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Exploration geologists can search for a lifetime without making a discovery. This is not true for these four alumni and one Mines professor who all made substantial discoveries. Their personal stories provide a window into a profession that rewards creativity, intuition, dogged persistence and a thirst for adventure.

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Almost 20,000 Russian nuclear warheads have now been converted into fuel for U.S. power stations under a 1993 U.S.-Russia agreement, which was once on a course to destroy itself. To alter its trajectory, Jerry Grandey ’68 helped rally the support of three governments and his industry.

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Cover illustration: Jeff Neumann
THE DIGNITY OF GIVING

Brenda and I just returned from a very successful 60th Reunion of the Class of ’52, and I am glad to have had the opportunity this late in life to meet again with 18 other classmates and their spouses and companions. Kudos to the alumni association for giving the event a full agenda, loads of good instructions, and coordinating a broad range of successful activities.

For our 40th Reunion class gift to Mines, our class agent, Bill Watts, collaborated with classmate Bob Pozzo, who promised matching funds if we raised $100,000 to set up an endowed scholarship fund. Our classmates more than met the challenge, and the Class of ’52 Scholarship Fund came into being. Over the past 20 years, our classmates have focused their contributions toward this fund, thanks to Bill’s continual urging. Today the fund, along with two other ’52 scholarship funds, totals well over $1.5 million. More than several dozen students have been helped by the income from these funds, which are administered by the Colorado School of Mines Foundation. Descendants of the Class of ’52 have first preference, and our classmates, both living and passed, have long been rightfully proud of the measurable good that our fund has provided.

I have been told that at many other colleges and universities the establishment of similar class-denominated scholarship funds is a common practice. Given the continual increase in tuition rates, I would hope that other classes at Mines might consider establishing similar scholarship-oriented gifts when it comes time to promote a class gift for significant reunions. Thanks to Bill, Bob and other major contributors over the years, such as Chuck Champion, Chuck Diver and John Lockridge, to name a few. Having that fund has worked out extremely well, providing an uncommon dignity felt by the Class of ’52, and an increasing number of deserving recipients.

Weldon G. Frost ’52

SOCcer ROOTS AND A FAReWELL

I really enjoyed the Wild Women ’85–’90 profile from the Winter 2012 issue. It’s a joy to read about these women and the friendships they’ve nurtured for such a long time.

The article states, “Many started the first Mines women’s club soccer team, coached by Thomas Wildeman.” Women’s soccer at Mines goes back further than the club started by the Wild Women. Bryan Allery ’82 started a women’s soccer club in 1978 and coached until spring 1981 (see team photo from 1981). We couldn’t get a team together after that—not until the Wild Women did so.

Meg Steinborn ’83 and Bryan Allery ’82

MICHELE VIVONA ’86: 1964–2012

The loss of my dear friend Michele has stopped me in my tracks. I am so thankful to have been friends for so many years and kept up with one another so frequently. She taught so many people so much and was a mentor to countless. Her laugh was infectious and she will be deeply missed. Makes the profile of our “Wild Women” group all the more precious. Thank you.

Melanie Westergaard ’87

Editor’s note: We were shocked and saddened to learn that Michele Vivona, one of the Wild Women featured in the winter issue, died on April 20, 2012, following a brief illness. Our sincere sympathy goes out to Michele’s family and all those grieving her sudden loss. You can read more about her life in In Memoriam, p. 47.
Join a team with the technology to take on big challenges, the integrity to do it responsibly, and the drive to keep the world moving forward. Are you up to the job?

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Lucky Finds, Nuclear Deals and a New Look

Finding a million ounces of gold from campus using satellite photography isn’t usual for a student earning a master’s degree in geology, but it’s what happened to Russell Dow MS ’04. His story of mineral discovery is probably the luckiest find recounted in the feature story, “Hitting Paydirt” (p. 20), but it’s not the most unusual of the four we share.

The cover story about Jerry Grandey ’68 (p. 26) is also fairly extraordinary. My interest was first piqued in February 2011, when he mentioned in a talk that he had been an anti-nuclear activist during the ’70s. Since he had later become CEO of the largest uranium company in the world, there was obviously a story to tell, but it was more than a year before we spoke and I found out just how much of a story it was.

Anyone who struggled through Physics I or II at Mines should read “Studio Physics Makes Waves” (p. 8). The work of Professor and Physics Department Head Tom Furtak and his colleagues over the last 15 years has undoubtedly led to more effective ways to teach some tough foundational physics courses, and the approach is also gaining traction in other technical disciplines. Could this be part of a fundamental change in teaching methodology that influences engineering education everywhere?

On the subject of impacting education, you may recall our story from 2009 about Hugh Harvey ’74, MS ’80 and his wife, Michelle, who created a $10 million scholarship program in 2009. On p. 12, we announce that they have more than doubled the size of the Harvey Scholars Program fund. The Colorado School of Mines Foundation estimates that their gifts will fully fund a Mines education for about 300 students over the next 25 years—that’s quite an impact!

A lesser impact, but one we hope you favor, is the new design in this issue. In addition to cosmetic changes, we’ve simplified how departments are divided. You’ll now find all campus stories in Inside Mines, such as the one about the men’s basketball team making a big splash last season (p. 14), and photos sent in by alumni are now dispersed throughout Class Notes. Another addition is found on the back page—Miner’s Pic is a place to feature your creative photography that carries a Mines theme.

Lastly, a couple of acknowledgements: Since joining the alumni association as managing editor in August 2011, Amie Chitwood’s hard work and thoughtful contributions to the publication have been considerable, and are particularly evident in the pages that follow. I’d also like to thank Oliver Dewey ’12, who worked on the magazine all four years he attended Mines. The care, sensitivity and respect he devoted to our obituaries is particularly appreciated.

And, of course, thanks to you for taking time to read this issue. We’d like to know what you think of the changes, so please email us at magazine@mines.edu. You can also start a conversation about any of the articles you read here by going to minesmagazine.com and sharing your thoughts at the bottom of the story.

Best wishes for the remainder of this blistering (in Colorado, anyway) summer.

Nick Sutcliffe
Editor and Director of Communications
Colorado School of Mines Alumni Association
We are looking for rare and unique resources with great potential for development. We offer great opportunities in countries all over the world. If you are an action-oriented, strategic thinker, with a strong spirit of entrepreneurship, we offer a unique place to work that allows you to thrive. Our mission is simple: to add value to our customers’ products or processes. Imerys includes well-known brands such as Damrec, World Minerals, Imerys Ceramics and Calderys.

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If you’ve never seen a standing wave, levitated a metal plate using a magnetic field, or built a mini railgun, you probably haven’t taken a recent physics class at Mines, where innovative teaching methods have dramatically improved student learning in some notoriously difficult—but required—courses.

Coined “studio physics,” the approach moves the bulk of instruction out of the traditional lecture hall and into specially designed classrooms, where students are encouraged to collaborate and interact as they work on group assignments and experiments.

Studies of this highly successful instructional model suggest social interaction is critical. As students work together to share, communicate and solve carefully structured problems, learning is enhanced. However, Physics Department Head Tom Furtak explains that no single element defines studio teaching: “It’s not just the classroom, or just socially engaged students. It’s kind of the whole mechanism,” he says.

Pioneered in 1994 at Rensselaer Polytechnic Institute, Furtak taught a pilot studio physics course in 1997. Today, after 15 years of thoughtful refinements, the program’s success has been dramatic. Before adopting studio physics, 40 percent of students dropped, withdrew or failed Physics I and II classes at Mines. Lately, that number has hovered between 10 and 20 percent.

Mines is now the only university in the U.S. where all undergraduate students take both Physics I and II in a studio format, and the program is frequently referenced in journals and papers as a national model. “We never set out to lead the way,” says Furtak. “We’ve remained focused on our campus mission. It’s just the way things turned out.”

Vince Kuo, a teaching professor who has played a leading role implementing and teaching studio physics at Mines, recently spoke about the program to the University of Wyoming Physics Department. Shortly afterward, the department voted to adopt the studio model for all foundational undergraduate physics courses. Later this year, Kuo travels to Abu Dhabi to help integrate studio physics at The Petroleum Institute.

On campus, the Physics Department continues to study how some of its upper-level classes can be adapted to the studio model. And Furtak continues to respond to a growing number of queries from other Mines departments interested in implementing a studio model in their courses. Included in his advice is a clear message about the commitment such a shift requires.

Moving away from a traditional university lecture model is a huge change. The studio environment is often noisy, lectures may fill only a quarter of the allotted time, and instructors must then take a back seat and let a social dynamic take over. “In almost every case that I’ve heard of, there has been a fair amount of resistance. It’s a radical shift to a different environment—a culture shift,” says Furtak. But that’s from the perspective of faculty; for students, it’s a methodology that undoubtedly works, and as it’s applied in universities around the world, Mines’ Physics Department can take pride in the role it played writing the formula.

—Oliver Dewey ’12
CONTINUING EDUCATION

New Courses for Oil and Gas Regulators

Colorado School of Mines, Penn State University and the University of Texas at Austin recently announced a training initiative aimed at educating regulators and policymakers about the latest shale resource technologies and best practices. The initiative—funded by GE and ExxonMobil to the tune of $1 million each—aims to address the shortage of qualified oil and gas field personnel on hand to oversee a range of oil and gas well operations.

Azra Tutuncu, who is coordinating development of the courses at Mines, points out that Colorado is no exception. “There is a shortage in the number of inspectors in many states due to the unconventional boom,” says Tutuncu, the Harry D. Campbell Endowed Chair in Petroleum Engineering and director of the Unconventional Natural Gas and Oil Institute. According to the Colorado Oil and Gas Commission, almost 47,000 oil and gas wells in Colorado were overseen by only 14 inspectors in 2011. Now with mounting interest in the Niobrara formation—a deep oil field stretching across a large swath of northeastern Colorado—the new courses should help the state address the issue.

“One of the missions of this collaboration is to facilitate the transfer of expertise and best practices between regulators within and across regions of oil and gas operations,” says Tutuncu. The training will provide a comprehensive technical background for field operations, including an up-to-date overview of the rapidly changing technologies in conventional and unconventional oil and gas.

Courses at all three schools will include petroleum geology (conventional and unconventional), principles of drilling operations and well design, facility design and operations, environmental management technologies and practices, and federal and state regulatory requirements for oil and gas operations.

—Amie Chitwood

GOLF

Golf Team Takes RMAC Championship

In a year of firsts in the athletics department, the Mines golf team achieved one of the greatest seasons in program history, claiming six team titles and earning the No. 1 ranking in the Central Region. The Orediggers also claimed the program’s first conference title since the 1968 season, after topping the 10-team field by 15 strokes at the April RMAC Spring Championship in Arizona.

All five Mines golfers ranked among the top 25 individuals, including Jim Knous, who was named 2012 RMAC Player of the Year. Other honors went to sophomore Michael Lee (Second Team All-RMAC), senior Cory Bacon and sophomore Kyle Grassel (Third Team All-RMAC), and head coach Tyler Kimble, who was named the RMAC Coach of the Year, after leading his team to wins in three of the four RMAC events.

The Orediggers finished third at the NCAA Division II West/Central Super Regional in Arizona and made their first-ever appearance in the NCAA Championships in Kentucky, where the team tied for 11th overall and Knous finished second, narrowly missing an individual national championship with a bogey on the 18th hole of the final playoff round.

—Colin Bonnicksen

In this rendering of the Niobrara formation, black dots represent exploratory wells; red and orange colors show the deepest parts of the formation. Interest in the Niobrara is just one factor contributing to the growing workload of state oil and gas regulators.
FACULTY SPOTLIGHT

College Dean Focuses on Sustainable Infrastructure

When Kevin Moore was a young associate professor at Idaho State University, he used to wear a tie to off-campus research team meetings. One day a colleague asked, “Kevin, why do you always wear a tie to these meetings?” Someone joked, “That’s because he wants to be a dean someday.”

The prediction came true on January 3, 2012, when Moore was officially named dean of Mines’ College of Engineering and Computational Sciences, a position he had been filling on an interim basis since the college was formed last summer. While Moore’s long-ago colleague might be surprised to learn the accuracy of his prediction, those at Mines who know him well see it as a natural fit.

“I can send an email to Kevin at any time of the day or night, and it is rare not to get a reply—and a follow-up set of questions—within about 5 minutes,” says Provost and Executive Vice President Terry Parker, who describes Moore as a strategic thinker with strong management skills and a broad understanding of academic disciplines.

A member of the former Engineering Division’s Executive Committee, Moore simply says that when the job came up, “I was a logical choice for the interim slot—I had actually been paying attention. It wasn’t until after a few months that I realized, ‘I can do this job.’”

His career certainly includes the requisite experience. Prior to becoming the G.A. Dobelman Distinguished Chair in Engineering at Mines in 2005, he was a senior scientist at Johns Hopkins University’s Applied Physics Laboratory. Before that, he was a professor of electrical and computer engineering at Utah State University, where he directed several multidisciplinary teams on autonomous robot development. In the mid-‘90s, he spent a year serving as interim associate dean of the College of Engineering at Idaho State University. Along the way, he authored three books, more than three-dozen refereed journal articles, and over 100 peer-reviewed conference papers.

The first dean of Mines’ first college is also a bit of a pioneer. “I am entrepreneurial in my outlook,” says Moore. “I see the prospect of exciting changes in engineering education. I hope that the work we do here will affect the engineering profession overall.”

Toward this end, Moore will first focus on raising the college’s profile. In the extractive industries, he points out, “people know us because of our programs.” Most students who study petroleum or geological engineering are deliberate about choosing Mines by its overall reputation, not a specific program. Moore would like to see that balance shift. “I want the college to be a destination of choice for these traditional engineering degrees,” he says.

