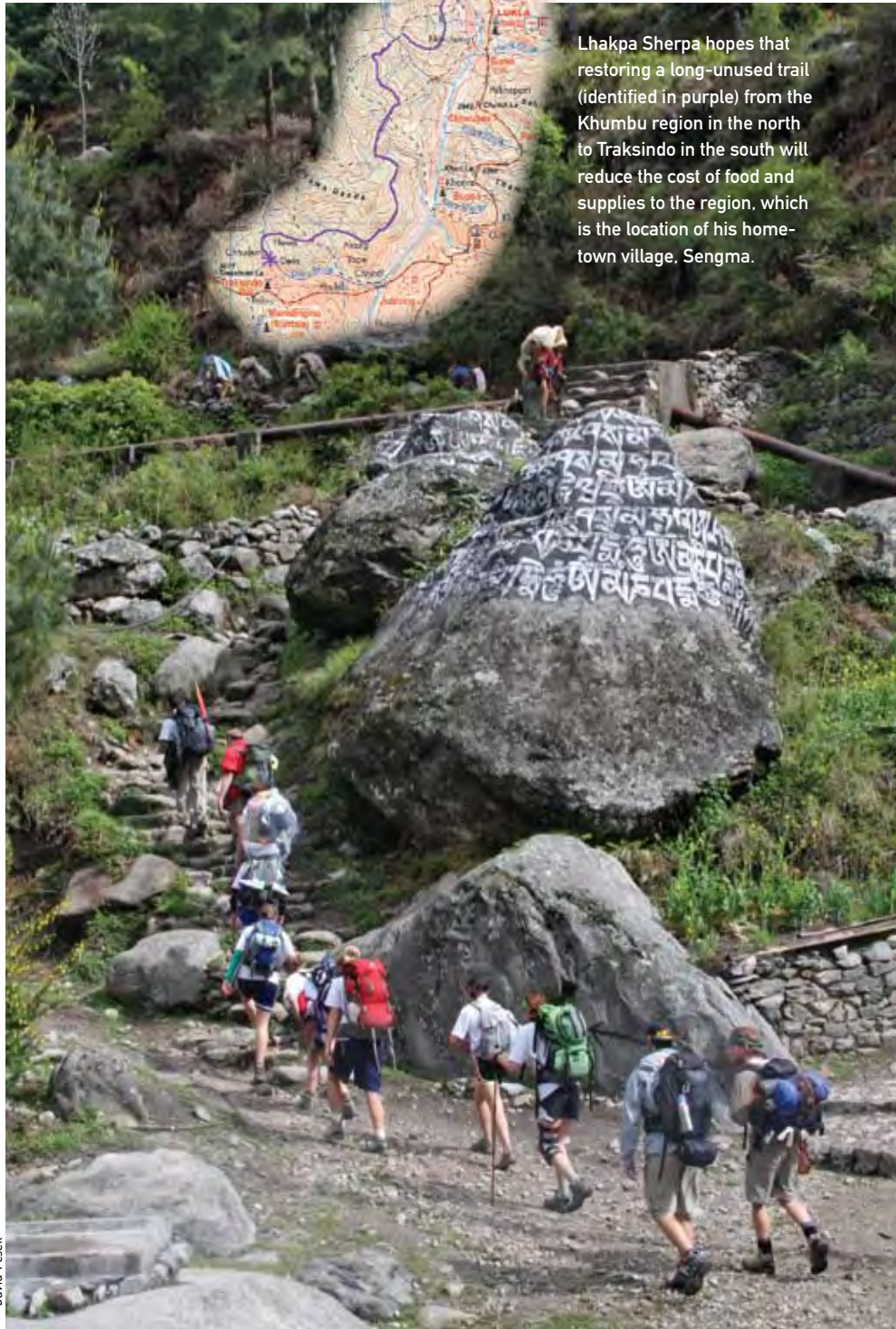
Mike Kmita



Lhakpa Sherpa



Top Prior to leaving Sengma on their way to camp outside Tate, the students were given white and gold scarves, representing a safe journey and a promise to return, in a traditional parting ceremony. **Right** The longest day of trekking started with plenty of chai and ended in the village of Namche. **Above** Mines students and Nepalese worked side-by-side clearing the trail.



Lhakpa Sherpa hopes that restoring a long-unused trail (identified in purple) from the Khumbu region in the north to Traksindo in the south will reduce the cost of food and supplies to the region, which is the location of his hometown village, Sengma.

David Pesek

Not Taken

By Emily Wald

T

This past spring, David Pesek '09, MS '11 and Nepal native Lhakpa Sherpa led a group of 13 Mines students to the Himalayas to help support construction of a trail that could help revitalize the economies of several mountain villages.

It's the same route used in 1953 by Sir Edmund Hillary and Nepalese Sherpa Tenzing Norgay on their way to summiting Everest for the first time, but over the last several decades it has fallen into disuse. As a consequence, the small mountain communities it connects have seen their economies shrink at a time when food prices have steadily climbed, prompting many to move to areas closer to the main trails.

David Pesek, a former Mines quarterback, played the lead role in organizing the 17-day trip. He'd been inspired by a trip to Afghanistan in 2007, where he'd worked alongside a group of volunteers and Afghan refugees on the construction of a community center.

Wanting others to have similar opportunities, he cofounded a nonprofit organization called the Invictus Initiative, aimed at supporting disadvantaged communities around the globe by encouraging volunteerism, particularly among the technically skilled.

The Nepal trip was the first he'd organized on this scale, the idea arising from a conversation he had with Lhakpa Sherpa, owner of the Sherpa House restaurant in Golden. Lhakpa has an intimate knowledge of the geography of the area, having grown up in Sengma, one of the tiny villages along the historic trail.

He's been working for several years to gather support for rebuilding the trail and explains how the route offers a much shorter journey from the busy Khumbu region to Traksindo, and thence to Jiri, the nearest town accessible by truck. Currently, most of the goods imported into the region are flown into the airport at Lukla, a treacherously short airstrip perched at 9,300 feet where only relatively small planes can land. The rest come up the valley via yak and mule trains. A trail that is a full day

A little student muscle and the massive efforts of a Nepalese community aim to make commerce exchange cheaper and easier by shortening the distance between two points.

shorter than the existing alternative route is sure to siphon off some commerce, he reasons.

Any increase in traffic would benefit the economy of Sengma and its neighboring village, Tate. Lhakpa believes it could also help lower the cost of food in the whole region. In addition, it will provide alternative access to the high valleys, which in the past were cut off after ice dams in the glacier-strewn mountains above were breached, releasing entire lakes that washed away bridges downstream in catastrophic floods.

However, the historic trail through Sengma passes over some ridges that are too exposed for year-round travel, so these sections must be rerouted to a lower elevation and widened, if trains of yaks and pack mules are to pass safely. Several sections pass along a sheer cliff face.



David Pesek

Suspension bridges comprised portions of the journey, here on the way to Sengma.

"It's pretty wild," says Pesek. "In places, the trail was about 6 inches wide, with a 500- to 1,000-foot drop." Blasting into the cliff to carve out a wider ledge would be the best option, but that would require too many permits and too much paperwork, says Pesek, who predicts sections of suspended walkway are more likely to be built in the short term. In addition to these obstacles, two bridges need to be rebuilt.

Attracting tourist traffic isn't the primary goal, but if the trail is wide and safe, it will attract some. Bad weather frequently strands tourists at Lukla airport, forcing some

to pay dearly for a helicopter ride to avoid missing flights from Katmandu. A more predictable itinerary that includes a hike through the foothills to a bus in Jiri will appeal to some travelers; avoiding a flight into or out of one of the most dangerous airports in the world will win others; and a more dramatic and shorter approach to the Khumbu region by foot will lure still more. Presently, the minority of travelers who hike into the region pass along the valley floor; the shorter approach through Sengma remains higher and commands spectacular vistas of Everest and the surrounding mountains.



A panoramic view of the Khumbu region and Namche rewarded the hikers on the sixth day of the trip: Mt. Everest rises as the central peak behind the group. Left to right, front row: Caleb Whitehead (sophomore), Marie Patton (junior), Kim Mazza (freshman), Allie Grazulis (sophomore), Allie Stange (freshman), Rylan Hess (freshman), Lhakpa Sherpa. Back: Jesse Dennis (senior), James Ham (freshman), Hannah Schuster (sophomore), David Pesek, Betsy Hansing (freshman), Megan Otting (sophomore), Taylor McBain (freshman), Mike Kmita, Brandon Oswald (freshman).

Connecting cultures

The Mines students who signed up for the hike were all asked to raise \$3,400 for the trip, and the group collected an additional \$2,000 to help fund trail construction. With flight time, getting to and from the area, and seeing a little of the Khumbu region, the team spent just three days working on the trail, but Pesek says they made good progress, and he sees the payoff in larger terms. “It was our intention to encourage the local community and work alongside them,” he says, “but more importantly, build relationships and show students, this is what Nepal is like, this is what the Sherpa community is like.”

The culture certainly made a deep impression on Hannah Schuster, a cross-country runner. “I never saw anyone in a hurry to be anywhere,” she says. “Even Sherpa porters carrying twice their body weight up a mountain had enough time to share a friendly ‘Namaste!’” After settling into a Himalayan mindset, she says she experienced “reverse culture shock” upon her return to the fast pace of the United States. “I dearly miss the peace and quiet of the mountains,” she reflects.

Footballer Brandon Oswald found himself a little outside his comfort zone at the beginning of the trip. “It was definitely a shock at first to see how the people lived,” he says, but the cultural differences were later dissolved by the friendliness of the Sherpa people. “The people were so welcoming to us—everyone spoke some English, so that helped as well,” he adds. “The trip was such an incredible experience.”

In his blog entry describing the students’ first night in Sengma, Pesek writes about a meal in a traditional Sherpa House that the community prepared for their arrival. His description of the ceremonies that followed hint at an interesting cultural exchange:

The night concluded with a wonderful welcoming celebration where the local villagers of the area showed their appreciation and enthusiasm for the team with Sherpa singing, dancing and general celebratory fun. The welcoming was well received and the team responded with singing and dancing of our own—an amazing night indeed.

In addition to their work on the trail, the students’ enthusiasm contributed a great deal, says Lhakpa. Their trip may have also helped encourage donations from the Nepalese community, from both the U.S. and the locals in Nepal. Lhakpa has collected a little more than \$23,000 for the project from the local community, and work is “ahead of schedule and completing more trail per dollar than anticipated,” he says. Part of this is attributable to the cost of labor—trail workers earn about \$5 per day—but he says it’s also more than simple economics. “People are willing to work hard for this trail,” he says, “because it’s something they need.”

Kimberly Mazza, a Harvey Scholar, whose trip was sponsored by the enrichment funds provided as part of her scholarship, gained an appreciation for the significance of the path they were building. “After hiking around to the different villages, I realized the importance of good trails in Nepal,” she says. “The location and quality of the trail we started will be a huge help to these villages.”

