

Hunting mineral treasure

Studio physics makes waves

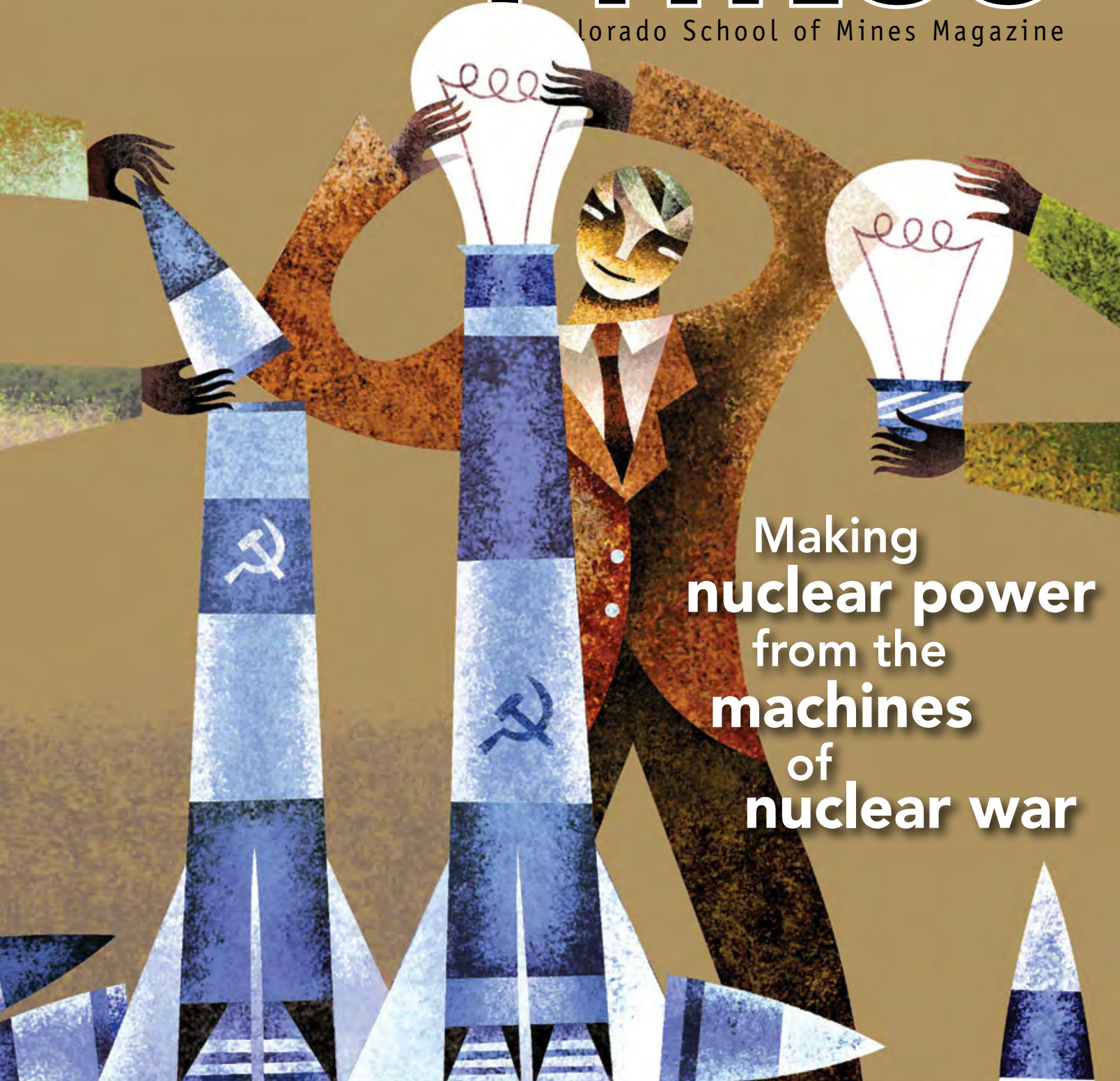
Who is Kevin Moore?



Summer 2012 Volume 102 Number 1

# Mines

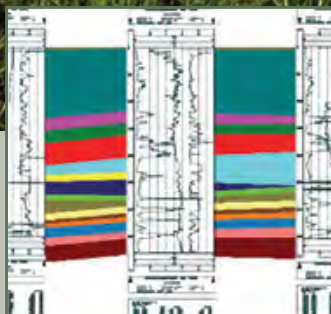
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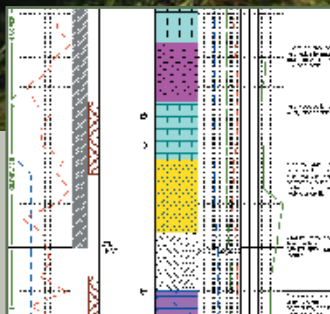


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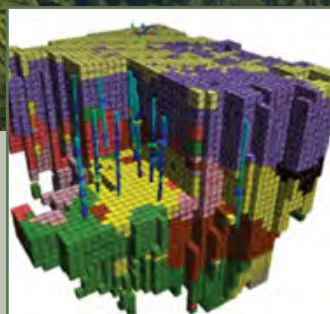