One strategy he plans to explore is placing an emphasis on intelligent, sustainable infrastructure, something he describes as “a key to developing improved quality of life for everyone on the planet in the 21st century.” Another is to promote what he calls, “engineering by doing”—getting students engaged in hands-on projects in the community. He’s interested in attracting and training students who view engineering as a way to help the disadvantaged. “In most of the developing areas of the world, if you can bring roads, energy, water and fiber optics, that will promote sanitation, agriculture and business,” says Moore. “Those things will lead to stability and peace, which allow a community to focus on education. With education you can raise the quality of life and establish a sustainable society. When prospective students talk about these interests, I want others to tell them, ‘Colorado School of Mines is your place.’”

—Robert S. Benchley

Read more about the formation of the college at minesmagazine.com, in the fall 2011 issue: “New College, New Digs, Bright Future.”
RESEARCH

Technology to Help Amputees Gain Better Mobility

At least 1.6 million Americans are missing a limb, and millions more people around the world live with amputations. For those missing lower limbs, prostheses can help them walk again, but it’s often more painful, arduous and slow than it is for the able-bodied. Since they fall more often, it’s also more dangerous.

Anne Silverman, assistant professor of mechanical engineering at Mines, wants to help change this, and her research is yielding some valuable information. Recently, she investigated lower-limb mechanics in individuals with an amputation. The 24 subjects she included—a little more than half of whom were amputees—had small, reflective spheres attached to their feet, ankles, shins, knees, thighs and hips. High-speed motion-capture cameras then tracked the movement of the spheres, allowing Silverman to characterize human-body motion. Silverman explains that it’s the same technology used to reproduce realistic movements for animated films and the video gaming industry.

After combining data from motion-capture and ground-force measurements, she was able to calculate the net power generated and absorbed at each joint, and so better understand how individuals with an amputation compensate during walking in the absence of a biological ankle. She also attached electrodes to her subjects’ legs to measure electrical activity in their muscles. By combining this electromyography data with other biomechanical measurements, she generated walking simulations in 3-D, which can be used to understand the roles of individual muscles and prosthetic devices in whole-body movements.

Commended for how well her approach brings a complex, dynamic system like walking into detailed and quantifiable definition, Silverman made some unexpected findings, including how little the intact leg was used by many subjects to compensate, and how much of the heavy lifting is done by hip muscles high in the amputated leg, especially when walking at faster speeds. She was also surprised by the degree of variability. “Some people are very well-adapted, physically active individuals … others with a similar amputation actually prefer a wheelchair,” Silverman says.

Ultimately, she hopes her work will contribute to technologies that can be widely applied in a clinical setting. She points out that the number of amputees is growing, driven by factors such as an aging population that is increasingly diagnosed with diabetes and dysvascular disease. Ironically, improved medical resources on the battlefield are a contributing factor as well, since surviving a severe injury often means living with an amputation. For these people, Silverman points out, “improving long-term mobility can have a tremendous impact on their lives.”

—Eric Schoeniger

Using computer models, Silverman is getting a better understanding of how muscles contribute to movement and balance as well as energy costs and loads on joints. In her lab, she measures the human body’s motion to determine the walking challenges of those who are disabled.

Watch the video of Silverman’s presentation at Alumni Weekend in Web Extras at minesmagazine.com.
Tagging sharks in Hawaii. Building bridges in Nepal. Repairing homes in Idaho. Conducting research in India. These are just some of the experiences that 12 hardworking Harvey Scholars are gaining through a prestigious program at Mines aimed at cultivating sophisticated and well-rounded future leaders with technical expertise.

Starting soon, the opportunities afforded by the program will be enjoyed by many more students, thanks to an additional $11.2 million given by Hugh Harvey ’74, MS ’80 and his wife, Michelle, which comes on the heels of their 2009 gift of $10 million that created the program. Once up to speed, Mines could have as many as 60 Harvey Scholars enrolled in the program, which pays for all tuition and living expenses, as well as enrichment activities such as study abroad, service projects and travel.

“I couldn’t ask for a better education than I got at Mines,” says Hugh Harvey, “and now I want to pay it forward. We want to help Mines attract the best, brightest and hardest-working students, then encourage them to be thinking philanthropically from the moment they enroll.” The Harveys have directed that the money be spent over a 25-year period. It’s enough to support about 300 students, but their hope is that their quarter-century-long investment in the Harvey Scholars Program will become self-sustaining, as those who landed dream scholarships as teenagers find themselves able to offer similar opportunities to subsequent generations of Mines students.

“I hope to one day run for office and use my degree to shape more informed energy policy.”
—Lucy Orsi, Harvey Scholar, chemical engineering

“The Harveys are a wonderful family,” says junior metallurgical and materials engineering major Scott Harper, who enjoys the lunches he and the other scholars share with the Harveys several times a year: “It is fantastic to be a part of this program and to experience all that we’ve had the opportunity to do and see.”

This fall, the Harvey Scholars Program welcomes its fourth contingent of students, bringing the total to 26. The 14 new students will join a close-knit and supportive group that regularly meets to organize community projects and select new scholars.

Hugh Harvey is executive vice president and director of Intrepid Potash, the largest potash producer in the U.S. Michelle Harvey is president of the Harvey Family Foundation and a 10-year volunteer children’s advocate with Jefferson County CASA.

—Trisha Bentz Kendall

Learn more and meet the Harvey Scholars at giving.mines.edu/harveyscholars.
Colorado School of Mines recently received 10 generous leadership gifts and commitments:

With a tremendous $11.2 million investment made through their family foundation, Hugh Jr. ’74, ME ’80 and Michelle Harvey more than doubled their support for the prestigious Harvey Scholars Program at Mines. An initial $10 million contribution in 2009 established the program, which provides student scholars with a fully comprehensive Mines experience.

With a $125,000 commitment, the American Bureau of Shipping will provide additional support for the ABS Scholarship Fund at Mines.

Bentley Badgett II ’74 and the J. Rogers Badgett Sr. Foundation contributed $25,000 to establish an endowed scholarship fund in memory of Bentley’s father, Russell Badgett Jr. ’40.

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

Other gifts and commitments of $25,000 and more:

The Adolph Coors Foundation made contributions totaling $75,000 to support student scholarships and the Multicultural Engineering Program.

Donna S. Anderson ’97 committed $50,000 to the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Aqua-Aerobic Systems, Inc. contributed $30,000 in continued support for the Advanced Water Technology Center (AQUATEC).

Chesapeake Energy Corporation committed $90,000 to support student scholarships and the Petroleum Engineering Department.

Marshall C. III ’67 and Jane Crouch made $77,500 in contributions, with $50,000 toward the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology and $27,500 to launch the Class of 1967 Endowed Scholarship Fund.

The Daniels Fund contributed $26,000 to establish the Daniels Opportunity Scholarship at Mines.

Devon Energy Corporation contributed $40,000 toward scholarships.

Thomas E. Dimelow ’66, MS ’73 made a commitment of $25,000 in support of the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Dynamic Materials Corporation contributed $40,000 toward faculty support in the Department of Metallurgical and Materials Engineering.

Patrick J. Early ’75 made a $25,000 contribution to The Mines Fund.

The Edna Bailey Sussman Fund contributed $64,145 to the Environmental Internship program.

Damian C. Friend ’75 made a $25,000 commitment in support of the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Gold Fields Exploration, Incorporated contributed $30,000 in support of the economic geology program at Mines.

Don K. Henderson ’61, MS ’63 and Patricia E. Jennings made a $25,000 commitment in support of the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Steven B. Hinchman ’87 committed $25,000 to establish the Hinchman Scholarship Fund.

Donald L. Kammerzell ‘71 made $25,000 in contributions to the Joe Davies Track and Field Scholarship Fund and The Mines Fund.

The family of Kurt O. Linn ’52 contributed $25,000 to the Linn Scholarship Fund in Kurt’s memory.

J. Robert Maytag made a $51,248 contribution in continuing support for the Andes Graduate Scholarship Fund.

Cordelia R. McBride made a $25,000 contribution in support of the McBride Honors Program in memory of President Emeritus Guy T. McBride Jr., the 12th president of Colorado School of Mines.

Lawrence D. Meckel made a $25,000 commitment to the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Steven L. Mueller ’75 contributed $50,000 to the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Jack W. ’72 and Cherri M. Musser contributed $25,000 to The Mines Fund.

Ira Pasternack MS ’82, PhD ’07 contributed $50,000 in support for the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

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

John W. ’94 and Diane Robinson committed $50,000 to support the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology. Mines President Bill Scoggins and first lady, Karen Scoggins, made a $25,000 contribution in support of Arthur Lakes Library and the music program, as well as to match the Senior Class of 2012 Gift.

Shell Exploration & Production Company contributed $37,000 in support for the Oil Shale Symposium and the Center for Oil Shale Technology and Research.

Stephen A. Sonnenberg ’81 committed $50,000 in support of the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Michael D. Van Horn ’79 made a $50,000 commitment to the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Bequest distributions of $64,060 from the estate of Marian K. Van Kirk will provide unrestricted support for Mines. To date, a total of nearly $240,000 has been received from the estate.

The Viola Vestal Coulter Foundation contributed gifts totaling $60,000 in support of scholarships, fellowships, the Coulter Instructorship in Mineral Economics and the Coulter Health Center.

ConocoPhillips contributed $700,000 toward the ConocoPhillips SPIRIT Program, Marquez Hall, the Multicultural Engineering Program, and several academic departments and programs.

Jim Emme ’81 committed $100,000 in support of the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Freeport-McMoRan Copper and Gold contributed $250,000 toward the Ward Endowed Scholarship Fund. The gift was made in memory of Milton H. Ward, who was a member of the company’s board of directors.

Albert P. ’64 and Joyce Geyer made a $100,000 contribution to establish the Joyce and Al Geyer Track and Field Endowed Scholarship Fund.

Goldcorp USA Inc. made a $300,000 commitment to the economic geology field program and to student support.

John P. ’52 and Erika Lockridge committed $1 million in support of the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology, and gave $100,000 in continuing support for the Blaster Scholarship Fund.

The Viola Vestal Coulter Foundation contributed gifts totaling $60,000 in support of scholarships, fellowships, the Coulter Instructorship in Mineral Economics and the Coulter Health Center.
Exhilaration, Victory, Heartbreak Mark Orediggers’ Season

Call it momentum, call it confidence, but there’s no doubt that the talented student-athletes on the Colorado School of Mines men’s basketball team gave the school its best season ever in 2011–2012. Picked to finish second by the RMAC Pre-Season Coaches Poll, the Orediggers, coming off of a 25–6 record in the 2010–2011 season, had been ranked as high as #18 in the nation. The team made a loud statement with an 87–56 win over Black Hills State in its first game of the season and kept the volume at 11, winning a school-best 29 games. By the time the final buzzer sounded, the Oredigger men had dropped only three contests, the third a painful loss against Metro State in the Central Region Championship game on March 13 that eliminated the team from further postseason play. Along the way, it was ranked #1 in the nation—the highest in school history—and earned the honor of hosting the Central Region Tournament.

“We went into every game knowing we weren’t going to lose,” says Dale Minschwaner (#23), who ended his Mines basketball career with the championship game and expects to graduate in December with a degree in mechanical engineering.

Minschwaner recalls the moment when that sense of inevitable victory took hold. “At Fort Lewis, Chris Goutama (#3) hit a game-winning shot. I think that helped our momentum,” recalls the 6’6” center, who, like two other starters, was not playing due to an injury. “We were on a road trip. It was during Christmas break, so we weren’t in school. We’d lost the night before, and we really needed this win on the road. That was probably the biggest shot of the season.” The 66–65 victory over Fort Lewis marked the first in a 17-game winning streak.

And next year? “We’re going to tweak some things,” says Head Coach Pryor Orser. “We’ll shoot more threes probably, maybe be a little more spread out. Obviously we’re going to miss Dale—when things got tough, we just threw the ball to him and he made a basket. That’ll be a little tougher to do, but we have some guys who want that role. That’s the most important thing—they want that accountability.

“Even though we lost some great players, someone else has to step up. We have really strong, high-character guys who want to continue their success and the legacy of this team.”

—Amie Chitwood

Catch video highlights of the season in Web Extras at minesmagazine.com.
ATHLETICS

Champions! Mines Claims First RMAC All-Sports Cup

For the first time in school history, Colorado School of Mines won the Rocky Mountain Athletic Conference All-Sports Competition Cup after narrowly topping defending champion Nebraska-Kearney.

Prior to this year’s championship, Mines’ highest finish came in 2006, when it tied for second with Adams State, although the school ranked fourth last year and third in 2010.

“We had 13 of our 18 programs qualify for some form of postseason play during this past academic year … this is truly a great opportunity for us to celebrate our student-athletes and our institution,” says Tom Spicer, director of athletics.

Mines claimed three RMAC regular season titles in men’s basketball, softball and men’s golf, while volleyball, women’s soccer, men’s basketball and men’s cross country all qualified for their respective NCAA Tournaments.

The RMAC All-Sports Competition Cup is awarded to the institution that accumulates the most points over the year based on its teams’ outcome during the regular season in the RMAC’s four core sports—football or men’s soccer, men’s basketball, women’s basketball and volleyball—and six wild card sports, consisting of the school’s best finish in three men’s and three women’s sports.

—Colin Bonnicksen

Find a complete list of points for each Mines sport and each school in this article at minesmagazine.com.

SOFTBALL. After a slow start, the softball team won 20 of its last 24 regular-season games, securing its second-straight RMAC regular-season title and posting a 26–14 record in conference play. During those 20 victories, the Orediggers won 10 straight, overcoming Metro State with a first-ever four-game sweep. And for a second straight season, the team’s defense was tops in the RMAC, with a fielding percentage of .968. Mines hosted the RMAC Tournament in April for the second straight year, but the team was eliminated after losing its first two games.

INDOOR TRACK & FIELD. The men’s team placed 14th at the 2012 NCAA Division II Indoor Track & Field Championship, finishing fourth in the distance medley relay with a time of 10:01.54, its fifth consecutive top-five finish in the DMR.