While their work was a meaningful contribution to the project, several students said they feel the Sherpa community gave them far more than they left behind. Schuster was one: “The lessons I have learned from this trip far exceed any help I could possibly give,” she says. [M](#)

To learn more about the Invictus Initiative and Lhakpa’s initiative, Hike for Help, visit <http://theinvictus.org> or www.hikeforhelpnepal.org. Lhakpa is organizing a second trip to Nepal in December and still has some space.

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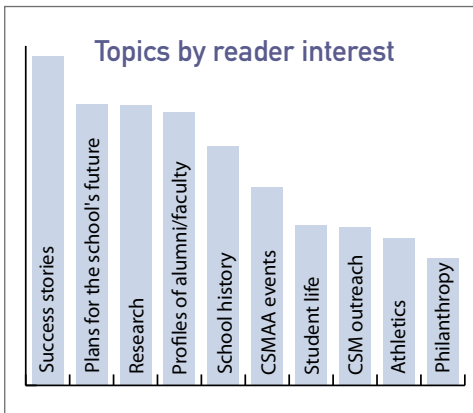
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The Network

So, how do you like us now?

Mines magazine's reader survey results mostly positive, constructive



Figuring that silence doesn't necessarily signify consent, *Mines* conducted an online survey this spring to find out what you really think of this publication. The answers—at times nearly unanimous and at others polar opposite—left us encouraged that, on the whole, you approve of the direction we've taken over the last few years.

More than 12% of the 13,700 surveyed responded, telling us that you want to keep up your connection with the Colorado School of Mines, and you do so by reading this magazine. In fact, 95.5% of respondents reported reading at least some of the magazine—40% said they read it cover to cover.

You like how often we send it (94.1% felt the frequency was about right), and how it looks and reads: 99.7% said the quality of writing was acceptable or good, 99.6% felt the same about the overall appearance and design, and 97.6% responded similarly about the originality and interest of the magazine's story topics.

At the top of the list of noteworthy stories that respondents recalled were "Plugging Macondo" (drilling the BP relief well, Spring 2011), "Constructing a Landmark" (alumnus Dave Zanetell leads construction and design on the Hoover Dam bypass bridge, Fall/Winter 2010) and "Sourcing Rare Earths and Critical Minerals" (tackling the supply problem, Spring 2011).

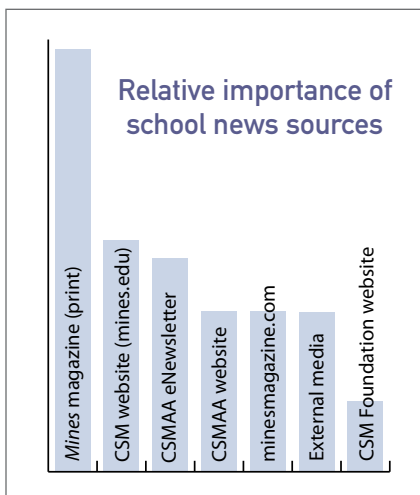
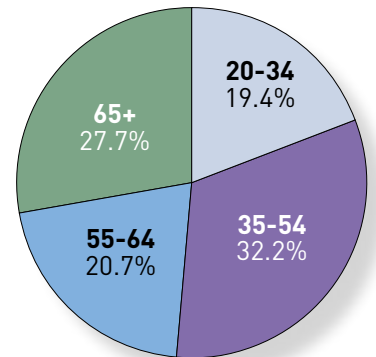
A significant takeaway for us was that, in this digital information age, 68% of respondents had not visited the redesigned *Mines* magazine website (minesmagazine.com) since it launched in January 2011. In the months ahead, we will be looking for ways to better understand this surprising statistic and adjusting our online strategy accordingly.

Of course, your own words gave us the clearest sense of what you like and don't like. Reading through the hundreds of submitted comments has given us a wealth of information for making the magazine better, the most mentioned being our decision to move the details of Class Notes online. One such comment and the editor's response is

included in Inbox on p. 4, where we've published some of this anonymous feedback. Perhaps the comments echo your own opinions. If they don't—or even if they do—we'd like to hear from you: email magazine@mines.edu with the subject line, "Reader feedback."

Lastly, a big thank you to all who responded to this year's survey. We appreciate and value your input.

Age of respondents



If you'd like to read more about our online survey results, go to minesmagazine.com and click on The Network, where you'll find copious charts and graphs.

Homecoming 2011: Campus snapshots

Students and alumni celebrated this year's homecoming (September 30 – October 1) by reuniting with old friends, parading down Washington Street and watching their team trounce Fort Lewis. Here are a few scenes from the events.



We have a lot more homecoming photos: Visit minesmagazine.com and click on Web Extras.



Tyson Brown



Teresa Malesardi

A glorious day for a victory Students and alumni cheered the Orediggers on to a 38-11 win over Fort Lewis at the Mines homecoming game.



A silver anniversary party Thirteen fast friends and fellow members of the Class of 1986, who have reconnected in person every year since graduation for a reunion event they've coined "Wild Women Weekend," chose Homecoming at Mines for their 25th. Posing in front of the sorority they founded in the early 1980s are (back row) Betsy Ryan Learussa, Catherine Reasoner Gardner, Kristin Zembeck England and Juley Nugent; (middle) Melanie Marquardt Westergaard, Jean Rickert Wilson, Kirsten Derr, Jody Kamrath and Kristin Westwater McDonald; and (front) Michele Vivona, Karla Fisher Dailey, Lezah Fellin Saunders and Jane Hallenbeck Paris.



Andria Schmid



John Bristow '11

Flintstones on parade Following the Homecoming 2011 parade, themed "Reinventing the Wheel," women of Sigma Kappa sorority posed with fellow students in front of the Fiji (Phi Gamma Delta) house. Left to right: Nate Thompson, Chase Tyree, Amanda Ayala, Hope Morton, James Trumble and Lauren Revis.

Never too young for football Nicholas Schmid, born June 16 to parents Andria '06 and Andrew Schmid '05 (see Class of 2032, p. 39), took in the homecoming game with Marvin the Miner.

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Cathy Mencin '83
Jo Marie Reeves
Nancy Webb



Coolbaugh House,
1700 Maple Street
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Golden, CO 80402
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800-446-9488, x3295
Fax: 303-273-3583
Email: csmma@mines.edu

minesonline.net

Fast Forward

Class Notes
 Weddings
 Alumni Profiles
 Births
 Passings

1949

Lawrence B. Curtis is a director for ECA and lives in Montgomery, TX.

1955

Gerard Demaison is an international petroleum exploration consultant and lives in Capitola, CA.

1957

Zell E. Peterman is the owner of ZEP Consulting and lives in Lakewood, CO.

1959

F. H. Merelli is the chairman of Cimarex Energy and lives in Conifer, CO.

1961

Bob P. Faulkner is an independent process consultant and lives in Riverside, PA.

Ralphe Wiggins 

1965

Gary K. Gantner is the president and owner of Gantner Associates and lives in Golden, CO.

1966

Henry Paasonen 

John Pessagno 

John W. Schlendorf Jr. is a realtor for Pacific Union and lives in Danville, CA.

1967

Jaime Navas Gaona is a director and chairman of the evaluation and reserves committee for La Cortez Energy, based in Bogota, Colombia.

1968

Vincente F. Campos is a member of the board of directors for American Beverage Co., based in Belo Horizonte, Brazil.

Joe W. Gray is the chair of the Department of Biomedical Engineering at Oregon Health and Science University.

Thomas E. Irwin is a construction manager, Livengood Gold Project for International Tower Hill Mines and lives in Fairbanks, AK.

David G. Wahl is a president and CEO for Southampton Associates, based in Mount Albert, ON, Canada.

John W. Walker Jr. is working for Salem Oil and Gas and lives in Amarillo, TX.

1969

Robert I. Watkins is a senior project manager for AREVA Federal Services and lives in Richland, WA.

Daniel C. Zabel II is a real estate investor and lives in Castle Rock, CO.

1970

George W. Off is the interim CEO for Catalina USA and lives in Berwyn, PA.


Lee A. Turner is a VP, quality health safety environment for Saxon Energy Services and lives in Spring, TX.

1971

Ralph Baird 

John I. Brockardt is the COO for Hunter's Specialties and lives in Marion, IA.

Dale Fitting 

David A. Gulley is a senior managing director for Mesirow Financial Consulting, based in New York. 

Craig W. Moseley is working for Jacobs Engineering Group and lives in Golden, CO.

Wesley P. Nason is a VP of operations and estimating for Welded Construction and lives in Anchorage, AK.

Roger A. Newell is a member of the board of directors for Midway Gold and lives in Golden, CO.

1972

Detlef Adolff is a certified phlebotomist for Apex Paramedical Services and lives in Aurora, CO.

D. Victor Bush is an energy efficiency program manager for Newmont Mining and lives in Littleton, CO.

Michael G. Long is a general director for MGL Capital Partners and lives in Las Vegas, NV.

Ronald R. Smith is working for EMSA and lives in Kennewick, WA.

Robert P. Snowden is a software engineer for Lockheed Martin and lives in Burleson, TX.

Steven T. Tedlie is a senior contracts manager for Fluor Enterprises and lives in Cape Coral, FL.

Pamela R. Tittes is a lieutenant colonel for the U.S. Air Force and is based in Annandale, VA.

1973

David Conover 

Scott Moravec 

John Robertson III is a mining specialist for HATCH and lives in Phoenix, AZ.

Weddings



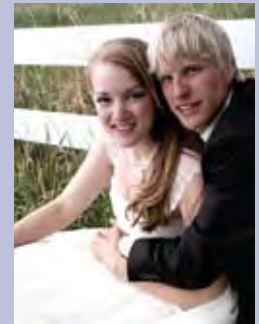
Charles Cooper '05, ME '06 and Anna Sullivan were married on August 8, 2009 at the Shrine of St. Anne's Catholic Church in Arvada. Multiple alumni were included on the guest list.



Laura Pearl '09 and **Jeremiah Tucker '09** were married on May 24, 2009 at Foothills Chapel in Golden. Many Mines alumni and students were in the wedding as well as in attendance.



Katie Thompson '00 and Jared Rockman were married on May 14, 2010 in Genesee. Mines alumni in attendance included **Karla Koop '00, Erica (Balstad) Leigh '00, Heidi Morrow '00, Jessica (Gonzales) Nesvold '99, Stacey (McEwen) Peterson '00, Nate Peterson '00, Mary (Larson) Troxell '00** and **Hobie Troxell '00**.



Molly Perkins '11 and Seth Roby were married on June 26, 2010 in Gunnison, Colo., at Molly's parents' home. Several Mines students who are now alumni attended.



Carole C. Fotino '08 and David E. Ramsay, both of Golden, were married in Vail on May 15, 2010.



Irina Hardesty-White '09 and Daniel White were married on June 3, 2011 in Cambria, Calif.