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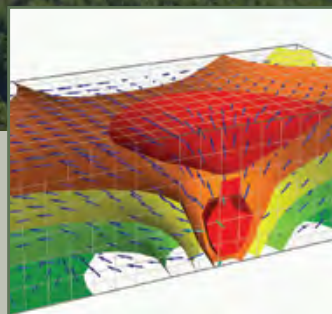


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### 26 Megatons to Megawatts: The Missile Deal that Almost Blew Up

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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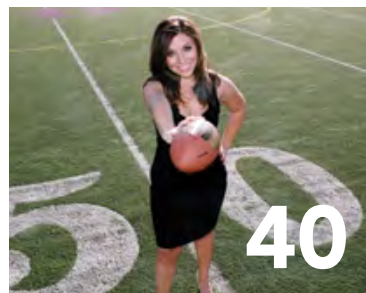
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## THE DIGNITY OF GIVING

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**



## SOCCKER 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**

Players and coaches: (standing) Roxanne Rogers Skeene '83, Jeanne Koskella '84, Tillie Wilson McVay '81, Elaine Bruno, Dawn Armstrong Tschanz '84, Patricia "Trish" Jolly, Alice Kuehn Murray '83, Carol Ondrusek Edson '85, Connie Barnes Groven '83, Marcia Talvitie '82 and Susan O'Connor. (Seated) Michelle Bell Brown '85, '87 (professional), Margaret "Meg" Steinborn '83, Bryan Allery '82, Sandra "Sandy" White Docherty '83, Thor Sutan Assin '83, Annamarie Mantei and Gigi Huang.

## 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.



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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](mailto:magazine@mines.edu). You can also start a conversation about any of the articles you read here by going to [minesmagazine.com](http://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



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Comments and suggestions are welcome. Contact us at [magazine@mines.edu](mailto:magazine@mines.edu); *Mines* magazine, PO Box 1410, Golden, CO 80402; or 303.273.3294. Just need to update your address? Go to [minesalumni.com/edit\\_my\\_info](http://minesalumni.com/edit_my_info).

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## ENGINEERING EDUCATION

# Studio Makes Waves in Teaching Physics

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



Oliver Dewey





WG Sports Photos

Jim Knous took second place at the NCAA Championships in Simpsonville, Ky.

## 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

## CONTINUING EDUCATION

# New Courses for Oil and Gas Regulators

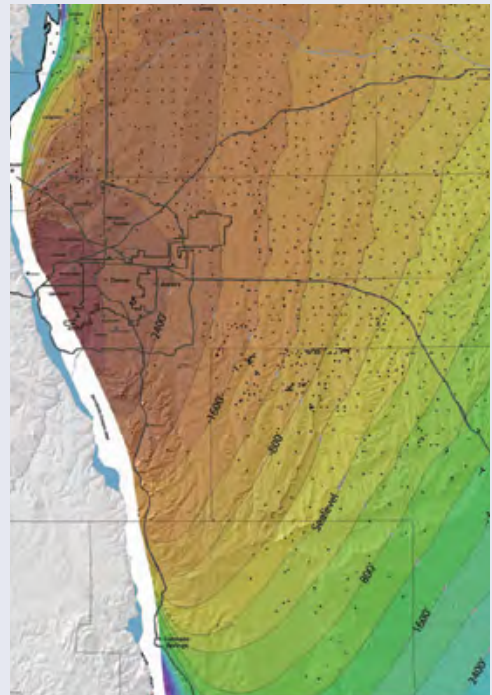
Colorado School of Mines, Penn State University and the University of Texas at Austin recently announced a training initiative aimed at educating regulators and policymakers about the latest shale resource technologies and best practices. The initiative—funded by GE and ExxonMobil to the tune of \$1 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



Colorado Geological Survey

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



Tyson Brown

Kevin Moore believes one way to differentiate the College of Engineering and Computational Sciences is by communicating a vision for the engineering disciplines that emphasizes their role in alleviating poverty and building stable societies.

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. On the other hand, those who wind up studying one of the mainstream engineering disciplines (civil, mechanical or electrical engineering) are often attracted to 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](http://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,



Thomas Cooper, Lightbox Images


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](http://minesmagazine.com).

## SCHOLARSHIPS

## Harvey Family Doubles Support for Scholars Program

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



Lauren Urban

The scholars program established by Hugh and Michelle Harvey (back row, fourth and fifth from the left) enables Mines students to travel and participate in service projects, with the goal of producing well-rounded future leaders with technical expertise. The 12 current scholars join the Harveys here, along with Peter Konrad, managing consultant of the Hugh & Michelle Harvey Family Foundation (back row, fourth from the right).

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.

"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

"I hope to one day run for office and use my degree to shape more informed energy policy."

—Lucy Orsi, Harvey Scholar, chemical engineering



Lauren Urban

Learn more and meet the Harvey Scholars at [giving.mines.edu/harveyscholars](http://giving.mines.edu/harveyscholars).



# Thank You

## TOGETHER, WE MAKE A DIFFERENCE.

### 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 \$525,000 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 (AQWATEC).

**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** '55 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.

**ConocoPhillips** contributed \$700,000 toward the ConocoPhillips SPIRIT Scholars 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.

**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 committed \$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 \$57,000 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.