OUTDOOR TRACK & FIELD. At the NCAA Championships, the team tied for 18th, with Mack McLain and Russell Drummond taking third- and fourth-place finishes in the 1500m. McLain claimed the 12th All-American honor of his career, the most ever by an athlete at Mines.
BOOKS

Just Published

Fundamentals of Drilling Engineering
This supplementary textbook for novice drilling engineering students devotes 10 chapters to rotary drilling, geomechanics, drilling fluids, cementing, hydraulics, drill bits, casing design, directional drilling, drill string design and drilling problems. Alfred Eustes, associate professor in the Petroleum Engineering Department, coauthored and edited the chapter on drilling fluids and, along with Neal Adams PhD ’11, the chapter on drilling problems. (Society of Petroleum Engineers, 2011)

Economic Evaluation & Investment Decision Methods, 13th Edition
Written for people with both technical and non-technical backgrounds, this highly successful book by the Division of Economics and Business father-son pair, Frank Stermole, professor emeritus, and John Stermole MS ’84, associate teaching professor, explains the concept of the time value of money and related decision criteria used to evaluate investments. Problems at the end of each chapter provide approaches to evaluating alternatives. (Investment Evaluations, 2012)

Seismology of Azimuthally Anisotropic Media and Seismic Fracture Characterization
Because most sedimentary rocks encountered in oil and gas exploration are effectively anisotropic, it is imperative to properly estimate seismic anisotropy and incorporate it into data processing and imaging algorithms. Ilya Tsvankin, professor in the Department of Geophysics, and Vladimir Grechka discuss seismic signatures and state-of-the-art inversion/processing methods for azimuthally anisotropic media in their book. (Society of Exploration Geophysicists, 2011)

Mormon Boy
Adjunct instructor Seth Tucker in the Division of Liberal Arts and International Studies was one of the winners at the Elixir Press 11th Annual Poetry Awards with his book of poetry, which is about his experiences in Baghdad in the early 1990s as a paratrooper with the U.S. Army’s 82nd Airborne Division. (Elixir Press, 2012)

Introduction to Data Acquisition with LabVIEW, 2nd Edition
The second edition of this book by Robert King, professor in the Department of Mechanical Engineering, teaches students how to measure physical properties with a computer-based instrumentation system. It includes new examples and exercises for the myDAQ device, in addition to the BNC-2120 and simulated devices used in the first edition, and contains revised content on the block diagram cleanup tool, property and invoke nodes, exporting chart data, and the event structure. (McGraw-Hill Science/Engineering/Math, 2012)

KARATE CLUB

Student Wins Gold at Karate Championship

His career goal may be to work in the nuclear power industry, but for now, Chris Cowdin is finding balance by focusing his energies on karate. Cowdin, who just completed his sophomore year at Mines and is studying mechanical engineering, took first place in two categories—18–34 Male Beginner Kata (pre-arranged sequences of techniques) and Kumite (semi-contact sparring)—at the 2012 U.S. Open Karate Championship in Las Vegas, Nev. (April 7–8). Although he traveled to the competition as an individual, he says the Mines Karate Club, where he’s the secretary, helped finance the trip.

Cowdin estimates that his opponent in the final kumite bout had about 7 inches in height and 100 pounds in weight over him, but “with a tied score and only 3 seconds left, I managed to land a reverse punch on his chest and win the bout,” he recalls. “I was extremely excited about winning, and it took me a long time to cool down once it was over. The other athletes and instructors joked that even after receiving my gold medal, I looked like I was ready to jump off the awards podium and back into the ring for another bout.”

While Cowdin has his sights set on completing the five-year master's program in nuclear engineering, his training won’t take a back seat. “With a strong emphasis on mental aspects, karate helps me discipline my mind so I can set high academic goals for myself and increase my mental focus when faced with difficult assignments,” Cowdin says. “Plus, there’s no better stress relief for a brain tired of studying than going to the dojo to spar with someone.”

—Amie Chitwood
MINING TEAM

Co-ed Team Takes First Place at Mining Games

The men and women of the Colorado School of Mines Mining Team returned from Cornwall, England, on April 2 weighted down by a slew of awards from the 34th Intercollegiate International Mining Games, not to mention the numerous Cornish pasties, bags of chips and pints of scrumpy they’d enjoyed while away. The six-member co-ed team (half women, half men) took first place overall in their division, as well as first place in hand steeling and hand mucking, and scored a top-three placement in six out of the seven events.

“The students tried to improve their own time and not compete with other teammates,” says Clint Dattel, the foreman at Edgar Mine who has been mentoring the teams and accompanied the students to England. “They supported and encouraged each other during the practice and the competition.”

This approach proved successful, particularly the day before the competition, when team captain Patricia Capistrant hit her hand with a 4-pound hammer while practicing for the hand steeling event. “It swelled up and we thought it may have been broken,” recalls Dattel. “She blew it off and not only competed in the co-ed division, but also won first place in the individual women’s competition for hand steeling.”

A cadre of mining experts aided the team in its preparation, including three-time world single jackdrilling champion Emmit Hoyl, Rick Thomas from Henderson Mine, and professional surveyor J. Warren Andrews ’63. Kadri Dagdelen, head of the mining program, and research associate Brian Asbury set the students up with practice space and lighting behind the EMI lab so they could train through the winter.

“It was snowy, muddy and cold,” says Capistrant of their February practices. “I know that no one wanted to show up, and that preparing for the competition at that point didn’t even seem worth it. But everyone showed up, and the hard work really did pay off when we took first place in England.”

Camborne School of Mines hosted the event for 36 teams representing 16 schools from the United States, Canada, Australia, England, Germany and Holland. The mining games began in 1978 as a way to honor 91 miners who died in the Sunshine Mine (Kellogg, Idaho) fire six years prior, as well as those who have died on the job in the succeeding years. All events are based on traditional mining techniques.

If Cornwall was too far to travel, there’s a Golden opportunity March 13–17, 2013, to watch the games, when Colorado School of Mines will host the 35th event. According to Capistrant, the mining team has already begun training.

—Amie Chitwood

EVENTS

Surveying: Teams are given a starting point and expected to report the coordinates of a finishing point using an old-fashioned vernier transit.

Hand Steeling: Drill into a concrete block using a 3- to 4-lb hammer and a 7/8-inch chisel.

Track Stand: Set up and tear down a section of track, including sleepers, rail, connecting plates and bolts.

Hand Mucking: Run a 1-ton ore cart down a 75-foot section of track and fill it with muck using shovels.

Swede Saw: Saw through a 6-by-6-inch piece of timber with a 36-inch bow saw.

Gold Panning: Find five flattened lead or copper ball bearings in a pan full of dirt and rock.

Jackleg Drilling: Drill into a vertical concrete face using a Holman 303 airleg drill.

Source: www.34img.com

If you’ve never seen hand mucking or any of the other events, check out the videos at minesmagazine.com, where we’ve posted complete results from the games.
GRADUATE RESEARCH

A Showcase for Mines Research for Students, by Students

By design, this year’s Conference on Earth and Energy Research (March 28–29) bore little resemblance to graduate research exhibitions of years prior. Carrying the tagline, “by graduate students, for graduate students,” the newly designed conference combined poster and oral research presentations with sessions on hydraulic fracturing, carbon capture and carbon dioxide sequestration, nanomaterials and nanomethods, enhanced oil recovery, and improved hydrocarbon techniques, among others.

“These are all really important topics in the field, and it’s difficult to find a comfortable environment in which you can access all of this knowledge within 48 hours,” says Zach Aman, a coordinator for CEER and former president of the Graduate Student Association, which sponsored the event. “The conference had higher participation and more focused content than those in any of our peer groups, except MIT.”

For the first time, students from other institutions were invited to attend. Of the 166 presenters, 11 came from other schools: Texas A&M, University of Colorado, University of Denver, University of Wyoming and Yale. “Opening up participation to schools outside Mines raised the profile,” says Tom Boyd, dean of graduate studies at Mines. “It now becomes a regionally important event that not only highlights the research activities of our graduate students, but, if done in a well-coordinated fashion, could also act as a real draw for high-quality students to Mines. The whole polish of the event was far beyond anything the GSA has done in the past.”

Another departure from the exhibition model was the inclusion of technology that allowed real-time feedback from the 79 judges, 42 of whom were Mines alumni. Judges made comments via tablets, enabling presenters to retrieve immediate feedback.

“Usually professional conferences are extraordinarily indirect,” says Cericia Martinez, a coordinator for CEER and new president of the GSA. “To generate world-class research scholars, this is the type of experience we need to foster.” She adds that alumni participation was invaluable to the event. “We had alumni walk up to us and say, ‘Wow! It’s great to see the cutting-edge work being done at Mines, and it’s a helpful update on state-of-the-art knowledge.’ The more they were engaged, the more they wanted to be engaged.”

—Amie Chitwood

IN BRIEF

The Hydrate Center has been awarded a U.S. Department of Energy grant of $700,000 aimed at reducing the environmental and operational risks posed by the formation of gas hydrate blockages in offshore natural gas and oil pipelines. Research will focus on improving models used by industry to predict hydrate formation, and advance computational models recently developed by the center.

Brittany Simpson has been named head women’s basketball coach after serving as an assistant coach at Mines for the past four seasons.

To promote the relationship between art and science in higher education, Mines hosted the inaugural Art in Science and Technology (ArtiST) conference in April, during which the school was awarded Best Use of Technology/Format for the school’s literary magazine, High Grade.

In April, Tissa Illangasekare, professor in the Civil and Environmental Engineering Department, received the Henry Darcy Medal from the European Geosciences Union for his contributions to hydrological science and water resource engineering.

Zizhong Chen and Michael Wakin, both assistant professors in the Department of Electrical Engineering and Computer Science, have been awarded National Science Foundation Faculty Early Career Development awards.

Mines won first place for the third time in four years at the TMS 2012 Materials Bowl science knowledge competition in Orlando, Fla.

The ASCE student chapter took second place overall in April’s American Society of Civil Engineers Rocky Mountain Student Conference. It also took second in the steel bridge competition and first in the pre-design competition.

Colorado School of Mines has launched newsroom.mines.edu to connect journalists and the public with university news, events and resources. In addition, a new mobile app, Mines Mobile, is available for iPhone and Android phones as a free download in the iTunes store and on Google Play.
Pulling together, moving as one – this is the strength of a team. Each member, focused on their specific tasks, working in concert with the rest to propel the team to victory. At SandRidge, we realize it takes diverse backgrounds, skills and experiences to move the organization forward. It takes the whole team. It takes the power of us.
Exploration geologists can devote entire careers to searching for undiscovered mineral deposits without ever chalking up a find. But for those who do, it’s tremendously rewarding, and many go on to more discoveries.

By Lisa Marshall

Seated atop a glistening, rock-strewn hillside on a remote plateau in southwest Argentina in 2000, Russell Dow MS ’04 lit a cigarette, took in the view and quietly celebrated a moment many in his line of work go their whole lives without experiencing.

At age 26, just two days into his first field trip for his master’s thesis at Colorado School of Mines, the New Zealand-born exploration geologist had found a virgin deposit that later would be estimated to contain 2 million ounces of easily accessible gold.

“I sat down and thought, ‘Wow. This is it. This might be the one shot in your career where you find something
really good,’” recalls Dow. “I relished that moment.”

Such discoveries are exceedingly rare, and getting rarer, as the low-hanging fruit—rich surface deposits easily found—become depleted, requiring intrepid geologists to follow fewer clues deeper below the surface in ever more remote regions. Mines economists estimate it takes 1,000 investigations to generate 100 mineral deposit targets worth drilling. Of those, perhaps one becomes a profitable mine.

The odds for gold discoveries are even longer—more like 10,000 investigations to yield one deposit of 4 million ounces or more. In 2009, according to Metals Economics Group, just one major gold discovery was made, amounting to 35 million ounces. (In comparison, 1996 brought 15 discoveries totaling 125 million ounces.) Meanwhile, global mining companies today are burning through 85 million ounces of gold annually and are hungry for more. The same supply gap exists with silver, copper and other minerals.

“We are not keeping up,” says mining stock analyst Brent Cook. “We cannot find and build these mines quickly enough.”

So, what does it take for an exploration geologist to make that big mineral discovery? And what happens next, to the finder, and the people who live on or near the deposit? The accounts from faculty and alumni exploration geologists that follow go some way toward answering these questions. In pursuit of their jobs, some have found themselves caught in the crossfire between warring rebels in remote African countries. Most spend their workdays trekking on foot, horseback, boat, helicopter or four-wheel drive to rugged corners of the world seldom explored.

“It is definitely a little Indiana Jones-ish,” says Mines economic geology professor Murray Hitzman, who discovered the world-class Lisheen deposit in Ireland in the mid-1980s. “It takes a slightly warped personality to do this job.”

Here are their stories.

A HIGH-STAKES CROSSWORD PUZZLE

Born in Bartlesville, Okla. (home of ConocoPhillips), into a family of petroleum geologists, Hitzman seemed destined for a career in the oil business. But wanderlust and interest in indigenous cultures led him on another path.

“I liked to travel and I wanted to figure out a way to do that for work,” says Hitzman, who double-majored in anthropology and geology at Dartmouth College as an undergraduate.

His first discovery came the summer after graduation—a small copper deposit in Nevada. He loved the thrill of the find and went on to get a doctorate in geology from Stanford, where he conducted his master’s thesis in the untamed Brooks Range of Alaska. His tools of the trade were, as he puts it, “a hand lens, a helicopter and a hammer.”

“As opposed to oil and gas, where a lot of it is done with very high-tech, expensive technology, the minerals game is still one where you spend a lot of time out in crazy places, looking at rocks. Occasionally, you knock one over and there it is,” he says.

That is not, however, how Hitzman discovered his prize find.

ZEROING IN ON ZINC

“What we do is more art than science—it’s about having the ability to see something that no one else sees,” says Murray Hitzman. His company abandoned the search for zinc in Ireland after four years, but Hitzman formed a partnership and drilled anyway, finding a 25 million-ton deposit of 11 percent zinc at 200 meters.
In fact, it was hidden beneath 200 meters of glacial till and rock in the lush farm country of central Ireland, where it took him five painstaking years to determine where X marked the spot.

“There were no rocks whatsoever sticking out,” he recalls. “It was a lot of detective work using geology, geochemistry and geophysics.”