Andria Eickelman '06 and **Andrew Schmid '05** were married on June 16, 2007 in Pueblo, Colo.



Luke A. Michael '03 and Dorothee Maroserro were married in the Black Hills of South Dakota on Sept 7, 2010. It was a small ceremony, which will be followed by a larger celebration in the south of France in June 2012.



Darek Bruzgo '95 and Serena Stickney, CSMAA's deputy director, were married at Fossil Trace Golf Course in Golden on June 18, 2011. About 35 alumni attended.



Adam Johnson '05 and Jennifer Lynn Hass were married February 4, 2011 at the Omni Severin Hotel in Indianapolis, Ind., with several Mines graduates in attendance.

To include your recent wedding in *Mines* magazine, email details to magazine@mines.edu, and include a selection of high-resolution digital images.

1974

Dean A. Henrickson is a senior engineering tech for Twin Rivers Testing and lives in Hershey, NE.

William T. Lockman Jr. is a chemist for Freeport-McMoRan Copper and Gold and lives in Morenci, AZ.

Gregg M. Moser is a project manager for Afren and lives in Houston, TX.

Robert G. Parkinson is a manager occupational safety, health and environment and quality assurance for Moly-Cop USA and lives in Kansas City, MO.

Andrew Pfaff is a country manager for EOG Resources China and lives in Chengdu, China.

Donald E. Ranta is the president, CEO and director for Rare Element Resources and lives in Golden, CO.



Success

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Providing service and information for charitable gift planning.

Gregory A. Robb is a mathematics teacher and lives in Roswell, NM.

John B. Sinton is lead geophysicist-seismic imaging for Maersk Oil and lives in Houston, TX.

Wilfred S. Streeter is the president of UOR Technology and lives in Colorado Springs, CO.

1975

Edward Biller

Carl E. Cross is a staff scientist for Los Alamos National Laboratory and lives in Estes Park, CO.

Hoy E. Frakes Jr. is the president of AMG Vanadium and lives in New Concord, OH.

Gregg J. Hodges is an operations manager for Ausenco PSI Chile and lives in Red Lodge, MT.

Dean D. Stoughton is a consulting geophysicist for Tabernash Technology and lives in Houston, TX.

Robert F. Unger is the president of Energy Production and lives in Dallas, TX.

William A. Warfield is a business development manager-GDE for Atlas Copco CMT and lives in Roseville, CA.

1976

Jose A. Botin is a professor and chair, economics and business for Universidad Catolica de Chile based in Madrid, Spain.

Thomas V. Demars Jr. is a director for L-3 Communications and lives in North Charleston, SC.

Robert W. Handford is a senior projects manager for Dyno Nobel and lives in Salt Lake City, UT.

David S. Hass is a senior engineer for General Dynamics and lives in Shawnee, OK.

Howard E. Janzen is working for Janzen Ventures and lives in Leawood, KS.

Gregory T. Kelleher is a senior VP southern division for Devon Energy and lives in The Woodlands, TX.

Alex B. Kilanski is a director for Science Applications International and lives in Warrenton, VA.

Norman E. Kramer is a project manager for Atkins and lives in Metairie, LA.

Alvin L. Langstaff is a manager, lean Six Sigma for Bechtel Group and lives in Pasco, WA.

Charles R. McLendon III is a program director for WRSSCompass and lives in Dripping Springs, TX.

Gary J. Nilson is a reservoir engineering advisor for Pioneer Natural Resources and lives in Irving, TX.

Randolph E. Pepper is a research advisor for WesternGeo and lives in Houston, TX.

John T. Rohde III is the president for Bear Creek Energy and lives in Colorado Springs, CO.

Arthur Schwab

Stuart M. Smith is an account manager for Computer Tech and lives in Houston, TX.

Jimmy B. Taylor is a project developer for Johnson Controls and lives in Warr Acres, OK.

John R. Underhill is a deep water drilling manager for Chevron and lives in Richmond, TX.

1977

Steven L. Brown is working for Romantix and lives in Arvada, CO.

Alan A. Burzlaff is the president, MHA CA of MHA Petroleum Consultants and lives in Bakersfield, CA.

Stephen M. Hamburg is a senior VP for Miller and Lents and lives in Katy, TX.

Claudio D. Manzollilo is a consultant for CDM Consultants and lives in Houston, TX.

David F. Volkert is the president and CEO for Paget Minerals Corp. based in Vancouver, BC, Canada.

1978

John H. Benton is a VP, Rockies regional manager for Rex Energy and lives in Littleton, CO.

Michael J. Dern is a VP corporate engineering for Forest Oil and lives in Evergreen, CO.

Brian Frost is a distinguished geophysical advisor for Anadarko Petroleum.

Robert C. Gindrat is working for Denbury Resources and lives in Lewisville, TX.

Michael N. Norred is a VP of strategic resource planning for Comstock Mining and lives in Morrison, CO.

Randy T. Pitts is a plant manager for Tata Chemicals (Soda Ash) Partners and lives in Green River, WY.

Dwight V. Smith is an adv. senior geophysicist for Marathon Oil and lives in Houston, TX.

Timothy L. Stouffer is a technical excellence knowledge manager for Marathon Oil and lives in Stafford, TX.

John B. Warren is an operations manager for Petara Oil and Gas and lives in Parker, CO.

Gary L. Weihs is a managing director for Kincannon and Reed and lives in Harlan, IA.

Bruce E. Weiler is a north slope startup lead for Udelhoven Oilfield System Services and lives in Anchorage, AK.

1979

Ted L. Anderson is the CTO of Quest Integrity Group and lives in Longmont, CO.

Profile

Frances Vallejo '87

Minority Engineering Program Plants Seeds for Alumna's Distinguished Career

"Some people know from a really early age what they want to do," says Frances Vallejo '87. "I was not one of them."

But a summer program at Mines for minority high school students changed all that for the Pueblo, Colo., native.

"It exposed me to geology, geophysics, mining and many engineering disciplines. I learned how to program in Fortran, and this was before we even had computers in my high school."

The program in which she was enrolled—the Summer Minority Engineering Training (SUMMET) program—provided the impetus for what would turn into a distinguished career, which has seen Vallejo rise steadily through the ranks at ConocoPhillips. Starting as a geophysicist after graduating from Mines, she moved to the business side as a finance associate, and then became manager of strategic transactions, assistant treasurer and other upper management positions. She is now vice president and treasurer for the company.

In fact, the impact of Mines on Vallejo's life extends far beyond providing that first glimpse into a new and different world. It's where she met her husband, Scott Irvine '87, during field camp the summer before her senior year. It's where, through The McBride Honors Program in Public Affairs, she was first exposed to what she calls "the business world beyond engineering," an exposure she says influenced her decision to take a leave of absence from work and enroll full-time in Rice University's MBA program. And it's where, today, she returns at least six times a year, as the most recent appointee to the school's board of trustees.

Professor Barbara Olds, who taught Vallejo in the McBride program and with whom she still keeps in touch, says that as a student Vallejo "possessed both the self-confidence and the humility to succeed in any path she chose. It's been a joy to follow her career."



VP/treasurer at ConocoPhillips, member of Mines' board of trustees and a mother: Frances Vallejo '87 balances many responsibilities.

Speaking of humility, mention to Vallejo that she was valedictorian of her high school class, and she's quick to correct: "co-valedictorian." The prestigious full-ride Boettcher Scholarship she was awarded to attend college? "It provided the resources necessary to go to Mines." Being named Outstanding Senior of The McBride Honors Program at Mines, Female Executive of the Year in 2009 by the Houston Hispanic Chamber of Commerce and being referred to as a "Woman Worth Watching in 2011" by the Profiles in Diversity Journal, not to mention receiving numerous awards along the way at ConocoPhillips?

"It's humbling."

The mother of three says she hasn't particularly sought the accolades and advancement she's earned. She's focused on her job duties—not her next promotion.

"I tell my kids, if you work hard, have talent and do your job, you'll be recognized."

Vallejo serves on a number of volunteer boards in Houston, including Teach For America. "My father and his mother were both superintendents of schools, so I always knew I wanted to be involved in education somehow." And, coming full circle, she has presented at programs that expose minority kids to engineering, including once taking a four-week leave from ConocoPhillips to teach at SUMMET.

"The program had such an impact on me and my life. I enjoy spreading the word and encouraging these kids to pursue technical careers."

And who better than Vallejo to promote the message?

"I tell my kids, if you work hard, have talent and do your job, you'll be recognized."

—Anne Button

David A. Bird is a regional manager for Microseismic and lives in Englewood, CO.

Steven C. Gebhard is a senior scientist for TDA Research and lives in Golden, CO.

Curtis L. Golike is the president of James Peak Consulting and lives in Golden, CO.


W. Scott Graeme is a senior consultant for WSGraeme Consulting and lives in Hoffman Estates, IL.

Kenneth J. Konrad is a director global E&P, mergers and acquisitions for BP and lives in Katy, TX.

Paul F. Martin is a chief application engineer for Sumitomo Drive Technologies and lives in Virginia Beach, VA.

Alan J. Mencin is marketing manager, North America for Bateman-Litwin and principal consultant of Mesa International.

Paula D. Menten is working for Kinder Morgan and lives in Broomfield, CO.

Paul J. Plante is a senior project manager for Nextera Energy and lives in Yarmouth, ME. 

L. Douglas Poole is an adjunct instructor at the Colorado School of Mines and lives in Golden, CO.

John W. Rozelle is a VP technical services for Vista Gold and lives in Golden, CO.

James R. Sharpe is a senior staff engineer for Enserra Engineering and lives in Lakewood, CO.

Gordon L. Strobeck is a director for Ernst & Young LLP and lives in Houston, TX.

1980

Michael S. Allen is a land development consultant and lives in Buena Vista, CO.

Kathleen A. Altman is a principal metallurgist for Roscoe Postle Associates USA and lives in Denver, CO.

James G. Brophy is a professor at Indiana University and lives in Bloomington, IN.

Susan M. Buth is working for Colorado Division of Insurance and lives in Lakewood, CO.

Jeffrey R. Corwith is working for ConocoPhillips and lives in Houston, TX.

Mark D. Cutright is a VP for Atlas Energy and lives in Aurora, CO.

Theodore R. DePooter is a resident engineer for Jacobs Associates and lives in Kennesaw, GA.

Philip O. Johnson is an engineering manager for Peterson Energy Management and lives in Arvada, CO.

Thomas E. Jorden is the president and CEO of Cimarex Energy Co. and lives in Centennial, CO.

J. Michael Liittjohann is an engineering manager for Chevron Phillips Chemical and lives in Spring, TX.

Michael G. Maslowski is a VP, exploration (Canada) for Golden Predator Corp. and lives in Hayden, ID.

David F. Mayer is a senior reservoir advisor for Berry Petroleum and lives in Bakersfield, CA.

Mohammad A. Mian is a petroleum engineer for Saudi Aramco based in Dhahran, Saudi Arabia.