Joel Bach

## MEN'S BASKETBALL

# 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 Minschwanner (#23), who ended his Mines basketball career with the championship game and expects to graduate in December with a degree in mechanical engineering.

Minschwanner 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](http://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](http://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.



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## BOOKS

## Just Published

**Fundamentals of Drilling Engineering**

This supplementary textbook for novice drilling engineering students devotes 10 chapters to rotary drilling, geo-mechanics, 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



Making time to train motivates Chris Cowdin to complete his studies early.

Tyson Brown

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 steel 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."



The co-ed mining team took first place in hand mucking, shown here. Members of the co-ed team included Lei Bates, Hannah Brinkmann, Patricia Capistrant, Paige Cybulski, Scott Fedel and Luke Van Zyl. On the men's team (11th overall, 3rd in swede sawing) were Tim Brueggeman, Chris Halsema, Eric Levonas, Fausto Moreas, Jordan Oxborrow and Doug Simpson.

internationalmininggames.wordpress.com

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



If you've never seen hand mucking or any of the other events, check out the videos at [minesmagazine.com](http://minesmagazine.com), where we've posted complete results from the games.

## 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.34iimg.com](http://www.34iimg.com)

## 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.”

Presenters at the conference were judged on scientific content, appearance, and presentation ability.

Tyson Brown



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



For award winners and a recap of the sessions, read this article at [minesmagazine.com](http://minesmagazine.com).

## 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.

**John Speer**, professor of metallurgical and materials engineering,

recently received the Association for Iron and Steel Technology's Distinguished Member and Fellow award, given to active AIST members who have made outstanding contributions to the iron and steel industry.

**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 educa-

tion, 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.



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# Hitting Paydirt

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.



Tarmo Tullit Photography

**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.

## 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



## 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.



Christopher Briscoe

“There were times I was literally brought to tears when I would contemplate what the people lost due to my discovery.”

—Larry Buchanan

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.”



Bolivia photos: Larry Buchanan and Karen Gans

## 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.



BHP Billiton

## 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.



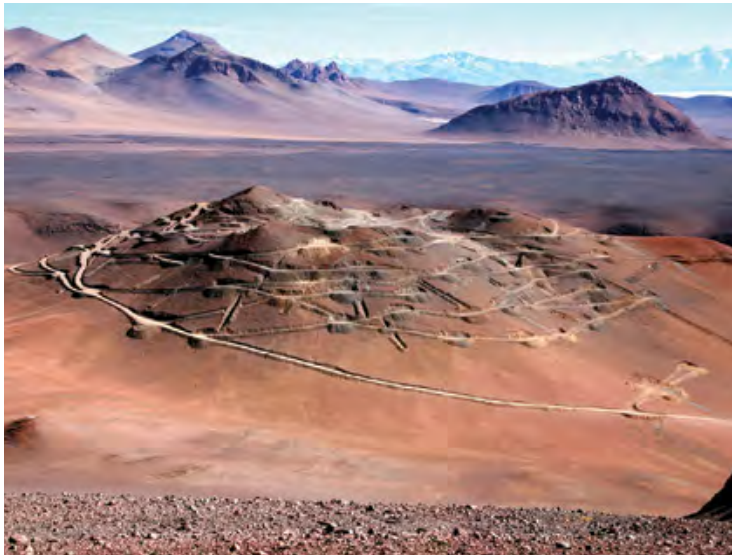
Courtesy of Dan Evans



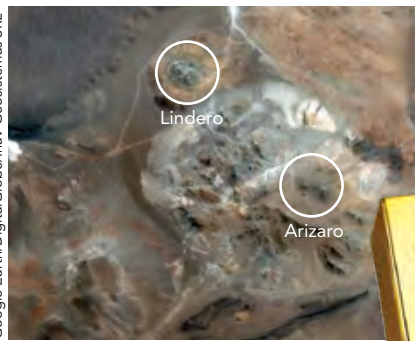
# Cu



**A NOSE FOR GOLD** In 2001, Hitzman's graduate student, Russell Dow, was studying satellite imagery of the known Arizaro deposit in Argentina, when he noticed a corona of white on a hill nearby. Samples he took from Lindero a few months later proved his hunch was well founded. In June 2012, a bullish press release from Mansfield Minerals announced that a prefeasibility study led to a full feasibility study, which will wrap up by the end of the year.



Google Earth/DigitalGlobe/Navteq-Geostemmas SRL



Courtesy of Russell Dow



Au



Mansfield Minerals

## 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 Lindero 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

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."

## OPTIMISM


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." 

# 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.

## APPROPRIATING A SOLUTION

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.