Hitzman went to Ireland alone as a Chevron employee in 1982, confident that his ideas for finding zinc within five years would generate results. “Zinc prices were down at that time and many companies were exiting Ireland,” he says. “I figured by the time I made a discovery, the zinc price would be back up.” He spent three and a half years poring over historic maps, scouring through public data filed by mining companies that had left empty handed, taking soil samples to look for anomalies, and knocking on farmers’ doors to ask questions.

“I reckoned that most of the things that had come to the surface had already been found,” he says. “I had to find something that was buried—and that was trickier.”

Four years into his stay, just as he began to zero in on where to drill, Chevron pulled the plug on the project and transferred Hitzman to Vancouver. “I was itching to drill and was basically told it was time to leave. It was awful.”

So he joined forces with some friends who formed a company that acquired the property through a joint venture with Chevron. Their first drill cores produced stunning columns of brownish sphalerite and silvery galena—an indicator that zinc and lead were present.

“We found it on the fifth hole. We knew instantly what we hit,” he recalls.

The Lisheen deposit (now owned by Vedanta Resources) has amounted to roughly 25 million tons of 11 percent zinc. Its discovery reinforced a lasting passion for exploration. “What we do is more art than science. It’s about having the ability to see something that no one else sees,” says Hitzman. “It’s like the earth is a crossword puzzle, and we have to figure out how all the pieces go together.” Hitzman has since been prospecting in the Democratic Republic of Congo, Somalia, and Mauritania, and several graduate students have struck it big on his watch.

In addition to Russell Dow, another of Murray’s students, David Broughton, discovered a copper deposit in the Democratic Republic of Congo that is so substantial it’s absorbed his attention ever since. Hitzman places it in the same league as Olympic Dam, and mining billionaire Robert Friedland predicts it will become the largest copper development on the African continent. Broughton was unable to speak about it as this article went to press, but when full details are public, Mines will follow up on this intriguing story.

**THE HUMAN COST**

To transform Larry Buchanan’s discovery into the second-largest silver-producing mine in the world, a Bolivian village had to be relocated, a wrenching process that Buchanan and his wife, Karen Gans, chronicle in their book, “The Gift of El Tio.” Clockwise, from top: San Cristobal before demolition; the mine; the relocated village; Buchanan and Gans.

**A MIXED BLESSING**

Exploration geologist Larry Buchanan ’73, PhD ’79 didn’t realize just how much of an adventure he was in for when, as he watched the sun set over a hillside in southern Bolivia in January 1995, a white glare caught his eye in the distance.

He was already well known in the industry for the Buchanan Boiling Model, outlined in a paper published in 1981 in the Arizona Geological Society Digest, which outlined how the boiling and oxidation of rising hydrothermal fluids could create rich ore deposits—a framework that has since helped guide geologists to billions of dollars’ worth of silver in thermally active regions.

Recognizing Buchanan’s expertise and well aware that silver prices were poised to spike, Apex Mining founder Thomas Kaplan hired him to scout for silver in Bolivia.

“If you are seeking elephants, you go to elephant country, and the largest silver producers were Mexico and Bolivia,” recalls Buchanan.

He had just made a disappointing trip to an abandoned open pit operation in a desolate, windswept region of that country at 14,000 feet. It showed no promise.

But as luck would have it, his driver’s truck broke down as they were leaving, forcing him and fellow Mines alumnus Jon Gelvin ’75 to spend the night. As they prepared their dinner
around the fire, they spotted the hills to the north catching the reflection of the setting sun. “It was so white it hurt your eyes,” recalls Buchanan.

The next day, they hiked over to discover an intriguing 2-square-kilometer field of illite, a mica-like material often associated with precious metal deposits. At its center sat a dilapidated white stone church, a cluster of thatched-roof homes with smoke billowing from their chimneys, and a stray dog wandering its cobblestone streets.

“It looked deserted, but it turned out that it was because we were there,” recalls Buchanan. “When they saw these strangers wandering around their village, they went inside and locked their doors.”

Buchanan returned home with what he thought was stellar news for his wife. Of the 51 samples they had collected and analyzed, 49 showed promise (from 20 to 1,000 grams per ton of silver and about 1 percent lead). In the end, they found the deposit contained 1 billion ounces of silver (as well as medium-grade zinc and lead), all easily mined by open pit. Today, the mine (now owned by Japanese mining giant Sumitomo) is the second-largest silver producer on the planet.

“It was a bonanza,” recalls Buchanan.

But Buchanan’s wife, Karen Gans, saw it differently.

“She was very negative about the idea of having to move the village,” he recalls. “She said we should leave them alone. I said they were starving to death and needed jobs. She didn’t believe the mining company would treat them right. I did. So she insisted we move there and document what happened to them.”

That’s exactly what they did, living in the primitive village of San Cristobal, Bolivia, on and off for a decade.

At one point, they watched with heavy hearts as workers in blue uniforms and white masks carefully dug up the bones from the 400-year-old village cemetery to relocate it to the new village 11 kilometers away. Days later, Buchanan joined village elders chewing coca leaves as they crawled around the vacant cemetery to beg forgiveness for disturbing the dead.

Then in July 1999, he and Gans looked on as the 400 villagers bid their ancestral home goodbye. It took 4 hours for bulldozers to level it.

“There were times I was literally brought to tears when I would contemplate what the people lost due to my discovery. It’s hard to talk about,” recalls Buchanan.

But there were also moments of pride. He points out that those living in abject poverty now have access to clean water, electricity, health care and much-needed jobs. Youth once destined to illiteracy now go to university.

And as for the white stone church he spotted that first day, the mining company took care to move it brick by brick and rebuild it in the new village.

In 2006, Buchanan was awarded the prestigious Thayer Lindsley award for the San Cristobal discovery, and in 2008, he and Gans published “The Gift of El Tio” (Fuze Publishing), a brutally frank memoir about their experiences there, which is now required reading for geology students at San Diego State University and for overseas geologists with the exploration company Silver Standard Resources.

“To this day, I do not think that what we did there was the wrong thing to do,” says Buchanan, 68, who is still exploring and believes he may have just found his next billion-ounce deposit (fortunately, with no village nearby). “I think [exploration geology] is a really honorable and needed profession that creates wealth out of barren rock. But we have a responsibility to be cognizant of the effect our actions have on the indigenous people and do our best to make things as smooth as possible.”
THE POWER OF TEAMWORK

The moral of the Olympic Dam story could boil down to something like this: What you seek is not always what you find.

“It is one of the well-known wisdoms in mining that the ore body or deposit that you find is often nothing at all like what you are looking for,” says Dan Evans ’69, who earned a master's degree in mineral exploration from McGill University in Montreal after leaving Mines.

Melbourne-based Western Mining courted Evans fresh out of graduate school for his expertise in a particular class of ore deposits (Archean aged volcanogenic massive sulfide), and invited him to western Australia to scout it out. After two years, he’d had little success, so he moved to Adelaide in South Australia for field exploration programs that tested the conceptual model of another young Western Mining geologist, Douglas Haynes, who had just created a novel model for the genesis of stratiform copper deposits.

Things didn’t work out as they’d envisioned—nothing new there—but through a team effort that combined analyzing publicly available geological maps of the region, geophysical magnetic and gravity surveys, their own structural geology expertise, and strong support from Western Mining, they ended up on a barren and remote slice of sand and clay in the South Australian desert with unique geophysical properties far beneath.

“We saw in the geophysical and geological information what others could not see because going into it we had a unique conceptual framework for the origin of stratiform copper deposits,” says Evans, whose two-car garage in Adelaide doubled as the Western Mining office and was the epicenter for the discovery.

He stresses that he considers himself only one of a half-dozen geoscientists “without whom Olympic Dam would probably not have been discovered.” In addition to playing a critical role in the exploration strategy and identifying the area, he wrote “The Andamooka Stratigraphic Drilling Proposal,” making the business case for the drilling budget and establishing an expectation at the outset that a large grid of exploration holes would need to be bored at considerable expense to see their exploration strategy through.

On June 10, 1975, at great financial risk, the company drilled the first-ever deep mineral exploration hole (named RD1) on the 48,000-square-kilometer Stuart Shelf. Evans was nonplussed by the results. “Originally, we wondered whether nature was a cruel mistress,” he says. “One percent copper located 1,150 feet beneath the earth would not have had a chance of being economic.”

However, Evans and his team convinced Western Mining to boldly continue exploration by stepping out on a grid with holes about 1,000 meters apart. A year later, the legendary RD 10 hole was drilled 700 meters north of the original hole. The result (170 meters at 2 percent copper from 348 meters) confirmed it. This discovery was world class.

Olympic Dam is now considered the world's fourth-largest copper deposit, the largest uranium deposit, and one of the world's major gold and silver deposits. Owner BHP Billiton is currently proposing a $30 billion expansion that would add open-pit operations to the mine, which is currently underground.

“There is no question that luck often does play a role in making world-class discoveries,” says Evans, who was Accenture's global mining expert after he left Western Mining, and now has his own business strategy consulting company, Executive Compass. However, he adds that good teamwork, inspirational leadership, the right technology, sound science, risk tolerance and a lot of persistence from all concerned can also help. “We had all that,” he adds.

PERSISTENCE PAYS

At great financial risk, Western Mining continued to explore the area in South Australia now known as Olympic Dam, thanks to the proposal of Dan Evans and his team. Olympic Dam is now considered the world's fourth-largest copper deposit, the largest uranium deposit, and a major gold and silver deposit.
Southeast Asia. “A lot of times geologists give up. They think it is too hard. But once you make one discovery it makes you realize that it’s possible. It creates this massive drive.”

In another conversation, Hitzman made a related comment: “Ironically, the people who find one tend to find more than one. Some people just have a nose for it.”

That may have been the case for Quinton Hennigh MS ’93, PhD ’96.

During a dismal postgraduate decade in which gold prices were bleak and jobs in exploration geology were short-lived or nonexistent, Hennigh worked as a middle school teacher and made maps for an architectural firm before re-entering his chosen profession in 2004. It was worth the wait.

“I have been very fortunate. I have made five discoveries and am now working on my sixth,” says Hennigh, who is a technical advisor and director for several junior companies, including Prosperity Gold.

While he says there has been a “sharp retraction” in the junior mining company sector of late, prompting companies to rein in exploration dollars, he thinks it is a good time to go into his business.

“The major mining companies are running out of resources and the only way they can keep up with production is to go out and acquire new projects or take over junior companies,” he says.

His advice to exploration geologists of tomorrow? “You have to be an eternal optimist, because the odds of you making a discovery are only slightly better than if you had never been born at all,” he jokes. “But in the end, that thrill of finding something that no one else has found and that could be of huge benefit to a lot of people—that makes our job incredibly rewarding.”

SERENDIPITY

Russell Dow considers himself a lucky man.

In 1999, he was sitting in Hitzman’s office at Mines, looking over satellite imagery and aerial photos in preparation for his field trip to Argentina, when he spotted a steep cone-shaped hill at the edge of the screen.

For his master’s thesis, he’d been assigned to map the eroded volcanic edifice where Mansfield Minerals’ Arizaro deposit sat. But as he looked at the screen he was distracted by a corona of white (an indication of thermal activity) around the uncharted outcropping.

“A lightbulb went on,” recalls Dow. “It was definitely a spot I had to go look at.”

Six months later, on the second day of his field trip, he found himself high in the Andes on the edge of a 14,700-foot plateau in Argentina, charging up that cone-shaped slope with map in hand.

“As I walked up that scree slope, I stared to see little bits of rock that looked interesting … little stains of malachite and quartz and magnetite,” he recalls. “I was a fresh young John still in university, and I walked right on to the highest-grade part of the deposit. It was basically exposed. It doesn’t get luckier than that.”

Twelve years later, what is now called the Linder deposit has yet to be mined. But the company has drilled 130 holes and is poised to release a bankable feasibility study within a few months.

Dow is confident it will be determined economic. And if he gets the finder’s fee he was promised long ago, “I will be a very happy man,” he says.

Nonetheless, the discovery alone has given him a confidence and reputation that many in the industry struggle to capture.

“The thrill of that day and watching this process play out over the past 12 years has been a great experience,” says Dow, who now works for Harmony Gold and explores mainly in Argentina.
Megatons to
Megawatts:
The Missile Deal that Almost Blew Up

A 20-year agreement signed in 1993 between the U.S. and Russia to turn 20,000 nuclear warheads into nuclear fuel contained some fatal flaws—but the deal was salvaged thanks in large part to the work of a team led by a Mines alumnus.

By Nick Sutcliffe
Illustration by Jeff Neumann

Nuclear power provides about 20 percent of the electricity used in the United States. Since 1995, about half of that has been generated with uranium from dismantled Russian nuclear warheads, shipped to the U.S. under the Megatons to Megawatts (MTM) program. When the 20-year program wraps up in 2013, about 20,000 nuclear warheads will have been put out of commission.

The useful conversion of so much destructive power (think three warheads a day for 18 years) is an inspiring story, but the deal almost fell apart. Structurally flawed from the outset, the agreement required a decade-long collaborative effort led by private sector nuclear industry partners, with considerable support from the U.S. and Canadian governments.

This effort has not been well covered by the media. Even less has been reported about the role played by Jerry Grandey ’68, who sounded the alarm, helped devise the rescue strategy, rallied support, and for six years led tough negotiations with the Russians that finally corrected the flaws and ensured that the weapons continued to be dismantled.

RIGHT MAN, RIGHT PLACE
It’s uncanny how well prepared Grandey was to intervene when the need arose. He was already on a first-name basis with the Russian minister of atomic energy. As president of Uranium Producers of America, Grandey had recently sued Russia for dumping uranium on the world market, and then spent several months showing the minister and others how they could join the international uranium market on a legitimate basis.

He instantly understood the threat posed to the weakened uranium market by the program, and, as Cameco’s senior vice president for marketing and corporate development, he had a strong incentive to protect the market from collapse.

Based in Canada, which has never developed nuclear weapons and is a trusted leader in the international nonproliferation community, Cameco already had a history of working with Ottawa to resolve nuclear scuffles.