Jane M. Obradovic is working for Halliburton and lives in Houston, TX.

Rodney O. Pace is the president/CEO of Rosemont Copper and lives in Tucson, AZ.

Richard D. Peters is working for Salym Petroleum Development and lives in Houston, TX.

Andrew K. Silva is a technical sales engineer for J-W Wireline based in Centennial, CO.

Richard A. Simonson is the CFO and president of business operations for Rearden Commerce and lives in Rye, NY.

Patrick Smyth 

Harry B. Tipton III is a VP of engineering for North American Coal and lives in Aubrey, TX.

Edmund Werner 

1981

Nicholas W. Atencio

Philip E. Brinkmann 

Daniel J. Cornette

Steven R. Enger

William R. Gee

Bret G. Gunneson

Linda Sue Hoops

Timothy Johnston 

Mark J. Ludwig

Tracy J. Lyman

Colin C. Nisbeth

Gary R. Pekarek 

Rick C. Powell

Diane L. Prier

Michael C. Purfield


Terry F. Rees

1982

Mehmet F. Akalin


Randall K. Brenimer

Michael R. Briggs

Norbert A. Fleck 

Michael J. Foley

Barbara L. Ganong

Kevin Ion 

David H. Jerome

Michael R. Kennedy

Alan K. Kosley

Editor's Note: Alumni from classes 1981 to 2011 who have recent updates online or have uploaded photos to minesonline.net over the last six months are listed. In addition, all class notes published in *Mines* magazine in the last four years are available on the site. When you visit, take a few moments to enter your latest information and upload some photos—we'll then list you here in the next issue of *Mines* magazine.

Instructions for viewing class notes and photos online

If you have never logged in to minesonline.net:


1. Go to minesonline.net and click the red "First Time Login" link at the top right of the homepage.
2. Enter your name and select the green circle next to your record (if your name appears twice, select the record that lists your degree).
3. Enter your authenticator ID. (Printed above your name on the back cover. Can't find it? Email csmaa@mines.edu.)
4. Create your username and password, then confirm/correct contact information on the subsequent pages.
5. Click "My Stuff" tab and select "Class Notes" to begin your search.
6. To view photos, you may need to click on the individual's hyperlinked last name when you arrive at the class notes results page.

If you have previously completed first time login:

1. Click the red "Login" link at the top right of the homepage.
2. Enter the username and password you created for yourself.
3. Update information if necessary. Go to #5 above.





Have a smartphone with a QR reader app installed? If so, this code takes you directly to My Stuff.



 denotes an individual who has recently posted photos on minesonline.net

Daniel Maguire 
Arthur C. Riese
Sandra A. Sullivan
Tor C. Tschanz
Kevin R. Wayment 
Fredric A. Woldow



1983

Michael T. Culligan
Gary D. Debus
Jeffery B. Frayser
Todd Habliston
Gene P. Krupp
Dennis A. Lobmeyer
Edward R. Norberg
Darien O'Brien 
David A. Powell
Stanley E. Shaw
Roxanne Skeene
Janine F. Weber 

1984


Frank C. Benedict Jr.
Michael R. Bowen
Kevin N. Brown
Mark Burtschi 
Jay W. Clements
Randy R. Cox
John M. Kirkpatrick
Jeffrey P. Lee 
Robert D. Moskal
Bradley N. Neptune
Bruce L. Niemeyer
Jeanne M. Pierson
David C. Raymes
Gabrielle A. Schavran
Robert N. Sencenbaugh
Bruce W. Smith
Matthew A. Telles
Mark E. Weber
Michael R. Wyman

1985

Rebecca A. Dorward
Carol A. Edson
Daniel S. Gralla
Jimmy L. Kowach
Michael Kozak
Carl E. Lakey
Javier Luengo Delgado
Yoseph G. J. Partono 
Gordon W. Paterson
Barbara J. Slayman
Kathleen Theisen 
Melinda G. Truskowski
John C. Wells

1986

Steve Biagiotti 
Mark Bowron 
David J. Camille
Eric D. Emerson
Gregory S. Floerke

Andrew B. Flynn
Melvin C. Haun
Barbara S. Helmkamp
James C. Hunter 
Steven P. Jeffords
Thomas M. Kreutz
Mitchell S. Mather
Loren R. Perlan
Russell C. Schucker
Gregory A. Snyder
Julianna M. Stansbury
Douglas M. Symons
Stephen D. Whidden
David T. Wickham
Robert B. Wilson
Jeremy J. Zimmerman

1987

Wade A. Bard
Todd P. Courtney
Peter C. Dillingham

Philip E. Hecker Jr.
David R. Krizek
Gilberto Marcha 
Nadia Chornij Miller
Scott R. Richey
Steven D. Rogge
Peter C. Sanford
Paul J. Taylor
Linda A. Tekrony
Steven Wood 

1988

Amir Assar
Michael J. Dammann
Anthony W. Fabrizio
Tama L. Funk
Scott M. Kelly
David R. Kennar
Corey D. Kramer
Michael Leska
Marc S. Simmonds

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Alumni

Fast Forward

Bambang Trigunaryah 📷
Chia-Chung Wang
James W. Williams IV
Thomas A. Zalan

1989

Bryan J. Kinderman
Jay B. Knaebel
Jeffrey J. Meskill
David R. Minke
Diana L. Moss
Hung H. Nguyen
Steven D. Sparkowich 📷
Eric S. Thurston
Michael Young 📷
Mark E. Zitterrich

1990

Denise R. Bauer
Bruce C. Bunch
Jennifer E. Day
Chi Dong 📷
Michelle S. Dunbar
Michael G. Ernest
Theron W. Jensen
Steven M. Lassek
David C. Lawler
Janet L.J. Peace
Dorival C. Pinto
Mark K. Reeves

Adam W. Smith
Ralf E. Topper
Ward A. Whiteman

1991

John W. Arms
Ronald P. Boese
John D. Jensen
Lisa A. McDonald
Samantha F. Meador 📷
Scott A. Musson
Scott M. Plummer
David G. Ray
Mark D. Sonnenfeld
Barry A. Thomas
Alexander L.H. Van
Hoeken
Ahmad R. Zainudin Nordin

1992

Zaal Anuar Alias
Russell A. Frishmuth
Oguz Gunduz
Geoffrey A. Houlton
Kregg Hyer 📷
Victoria B. Jackson
Nielsen
David J. Kalman
Nicholas J. Kiusalaas
Erika J. Nelson-Wong

Linda D. Parkhill
James K. Roudebush
Michael A. Rynearson
Toni Showan 📷
Anna M. Young

1993

Henry Antwi
Sally P. Armitage 📷
Daniel V. Colston
Gary F. Desrochers 📷
Mark R. Gwaltney
Robert C. Klug
Ulf A. Kutschera
Jonas A. Martinez
Ross A. Thompson
Christopher J. Witherell

1994

Jay M. Allin
Matt L. Brewer
Bryan J. Burinda
Christopher L. Coil
Debra M. DeCrausaz
Genet Hailemichael
Michael R. Hare
David H. Kingsbury
Carl B. Krutka
Taras Makogon 📷
Mark Moseley-Williams

Toshisuke Ozawa 📷
Robert W. Patlovany
Timothy J. Piwowar Jr.
Oliver W. Posso
Harry J. Sorensen
Michael S. Stoner
Dean L. Tinsley
Mark J. Vessely
Christine P. Whelchel
Christopher M. White

1995

Michael L. Armentrout
Mark A. Erickson
Erika A. Frietheim
Jhairo J. Garcia
Rhonda G. Gathers
Stanley A. Kongnetiman
Timothy K. Marvel
Nicole L. Matthews 📷
Christopher D. Miksa
John B. Mosher
William M. Moss
M. MacLean Price
Christopher J. Rusanowski
Tim C. Saenger
Brian P. Scott
Seth S. Terry
Scott A. Walker
Paul M. Wiebe

1996

Edward A. Adkins
Serdar Aksu
Jami L. Alley 📷
Christopher S. Callaway
Robert D. Carlson
Christopher W. Clark
Mitchell L. Crane
Troy B. Dinkel
Trevor R. Elenbaas
Lee C. Fronapfel
Ahmad A. Gharaibeh
Brandi A. Goodman
Covey E. Hall
Maia C. Hunt
Catherine L. Kling
Mary C. Portillo
Jonathan J. Richter
Jose R. Rodriguez Chacon
Michael R. Sanders
Roy B. Townsley
James C. Westhoff
Ryan E. Zorn

1997

Brad G. Bijold
Anna T. Dube
Mary E. Faulk
Dana J. Fowers
Aaron C. Franklin
A. Scott Goldberg
Valarie L. Salaz Hamilton
Pirat Jaronpattanapong
Aaron M. Nielsen
Elizabeth R. Reigles
Brian W. Robbins

Brooke Rosener 📷
Paul R. Sabby
Jason T. Sarno
Anthony K. Staley
Christopher M. Stevenson
Walter H. Strohmayr
Lori L. Stucky
Dustin A. Turnquist
Stephanie S. Walker
Tonya L. Wyatt

1998

Jeffrey L. Alleman
Robert C. Busse
Jason H. Carmichael
Thomas P. Collins IV
David C. Collins
Meredyth M.S. Crichton
Evan-Pierre B. Genaud
Elizabeth M. Gilbert
Kristopher L. Kuhlman
Brian L. Mossberger
Balazs Nagy
Toby M. Padilla
Ryan L. Robinson
Spring A. Stutzman
Brett W. Thompson
Erkan Topal
Derek R. Trebilcock
Hirofumi Yamamoto

1999

Ryan T. Bennett
Brian F. Birnbaum
James T. Brumley II
Donald W. Bucholz
Karen L. Dennis
Aaron Fleet
Dawn D. Gaynor
David B. Graham
Eric D. Hallam
Jacob M. Hoban 📷
Jason Le Gore
Brian A. McCaig
Tathagata Tota Mukherjee
Gordon L. Olson
Kiran Patankar
Roy E. Pfaltzgraff III
Susan A. Rainey
Craig L. Randolph
Jason S. Spears
Carrie L. Strand
Edward W. Swim
George Tumur 📷
Jackson A. Unrau
Carrie A. Wildin

2000

Adam B. Anderson
Leslie A. Baca
Capt. Dustin L. Ballinger
Brent D. Bergin
Magdalena Boogaard
Ryan G. Fisher
Anne Grau
Aaron J. Hall
Zachary S. Herman



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Class of 2032



Everett Lawrence was born on June 3, 2010, to **Jamie (Stadtlander) '03** and **Andrew Headley '03**.



Josh '01 and **Cassie Viets** welcomed **Scarlett Lillian** to their family on September 15, 2010. She joins sisters **Lydia Jean** and **Claire Elizabeth**.



Charles Cooper '05, **ME '06** and **Anna Sullivan** are proud to announce the birth of their second child, **Dean Cooper**, born November 29, 2010.