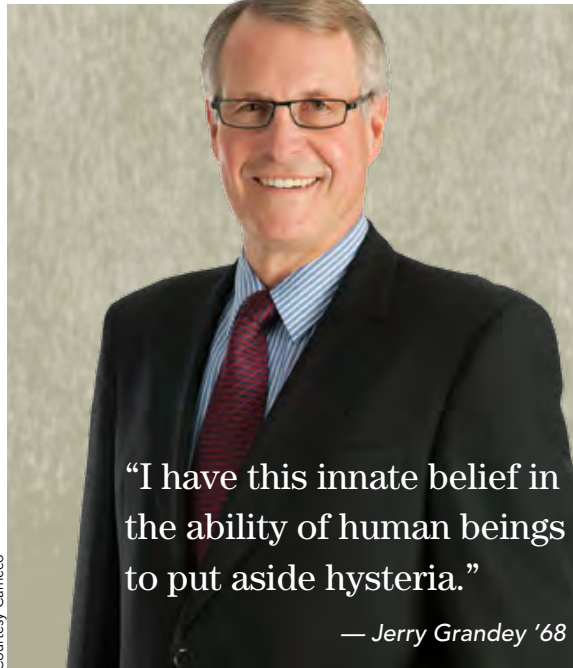
The impasse was broken when Senator Pete Domenici successfully rallied support for a Congressional appropriation of \$325 million to buy the stockpiled Russian uranium and keep it off the market for 10 years. The purchase would be contingent upon Russia signing a commercial agreement for the sale of 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."



Courtesy Cameco

**"I have this innate belief in the ability of human beings to put aside hysteria."**

— Jerry Grandey '68

## BEYOND NUCLEAR


In 2003, 10 years after joining the company, Grandey was appointed CEO of Cameco, remaining in the position until June 30, 2011. Despite careful succession planning, his exit was tumultuous, coming three months after the Fukushima Daiichi nuclear meltdown. "I've dealt with a lot of crises in my career, so it was somehow fitting to go out handling one more," reflects Grandey.

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 NETWORK

## 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](http://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](http://minesmagazine.com).



**TOP LEFT** Has it really been 50 years? Forty-one members of the Class of '62 gathered at Golden's stunning Fossil Trace Golf Club for their class dinner. **BOTTOM RIGHT** The women of Mines came together for celebration and support during Alumni Weekend, including the seventh female graduate (center), Mary McGill Edwards '62 (video interview on [minesmagazine.com](http://minesmagazine.com)). **BOTTOM LEFT** Mines seniors showcased their design projects for the campus and Alumni Weekend attendees.

### 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](mailto:sbruzgo@mines.edu)).

## ALUMNI ASSOCIATION

# 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.

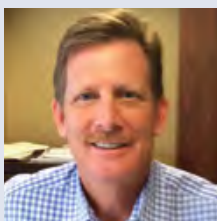


**Tracy Gardner '96, MS '98**  
Golden, CO

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 CO<sub>2</sub> 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.



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President

James R. Larsen '65  
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Jafar Tabaian '00  
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Paul Roamer MS '97  
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Paula Nolan '05

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Find full bios for board members online at [minesalumni.com/board](http://minesalumni.com/board). Interested in getting involved with the alumni association? Learn about the opportunities at [minesalumni.com/volunteer](http://minesalumni.com/volunteer).

# CLASS NOTES

**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** 

**Jim V. Rouse** is a principal geohydrologist for Acuity Environmental Solutions and lives in Golden, CO.

**Terril E. Wilson** is a professor of practice for University of Arizona and lives in Tucson, AZ.

**1962**

**Bill Barney** 

**Richard G. Hoagland** is a laboratory associate for Los Alamos National Laboratory and lives in Santa Fe, NM.

**James H. Whitcomb** is a section head, deep earth processes for National Science Foundation and lives in Vienna, VA.

**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.

**Donald W. Howard** is a geophysicist for INEXS and lives in Houston, TX.

**Peter E. Maciulaitis** is an independent generative geologist and lives in Boulder, CO.

**1968**

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

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

**Thomas Elliott** 

**Paul E. Olson** is working for Consolidated Precision Products and lives in Chino Hills, CA.

**James A. Tomsic** is a director of information technology for Ozanam Hall Nursing Home and lives in Shelton, CT.

**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.

**Howard W. Musgrove** is a staff reservoir engineer for QEP Resources and lives in Parker, CO.

**1971**

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

**Thomas S. Proehl** is a senior project manager for Applied Drilling Technology and lives in Houston, TX.

**William H. Smith** is the president and CEO of Gallic Energy based in Calgary, AB, Canada.

**Daniel R. Walton** is a senior coal advisor for Wood Mackenzie and lives in Annapolis, MD.

**1972**

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

**D. Victor Bush** is a global energy program manager for Newmont Mining and lives in Littleton, CO.

**William L. Fischer** is a principal structural engineer for Mesa Associates and lives in Louisville, TN.

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

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

**Clyde 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 Lancaster, SC.

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

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

**1973**

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

**John Kyffin** 

**Logan T. MacMillan** is a member/manager for LiTMus EPO and lives in Littleton, CO.

**A. Edward Mantz Jr.** is a program coordinator at Mines and lives in Golden, CO.

**1974**

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

**Kim C. Harden** is a director of engineering for Simbol Materials and lives in Spring, TX.

**Robert P. King** is the president and COO of Westmoreland Coal and lives in Venetia, PA.

**Van G. Plocus** is working for Diamond Engineering Associates and lives in Home, PA.

**Donald E. Ranta** is the chairman of Rare Element Resources and lives in Golden, CO.

**1975**

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

**Joseph S. Douglas** is a system integration engineer for Ortho-Clinical Diagnostics and lives in Webster, NY.

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

**Damian C. Friend** is a chief geoscientist for Southwestern Energy and lives in Spring, TX.



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**James Ham**

Sophomore, Engineering Physics | Harvey Scholar

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**Matthew A. Thiel** is a mine manager for Freeport-McMoRan Copper & Gold and lives in Lamoille, NV.