And along with the right connections, background and credentials, Grandey also happened to be in London when President Clinton announced the MTM program in February 1993, so he had only a short plane ride to Moscow.

PECULIARITIES OF THE URANIUM MARKET
It’s hard to appreciate what follows without understanding a little about how nuclear fuel is bought and sold. It’s a market unlike any other.

After uranium ore is milled and refined, the concentration of the uranium 235 isotope is around 0.7 percent. To make nuclear fuel (low enriched uranium, or LEU) the concentration of this isotope must be increased to about 5 percent, while weapons-grade uranium (highly enriched uranium, or HEU) must be closer to 90 percent.

The cost of LEU is determined by two factors: the cost of the original refined concentrate required to make the fuel (the natural uranium component) and the cost of increasing the concentration of uranium 235 from its natural level to the required level of 5 percent (the enrichment component).

When a utility company pays for a delivery of LEU, it writes at least two checks: one to the company that supplied the natural uranium component (it takes about 8 pounds to make 1 pound of LEU) and another to the company that enriched it. The amount paid for uranium depends on the market. The cost
of enrichment depends on the market price of the enrichment service and the amount of work required to achieve the desired levels of uranium 235.

Making nuclear fuel using HEU taken from Soviet warheads requires no new mining, refining or enriching since all of this was done to make the weapons material decades before. Instead, the HEU is mixed with the tailings left over from previous enrichment operations. The result of the blending is LEU suitable for use in U.S. and other light water reactors.

However, while making LEU from HEU is less costly, Russia entered into the MTM program expecting to be compensated in the conventional way for both the uranium component and the enrichment component.

“When Russia agreed to dismantle the 20,000 warheads, they weren’t trying to make the world a safer place, although that’s what everyone said. They desperately needed the hard currency and expected to get paid fair value for all of the components,” explains Grandey.

But the way the agreement was framed, this was unlikely to happen.

THE MOSCOW MEETING

When he met with Russia’s minister of atomic energy in March 1993, Grandey’s suspicions about the details of the agreement were confirmed.

The impact the deal would have on demand for enrichment services in the U.S. market had been considered. The U.S. government owned the only two uranium enrichment facilities in the country, and since the anticipated LEU imports from Russia would supply the U.S. with about half of its needs for 20 years, one of the plants would close.

On the other hand, the agreement gave almost no consideration to the impact on the uranium market. “They just didn’t think about it,” says Grandey. But it was sure to be substantial. Russia was about to displace about 20 percent of world uranium demand with their weapons-derived LEU. “All of this demand was about to evaporate,” says Grandey. With prices already low, the impact on the industry would be devastating. It could also scuttle the MTM program.

Grandey recalls his conversation with the minister of atomic energy: “I said, ‘Do you realize that this 20 million pounds equivalent that the weapons material represents is going to destroy the uranium market? The price of uranium will approach zero.’ The minister’s response was, ‘Well, if it does, then we won’t do the deal. We won’t dismantle the weapons.’”

CREATING A PHANTOM MINE

Grandey’s first attempts to reach the U.S. State Department to explain the threat to the MTM program went nowhere. However, when the Canadian government initiated legal action under the U.S./Canada Free Trade Agreement, arguing Russia had been given an advantage in the U.S. uranium market, Grandey got his opportunity to explain the flaws in the program and how they could be fixed.

James Timbie, a senior adviser to the undersecretary for international security and nonproliferation at the U.S. State Department, was one of the first to understand why MTM was on a trajectory to crater the uranium market, and why that endangered the whole program. “The agreement had sounded very simple, but in fact it was very complicated,” he says. “We first learned all this from Jerry.”

Once Timbie and his colleagues understood the plan for making MTM work, they enlisted the support of Congress. “Legislation was passed that treated the LEU from Russia as if it were from a new mine coming into production,” explains Grandey. The uranium from this new “mine” could only enter the U.S. under a quota system that began at 2 million pounds of natural uranium equivalent per year, and grew by 2 million pounds per year until it hit 20 million pounds.

The quota system was almost as ephemeral as the mine it governed. With 20,000 warheads to process, far more uranium needed to be moved than was permitted by the quota. Even in the first year of shipments, the natural uranium equivalent of the LEU actually exported by Russia to the U.S. exceeded the quota tenfold.

It was the method of compensation that kept Russia in compliance: For every pound of imported LEU that was in excess of the quota, the country received cash from the United States Enrichment Corporation (USEC) for the enrichment component and 8 pounds of natural uranium that was stored in specially monitored stockpiles for later sale.

The only reason Russia went along with this arrangement was because there was no quota for the enrichment component, which was more valuable. Even during the first year, it received hard currency for about 70 percent of the value of its LEU. For the rest, it accumulated a large stockpile of natural uranium.

GROWING STOCKPILE, MOUNTING FRUSTRATION

As the years passed and the stockpile of uranium grew, the pressure to find a buyer increased. “They were getting paid for the enrichment, but the natural uranium was just piling up,” Grandey explains. “We all knew something would have to be done, but it wasn’t clear what that would be.”

Between 1994 and 1999, Grandey and others met every two or three months with a team of Russians to discuss the uranium component. “The negotiations were not easy,” he recalls. “The Russians kept trying to introduce an agent into the process—someone to skim money off for the benefit of people within Russia—and we kept excluding the agent. Many times we ended up simply saying, ‘If you insist on that, we’re leaving,’ and we’d get up and fly home.”

In 1997, with tensions escalating, Grandey formed a partnership between Cameco, the French nuclear energy company Areva, and its German counterpart, Nukem. With better access to the European market, they stepped up purchases of uranium, but even this alliance of nuclear energy industry giants couldn’t put much of a dent in the tottering Russian stockpile of almost 30 million pounds.
In 1998, mounting Russian hostility and the privatization of USEC set an initiative in motion that ended up solving the problems in the uranium market.

To break the stalemate, Russia and the U.S. needed a private buyer for the natural uranium component. However, after a decade of low prices had weakened the industry, the Cameco-Areva-Nukem partnership was the only serious contender for the role. But buying the entire stockpile was too risky, and so was committing to the purchase of future shipments while the accumulated uranium could still bury the market.

The impasse was broken when Senator Pete Domenici successfully rallied support for a Congressional appropriation of $325 million to buy the stockpiled Russian uranium and keep it off the market for 10 years. The purchase would be contingent upon Russia signing a commercial agreement for the sale of the natural uranium component of future LEU shipments through the end of the program. It was the breakthrough they needed, and an agreement was signed with the Russians by the three Western companies.

Concurrently, another stockpile of natural uranium owned by the Department of Energy was added to the sequestered stockpile. Russia was required to create a similar sequestered stockpile in Russia and Cameco and Areva delayed projects to keep from adding to the global uranium supply.

“All this was done to support the price of uranium and make the deal work,” says Grandey. “Our thinking was that if we can keep the price of uranium around $10–$14 per pound, we can continue to operate our existing mines, the Russians will get what they need, and we’ll be able to make the deal work. And that’s pretty much what happened. After 1999, Russian threats of tearing up the agreement evaporated.”

Looking back, Grandey is proud of the efficiencies achieved by the public-private collaboration. “The brilliance on the part of the U.S. and Canadian governments was to turn the implementation of the deal over to the private sector. We amended it about eight times, and each time we had to get approval from the Russian and U.S. governments, but that was easy because we were making the nonproliferation deal work.”

The State Department is equally positive. “They were our partners in implementing the agreement, which has now supplied roughly half of the enriched uranium to the United States for almost 20 years,” says Timbie. “Problems arose from time to time, and whenever they did, we’d get together with Jerry and solutions would be found.”

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In May 2012, Grandey was invited to Oslo, Norway, after a worldwide search identified him as one of about 90 nominees for the 2012 Business for Peace Awards. Although Grandey was not among the final six honorees, the recognition of his role in MTM is a great honor, which he is quick to share with others. The success of the program has required the support of numerous legislators, government officials and, in particular, USEC, says Grandey. “They have been absolutely instrumental in the performance of this deal as well.”

While retirement has brought big changes for Grandey, some routines remain the same. A former member of the Mines swim team, he still begins most days with a 4,000-yard workout. His father, now in his mid-90s, still regularly beats him at golf. And along with continued philanthropic involvement in the Saskatoon community, he serves on the Dean’s Advisory Council of the University of Saskatchewan’s Edwards School of Business, and on the Board of Governors of the Colorado School of Mines Foundation. Preferring to make a clean break, he’s not on Cameco’s board anymore, but he is on the boards of four other companies.

In spite of the post-Fukushima slowdown, his outlook for the nuclear energy industry is positive. “I have this innate belief in the ability of human beings to put aside hysteria,” he said in an interview for the Canadian newspaper, The Globe and Mail. “Once people reflect on the risks associated with other energy sources, they’ll come to the rational conclusion that nuclear, even in the worst circumstances, is still better than the alternatives.”

That’s not what he believed when he began his career. After earning his degree in geophysics from Mines in 1968 and completing his service with the Army Corps of Engineers in Korea, he studied law at Northwestern. While a student, he worked for a public interest law firm, where he challenged the licensing of nuclear plants around the Great Lakes. It remains one of the great ironies of his career. “I spent two and a half years opposing the interests of companies that ultimately became my best customers,” chuckles Grandey.
ALUMNI WEEKEND

Miners Welcomed Home for Reunion Events

Women of Mines, graduates of the Department of Chemical and Biological Engineering, and the classes of ’52, ’62, ’67 and ’72 were reunited at this year’s Alumni Weekend, held April 26–28. The program was designed to showcase changes on campus and Mines’ scholarly and technological advances, and give the nearly 600 alumni and guests who attended a place to reconnect over three beautiful spring days. Among the multitude of special moments, we’ve shared a few below. You’ll find many more at minesmagazine.com.

CELEBRATION OF ALUMNI 2012 AWARD WINNERS

At CSMAA’s Celebration of Alumni banquet held April 27 during Alumni Weekend, 10 individuals were honored for their contributions to Mines:

Distinguished Achievement Medalists
Karen Krug ’84 and J. Don Thorson ’55

Mines Medalists
Michael S. Nyikos (posthumously) and George Wood ’65

CSMAA Melville F. Coolbaugh Award
Jim Emme ’81

CSMAA Outstanding Alumna Award
Catherine Mencin ’83

CSMAA Young Alumnus Award
Kelly Taga ’00

CSMAA Alumnus of the Future Award
Oliver Dewey ’12

CSMAA Honorary Members
Carol Chapman and Kirsten Volpi

Read more about the 2012 honorees by going to Web Extras at minesmagazine.com.

ALUMNI WEEKEND 2013: GET INVOLVED

Would you like to meet up with your classmates? Are you wondering what happened to them? Class committees are forming, and there’s still room for more volunteers. If you want to help plan a class reunion for the next Alumni Weekend, to be held April 25–27, 2013, email Serena Bruzgo (sbruzgo@mines.edu).
Meet the Colorado School of Mines Alumni Association Board of Directors

Have you ever wondered what the CSMAA board does? Over the next four issues we’ll highlight each of the directors and their roles in serving the alumni community.

**Tracy Gardner ’96, MS ’98**
Golden, CO
Director, Campus Relations
As a member of chemical and biological engineering faculty at Mines, Tracy looks for opportunities to build an increasingly collaborative and mutually supportive relationship between Mines faculty, the alumni association, the administration and the alumni community. Her three Mines degrees include a bachelor’s in mathematical and computer sciences, and bachelor’s and master’s degrees in chemical and petroleum refining engineering. She earned her doctorate in chemical engineering from the University of Colorado at Boulder. Since her sophomore year, Tracy’s dream career was to teach at Mines, a dream she’s been living since joining the faculty in 2004—she is currently a teaching associate professor and assistant department head.

**Brady McConaty ’78**
Houston, TX
Director, Development
Brady works with the association, the foundation and the school to facilitate constructive relationships between the three organizations, particularly as they relate to fundraising efforts. Brady’s career, starting with his degree in petroleum engineering from Mines, spans extensive experience in building and operating oil and gas businesses, both conventional and unconventional, in the Rockies, Alaska and on the Gulf Coast. He recently co-founded a company in the Permian Basin based on CO₂ enhanced oil recovery.

**Susan Evers ’97**
San Francisco, CA
Director, Volunteer Development
Susan promotes volunteerism among alumni to help foster and strengthen the Mines community—a role that turns out to be a natural fit for this former sorority president and student mentor. After earning her degree from Mines in chemical engineering, with a minor in public policy through the McBride Honors Program, Susan spent three years in the oil industry, and then launched her career in the bio/pharma industry. She’s a senior project manager for Genentech.

**Mahesh Vidyasagar MS ’00**
Spring, TX
Director, Alumni Programming (outside Colorado)
Mahesh builds alumni support and participation outside Colorado through events and services, and assesses program offerings in other areas where alumni are concentrated. After completing a bachelor’s degree in geological engineering from New Mexico State University, he earned a master’s in mining engineering focused on tunnel boring machines from Mines. He manages consulting teams nationwide for ExxonMobil.

Find full bios for board members online at minesalumni.com/board. Interested in getting involved with the alumni association? Learn about the opportunities at minesalumni.com/volunteer.
1944
Thomas C. Hedlund is a registered professional engineer for Rock Energy Resources and lives in Grand Junction, CO.