Elena Birckenstaedt was born January 4, 2011, to parents **Bonnie McCoy '05** and **Hernan Birckenstaedt**. She joins big brother **Dante**.



Jonathan '01 and **Susie Kepler** are proud to announce the healthy arrival of **Jackson James**, born on April 24, 2011, at the American Hospital of Paris in Neuilly-Sur-Seine, France.



Michelle (Palmer) '98 and **Josh Lamb '04** are pleased to announce the birth of their daughter, **Annette Palmer**, on January 21, 2011.



Laura (Pearl) '09 and **Jeremiah Tucker '09** welcomed their daughter, **Sarah Faith**, on March 18, 2011.



Clayton '07 and **Kaleena McWhite** were blessed with their first son, **Titus Matthew**, on April 16, 2011.



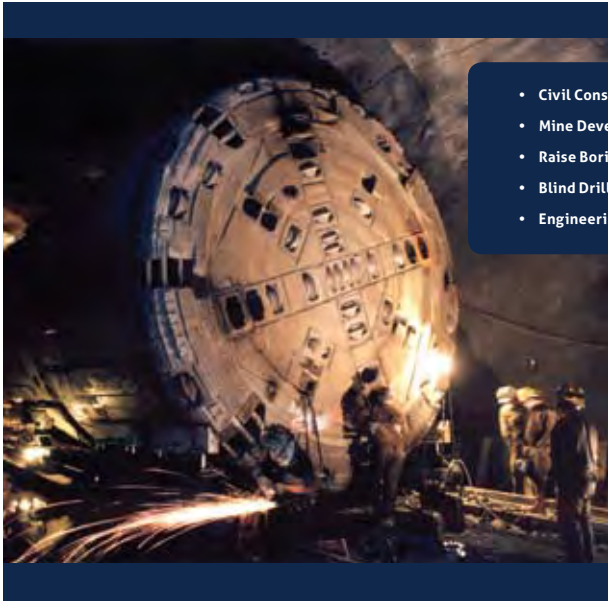
Andria (Eickelman) '06 and **Andrew Schmid '05** welcomed son **Nicholas Jeffrey** on June 16, 2011.



Troy Gerard was born on August 20, 2011, to proud parents **Melissa (Foppe) '09** and **Joe TeBockhorst**.



Louisa June was born October 6, 2011, in San Francisco, CA. She is held by proud parents **Tim '04** and **Katy Clem** and older sister **Ellery Anne**, who was born May 20, 2009.



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Timothy A. McCarthy
Melissa E. Ott
Sivakumar Subramanian
Joshua M. Thomason
Mahesh Vidyasagar
John Robert West

2001

Daniel D. Adams
Brianna G. Atherton 
Daniel S. Baker
Jacob Benson 
John C. Gibbs
Jaclyn B. Haney
Michael J. Harrington
Holly D. Hindle
Jonathan Kepler 
Russel P. Lannin
Erin L. Anderson McEvers
Christopher T. Mills
Bryant M. Mook
Juan Pablo Moriametz
Paula A. Oransky
Dawn M. Paling
Kerry L. Petranek
Angelina C. Southcott
Joseph A. Teff
Whitney J. Trainor-
Guitton 

2002

Mansoor H. Al-Harthy
Cody M. Allen
Eric W. Boogaard
Leo T. Brown
Jeffrey R. Busby
Robert A. Cambron II
Ryan J. Countryman
Mark D. Eisbrenner II

Brian A. Ellis
Jared C. Geissler
Chad L. Goerzen
Jeremy Hamer
Cambrey S. Johnston
Erin L. Matternson
Zachary T. Miller
Anthony M. Phillips
Benjamin J. Ploeger
Michelle A. Puca
Edward T. Smith
Daniel B. Stouffer

2003

Bret M. Banwart
Kimberly M. Boitano
Forest J. Bommarito
Christopher M. Bradley
Birgit Braun
Robyn C. Brown
Charles J. Bushman
Bradley A. Crenshaw
Scott J. Fischaber
John E. Hillert
Juliet Kelty 
Emily R. King
Luke A. Michael
Patrick E. Mohr
Jared G. Noe
Patricia L. O'Day-
Greenfield
Joshua S. Parrill
John H. Pfahl
Zane T. Prickett
David A. Renner
Timothy J. Schulte
J. Ross Serven
Phartrucha Tantivess
Jesse J. Terry
Jared R. Thompson
Hector A. Wills

2004


Bader S. Al Mana
Rafael A. Bacigalupo
Brandon R. Baker
Jasper Bertisen
Timothy E. Clem
Juergen Dreier
Payman Farrokhhyar
James R. Heath
Becky L. Kowalski
Angelique N. Lasseigne
Jennifer M. Lazetera
Hokook Lee
Sarah A. Lincoln
Ivan Laurence London
Cristian H. Malaver
Peter Dominic Montano
James M. Mosby
Tylor Slauter 
Teresa L. Smithson
Jason T. Stewart
Hossein Forough Tabrizi
Zachary T. Trautt
Marc C. Wennogle
Kristie J. Wilkerson

2005

Ryan M. Briggs
Albert C. Brown
Douglas E. Burkes
Mark P. Chung
Michael B. Delaplain
Andrea C. Fleming
Steven P. Fremem
Matthew A. Fritzinger
Blaise H. Hara
Matthew J. Hazleton
Casey L. Hensley
John C. Hottenroth
Ryan J. Hubbard


Lon A. Hutt
Geoffrey N. Johnson
Jennifer N. Malik
Bonnie McCoy
Jolene R. Mulumba
Paula M. Nolan
Gian S. Porro
Eric M. Reynolds
Cristin C. Rhinehart
Alireza Roostapour
Jedidiah D. Rust
Christopher E. Schneider
Jessica M. Schwark
Gabriel C. Schwend
Christopher L. Scott
Jeffry H. Simanjuntak
John W. Thompson
Joshua D. Venters
Travis A. Yenne

2006

Brian J. Boudreau
Rachel D. Chandler
Jorge V. Fandino
Betancourt
Emory A. Gallavan
Nicholas Geanetta 
Logan Hackett
Nichole M. Janisch
Travis E. Jones
Shawndra M. Lopez
Kaitlyn C. Mace
Timothy M. Miller
Dallas J. Nutsch
Haytham Y. Osman
Ryan E. Pennington
Jacob W. Richardson
Christina A. Sack
Matthew R. Sayer
Kaitlyn M. Schaumberg
Adam A. Schmetzko

Andria L. Schmid 
Jeremy T. Sell
Devin D. Shable
Devon M. Simmons
Megan M. Starr
Catherine A. Tolliver
Jared R. Wageman
Ross T. Wagle
Patrick R. Wieck
Cameron D. Wilkins
Jonathan M. Wilson

2007

Joseph A. Amend
Stephanie E. Ashley
Kenton R. Austin
Amanda Barngrover
Sarah A. Bartlett
Nathan W. Budge
Scott T. Dudley
Babatunde I. Egunjobi
Tyler A. Farley
Zachary A. Felkey
Teresa E. Frontczak
Ismael Gonzales
Thor V. Haraldsen
Brian P. Hesselberg
Christi Hurelle
Bart D. Jordan
Jacob W. Kirkley
Ulrich K. Koberg
Ryan L. Koontz
Casey A. Korejwo
Adam D. Noelck
Allison L. Nold
Chike E. Okoye
Nathan A. Pitts
Amanda E. Rebol
Clay A. Rosson
Steven W. Schow 
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1981



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Minor in Metallurgical
Engineering, 1982



Brad Knepper
Patent Attorney, Principal
B.S., Electrical Engineering,
1998



Matthew Ellsworth
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Yunjong Yeo
Bob Yu

2008

Luis A. Agapito Tito
Hussain Al-Mahamedh
Travis Arciaga
Brandon Ardiente

Kelli S. Barnes
Bello Bichi
Morgan K. Brown
Rachel des Cognets
Gavin C. Dittman
John Fennell
Jason M. Feucht
Daniel Funderburk
Kurtis A. Griess
Andrea Ham
Aaron J. Heun

Andrew J. Husak
Stephen M. Immel
Vladislav D. Kaufman
Sarah A. Kupko
Sarah Labosky
Jason Leon
Shannon K. McNamara
Thomas J. Migchelbrink
Nikole C. Muckelroy
Laura E. Nicholas
Thomas L. Papiernik

Alexander Pirogov
Carole C. Ramsay
Jennifer Rotramel
Anthony Ruddy
Gregory J. Satriano
Gary D. Scherer
Melissa S. Stratton
Liyu Sun
P. Kyle Trainor
Natalie M. Wagner

2009

Doyle A. Adams
Jesus Alvarado
Lance A. Atkins
Daniel J. Auwerda
Aaron P. Boranian
Jacob T. Bosh
Amanda K. Bowers
Jessica R. Bowser
Mikolaj Bykowski
David A. Carey

Profile

Brock O'Kelley '74

Reengineering the Nation's Only Major Source of Rare Earth Metals

Brock O'Kelley has seen the good times and weathered the bad ones at Molycorp's Mountain Pass Mine, located 50 miles south of Las Vegas. He was there 22 years ago, when the mine ranked as the world's largest single producer of rare earth metals. And he endured the dark period of the late 1990s and early 2000s, when a changing market and regulatory challenges slowed production to a trickle.

Today, Mountain Pass is poised to enter a new era of prosperity, and O'Kelley did as much as anyone to bring it about. As director of technology for Molycorp, O'Kelley introduced a suite of innovations that increased efficiencies, lowered costs and cleared away longstanding regulatory obstacles.

The result is a new lease on life for Mountain Pass Mine—and a new job title for O'Kelley. Molycorp promoted him to Technology Fellow, marking the creation of a new executive-level position with a formal dinner in his honor. In his new role, O'Kelley will continue perfecting the company's refining and processing technology.

"He's one of the top people in the world when it comes to knowing how to process these materials," says Molycorp CEO Mark Smith. "When you combine all the things Brock and his team have worked on, they allow us to process our materials for about 25 percent of the cost of the rest of the world."

The renaissance at Mountain Pass comes at a critical time. In the last decade China has come to dominate the world market for rare earth metals, which have critical applications in defense technology, consumer electronics, renewable energy and other key industries. In 2010, China accounted for roughly 95 percent of the world's rare earth production. When that country slashed its export quota a year



Brock O'Kelley, who led the charge to develop innovative processes for separating rare earth metals, was honored by Molycorp at a dinner upon his promotion to technology fellow.

ago, the threat of worldwide shortages loomed.

"We sensed there was a great need to make sure we were up and running sooner rather than later," says O'Kelley. "We accelerated our schedule such that we were able to start up operations in 2007 using stockpiled materials."

Because they occur in unusually complex ores, rare earth metals are difficult to separate out at high concentrations, so the refining process is long and costly. Mountain Pass's long period of near-idleness turned out to be a blessing, O'Kelley says, because it gave him and the young mining engineers in his charge time to step back, think about the big picture and reengineer the entire production sequence.