**Gary L. Wallen** is a director and project manager, international exploration and development for Houston Drilling Management and lives in Houston, TX.

**1976**

**Ronald L. Brinkman** is a reliability engineer for Flint Hills Resources and lives in Corpus Christi, TX.

**William L. Gillette** is working for Apache and lives in Midland, TX.

**Michael Hiza** 

**Mark D. McCuen** is a geophysical consultant for Allen-Hoffman Exploration and lives in Katy, TX.

**James D. Reed** is a solution architect for Hewlett-Packard and lives in Centennial, CO.


**R. Glen Sykes** is the president of Special Mining & Engineering and lives in Rifle, CO.

**Jimmy B. Taylor** is an energy solutions development engineer for Johnson Controls and lives in Warr Acres, OK.

**1977**

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

**Frank J. Hagar Jr.** is the president of Geospacial Analysis and lives in San Clemente, CA.

**David J. Kelly** is the president of Austrian Foundation for Quality Management based in Vienna, Austria. 

**William D. Zogg** is an advanced senior geologist for Marathon Oil and lives in Houston, TX.




**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**

**Mark S. Pelizza** is a SVP for Uranium Resources and lives in Plano, TX.

**1979**

**Austin I. Cooley** is a VP for Brown and Caldwell and lives in Houston, TX. 

**Todd A. Denman** is working for BP Alaska and lives in Anchorage, AK.

**Dwaine H. Edington II** is a junior hydrogeologist for Catcher Tech and lives in Highlands Ranch, CO.

**M. Scott Gillis** is a senior managing director for Galt & Company and lives in Charleston, SC.

**Jarvis D. Hurd** is working for RMD Kwikform and lives in Castle Rock, CO.


**Gustavy Niemtschik** 

**L. Douglas Poole** is an assistant professor for Chadron State College and lives in Chadron, NE.

**Raymond Priestley** 

**Mark D. Rheinlander** is a quality manager for Northwest Pipe and lives in Houston, TX.

**Michael Shade** 

**Gary P. Sotack** is the CEO of SOTACK Energy and lives in Golden, CO. 

**1980**

**Jeffrey R. Corwith** is a principal reservoir engineer for ConocoPhillips and lives in Houston, TX.

**Robert L. Davis Jr.** is working for Celestica and lives in Gresham, OR.

**Lance J. Galvin** is a VP reservoir engineer for SandRidge Energy and lives in Edmond, OK.

**Russell W. Kemp** is a VP, R&D and regulatory affairs for Innophos and lives in Robbinsville, NJ.

**David F. Mayer** is a technical consultant for Aera Energy and lives in Bakersfield, CA.

**Thomas Netzel** 

**Kenneth P. Neumann** is working for Greenscape Ventures and lives in Sugar Grove, IL.

**Dean P. Reynolds** is a senior mining engineer for Kinross Gold and lives in Round Mountain, NV.

**Richard P. Smiley** is a VP of operations for Propel Energy and lives in Spring, TX.



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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 Ion   
William A. McElduff Jr.  
Serge Nicoletis  
Joseph J. Oravetz  
Ira Pasternack  
Marcia Talvitie 

## 1983

Jeffrey C. Allen  
Richard S. Anderson  
Douglas A. Donato  
Jonathan Friedman   
Virginia A. Gent  
Marc L. Gesink  
Jolene K. Kramer  
Frank G. Long  
Jonathan A. Nourse  
Paul A. Sease

## 1984

James P. Blackwell  
Kelly E. Cook  
Karl W. Eggers

Michael James Glen  
Daniel A. Harms  
Matthew C. Holdeman  
Alexander T. Lamar   
Jeffrey Lee   
Daniel S. Meendering  
Thomas K. Moffitt  
Stephen G. Swinney  
Matthew A. Telles

## 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. Kunkle  
Timothy M. Marsh  
Scott A. McKittrick  
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. Quaratino  
Patricia A. Stewart  
Randal 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. Fronczak  
Joann M. Menebroker  
James Ruble   
Wayne J. Weber 


## 1992

Scott B. Chesebro'  
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  
Chad M. Foltz  
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 Fischhaber '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 Fischhaber, 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 Fischhaber 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.

Fischhaber 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.

Fischhaber 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, Fischhaber 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 knew about it."

However, things changed when the company won two National Science Foundation grants totaling \$150,000 for an idea that taught kids how to program through animation. The funding kept the company afloat, and they were able to develop a new product, Make a Movie, which Kerpoof introduced at TechCrunch 40.



Tom Fischhaber at Disney Online Kerpoof Studios, where four Mines graduates currently work (Jeff Ward '05, Raul Rangel '08, MS '09, Richie Zirbes '10, MS '12 and Janeen Neri '11). The company is also employing a Mines student intern this summer.

Fischhaber 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 Fischhaber.

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 Fischhaber, "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

*"We thought the children's market was underserved—we thought we could do something unique."*

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.

Ready for new opportunities, the Kerpoof founders have now gone their separate ways. Fischhaber 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, Fischhaber 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."