1952
Wesley T. Bitzer Jr. is VP tech services for ITT Carbon Industries and lives in Charleston, WV.

1958
Robert L. Elder is the president of Goldsil Ventures and lives in Leadville, CO.

1961
Paul Lafleur is a principal geohydrologist for Acuity Environmental Solutions and lives in Golden, CO.

1962
Bill Barney is a laboratory associate for Los Alamos National Laboratory and lives in Santa Fe, NM.

1963
Philip R. Coffin is working for Coffin Investments and lives in Georgetown, TX.

1964
Daniel K. Fix is a vacation counselor for Diamond Resorts International and lives in Cornville, AZ.

1967
Louis Harmon is a senior project manager for Western R&D and lives in Cheyenne, WY.

1968
Edward J. Briggs is a lead engineer NDE specialist for FMC Technologies and lives in Kingwood, TX.

1969
Craig E. Moore is a chief geophysicist for Buccaneer Alaska and lives in Houston, TX.

1970
Robert P. Hofmann is a principal consultant for Landmark Graphics and lives in Broomfield, CO.

1971
James L. Lawler is a reservoir engineering manager, Piceance asset for WPX Energy and lives in Denver, CO.

1972
Ramazan K. Akbulut is a lead sensor systems engineer for Mitre and lives in Chelmsford, MA.

1973
Timothy M. Hawkes is a technical advisor for Banpu Investment and lives in Murrells Inlet, SC.

1974
Dennis R. Canfield is an engineering superintendent for Chevron and lives in Centennial, CO.

1975
Ronald W. Cattany is a deacon and seminarian for Blessed John XXIII National Seminary and lives in Denver, CO.

Claude H. Peppin is a VP Mexican operations for Silvermex Resources and lives in Hayden, ID.

James E. Pittinger is a process specialist for Pittinger Services and lives in Evergreen, CO.

Robert R. Schlosser is a materials and process engineer for Infinity Technology at Lockheed Martin Space Systems and lives in Brighton, CO.

Pamela R. Tittes is a chief metallurgist for Haile Gold Mine and lives in Lansing, CO.

Roy D. Willis is a principal mining consultant for Mincon and lives in Golden, CO.

Alfred P. Wu is a physician for Douglas Family Care and lives in Douglas, AZ.

Donn Kraemer retired from law enforcement after 36 years of service and lives in Golden, CO.

Richard P. Crist is a VP, business development and exploration for Gasco Energy and lives in Lone Tree, CO.

Thomas Elliott is a principal mining consultant for Los Alamos National Laboratory and lives in Golden, CO.

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Roger J. Johnson is a manager petroleum engineering training for Chevron and lives in Spring, TX.

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Thank You.

James Ham
Sophomore, Engineering Physics | Harvey Scholar

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1977
Guy Flanagan is a geoscience fellow for ConocoPhillips and lives in Cypress, TX.

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HAVE T-SHIRT, WILL TRAVEL: David Pesek ’09, MS ‘11 says he’s been to 25 countries since earning his master’s degree, including a stop at the Great Wall of China.

1978
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Editor’s Note: Alumni from the classes of 1981 to 2012 who have recent updates online or have uploaded photos to minesalumni.com over the last four 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. For online viewing instructions, click on Class Notes at minesmagazine.com.

1981
Michael D. Black
Randal Carter
John R. Craig
Paul G. Grundy
Mitchell W. Knapton
David Lange
Margaret A. Lessenger
Mark J. Ludwig
Kenneth J. Mobley
Christopher M. Nyikos
Susan M. Perrell
Diane L. Prier
Daniel J. Rich
Robert E. Tucker
James M. Wylie

1982
Daniel W. Andrews
Timothy Berg
Robert W. Borruso
Roger L. Burch
L. Roger Hutson
Kevin J. Ion
William A. Mcelduff
Serge Nicoletis
Joseph J. Oravetz
Ira Pasternack
Marcia Talvitie

1985
Stephen B. Batman
Kimberly S. Burch
Glenn E. Emery
Michael F. Fry
Kirk L. Ketcherside
Riley S. Moore
Jeffrey C. Simmons
Brian J. Smith
Thomas R. Stahr
Bryan W. Stone
Bruce O. Young

1986
Christopher L. Beato
Gregory R. Cahill
Daniel P. Emmer
Andrew B. Flynn
David F. Fobare
Marta K. Green
Paul G. Krueger
John G. Kunke
Timothy M. Marsh
Scott A. McKirck
Michael T. Tapia
Anthony L. Troutman
Jeffrey A. Wiemelt

1987
Yavuz Atasoy
Rita R. Beale
Bryan J. Brock
Kelly P. Coleman
J. David Keller
Randy L. Smith
Theresa M. Wisda

1988
Vivek Chandra
Karen T. Hyde
Jeffrey W. Jackson
Jeffrey D. Jarriel
Jeffrey P. Quarantino
Patricia A. Stewart
Randall Strauss
Matthew M. Weaver
David N. Witter

1989
Douglas Barr
Gregory L. Davoll
Matthew Donohue
Eric M. Gopsill
R. Patrick Highsmith
Wesley A. Smith
Brad E. Yonaka

1990
Steven M. Lassek
John K. Lehew
Duane Maue
Bjorn Ostebo
Kathleen L. Sullivan
James D. Walker
Michael B. Wilson

1991
Ronald P. Boese
William H. Fromczak
Joann M. Menebroker
James Rube
Wayne J. Weber

1992
Scott B. Chesbro’
Cynthia C. Hoppe
Hans C. Hoppe
Victoria B. Jackson
Nielsen
Blaine K. Spies

1993
Greg P. Anderson
Quinton T. Hennigh
Eric T. Lyons
James D. Parry
Michael Terada
Julie D. White

1994
Rebecca A.
Beekmann
Bruce G. Darlington
Glen D. Frank
Charles A. Hamre
Brenda E. Head
Ronald W. Kuehne
Karen G. Lillrose
Robert E. McKee IV
Brian S. Penn
Samuel S. Roushar
Brian J. Rusk
Bryan T. Walder

SUSAN EVERS ’97 married John Matsushima on April 14, 2012 in San Francisco, Calif. Seven alumni attended, including matron of honor Tiffany Abbink ’94.

THREE OUT THE DOOR: Mark ’84 and Michele Burtschi are preparing for an empty nest in the fall as their triplets head to college. Daughters Corinne (left) and Kerry will attend James Madison University to study pre-med and veterinary medicine respectively, while Tyler will study sports marketing at Virginia Commonwealth University. “I believe he’ll be a lawyer after dreaming of being a sports agent,” Burtschi says. “At least they’re dreaming!”
ALUMNI PROFILE

Letting Kids Create on Disney Online

Tom Fischaber ’98 can recall the precise day his new Internet venture achieved critical mass. It was September 18, 2007, and his company, Kerpoof, was one of 40 startups invited by TechCrunch, a leading technology blog, to present at its inaugural conference. Unlike most conferences, TechCrunch 40, as it was called, was not charging presenters a hefty fee.

“That was important,” says Fischaber, with a chuckle.

He and three co-founders had launched the Boulder, Colo.-based Kerpoof 18 months earlier with $50,000 of their own money and a commitment to take no salaries for a year. The four had been engineers at Xilinx, a programmable-chip maker in Longmont, Colo., where Fischaber worked for eight years as a designer in its intellectual property division, developing numerous high-speed networking products for which he was granted seven U.S. patents.

Fischaber majored in electrical engineering at Mines alongside his twin brother, Curtis ’98, and both joined Xilinx after graduation. Curtis, who shares Tom’s DNA but not the entrepreneurial itch, chose to remain at Xilinx, where he is a staff engineer in the company’s design center. Their younger brother, Scott ’03, also majored in electrical engineering at Mines and pledged to Sigma Phi Epsilon, which makes the three fraternity brothers as well. Today, Scott is the co-founder and chief engineering officer at CapnaDSP, a technology company in Belfast, U.K.

Fischaber says Kerpoof began with a mission to create a space on the Internet where kids could find fun that was both creative and educational. “We thought the children’s market was underserved,” he says. “We thought we could do something unique.” The company’s first offering, Make a Picture, allowed kids to select a background, place objects in it, move them around for a change in perspective, and add color.

While their team is strong in engineering know-how and creativity, Fischaber admits they lacked marketing savvy. “We took the engineers approach: ‘If you build it, they will come,’” he recalls. “We built a wonderful website—and they didn’t come. Nobody was there for him, but he’s not thinking about launching a new company right now: “I’m focusing on getting married.”

“Ready for new opportunities, the Kerpoof founders have now gone their separate ways. Fischaber left in January and is taking time off to travel with his fiancée before their wedding in August. Speaking from Paris, where we caught up with him for a phone interview in May, Fischaber says the entrepreneurial itch is still there for him, but he’s not thinking about launching a new company right now: “I’m focusing on getting married.”

Fischaber ran the visuals on the big screen while his partner, Krista Marks, outlined the company’s vision of a website where “kids not only see great art, but they create it. Where kids not only read great stories, but they write and illustrate them. Where kids not only watch movies, but they make them.” Then they showed a brief animation created by an 11-year-old girl in 20 minutes on her first try. There were audible cries of “Wow!” from the audience of venture capitalists and high-tech bigwigs. The buzz that followed brought them enough publicity that, almost overnight, they had users in more than 20 countries, says Fischaber.

Among those wowed at TechCrunch 40 was a small group from Disney, who saw this as an exciting new way to reach kids. Within a year, Disney had acquired Kerpoof, renaming it Disney Online Kerpoof Studios, and its marketing and financial challenges disappeared.

“We didn’t start the company to sell it,” says Fischaber, “but Disney was the best possible win. It’s a company with great integrity, and no other company has better brand alignment and reach with children’s creativity than Disney.” Moreover, Disney wanted the founders to stay on and continue expanding the company, which they did, often recruiting Mines graduates, as they had at Xilinx.

Three and a half years later, Disney Online still has a strong presence in Boulder. Not only does Kerpoof.com continue to flourish as a top site for creativity in the classroom, but the team also has developed Disney.com/Create, where more than 10 million pieces of art have been created and they’ve logged 100 million views.

“We thought the children’s market was underserved—we thought we could do something unique.”

—Robert S. Benchley
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<td>2000</td>
<td>Faisal Aljalalmah, Magdalina Boogaard, Ronald W. Doster, Danny C. Fisher, Jessica A. Good, Richard E. Kopp, Michelle M. McCassey, Jennifer M. Reiter, Benjamin M. Smith, Kelly T. Taga, Christopher L. Valdez</td>
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<td>2008</td>
<td>Luis A. Agapito Tito, Nathan M. Beasley, Wesley X. Becker, Sean M. Brune, Sarah E. Casias, Narayan J. Choudhary, Alex Davidson, Alexis G. Dobrinen, Dylan P. Engberg, Justin R. Engle</td>
</tr>
</tbody>
</table>

Dan Lewis
Real Estate Broker Associate
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dl@easystreetproperties.com

Life’s Better on Easy Street
Real Estate Broker Associate
1301 Arapahoe St., Suite 101
Golden, CO 80401
720-530-2782
FUTURE ROCK STAR: Robin Hendrickson’s ’71 grandson, Nathan Carr (8, shown at age 6), appears to be headed for a career in geology. “He attends the Northwest Mining Association conference with us, loves the displays and says he ‘has a love of rocks’ in him,” says his grandmother, Pat Hendrickson. “He has also decided to love math, because once he is a geologist like his Papa, he will need to count all his gold!”

JENNIFER VAN DINTER ’97, PhD ’12 married Dave Lefaive on October 22, 2011, in Hales Corners, Wis. Guests included Rob ’97 and Cherlyn ’97 (Augenstein) Foster, Jon Kilikewich ’97 and Lauren Davis MS ’07, PhD ’09.

KHRISTOPHER KIRCHER ’01 and Leslie Krause were married on December 31, 2011, in Ventura, Calif. Five Miners attended: Michael Griffis ’00, Kristina Griffis MS ’06, William Hadrys ’96, Jennifer Gadberry-Hadrys ’96 and Steve Coombs ’81.

JENNIFER AYERS-BRASHER ’00 and Randy Brasher welcomed Rowan on July 31, 2010.

HONORED FELLOWS: At the annual American Society for Metals International Awards Banquet held in conjunction with the materials conference MS&T 2011 last October, two MME alumni were named ASM Fellows: Deniece Korzekwa ’80, nuclear materials science group leader at Los Alamos National Laboratory (second from left), and Bradley James PhD ’94, director and principal engineer, materials and corrosion engineering for Exponent (second from right). The honor recognizes society members for their distinguished contributions to materials science and engineering and their professional leadership. Present at the awards ceremony were two more MME Mines graduates: Deniece’s husband, David Korzekwa ’77, MS ’81, and Bradley’s wife, Audrey Fasching-James ’88, PhD ’95.

MARCO ALVAREZ BASTOS PhD ’02 and Cristina Cardona-Osorio enjoyed a holiday in Dubai with Mariana, born January 27, 2011, and big brother Juan Camilo (3).

HEATHER (COURSEY) PUTERBAUGH ’93 and her husband, Mike, announce the birth of Samuel, born on March 10, 2011, joining big sister Elena (4).

RANDAL SRAUSS ’88 and Katherine Davis were married near Crested Butte, Colo., on the auspicious date of November 11, 2011.

JUSTIN MAUCK ’95 and Rose Laflin, along with their children Kathryn (7) and James (5), welcomed the latest addition to their family, John William (“Liam”), on February 10, 2012.

CHIP KARO ’03 and Emily Kate Williams had a daughter, Payton Elizabeth, on February 29, 2012 (Leap Day).

HEATHER (COURSEY) PUTERBAUGH ’93 and her husband, Mike, announce the birth of Samuel, born on March 10, 2011, joining big sister Elena (4).
You can support Colorado School of Mines with tax-wise gifts of all kinds. Discover the extra tax and financial benefits of donating property. With an investment of appreciated stock, life insurance, gold coins and precious metals, or real estate, you can maximize the value of your giving while securing Mines’ future.

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Senior Director, Gift Planning  
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giving.mines.edu/giftplanning
A Dream Career in Sports and Law

“Sometimes you have to create your own economy,” a friend once said to Alicia Jessop ’06, who’d just learned that a job she’d pinned her hopes on had gone to another finalist. It was advice she took to heart.

This City of Aurora criminal prosecutor has earned national attention and airtime for her commentary on the legal and business issues of sports through her sports blog, rulingsports.com.

Her lifelong love of sports began with her father. “I guess I’m the son my father always wanted,” says Jessop. “I still remember my seventh birthday, when he gave me sports gear and my mortified mother went out and bought me dresses.” Sports forged a bond between father and daughter, who watched countless games together and often spent weekends collecting sports memorabilia.