"The old process just didn't make sense," O'Kelley says. "We had to have the ability to produce the same high-quality separated


rare earths the Chinese offer, and we were able to come up with some innovative processes to do that."

While the details of those innovations aren't open for public discussion, O'Kelley characterizes them as an accretion of small changes rather than one large, transformational breakthrough.



"There was no big new discovery," O'Kelley says. "It was just a matter of figuring out how to piece things together more effectively."

Mission accomplished, says Molycorp chairman Ross Bhappu PhD '88. "The work Brock's group is doing has led to incredible recovery rates and incredible overall efficiency," he says. "It's going to make us the lowest-cost operator in the world."

"It's not just the ideas Brock has come up with," adds Smith. "It's

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 Ryan A. Cline
 Arianne M. Dean
 Ryan J. Decker
 Dustin J. DeForest
 Ustun Duman
 Garrett S. Ensor
 Scott A. Gordon
 Grant Gunhus 
 Meredith S. Heilig

Erika C. Hirsch
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 Ryan M. Holden
 Joshua E. Jackson
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 Kimars Mahmoodi
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Drew R. Meyer
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 Joseph A. Ricotta
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 Prianto Setiawan

also the leadership he has provided. He's taken a group of young engineers and turned them into outstanding rare earth scientists who have come up with processing technologies that rank second to nobody in the world. That team—largely because of Brock's leadership—will enable us to produce the same amount of product as our competitors from less than half the amount of ore.”

“The biggest message to our young people was to be creative,” O'Kelley says. “We gave some guidance to our young engineers and chemists, but mostly we gave them free rein to figure out what was needed.”

Even when Mountain Pass was closed and Molycorp faced bleak prospects, O'Kelley figured it was only a matter of time before things turned around. “We have a world-class deposit,” he says. “I believed at some point in time the markets would turn around, and the materials we could produce would benefit not only our economy, but also our country.”

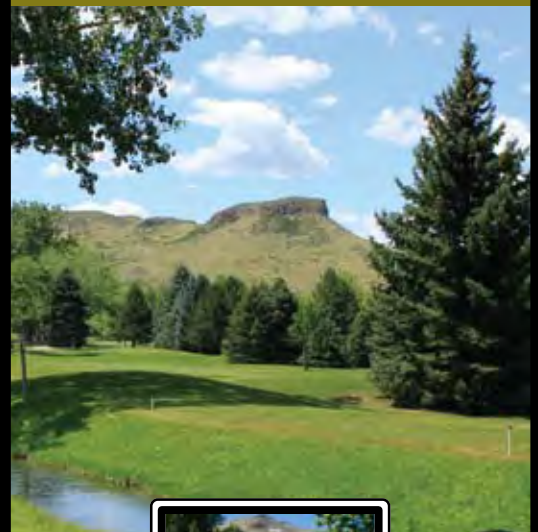
And turn around they did. The price of neodymium, which is used to make rare earth magnets, has increased 1,400 percent in just the last three years. The market's response on Molycorp's share price has been impressive too, going from \$14 at its initial public offering on July 29, 2010, to \$57 on August 31, 2011. While myriad factors play into this success, O'Kelley's meticulous overhaul of Mountain Pass Mine has helped secure Molycorp's position in the industry, while providing the country with a valuable future source of rare earth metals outside China.

“We gave some guidance to our young engineers and chemists, but mostly we gave them free rein to figure out what was needed.”

—Larry Borowsky



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Melissa A. TeBockhorst
Alicia M. Thompson
Gregory C. Trickle
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Zachary C. Waite
Brian P. Wilson
John R. Zisch

2010

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Thomas R. Amedro
Christopher J. Amsden
Randy D. Andersen
Joshua J. Auger
Celina Barajas
Mark J. Barkmeier
Arkajyoti R. Barman
Robert J. Beach
Michelle R. Beckman
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Rahul Bhola
Sarah K. Bisque
Joshua M. Black
Christopher T.

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K. Daniel Kite
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Amy A. Livingston
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Mark V. Lu
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Lacy M. Taylor
Brandon M. Todd

Matthew A. Trias
Richard Z. Vidal
Jacob F. Weigel
Eric A. Weisgerber
Brittney L. White
Greg R. Widgery
Cody K. Yancey
Fan Zhang

2011

Hamdi A. Al Ramadan
Laura Anderson
M. Gregory Begalle
Amanda Bell
Jamie N. Berghorn
Lisa M. Bernau
Sean Bingel
Andrew J. Bratt
Kirstie Bunting
Ryan S. Crawford
Evan Forbes
Kevin T. Gallas
Jessica L. Garcia
Amber C. Gaume
Andrew R. Giebel
Richard Gilmore
Harrison L. Godwin
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Ransom D. Hamrick
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Jonathan P. Harrelson
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D. Ryan Hild
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Michael J. LeBaron
Victoria K. Marques
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Brandon M. Meehl
Mohammad T. Mian
Douglas L. Morter
Heidi Pilath
Daniel Ramirez-Rubio
Kory L. Risky
Andrew P. Schaaf
David R. Schnabel
David A. Schuster
Benjamin A. Seling
Tycee E. Shipley
Sydney T. Slimm
Kaitlin D. Soehner
Keith L. Stevens
Justin C. Tappan
Salvatore E. Vigil
Benjamin M. Webster
Timothy M. Weilert



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Passings

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

—Thomas Campbell 1777-1844



Harry D. Campbell

HARRY D. CAMPBELL '42 died May 6, 2011, at the age of 97.

Harry was born in Redondo Beach, Calif., in 1913 and attended Pasadena Junior College prior to coming to Colorado School of Mines. At Mines he excelled academically and played quarterback on the historic undefeated 1939 football team.

After graduating from Mines in 1942 with a professional degree in petroleum engineering, Harry joined the Navy, serving with distinction during World War II as the commander of a minesweeper.

Following the war, Harry began an illustrious 50-year career in the petroleum industry. From 1949 to 1965 he was president of Franco Western Oil. In 1965, Harry became general manager of exploration and production for the western division of Mobil Oil. In 1972 he established The Campbell Company to invest in oil and gas exploration.

Harry had an avid lifelong interest in football, and in fact declined offers to play for the Philadelphia Eagles and the Detroit Lions when he graduated from Mines. He was inducted into Mines' Athletic Hall of Fame in 2004. At the end of the 2007 season, Harry's #48 jersey was retired by the Orediggers, a first in the school's history. The new football field was named in his honor, with the groundbreaking ceremony for the Harry D. Campbell Football Field held on April 24, 2010. Harry was a fixture at Mines football games, attending his last game in the bitter cold in November 2010, cheering them on to a win. His heart was always with the Orediggers.

Harry was a generous benefactor to his alma mater, investing his time, energy and resources to help ensure Mines' tradition of strong academics and athletics. He established endowments in support of the football program, undergraduate scholarships and the Harry D. Campbell Endowed Chair in Petroleum Engineering. He also made major gifts to the John U. and Sharon L. Trefny Endowment for Curriculum Advancement, the Marquez Hall project, the Undefeated Champions of 1939 Scholarship Fund and the construction of Harry D. Campbell Football Field.

Harry served as an honorary member of the Colorado School of Mines Foundation Board of Governors. His lifetime giving places him among the top 10 most generous donors who have ever contributed to the university.

He is survived by his wife, Velia Ward Campbell, and his three children, Margaret Campbell and her husband Edward Johnson, Judith and her husband Gary Judd, and Duncan. Also surviving him are four grandchildren, two great-grandchildren, three nieces, four step-children and a step-grandson.

Harry's commitment to and love for Colorado School of Mines were remarkable. As a loyal donor, dedicated volunteer and constant champion, Harry helped to build and sustain the school's tradition of excellence.



Guy T. McBride

GUY THORNTON McBRIDE JR., the 12th president of Colorado School of Mines (1970–1984), died March 21, 2011, at the age of 91. Guy was born in Austin, Texas, in 1919. He earned a degree in chemical engineering from the University of Texas and a doctorate in chemical engineering at the Massachusetts Institute of Technology.

Guy had an outstanding career in both academia and industry. In 1948, he joined the faculty at Rice University, where he also served as dean of students. In 1958, Guy went to work for Texas Gulf, serving as vice president and general manager of Texas Gulf's phosphate division until his appointment as president of Colorado School of Mines in 1970.

During his tenure of distinguished service at Mines, undergraduate enrollment nearly doubled. Three major new buildings were constructed on the campus. The Engineering Practice Introductory Course Sequence (EPICS) program was launched and several new degree programs introduced. In the first seven years of his presidency, Guy raised the endowment to more than \$40 million, enabling the establishment of 25 named professorships.

Passionate about the importance of undergraduate education, Guy regularly taught an 8 a.m. thermodynamics class, affectionately termed "Breakfast with McBride," which students learned to fear and appreciate. Recognizing the importance of a healthy graduate program in attracting and retaining good faculty, Guy instituted graduate degrees in the departments of mathematics, chemistry and physics.

He was widely recognized and respected as the state's senior higher education statesman, and was a strong advocate for Mines at the state legislature, arguing for better funding of education. A Denver Post story called him "coldly clear-eyed about what education is" and added that he was "rigidly demanding of students."

In 1978 the school instituted an Honors Program in Public Affairs, with the specific intention of broadening Mines students' abilities in the liberal arts. In 1984 the Board of Trustees named this program The McBride Honors Program in Public Affairs in recognition of his scholarship and interest in this area.

Outside of his professional life, Guy pursued his interest in carpentry, following in the footsteps of his father and grandfather, both of whom were carpenters.

Guy was married to Rebekah Jane Bush McBride for 56 years. Becky McBride, who passed away in 1998, served as a gracious first lady of Mines during the years of his presidency. They had three children, Rebekah Ann, William and Ellen. Guy married Cordelia Rush McBride in 1999. In addition to his wife, Cordelia, Guy is survived by his son, William; his daughter, Ellen Alsobrooks; five grandchildren; three great-grandchildren; three stepchildren; six step-grandchildren; and four step-great-grandchildren. His daughter, Rebekah Ann McBride, died of cancer in 2004.



WILLIAM "BILL" C. BAGBY '58 of Houston, Texas, died on February 20, 2011. Bill graduated from the second graduating class of St. John's School. At Mines, Bill played on the football team, was a member of Sigma Alpha Epsilon fraternity and earned a professional degree in petroleum engineering. In 1960, he graduated from Harvard Business School with an MBA, and then started

his career in the oil business. In the 1960s he was employed as an analyst for Continental Oil. He later held positions with Five Resources, General Crude, Texas Vanguard, Entex and Destec Fuel Resources. In 2000, he started his own company, Bagby & Company. Bill enjoyed spending time in Port O'Connor, where he taught many people to swim, ski and fish. He also enjoyed hiking and taking friends and family on adventures throughout Colorado. Bill is survived by his wife, Carmen; daughters, Chaille, Maria, Lisa and Amy; two grandsons; his sister, Sally Hill; and six nieces and nephews.