—Robert S. Benchley

## 1995

Steven N. Graese  
Nicole D. Hughes  
John D. Moffitt  
Erik I. Rylander

## 1996

Christopher W. Clark  
Erik Keskula  
Matthew B. Moore  
C. Richard  
Schwerdtfeger Jr.  
Patrick R. Stevens  
Scott G. Van Sickle  
Robert D. Williams

## 1997

Randy G. Edelen  
David P. Mills  
Jason K.  
Reicheneker  
Adam R. Rogers  
Lori L. Stucky  
Anawat Sungpet  
Charles S. Verdel

## 1998

Efem Altinok  
Dawn M. Ambrosio  
Jennifer I. Knepp  
Frank E. Lousberg  
Patrick M.  
MacCarthy  
Melanie E.  
McDonald  
Robert W. Potter  
Daniel R. Wallace

## 1999

Ali Essa Ali  
John Brinks  
Beth Krygowski  
Carter  
D. W. Culp  
J. Erin Evans  
Mathieu F.  
Guillebaud  
Tiffany L. Kochis  
Maria C. Lazo  
Aaron M. Martinsen  
Paul E. Murray  
Vui Thi Nguyen  
Gordon L. Olson  
Stephen N.  
Paglieri  
Kiran Patankar  
Keith D. Robinson  
Eric L. Smith

## 2000

Faisal Aljalalahmah  
Magdalena  
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

## 2001

Basil N. Al-Ajmi  
Nathaniel C. Barnes  
Matthew J. Cannon  
Mark W. Elliott  
Amy L. Sirois Garcia  
Benjamin W. Garrard  
Christopher N.  
Jenkins  
Khristopher A.  
Kircher  
Russel P. Lannin  
Jeremy K. Lee  
Amelia C.  
MacSleyne  
Juan Pablo  
Moriamez

## 2002

Jeffrey D. Berget  
Ross E. Boone  
Charles K.  
Chambers II  
Sean M. Clark  
Joshua D. Crumb  
John-Paul DeBauge  
Salina J.  
Derichsweiler  
Aaron R. Frahm  
Brandon L. Gleeson  
Guglielmo Gottoli  
Forrest F. Guest  
Cynthia A. Davis  
Hicks  
Shaun C. Jensen  
Elliott T. Kess  
Giuseppe Liberati  
Jose M. Martinez-Val  
Emma J. Nicoletti  
Michael B. Sharkey

## 2003

Matthew R. Bird  
Devon G. Brendecke  
Benjamin L. Cohen  
Weston A. Dobson  
Justin R. Gale  
Angel P. Gonzalez  
Stephen A. Hand  
Scott N. Hodgson  
Alyssa M. Kohlman  
Manjari Kumar  
Hermann F. Logsend  
Brent J. Pounds  
Nicholas J. Rogers  
Francisco Javier  
Sanchez  
Dominic R. Spencer  
Todd S. Street  
Isaac T. Tiley  
Jennifer Harvey  
Tobin  
Ross G. Tobin  
Meghan C.  
Waterbury  
Andrew T. Zwickl

## 2004

Eryn M. Bergin  
James D. Biren  
Jamon D. Bowen  
Robert M. Connolly  
Aspen L. Coombs  
Liane T. George  
Sara E. Hansen  
Gloria B. Mattson  
Ryan W. Phillips  
Andrew T. Ritter  
Curtiss P. Schneider  
Elizabeth A. Smith  
Timothy A. Strobel

## 2005

Kunlapa  
Chaudakshetrin  
Charles C.G. Cooper  
Stephanie M. Fox  
Jordan D. Harrison  
Adam P. Johnson  
Mason A. Kass  
Kristopher C. Koski  
Blake E. McMullin  
Lindsay A. Oyola  
Nathan Pauls  
David C. Schneider  
Timothy G. Spriet  
Colin M. Wein

## 2006

John M. Agee  
Brian R. Alleman  
Daniel R. Bolton  
Jennifer L. Erickson  
Nathan G. Garvey  
Logan Hackett  
Annia G. Hincks  
Alicia C. Jessop  
Bryan J. Jilka  
Scott W. Kemler  
Zachary J. Kimball  
Dylan Mikesell  
Samantha L.  
Richardson  
Jeremy T. Sell  
Jesse B. Spooner  
Meghan R. Tonello  
Joshua T. White

## 2007

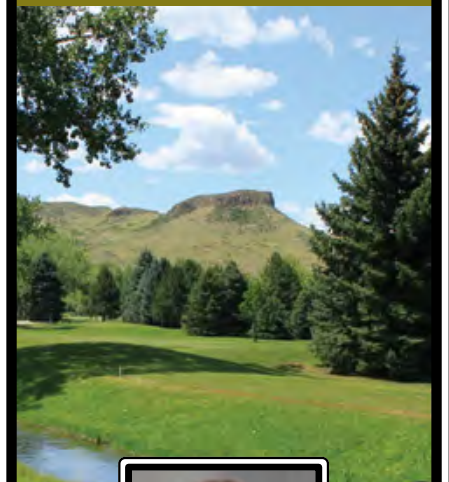
Todd W.  
Dalessandro  
Ryan J. Ellis  
Kyle A. Fitzpatrick  
Garrett C. Garner  
Ryan R. Inman  
Nicholas B. Inzalaco  
Joel W. Johnson  
Adam R. Koester  
Eric J. Larson  
Matthew D. Lehr  
James T. Martineau  
Jeannette E. McGill  
Ryan J. Miles  
Navan J. Powers  
Brycen R. Roy  
Ross E. Shaeffer  
Katherine Steele  
John W. Stefanic  
Gisela Del Pilar  
Vanegas Cabas  
Sean T. Weber  
Bryan K. White

## 2008

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



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**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.