When it was time to go to college, Jessop chose Mines, drawn by the competitive academics, extracurricular activities and 20-minute drive from home (her grandmother had recently developed Alzheimer’s disease and staying nearby was a priority). She majored in economics, joined Sigma Kappa sorority, captained the cheerleading team and became president of ASCSM. Her biggest thrill, though, was cheering on the football team to an undefeated regular season in 2004. “That changed the sports culture at Mines,” she says. “We realized we could win and that if we invest in athletics, great things can happen. I’m really proud of what they have achieved.”

After Mines, Jessop focused on a career in sports and entertainment law. At Chapman University School of Law in Southern California, she worked for the Screen Actors Guild and Warner Bros.’ music publishing company. But by the time she had earned her law degree in May 2009, the U.S. economy had tanked, dashed her hopes for a job in Hollywood. Then, in another disappointing turn of events, Jessop was one of two finalists for the general counsel position at NASCAR in Daytona Beach, Fla., but didn’t get the job. Disheartened, she took a position in mortgage banking litigation, giving her an income at a time when many of her law school classmates remained unemployed—but she was in a funk.

That’s when her friend’s advice gave her the inspiration to launch rulingsports.com on July 1, 2011. “I wanted to show the world that I knew as much about the intersection of sports and the law as anyone I might be competing against for a sports law job,” she says. “Initially, I suspected that only my dad would read the website—and my mom if I hounded her. But within 24 hours of launch, I made key contacts at ESPN, CBS Sports and Fox Sports, and landed my first radio interview.”

Since then, Jessop has appeared on radio shows nationwide, including Sirius/XM and ESPN Radio, and in October 2011, she took over the website businessofcollegesports.com when its founder took a position with ESPN. Jessop also serves as CBS Denver’s sports business expert and recently began writing sports business stories for Forbes.com.

Last December, she moved back to Colorado and began working for the City of Aurora. Since then, she’s enjoyed reconnecting with Mines and the local alumni community, organizing a pre-game alumni get-together during the exciting close of the men’s basketball season in March, and serving on the Women of Mines planning committee for the recent 2012 Alumni Weekend.

She continues to write for the two websites, tape radio and television segments and is enjoying the opportunities her new agent is sending her way. She knows she’s got her sights set high, but says that Mines taught her how much time you have to invest to become good at something. Mines also prepared her to work in an environment where women are in the minority. In fact, admits the single 28-year-old who can count several sports luminaries among her friends, “Being a woman who knows about and is able to discuss sports does a lot for my social life.”

—I Robert S. Benchley
RACHEL DES GNE '08 AND JESSE GEIGER '08 were married on October 15, 2011, in Denver, Colo. Alumni in the wedding party included Spencer Biddle '08, Jessica Lee '08, Amy Dubetz '09 and Elizabeth Newton '08.

STEFANI WHITTAKE '02 married Jason Brakenhoff at The Della Terra Chateau on May 29, 2011, in Estes Park, Colo.

CALEB RING '08 and his wife, Jackie, had their first baby boy, Colt Alan, on September 13, 2011.

DUSTIN '03 AND STEPHANIE (WOLFE) '03 BENNETTS announce the birth of their second child, Kiera Rose, born on August 24, 2011. She joins big brother Beau (3).

STEFANI WHITTAKE '02 married Jason Brakenhoff at The Della Terra Chateau on May 29, 2011, in Estes Park, Colo.

RACHAEL DES GNER '08 AND JESSE GEIGER '08 were married on October 15, 2011, in Denver, Colo. Alumni in the wedding party included Spencer Biddle '08, Jessica Lee '08, Amy Dubetz '09 and Elizabeth Newton '08.

PARKER VALORA '10 and his wife, Emily, welcomed Adelynn to their family on September 13, 2010.

THAI REUNION: Robert Siegrist, professor of civil and environmental engineering, spent a week in early February at Kasetsart University in Bangkok, Thailand, where he delivered an invited lecture on onsite water reclamation and reuse, and a workshop on remediation of contaminated land and water. While on the trip, he had dinner with several Mines alumni. Clockwise, from bottom left, are Siriporn Larpkliattaworn MS '96, PhD '99; Siegrist; Siegrist’s wife, Sue; Orapin Chienthavorn; Nuta Supakata MS '99; Pinsuda Viravathana PhD '01; Fairda Malem PhD '06; R. Travis Canon III '80; Pongsak Noophan MS '98, PhD '03; and Tanapon Phenrat.

PARKER VALORA V'10 AND ELYRA V'10 and his wife, Emily, welcomed Adelynn to their family on September 13, 2010.
CRISTAL ORTEGA ’01 AND GREGORY MONDRAGON ’01 were married on September 8, 2011, on Waimanalo Beach, Oahu, Hawaii.

JENNIFER ROTRAMEL ’08 AND LOGAN RONHOYDE ’11 were married February 19, 2011 in Arvada, Colo., just five days after Jennifer was diagnosed with leukemia. Even with such short notice, there were more than 150 in attendance, including Jennifer’s uncle, Brian Smith ’85, and her cousin, Erik Smith ’03.

JESSICA SIGALA ’03 married Andrew Turner on September 18, 2011, at Fossil Trace Golf Club in Golden, Colo. Amy Vaughan ’95 was in the wedding party.

EMILY ’04 AND ALAN ’02 LEJEUNE II welcomed Aidan James to their family on August 1, 2010.

ANDREW ’02, MS ’04 AND SARA (JOHNSON) ’03 DEPPERSCHMIDT welcomed Iris Hailey on September 22, 2011. She joins sister Exia (3) and brother AJ (2).

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MULTIGENERATIONAL MINERS: Taken on a fall day last November in Golden, this photo of the Bisque family represents a broad generation of Mines alumni. Ramon Bisque, center, is a professor emeritus and honorary member of the alumni association (1990). Clockwise, from bottom left, with relationship to Ramon indicated, are Evan Ford (grandson), who just completed his freshman year; Matthew Bisque ’90 (son); Daniel Bisque ’89 (son); Scott Tracy ’84 (son-in-law); Edward Ford ’79 (son-in-law); Steve Bisque ’83 (son); Sarah Bisque ’10 (granddaughter); and Lorae Tracy ’12 (granddaughter).

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We are looking for top performing engineering graduates for challenging assignments at our facility in Pueblo, Colorado. EVRAZ is one of the largest vertically integrated steel and mining businesses in the world. We’re the largest producer of rail in North America and the largest recycler in Colorado. All while manufacturing excellence and building careers. If we sound like your kind of company, we’d like to hear from you.
Robert “Bob” J. Andersen ’54 of Muldoon, Texas, died September 30, 2010. Robert was born in Ft. Lupton, Colo., in 1932 and graduated from Nederland High School in 1950 with just one other student. After graduating from Mines with a professional degree in geophysical engineering, he was hired by Geophysical Service Intercontinental, remaining with the company until 1957. Robert also enlisted in the U.S. Navy Reserve upon graduation, and served until 1967. From 1958 to 1989, he held a variety of positions within the international geophysical exploration field ranging from party chief on seismic crews in Dhofar, Saudi Arabia, to project manager in Houston. His career also carried him to Yugoslavia, Denmark and Singapore. While working for Citco International, he received special recognition for his initial mapping and other work in an area of more than 1,000 square miles. He remained with Citco from 1978 to 1989. Robert retired and built a home in LaGrange, Texas, where he enjoyed spending time with his dog, Peggy. Robert is survived by his sister, Elenore Andersen; one niece; and four nephews.

Todd E. Bergren ’88 of Denver, Colo., died May 17, 2011. Todd was born in Sioux Falls, S.D., in 1962 and moved to Colorado with his parents when he was a child. He graduated from Mines with a degree in mechanical engineering, and also received a bachelor’s degree in veterinary medicine from Colorado State University, and a master’s and doctorate degree in bioengineering from the University of Colorado at Boulder. Todd was a professor at the Community College of Aurora and taught genetics, evolution, biology and anatomy, and physiology for 15 years. He also taught classes at Metropolitan State College of Denver, and spent time in Mexico studying sewage-damaged coral reefs. A member of the State Board for Community Colleges and Occupational Education, Todd was named Colorado Bioscience Educator of the Year in 2009. Todd is survived by his wife, Michelle, as well as his children, Dana and Benjamin; parents, Helen and Robert; and his brothers, Scott, Guy and Lee.

Charles “Chuck” J. Boyce ’55 of Denver, Colo., died September 21, 2011. Born in 1931, Chuck earned a professional degree in petroleum engineering at Mines, where he was a member of Sigma Nu fraternity. After beginning his career with Stanolind Oil and Gas in Salt Creek, Wyo., he spent 31 years with Amoco Production, before retiring to Denver. Chuck is survived by his wife of 56 years, Lois; three children, Kevin, Deborah and Kerry; and five grandchildren.

James “Jim” H. Bright ’52 of Reno, Nev., died January 16, 2010. Jim was born in 1927 in Webster, S.D.; his family settled in Denver. During World War II, he served with the U.S. Army in the Pacific Theater, later attending West Point and Mines, where he joined Kappa Sigma fraternity and graduated top of his class with a professional degree in geological engineering. A member of ROTC at Mines, he also remained a reservist with the Army. In addition to work for other companies, he had two businesses of his own, Nevada Resources and Exploration Resources, and was responsible for a number of significant mineral discoveries covering territory from British Columbia to Colombia. A registered professional engineer, Jim was a member of the Society of Economic Geologists, Society of Mining Engineers, Society of Mining, Metallurgy and Exploration, and the Geological Society of Nevada; he was also a member of MENSA. He is survived by his former wife, Patti; brother Robert Bright; daughters Jenni-Sue Smith and Marin June Bright; four grandchildren; and two great-grandchildren.

Donald “Don” A. Craig ’48 of Aurora, Colo., died October 23, 2011. Don was born in Denver in 1924 and graduated from West High School. His time at Mines began in 1942, but was interrupted when he was drafted into the Army Corps of Engineers. He returned to Mines in 1946 and graduated with a professional degree in metallurgical engineering. Following graduation, Don joined Phillips Petroleum and later Dow Chemical at Rocky Flats in 1952, where he was involved in work on beryllium metallurgy. Don was a member of the American Society for Metals and served as the president of the Rocky Mountain chapter. Following in his father’s footsteps, he served as president of the Colorado School of Mines Alumni Association, a position his daughter-in-law, DeAnn ’73, ’80, MS ’02, MS ’06, PhD ’05, also filled. He is survived by his wife of 65 years, Lois; sons Bruce ’70, MS ’75, PhD ’80, Robert and Thomas; daughter Marcia Benshoof; seven grandchildren; and two great-grandchildren.

Margarita D. Gallego MS ’77 of Denver, Colo., died November 30, 2011. She was born in Havana, Cuba, in 1951 and moved to Denver in 1963, where she attended Cathedral High School. Before attending Mines, Margarita graduated from Colorado Women’s College with a bachelor of arts in chemistry and French. She attended Mines to earn a master’s degree in chemical and petroleum refining engineering. Margarita was fluent in English, Spanish and French, and worked in project management and process design for more than 20 years; she was president of Infosis. She is survived by her mother, Margarita; her sister, Ana Maria; and several nieces and cousins.

“When you are sorrowful look again in your heart, and you shall see that in truth you are weeping for that which has been your delight.”

—Kahlil Gibran
FRANK A. GILL ’62 of Brooklyn, Conn., died February 14, 2010. Born in 1940, Frank earned a professional degree in mining engineering from Mines, where he played varsity football. He worked for many years as a mining engineer for Tilcon Tomasso and was a member of the board of directors of his family’s company, Gill Rock Drill, in Lebanon, Pa. Frank’s passions were his family and friends, woodworking, bicycling, sports, nature and animals, especially dogs. Frank is survived by his wife of 47 years, Joan Fiodella Gill; son David; daughters Susan Fisher and Diane Vernon; and seven grandchildren.

JACK V. GLINKMAN ’54 of Fredericksburg, Texas, died March 5, 2011. Born in Jefferson City, Mo., in 1932, Jack moved to Pueblo, Colo., when he was still young. An Eagle Scout, Jack graduated from Mines with a professional degree in geophysical engineering. After graduation, he was commissioned as a second lieutenant in the U.S. Army. The majority of his career was spent with Sun Oil (later Oryx) in the international department, where for 35 years he traveled widely. When he retired, he and his wife, Mary, moved to Fredericksburg, where they enjoyed the guesthouse business and dealing antiques. Jack is survived by his wife; daughter Jennifer Weiss; and two grandsons.

Van Dyne Howbert II ’51 of Midland, Texas, died October 10, 2011. Born in 1926 in Denver, Colo., Van graduated from East High School and served two years with the Army Corp of Engineers in Italy. Both his father, Van Dyne ’16, and his brother, John ’48, graduated from Mines as mining engineers. A member of Beta Theta Pi fraternity, Theta Tau, and Blue Key, Van was also a cartoonist for The Oreodigger and The Prospector. In 1948, he married his high school classmate, Doris Livingston. Van graduated from Mines with a professional degree in geological engineering and began his career with Honolulu Oil in Midland, before becoming an independent geologist. He eventually founded Howbert & Howbert with his son. Van was a member of numerous professional societies and was active with the Colorado School of Mines Alumni Association. In 1987, he received the Outstanding Alumnus Award. He is survived by his children, Joan, Chuck and Jill; seven grandchildren; and two nephews.

Warren O. Johnson ’49 of Ellinwood, Kan., died June 4, 2011. Born in 1921, Warren achieved the rank of Eagle Scout before pursuing a professional degree in petroleum engineering at Mines, where he joined the Sigma Phi Epsilon fraternity. After serving as a pilot in the Army Air Corps during World War II, he married Helen Dowdy in 1948. His first job after leaving Mines was as a field engineer with Republic Natural Gas Company, but for most of his career he was an independent consultant. He was also a member of the Immanuel United Church of Christ, Rotary Club, Grove Park Golf Club, the Kansas Geological Society; the Kansas Independent Oil and Gas Association, and the Society of Petroleum Engineers. He is survived by his sons, Wade and Mark; daughter Jan Roth; exchange student son Thomas Constantinides; five grandchildren; and three great-grandchildren.