JERRY R. BERGESON of Golden and Idaho Springs, Colo., died May 30, 2009. He was a well-known and respected oilman and former professor of petroleum engineering at Mines. Jerry was born in Saskatchewan, Canada, in 1933, graduated from high school in Calgary, Alberta, and studied at the University of Okla-

homa. After teaching from 1964 to 1974 at Mines, he founded Bergeson and Associates, an international oil consulting company in Golden, and consulted and taught reservoir engineering courses around the world until he retired in 2008. A dedicated teacher, mentor and friend to many of his students long after they finished his courses, he followed their careers with interest and was proud of their accomplishments. To honor his dedication to education, a scholarship fund has been established in his name with the Colorado School of Mines Foundation. Jerry is survived by his wife, Sharon; his mother, Mary; daughter, Debi Kornmaier; son, Michael; stepchildren, Barry and Kelli Anderson; brother, Dale; sister, Barbara Bergeson; and four grandchildren.



HAROLD "HERC" E. CLARK MS '73 of Waldport, Ore., died on August 9, 2010. Herc was born in 1937 in Natrona Heights, Pa., where he attended grade school. He received a bachelor's degree from St. Vincent College, and later attended Mines for a master's in physics. He was an aeronautical engineer, computer scientist and mathematical physicist with an impressive résumé. He

held a variety of positions with several large corporations during his career, such as Allied Signal Avionics, Boeing, Rockwell Collins, General Electric, Technisource and Hercules Chem. During his younger years, Herc played football for the Steelers as a fullback. In 1960, he married Patricia Donnel. He and his second wife, Carol Ann, spent eight years teaching English in Poland, and later he volunteered as a teacher and tutor of math and science in Waldport. He is survived by Carol Ann; children, Erik, Jocelyn, Shane, Mark Rocheleau and Laura Pederson; brothers, Patrick, Mike, Tony, Kevin, Brian and Charlie; sisters, Eve, Jean and Cherie; and one grandchild.

GENEVIEVE "JENNY" A. DARDEN of Littleton, Colo., died July 8, 2011. Jenny was the wife of Jim Darden, who coached the baseball and football teams at Mines from 1954 to 1992. In 1995, Jenny set up a memorial fund in honor of her husband, who passed away in 1994. The Darden Basketball Scholarship Fund awards scholarships to undergraduate student athletes from Colorado or Wyoming with financial need. Jim had been inducted into the Colorado Sports Hall of Fame in 1984. A member of the President's Council and the Heritage Society, Jenny was a proud supporter of the school in her own right. She is survived by her sister-in-law, Ruth Peters.



S. NORMAN "NORM" DOMENICO '48, DSC '51 of Tulsa, Okla., died March 27, 2011. Norm was born in 1925 in Louisville, Colo., but was raised in Denver. He spent two years in the Naval Air Force before enrolling at Mines, where he earned a professional degree in geophysical engineering. A member of Beta Theta Pi fraternity, Norm went on to acquire a master's in geophysics from the California

Institute of Technology, where he worked as a graduate research assistant for Charles Richter. He returned to Mines for a doctorate in geophysics, and then was employed by Stanolind Oil and Gas (later renamed Amoco). Norm spent 22 years with Amoco; he held a wide variety of positions and traveled the world. In 1976, he was awarded a Distinguished Achievement Medal by Mines. His company, Norshir, was liquidated in 1996 as a life income gift to Mines. He taught courses on seismic exploration for Oil and Gas Consultants and was a visiting professor at the University of Oklahoma and Baylor University. Norm is survived by his wife of 61 years, Shirley; daughters, Debra and Cheryl; three grandsons; four sisters; and his nieces and nephews.



FERESHTEH EBRAHIMI PhD '82 of Gainesville, Fla., died January 29, 2011. Fereshteh was born in 1951 in Tehran, Iran, and graduated summa cum laude from Arya-Mehr University of Tehran. She came to the United States in 1979 during the Islamic revolution with the goal of pursuing a graduate degree. At the time she received her PhD in metallurgical and materials

engineering, she was one of the first women ever to receive a PhD from Mines. Following graduation, she joined the National Bureau of Standards. In 1984, she became an assistant professor at the University of Florida in the Materials Science and Engineering Department. She remained there for the rest of her career, ultimately becoming the associate chair of that department. An early pioneer in the research of nanoparticles, Fereshteh was widely recognized as an inspiring and challenging professor, and gained deep respect and admiration from both her students and her colleagues. She is survived by her husband, Stephen Schachter; daughter, Sara; brothers, Farrokh, Farhad and Firuseh; and her stepchildren Kaira, Nora-Leah and Seneca Schachter.



PAMELA “PAM” WOODS EDRICH '82 of Lakewood, Colo., died January 2, 2011. Pam was born in 1959 in Pueblo, Colo., and graduated from Pueblo East High School in 1978. She attended Mines on an academic scholarship, where she was a member of Blue Key and earned a bachelor's degree in chemical engineering. She met her husband, Rick '82, MS '86, at the school and

the couple married in 1985. Most of her professional career was spent in environmental cleanup and reclamation, including work on the closure of Rocky Flats near Golden. Pam was involved in the Girl Scouts, her church and school parent groups; she also enjoyed gardening, camping, hiking and reading. She is survived by Rick; their daughters, Becky and Rachel; her parents, Kenneth and Virginia Woods; brother, Bruce; and sister, Diana.



THOMAS J. ELLIS III '52 of Largo, Fla., died May 2, 2011. Born in Sarasota, Fla., in 1928, he attended Marion Military Institute and the University of Florida. At Mines he worked on the Oredigger and the Prospector, and was a member of the boxing team, glee club and talent show. He was also in the Sigma Gamma Epsilon honor society, the M Club, SSEG,

and was elected to “Who’s Who.” Thomas earned a professional degree in geophysical engineering. He worked in the oil business before founding Ellis Exploration Research and Domino Mining, and later moved into electronics for Motorola, T.I. and Martin Marietta. He belonged to the American Legion, NRA, Flat Earth Society, Moose and Elks lodges, and Gourmet clubs. He was married in 1954 to Ethel Kromeich of Golden. He is survived by two daughters, Mercia Bailey and Marion Ellis; his long-time companion, Marge Slota; and his brother, Edward.



IRWIN WILLIAM “BILL” ENGEL '60 of Aurora, Colo., died April 17, 2011. He was born in 1937 in Chicago, Ill., and moved to Denver at a young age, where he graduated from South High School in 1955. A member of Theta Tau honor society and Sigma Phi Epsilon fraternity, Bill graduated with a professional degree in metallurgical engineering. At Mines he played football and golf.

He began his professional career with Bethlehem Steel, but soon became interested in the wholesale meat business in Los Angeles. With a remarkable work ethic and an entrepreneurial spirit, he built his own company, DARA Foods, into one of the region's largest meat distributors.

Longtime members of the President's Council, Bill and his wife, Sharon, showed their dedication to the school by his chairing a successful fundraising campaign, and opening their home several times to host events. In recognition of his service to the school, Bill was named a Mines Medalist in 1994. He was predeceased by his son, Mark. Bill is survived by his wife, Sharon; daughters, Dana and Rachael; and sons, Eric and Brad.



JOHN ALBERT GAZEWOOD '56 of Arlington, Texas, died December 14, 2010. John was born in 1927 in Mount Harris, Colo., and graduated from Hayden Union High School. He worked as a roughneck in the oil fields to earn money for college, and graduated from Mines with a professional degree in petroleum refining engineering. At Mines, he was a member of Tau Beta Pi,

Sigma Gamma Epsilon and Sigma Phi Epsilon. After serving with the 40th Infantry Division in the Korean War, John went to work in the petroleum industry with Creole Petroleum in Venezuela. He later returned to the United States, earned a JD from the University of Denver and worked in the field of patent law for 25 years. He enjoyed sports, coaching his children's teams, fishing, traveling, playing bridge and doing crossword puzzles. John is survived by his wife of 51 years, Patricia; sons, John and Jason; daughter, Julie Jovais; brothers, Frank, Richard, James and Bob; and six grandchildren.



HOWARD L. HALSTEAD '32 of Towson, Md., died December 29, 2010. Howard was born in Baltimore City, Md., in 1911 but grew up in Sparrows Point, Md., where he graduated from high school in 1928. At Mines, he joined the Kappa Sigma fraternity and Tau Beta Pi honor society and earned a professional degree in mining engineering. He went on to work for Bethlehem

Steel in Sparrows Point, first as a testman in the fuel department; by 1968 he had advanced to fuel engineer. A member of many professional societies, Howard served on the board of directors of the Association of Iron and Steel Engineers. Married to Rose Ellen McClean in 1938, they enjoyed 72 years together. Howard is also survived by their two children, Mary Pickard and Thomas, and four grandchildren.



GLEN E. HASSE '62 of Columbia, Tenn., died on May 17, 2011. Born in Appleton, Colo., in 1939, he attended Grand Junction's Central High School before enrolling at Mines in 1957 on a wrestling scholarship. He met his future wife, Kathy Bates, at a fraternity rush function. After graduating with a professional engineering degree in metallurgical engineering, his career

took him to Illinois, Ohio and Tennessee, before the family settled in Baton Rouge, La. for 25 years, during which time Glen worked for Exide. He retired as executive VP, and the couple returned to Columbia to be close to family. During retirement he consulted and served on the boards of several community and environmental organizations; he was a mayoral appointee on the Metro Charter Commission at the time of his death. His 1961 wrestling team was inducted into the CSM Athletics Hall of Fame, having placed second in the small college national tournament—Glen placed third overall. He is survived by Kathy, his wife of nearly 50 years; daughters, Dee Ann Hasse and Dione Hasse Harr; and one grandson. Contributions in Glen's memory may be sent to the CSM Foundation to support the Glen Hasse Wrestling Wall of Fame.



RONALD "RON" K. JUNE '54 of Houston, Texas, died April 28, 2011. Born in Denver in 1932, Ron was awarded a scholarship to attend Mines, where he joined Sigma Phi Epsilon fraternity, and earned a professional degree in chemical engineering. He met and married Mary Riesbol in Denver. His long

and successful career with Shell Development, which began in Emeryville, Calif., the year he graduated, was interrupted for 12 months of service in the U.S. Army as a second lieutenant at the Edgewood Chemical Center in Maryland. In 1972, Ron relocated to Houston, and he later retired to spend time on the family farm in Pennsylvania. Ron loved cars, dogs and the outdoors. He was predeceased by his son, Richard. Ron is survived by his wife of 61 years, Mary; daughters, Diane and Marilyn; sons, Carl and Raymond; 17 grandchildren; and three great-grandchildren.