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



**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).



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



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




**JUSTIN MAUCK** '95 and Rose Laffin, along with their children Kathryn (7) and James (5), welcomed the latest addition to their family, John William ("Liam"), on February 10, 2012.

Jesse J. Forth  
Kathleen E. Gesterling  
Andrea Ham  
Dustin J. Haynie  
Paul B. Johnson  
Vladislav D. Kaufman  
Brendon C. Loucks  
Ian K. Lynn  
Roberta D.


Martinez-Hernandez  
John I. Mbibi  
James R. Mogge  
Vladimir V. Petunin  
Paul G. Porto  
Stephen R. Pronovost  
Gina M. Ross  
Joseph B. Shrewsbury  
Indar Singh  
Benjamin Weilert  
Christopher P. Youngmeyer

## 2009

Claire N. Anderson  
Luke B. Baron  
Justin J. Beougher  
Jacob T. Bosh  
Thomas Boyles   
Justin J. Corwin  
Kellen E. Costelow  
Matthew J. Curtice  
Robert W. Cutcliffe  
James M. Cuzella  
Katharine G. Dahm  
Joseph A. Daily  
Devin W. Daugaard  
Jacob G. Davis  
Elliott J. Dudley  
Timothy L. Eller  
Joshua D. Elliott  
William L. Grant  
Alan C. Greenrod  
Andrea M. Griesinger  
Levi E. Harris  
Jason R. Hopkins  
Kyle A. Jackson  
Daniel L. Keeran  
James D. Molde  
Matthew J. Nichols  
Ryan D. Paynter  
Andrew R. Williams  
Roberts

Ana Ruiz   
Joseph D. Schneiderwind  
Kale A. Stanton  
Grant A. Thomas  
Elizabeth W. Wachel  
Richard G. Waltsak  
Ryan A. Ward  
David C. Wilson

## 2010

Jonathan D. Albright  
Kinzie C. Beavers  
Steven J. Bjornseth  
Nathan C. Bland  
Matthew Bourget   
Laura A. Brewster  
Michael G. Brown  
Christopher M. Bukowski  
Tom A. Bukowski  
Bryan L. Cantor  
Matthew S. Casey  
Chad A. Daigle  
Emilyanne Dalton  
Keano R. Dashkowitz  
Josiah O. Davis  
Kaitlyn C. Edmiston  
Rebecca C. Egerdahl  
Michael P. Eysler  
Thomas M. Fedel

Jordan T. Foss  
Alexander C. Franceski  
Jeremiah M. Gorman  
David J. Grabowski  
Youn M. Gu  
Benjamin R. Hollar  
Jeffrey A. Hutsell  
Drue C. Ita  
Michael C. Johnson  
Joshua P. Jones  
Christopher L. Kessler-Tiffany  
Nicolle L. Kindall  
Jonathan D. Krueger  
Electra L. Lamb  
Christopher A. Lorenzini  
Thomas M. Mason  
Craig T. Matsuda  
Matthew A. Miller  
Mickey P. Moulton  
Sami M. Mourtada  
Christopher J. Platkus

Stefano N. Raffo  
Amy E. Richards  
Jason M. Sexauer  
Blaine W. Sumner  
Larissa F. Taylor  
Jeffery A. Thompson  
Kraig D. Weaver  
Jacob F. Weigel  
Breian J. Wells

## 2011

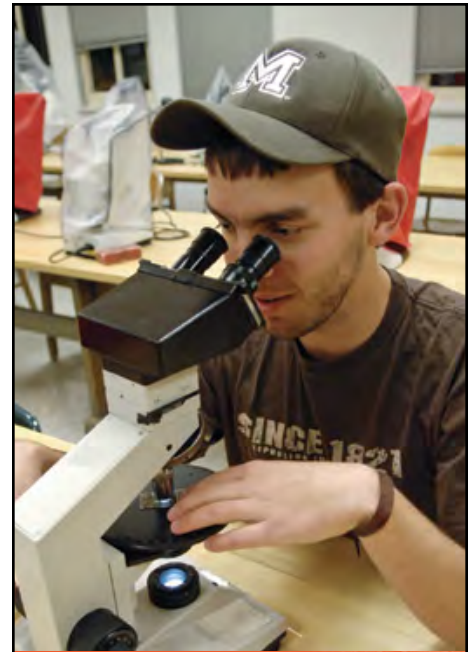
Nicholas D. Amedo  
Eryn M. Ammerman  
Elizabeth A. Balogh  
Kyle T. Baseggio  
Angela Bauer  
M. Gregory Begalle  
Carl D. Blum  
Lance M. Boylan  
John H. Bristow  
Olivia B. Bromley  
Daniel R. Bulfer  
Daniel A. Cruz  
Christopher J. Cutt  
David J. Danford  
James S. Douglass  
Troy M. Driller  
Eric W. Eisinger  
Scott M. Ferguson  
Sean K. Fitzsimons  
Jamie M. Furney  
Lydia R. Gerber  
Nicholas R. Hansen  
Christopher R. Harper