Bruce D. Jones MS ’48 of Arlington, Va., died January 9, 2011. Born in Portland, Ore., in 1917, Bruce graduated from Oregon State University with a bachelor of science in civil engineering in 1938. During World War II, he served in the Pacific Theater, and later graduated from Mines with a master’s degree in mining engineering. His father, William ’18, earned a professional degree in mining engineering. Bruce served with the Army Corps of Engineers for 28 years. In the 1950s, he returned to Mines to head the ROTC program, and during that time he played a critical role in civil defense planning for the entire Denver metro area during the Cuban missile crisis. Before retiring as a colonel in 1966, his last active duty assignment was at the Pentagon. Bruce was a member of the Arlington Kiwanis Club and worked as an engineering consultant after retirement. His wife of 60 years, Jean Stack Jones, predeceased him. Bruce is survived by his daughters, Barbara and Nancy; sons Bruce, William and Michael; 10 grandchildren; and four great-grandchildren.

Sarah J. Jurgensmeier ’00 of Houston, Texas, died October 15, 2011. Sarah was born in 1980 in Washington, DC, and graduated from Smoky Hill High School International Baccalaureate program in Aurora, Colo. At Mines, she was a member of the Minority Engineering Program, and graduated with a degree in mechanical engineering. She went on to earn a master’s degree in nuclear engineering from Pennsylvania State University in 2002. Sarah will be receiving a master’s degree from Texas A&M posthumously. She worked with Hess Oil for the past four years and in 2011, she received her professional engineer’s license. Sarah enjoyed playing rugby for Penn State and continued to support the team after her graduation, including paying for new uniforms for the whole team. She traveled extensively, visiting six continents and dozens of countries. Sarah is survived by her parents, Lee and Vicki; brothers Andy, Paul and Matthew; grandmother Marian Brown; and her dog, Caisson.

Harvey J. Kingry ’50 of Canyon Lake, Texas, died December 6, 2010. Harvey was born in San Antonio in 1927 and served in the U.S. Navy from 1945 to 1946. He was on the basketball, football, golf, and track and field teams at Mines, and graduated with a professional degree in geological engineering. Football was Harvey’s passion, but despite being drafted by the Philadelphia Eagles after graduation, he chose to start his engineering career. Harvey and his wife Jinny traveled extensively for his work as a geophysicist with Sinclair and ARCO oil companies through the U.S., Argentina, Peru, England, Denmark and Chile. Following his retirement, Harvey and Jinny continued their travels across the U.S. and Canada in an RV. Harvey is survived by his wife of 60 years; daughters Constance Kingry and Candice Malone; son Harvey; and three granddaughters.
Edmond “Ed” A. Krohn ’43 of Boulder, Colo., died November 21, 2011. Ed was born in 1921 in Grand Junction, Colo., where he fell in love with trains, influenced by his father’s early railroading career. In later years, his passions turned toward motorcycles, and he joined a motorcycle club and enjoyed many adventures. Ed was a member of Sigma Nu fraternity at Mines, graduating with a professional degree in metallurgical engineering. He joined the U.S. Navy and trained at Cornell University before serving as an ensign in both the European and Pacific theaters during World War II. He joined U.S. Steel in Dragerton, Utah, and later moved to Boulder, Colo., with his wife, Evelyn, to work for Stearns-Roger and Dow Chemical/Rockwell International. He enjoyed classical music, skiing, cats and all things related to Einstein—he even derived his own theory of gravity using a purely mechanical model. Ed is survived by his wife; daughters Ann Krohn Rick, Lauren Krohn Arnest and Jeanne Krohn Wade; and two granddaughters.

Carl A. Lee of Fort Belvoir, Va., died December 4, 2010. A former professor and head of military science at Mines, Carl was born in Jamestown, N.D., in 1924. After serving in World War II, he attended North Dakota State University on a National Guard ROTC scholarship and earned a degree in agricultural engineering in 1947. He went on active duty with the North Dakota National Guard in 1950 and later transferred to the Corps of Engineers; he earned the Combat Infantryman Badge and a battlefield promotion to captain while serving in the Korean War. Carl earned a bachelor’s degree in civil engineering from Texas A&M in 1956, and a master’s in economics from the University of Maryland in 1969. His military service also included two tours in Vietnam and an assignment at the Pentagon. At Mines, Carl taught classes on military science from 1972 to 1974. He is preceded in death by his wife of 52 years, Carol, and is survived by his sister, Marian Mueller; sons Robert and Carl; daughters Lynn Munch, Virginia Lee and Julie Kay; one granddaughter; and one great-granddaughter.

Robert “Bob” E. McMinn ’49 of Spring, Texas, died December 23, 2010. Born in 1924, Bob served in the U.S. Army Air Corps as a navigator in the European Theater, completing 35 bombing missions. He later graduated from Mines with a professional degree in petroleum refining engineering, and was a member of both the Beta Theta Pi fraternity and Tau Beta Pi. Despite a scholarship offer from Harvard, Bob accepted a job with Black, Sivalls and Bryson Process Systems, initially servicing equipment in oil fields near Casper, Wyo. Bob’s 30-year career also took him to Worley Engineering, International Systems and Controls, and his own company, Bob McMinn and Associates, where he was president. A member of the American Petroleum Institute, he worked as a consultant well into his 80s. He is survived by his wife of 61 years, Virginia; sons Doug, Bob and Dick; and four grandchildren.

Carlos Ermirio de Moraes ’79 of São Paulo, Brazil, died August 18, 2011. Carlos was born in São Paulo in 1956, and studied metallurgical engineering at Mines. He was chairman of the board of directors of Grupo Votorantim, a company owned by his family for four generations. Carlos was recognized as a great leader in the company, and served as a source of many of the company’s most widespread values. From 1986 to 1987, he served as the CEO of the Institute for Nonferrous Metals, and was CEO of the Brazilian Aluminum Association from 1993 to 1996. His three brothers and one cousin are Mines graduates, as is his father, Antonio ’49; uncle José ’48; and grandfather José Ermirio ’21. Carlos is survived by his wife, Marcia, and sons Eugene and Julia.

Robert “Bob” E. McMinn ’49 of Spring, Texas, died December 23, 2010. Born in 1924, Bob served in the U.S. Army Air Corps as a navigator in the European Theater, completing 35 bombing missions. He later graduated from Mines with a professional degree in petroleum refining engineering, and was a member of both the Beta Theta Pi fraternity and Tau Beta Pi. Despite a scholarship offer from Harvard, Bob accepted a job with Black, Sivalls and Bryson Process Systems, initially servicing equipment in oil fields near Casper, Wyo. Bob’s 30-year career also took him to Worley Engineering, International Systems and Controls, and his own company, Bob McMinn and Associates, where he was president. A member of the American Petroleum Institute, he worked as a consultant well into his 80s. He is survived by his wife of 61 years, Virginia; sons Doug, Bob and Dick; and four grandchildren.

Richard “Dick” E. Oppel ’51, MS ’53 of Edmond, Okla., died December 9, 2011. Born in 1930 in Dallas, Texas, Dick was a member of the ROTC at Mines and earned a professional degree in geological engineering and a master’s in geology. Dick spent the 1950s and 1960s as a geologist in Houston and West Texas for Shell Oil, Cabot and British American Oil. Shortly after his marriage to Phyllis Edwards in 1968, Dick and his family moved to Dakar, Senegal, where he worked for Texasgulf Sulphur. He enjoyed traveling extensively with his family during their three years in Senegal and throughout the rest of his life. In the 1980s, Dick reinvented himself as a hydrologist and joined Kerr McGee. He was a member of numerous professional organizations, including the Geological Society of America; the Society of Mining, Metallurgy and Exploration; and the American Institute of Mining, Metallurgical and Petroleum Engineers. Dick is survived by his wife of 43 years; daughter Julie; and sons Frank and Greg.

Lewis T. Putman Jr. ’86 of Bolingbrook, Ill., died November 14, 2011. Born in 1961, Lewis graduated from Mines with a degree in geological engineering, and then worked as an environmental engineer for five years. He decided to further his career by attending law school and graduated with his doctor of jurisprudence from the University of Illinois Chicago in 1994 as magna cum laude. While he worked at, and eventually became partner of, the law firm of Kirkland and Ellis as an environmental transaction attorney, he earned an MBA from the University of Chicago. After 10 years, he joined the firm of Milbank, Tweed, Hadley and McCloy as head of the environmental and natural resources practice in 2004; he was made partner the following year. Lewis married his second wife, Megan, in Telluride, Colo. He is survived by his wife and his children, Audrey, Hanna, Jessica, Kelly and Jack.
Roman Z. Pyrih
MS '70, PhD '74 of Golden, Colo., died February 7, 2006. Born in 1946, Roman worked most of his career as a geochemist studying heavy metals and radiochemical migration. He established his own consulting firm, Roman Z. Pyrih Associates, and held four U.S. patents for hydrometallurgical processes to recover vanadium and uranium. Roman spent part of his career in the Ukraine, as well as with Fluor Daniel GTI and Geochemical Ventures International. He enjoyed traveling, hiking, fishing and studying history. Roman is survived by his wife, Luba, and two sons, Adrian and Andrew.

Edwin “Ed” S. Rugg
'43, MS '56 of Surprise, Ariz., died July 18, 2011. Ed was born in Denver in 1922, and served in the U.S. Navy during World War II. After training at Annapolis, he was commander of a submarine chaser in the North Atlantic. Ed graduated from Mines with a professional degree in mining engineering, and later earned a master’s in geology. He was highly regarded as a geologist and mining engineer, and was instrumental in locating a number of valuable mineral deposits. He worked for several major mining corporations, which took him to the western U.S., Alaska, the Middle East, Canada, South America and Africa. In 1978, he relocated to Reno, where he opened a mining exploration office for Dome Exploration. Ed is survived by his second wife, Martha; his children, Marcena Witherly, Melanie and Mark; two grandchildren; and three great-grandchildren.

Michele M. Vivona
'86 of Burien, Wash., died April 20, 2012. Michele was born in Sydney, Nova Scotia, Canada, in 1964, and spent her childhood following her father’s postings across the United States as a U.S. Air Force pilot. At Mines, Michele captained the women’s tennis team and was one of the earliest members of Pi Beta Phi sorority, where she established firm and long-lasting friendships with the Wild Women, profiled in the winter 2012 issue of Mines magazine. She graduated with a degree in mathematics from Mines. After earning an MBA from Stanford in 2000, she worked for LexisNexis in Seattle, rising to the rank of SVP of global web strategy. She served on the Board of Public Counsel in Los Angeles and on the foundation board of the Northwest Women’s Law Center in Seattle, of which she was president from 2004 to 2005. Michele was an advocate and a volunteer with Legal Voice, the Seattle Humane Society, and Somaly Mam Foundation. In 2004, she received the Mines Distinguished Achievement Medal. She is survived by her husband, Keith Heffernan; father and stepmother, Al Vivona and Beckie Cowart-Vivona; and sister and brother-in-law, Marianne Vivona and Steve Furneaux.

Lawrence “Larry” Williams Jr.
'52 of Peoria, Ill., died December 21, 2011. Larry was born in Lake Forest, Ill., in 1926, and spent his youth in the Chicago area. He joined the U.S. Marine Corps and fought as an infantryman in the Pacific Theater during World War II. After graduating from Mines with a professional degree in geological engineering, he attended the Columbia University Graduate School of Business. Larry worked for Caterpillar for 38 years, serving as VP of marketing during Caterpillar’s major rebranding effort, and then as the VP for administrative responsibility for Europe/Africa/Middle East and chairman of Caterpillar Overseas SA in Geneva, Switzerland. After retiring in 1990, he enjoyed golf and served as a governing board member and president of the Country Club of Peoria from 1986 to 1987. Larry is survived by his wife, Barbara; daughters Ann Williams Stocke and Jane Williams Korhonen; sons Kirk Williams McKie and Lawrence Williams IV; and six grandchildren.

—Compiled and edited by Oliver Dewey ’12 and Nancy Webb

Robert “Bob” B. Schlosser
'53 of Brownsville, Ore., died July 1, 2011. Bob was born in Greeley, Colo., in 1928. He served three years in the Marine Corps before being granted a fleet appointment to the U.S. Naval Academy. After two years, his poor vision prevented his return to the Marines, and he left the academy to attend Mines. He graduated with a professional degree in mining engineering, and was a member of the Blue Key honor society. During his career, Bob was a superintendent for mines around the country; while employed at the Jackpile Mine in New Mexico, he made advancements in technology used in the uranium industry. He moved to Brownsville in the mid-1980s. He was a member of the American Legion, served on the Brownsville City Budget Committee and Community Library Board, and was involved with the SMART reading program. He enjoyed outdoor activities and was a square dance caller. Bob is survived by his wife of 47 years, June; sons Richard and Donald; daughters Cindy Hertin and Cathy Rautio; and stepchildren Carolyn Batteas and Mark Brooner.

Robert J. Taylor, prof.
'61

Also Remembered
Douglas D. Amaya ’73

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John C. Dinsmoor ’89

John S. Lathrop Jr. ’51

Robert W. Linke ’51

Lester Newhouse ’40

David R. Peterson ’68, MS ’82

Ralph J. Price ’38

Douglas R. Reid ’61

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- Environmental Geodesy
- Environmental Geomatics
CLASS OF 2012

On May 11, 817 students (607 undergraduate, 182 master’s, 28 doctorate) swung tassles across mortarboards and stepped into a future as Colorado School of Mines alumni. Watch the commencement speech by Craig Barrett, former Intel chairman and CEO, in Web Extras at minesmagazine.com.

This photo was taken by Thomas Cooper, who lives in Littleton and frequently photographs campus. Next issue, Miner’s Pic could feature your photography. Anyone may submit. Whether taken on campus or off, we’re simply looking for artful images that will appeal to the Mines community. Send yours to magazine@mines.edu.
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