ROBERT A. "JIM" McCLEVEY JR. '32 of Ottawa, Ill., died April 28, 2011. Jim was born in 1910 in Austin, Ill., and attended Oak Park High School before coming to Mines. A member of the Sigma Alpha Epsilon fraternity and Blue Key, Jim helped lead the illumination of the "M" 79 years ago. After graduating with a professional degree in mining engineering,

he worked with Ottawa Silica until his retirement in 1975, having taken time to serve with the U.S. Army during World War II. He married Edith Eleanor Eldridge in 1961. He was a member of several professional societies, including the Illinois Society of Professional Engineers and the Society of Mining Engineers. A dedicated alumnus, he was a member of the Mines Century Society, the Heritage Society and the President's Council, and drove to all of his class reunions, even into his 90s. He was predeceased by his wife in 1999. Jim is survived by his nieces, Alison Gonzalez, Barbara Dix and Cynthia Cox.



WENDELL JONES "JONES" McQUINN '46 of San Rafael, Calif., died March 9, 2011. Jones was born in 1923 in Greenwood, Ind., and attended Franklin College for two years before coming to Mines, where he earned a professional degree in petroleum engineering. In 1971, Jones was awarded the Distinguished Achievement Medal

for his accomplishments. He played an important role in the American petroleum industry in the Middle East during his years with Stanolind Oil, where he started as a design engineer and was ultimately corporation director. He served on the boards of directors for many of Stanolind's foreign affiliates, including Arabian American Oil and Iran Chevron. He also helped with the transition of Aramco from American to Saudi ownership. Jones served as visiting member of Mid-East affairs at Harvard, The Middle East Institute and the San Francisco Committee on Foreign Relations. He is survived by his wife of 66 years, Mary ("Benny"); two sons, Doug and Paul; and two grandsons.

DONALD "DON" EUGENE MILLER '53 of Englewood, Colo., died April 26, 2011. Born in 1930, Don grew up in south Denver and attended South High School. He graduated from Mines with a professional degree in metallurgical engineering, and was a member of Beta Theta Pi fraternity.

Don served in the U.S. Army for two years. He spent much of his business career with Gates, where he eventually served as president for 10 years. In 1996, he retired as vice chairman. He also served on the boards of Mountain States Employers Council, Rubber Manufacturers Association, Armstrong Rubber, and Great Northern Nekoosa, among others.

Don remained involved at Mines, having served on the board of trustees and the CSM Foundation board. He was awarded an honorary doctorate of engineering, a Distinguished Achievement Medal and the Coolbaugh Award. He is survived by his wife of 59 years, Barbara; sons, Steve and David; four grandchildren; and one great-granddaughter.

ROBERT "BOB" B. MORRISON '51 of Arvada, Colo., died August 8, 2009. Bob was born in San Diego, Calif., in 1927 and graduated from East High School in Denver before coming to Mines. He was a member of the Kappa Sigma fraternity and graduated with a professional degree in mining engineering, as did his father, Jewel Morrison, in 1926. After a year at Mines, Bob joined the U.S. Army to serve during World War II. He returned in 1948 to complete his degree. Shortly after graduating, he joined Telluride Mining. From 1954 to 1956 he was the assistant county engineer for Jefferson County. He was also regularly involved in Arvada city government. In 1988 he retired as the VP and chief engineer of Hutchinson Homes. He is survived by his wife of 53 years, Betty; children, Mary Elizabeth and Paul; and two grandsons.



THEODORE "TED" WIRT NELSON '34 of Westfield, N.J., died February 23, 2011. He was born in 1914 in Missoula, Mont., but was raised in Casper, Wyo. He graduated as valedictorian of his high school, and earned his professional degree in petroleum engineering at Mines. As a student he was a member of Tau Beta Pi and Sigma Alpha Epsilon fraternity.

He began his career with White Eagle Oil in Augusta, Kan., a subsidiary of Socony Vacuum, which later became Mobil Oil. Before moving to New Jersey to become manager of the Paulsboro Refinery in 1937, he married Elizabeth Wiley. At Paulsboro, he helped perfect the Houdry process for cracking gasoline, and during World War II, he was Mobil's representative to the Aviation Gasoline Advisory Committee in Washington, D.C. By 1964, he was a senior VP for exploration and production at Mobil, and the same year Mines awarded him a Distinguished Achievement Medal. Appointed to Mines' board of trustees, Ted was a passionate volunteer for the Westfield Y and his church. He was predeceased by his wife in 1997 and is survived by his son, John; two daughters, Barbara Nelson and Susan Elliot; nine grandchildren; and six great-grandchildren.



PAUL LEO PLACEK '49 of Salt Lake City, Utah, died February 7, 2010. Born in 1927 in New Ulm, Minn., Paul attended East High School and graduated from Mines with a professional degree in metallurgical engineering. For 30 years he worked for the U.S. Bureau of Mines, a commitment that was only outlasted by his holding season tickets for the Utah Symphony for 50 years.

He enjoyed playing piano, traveling, photography, hiking, camping and cats. Paul is survived by his wife, Maxine; stepson, Malcolm MacDuff; brother-in-law, Lewis Nielsen; six grandchildren; and three great-grandchildren.



HERMAN "TED" THEODORE SCHAASBERGER '50 of Bend, Ore., died August 22, 2010. In 1923, Ted's family moved from Germany to New York, where he was born in 1925. After his mother's death, Ted's father brought his sister and him back to Germany so grandparents could raise them. In 1935, his stepmother took him to Yonkers, N.Y. After graduating high school, he joined the Air

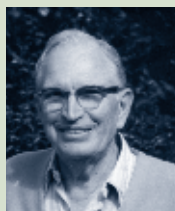
Corps as a second lieutenant. Ted attended Mines and earned a professional degree in geological engineering, before joining the U.S. Geological Survey in Denver and later working for Climax Mining in Climax, Colo. After he married Ruth Karvelis Wells in 1954, the couple moved to Lakewood, and he worked for Amax, which had taken over Climax. He later became the manager of the Western Exploration division of the company and traveled around the U.S. and the world in search of mining properties. The couple retired to Bend, Ore., in 1985; in their new home, Ted enjoyed working on their land and gardening. He is survived by his wife; their daughter, Lisa Druckenmiller; son, Kenton; one granddaughter; and sister, Helena Hartig.



ROBERT "BOB" D. SLOAN '49, MS '52, PhD '57 of Santa Barbara, Calif., died August 29, 2010. Bob was born in 1927 in Loma Linda, Calif., but grew up in nearby Redlands. At Mines, he was a member of the Sigma Alpha Epsilon fraternity and participated in track and field, while earning a professional degree in petroleum

refining engineering. He was employed by Richfield Oil in Long Beach for two years after graduation. In 1951, he married Virginia Bachmann and, shortly thereafter, he returned to Mines for his MS and PhD. He worked for Royal Oil in Denver before moving to Santa Barbara in 1956 to open his own research laboratory, Delta Laboratories, which later became Sloan Research Industries.

His clients included Hughes Aircraft and NASA, and Bob was involved in the Apollo program. He enjoyed yachting and flying, and was the scoutmaster for Troop 35. He is survived by his wife, Virginia; sons, Scott and Robert; daughter, Cydney Brooks; and eight grandchildren.



JOHN S. SOUTHWORTH '38 of Burbank, Calif., died November 8, 2010. He was born in 1915 in Lake Huron, Mich., but in 1922 his family moved to California, where he attended Glendale Public Schools. John was a member of the Alpha Tau Omega fraternity at Mines and graduated with a professional degree in mining engineering. He served in the U.S.

Army during World War II and in 1943 was sent to Caltech to earn a master's in meteorology. John started his career in Nevada gold mines, but later moved into constructing dams in California. He also did survey work for other mines before moving to Burbank to work for Lockheed as an aircraft structural engineer. In 1972 he moved to Rockwell to work on the space shuttle in the same capacity. John was an avid historian, and wrote numerous articles concerning western and mining history. His book, "Death Valley in 1849—The Luck of Gold Rush Emigrants," went through four printings, and the fifth edition was published in 2009. John's wife of 58 years, Helen, passed away in 2000. He is survived by two sons, John and David; five grandchildren; and five great-grandchildren.



DAVID L. WARING '58 of Lake Oswego, Ore., died February 9, 2011. Born in 1932 in Palmerston, Pa., David interrupted his studies at Mines to serve in the U.S. Army. Upon his return, he married Judith and completed his professional degree in geological engineering. At Mines, he played football and was a member of the Alpha Tau Omega fraternity. David's career in

the iron ore industry began with Marcona Mining in Peru. Four years later, he returned to the United States and earned an MBA at the Wharton School of the University of Pennsylvania. He then joined Hanna Mining in Ohio and served for 10 years as its representative in London, before returning to its home office. He then joined a Brazilian mining company, Companhia Vale do Rio Doce, and managed its ore sales in New York. He enjoyed sailing and kayaking, and was a master woodworker. David is survived by his wife of 54 years; their son, Daniel; daughter, Elizabeth; and two grandchildren.

—Compiled and edited by Oliver Dewey and Nancy Webb

Also In Memoriam

George S. Blake '61..... July 2, 2010
Donald Ray Chipman '49..... February 27, 2011
Colin L. Fox '41..... October 6, 2010
Karl W. Herrala '64..... October 6, 2009
Harry F. Hopp Jr. '47..... July 12, 2010
C. Douglas Howald '69..... December 2, 2010
Victor L. Inman '51..... September 18, 2010
Kory R. Kaltenbacher '92..... November 9, 2008

Robert W. Krenzer '62..... May 17, 2004
Leonard Kurtz '41..... January 18, 2010
Charles W. Matthews '50..... June 3, 2010
Andrew Leonard Smith '41..... March 10, 2010
Henry W. Snyder '57..... August 28, 2007
James Robert Thoma '55..... October 24, 2009
Gary L. Wallen '75..... September 10, 2005
Harold E. White '49..... February 26, 2006

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STUDENTS AND ALUMNI ATTENDED
CSMAA EVENTS IN 2011

923

CSMAA LIFE MEMBERS

448

DONORS WHO SUPPORTED CSMAA
PROGRAMS IN 2011

168

ALUMNI AND STUDENTS PARTICIPATING
IN THE CSMAA MENTORING PROGRAM

18

LEGACY GRANTS AWARDED IN 2011

In 2010–2011, funding through membership enabled CSMAA to...

Co-sponsor the “**Future of Nuclear Energy**” series in Denver, Houston and Washington D.C.

Honor **David Zanetell’s ’87 project leadership of the Hoover Dam Bypass Bridge**, with an award ceremony, an article in *Mines* magazine and a campus presentation.

Feature the provocative Reunion 2011 faculty-led symposium, “**Critical Energy and Mineral Resources.**”

Showcase Mines’ excellence—past and present—through *Mines* magazine’s **100th Anniversary Issue**.

Launch **E-Days ’Round the World in 35 cities**.

Welcome **150 incoming Mines freshmen** through alumni-hosted sendoff parties across the United States.

CSMAA MEMBERSHIP IS TAX DEDUCTIBLE. JOIN BEFORE DECEMBER 31!

MINESONLINE.NET/MEMBERSHIP



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