Dru F. Harrison  
Isaiah P. Hess  
Tyler D. Holtzinger  
Alex W. House  
Michael E. Junk  
Courtney N. Kais  
Davis A. Kali  
Michael J. Kasberg  
Kristyn R. Kiley  
Pamela Lagrava Zamorano  
Anya D. Lehrner  
Rhett C. Long  
Richard M. Lucero  
Dean R. Madrid  
Stephen C. Marchesi  
Alan M. Marchiori  
Katherine E. McClard  
Scott W. McNear  
Ricardo Mendez

Nicholas A. Mostaccero  
Nathaniel G. Muniz  
William L. Nagle  
Eric S. Nelson  
Ricky Nguyen  
Jason W. Noelck  
Eric J. Nydegger  
Sean P. O'Neal  
Caleb R. Owen  
Chelsea M. Parten  
Marc Petrequin   
Paul S. Petrie  
Rachel H. Phillips  
Benjamin E. Reisinger  
Taylor J. Ruder  
Christopher E. Runyan  
Calvin J. Rutter  
Travis A. Sauers  
Cameron E. Schappell  
Tyler J. Schwein  
Nathan L. Shultz  
Tyler B. Smith  
Matthew P. Stiasny  
Robert A. Strain  
Joseph S. Sumner  
Taylor M. Taipale  
Benjamin C. Tanner  
Zach L. Tedford  
Dave J. Tedrow  
Efrain Ugarte Zarate  
Sergio R. Villa  
Anastasia J. Von Pichl  
Charles K. Walker  
Anthony S. Welch  
William Welch   
Steven D. Wilbur  
Ryan T. Williams  
Daniel M. Wilson  
Benjamin P. Zywicki

## 2012

Michelle Hughes   
Ogemdi Isiguzo-Ogemdi   
Jordan Larsen   
Jonathan Reberry   
Kevin Schaeffer 



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## ALUMNI PROFILE

# 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, dashing 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



Alicia Jessop has carved a successful niche between sports and the law.

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.”

—Robert S. Benchley





**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 WHITTAKER '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.



**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 Larpkittaworn 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.



**RACHEL DES COGNETS '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.

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Minor in Metallurgical  
Engineering, 1982



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



**Matthew Ellsworth**  
Patent Agent/Technical Specialist  
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M.S., Engineering Technology  
Management, 2005  
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**CRYSTAL ORTEGA '01 AND GREGORY MONDRAGON '01** were married on September 8, 2011, on Waimanalo Beach, Oahu, Hawaii.



**JENNIFER ROTRAMEL '08 AND LOGAN RONHOVDE '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.



**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).



**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).



**FAHAD AL-FARESI '03** and his wife welcomed Yasmeen to their family March 28, 2010, joining brother Abdulrahman (5).



**JONATHAN '06 AND CAITLIN HOGAN '06 WILSON** welcomed Collin Richard into their family on October 5, 2011, joining big brother Josiah, born June 14, 2010.



**JESS KINDLER '98** and his wife, Kyndra, welcomed Reese Magnolia on June 30, 2011, joining brothers Spencer and Henry, and sister Laney; Jess celebrated with Reese at his graduation from Wharton's MBA for Executives program (pictured here).

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# IN MEMORIAM

“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



**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. GALLEGOS** 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 Infoasis. She is survived by her mother, Margarita; her sister, Ana Maria; and several nieces and cousins.

**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 Fiondella 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 Oredigger* 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 metal-

lurgical 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.



**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, while 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.

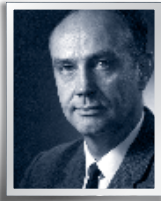


**LEWIS T. PUTMAN JR.** '86 of Bolingbrook, Ill., died November 14, 2011. Born in 1961, Lewis graduated from Mines with a degree in geological

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.



**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.



**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

## ALSO REMEMBERED

<b>DOUGLAS D. AMAYA</b> '73.....	May 5, 2011
<b>DAVID W. DICKSON</b> '66.....	April 8, 2011
<b>JOHN C. DINSMOOR</b> '89.....	April 27, 2010
<b>JOHN S. LATHROP JR.</b> '51.....	November 16, 2010
<b>ROBERT W. LINKE</b> '51.....	August 13, 2011
<b>LESTER NEWHOUSE</b> '40.....	March 30, 2011
<b>DAVID R. PETERSON</b> '68, MS '82.....	April 11, 2011
<b>RALPH J. PRICE</b> '38.....	November 5, 2010
<b>DOUGLAS R. REID</b> '61.....	March 31, 1999
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<b>ROBERT J. TAYLOR</b> , prof. ....	September 25, 2011

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*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](mailto:magazine@mines.edu).*



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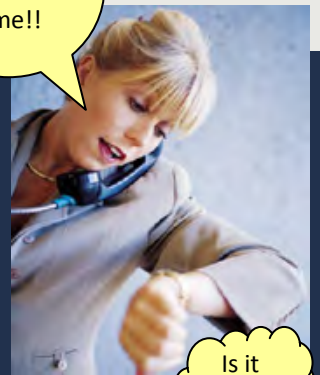
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