

New water center launched

Runner beats brain tumor

16-year-old Santiago graduating

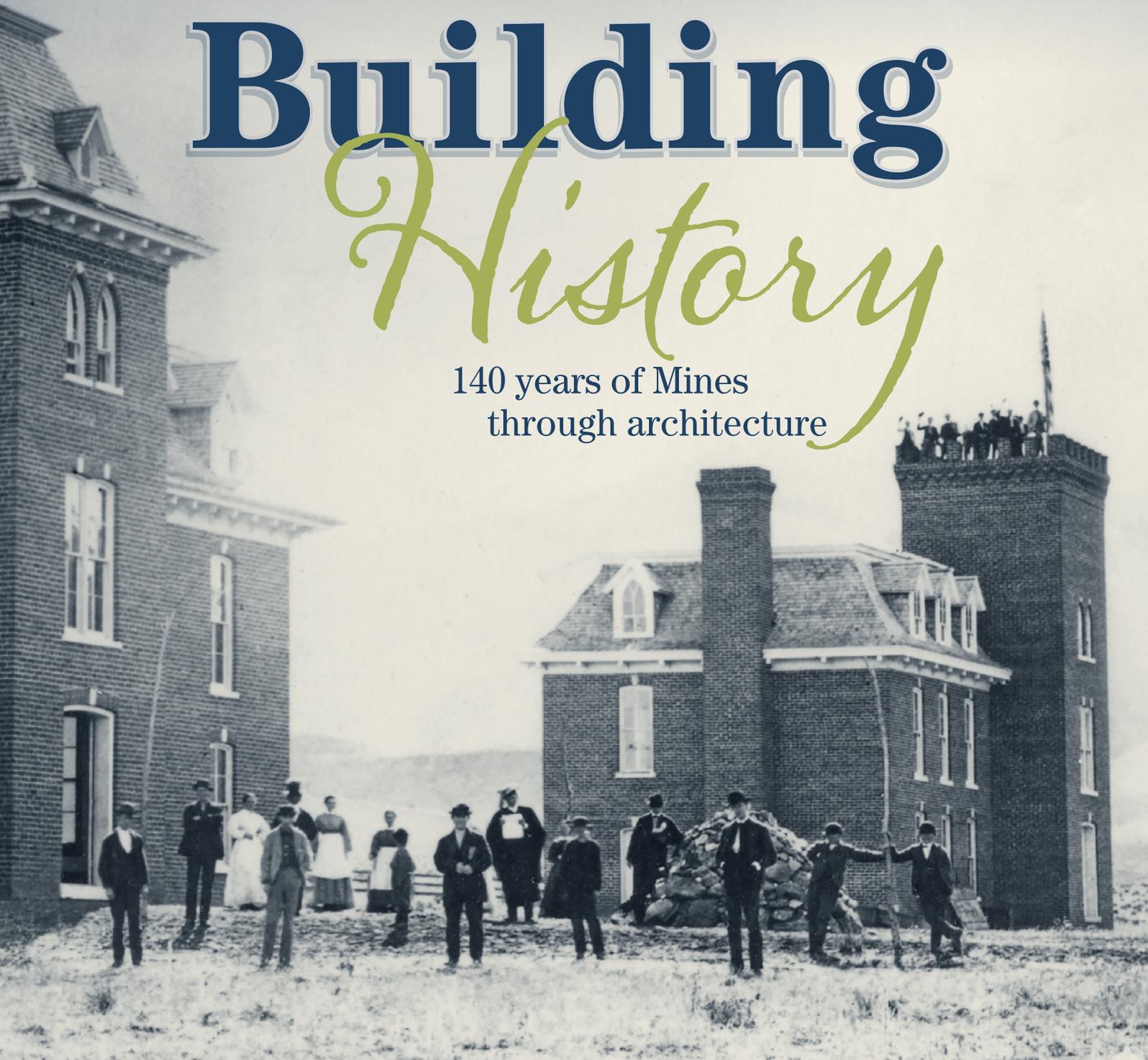
Summer 2014 Volume 104 Number 2

Mines

Colorado School of Mines Magazine

Building History

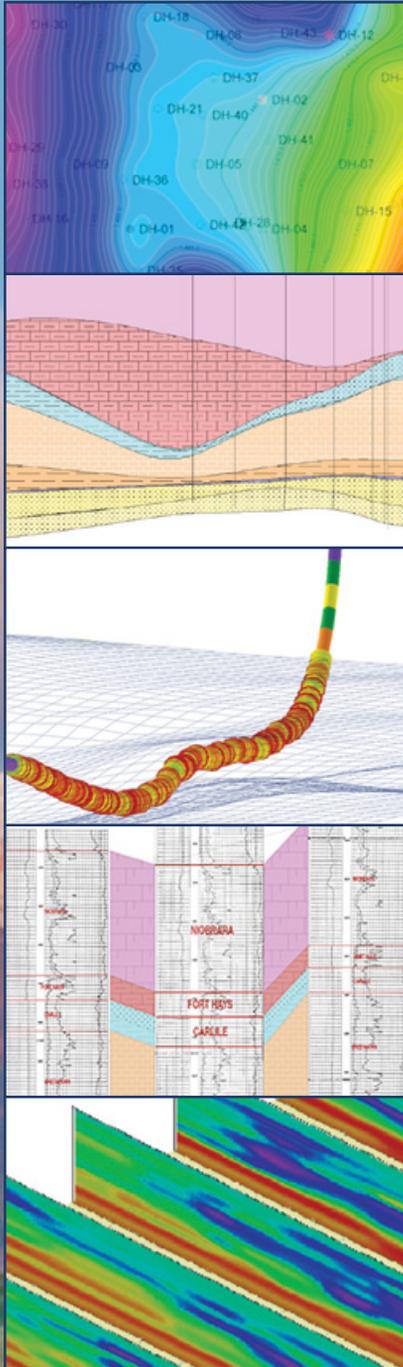
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through architecture





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FEATURE

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Much of Mines' 140-year history is recorded in its architectural landscape, telling a story of exploration, war, economic depression, philanthropic largesse and technological innovation.

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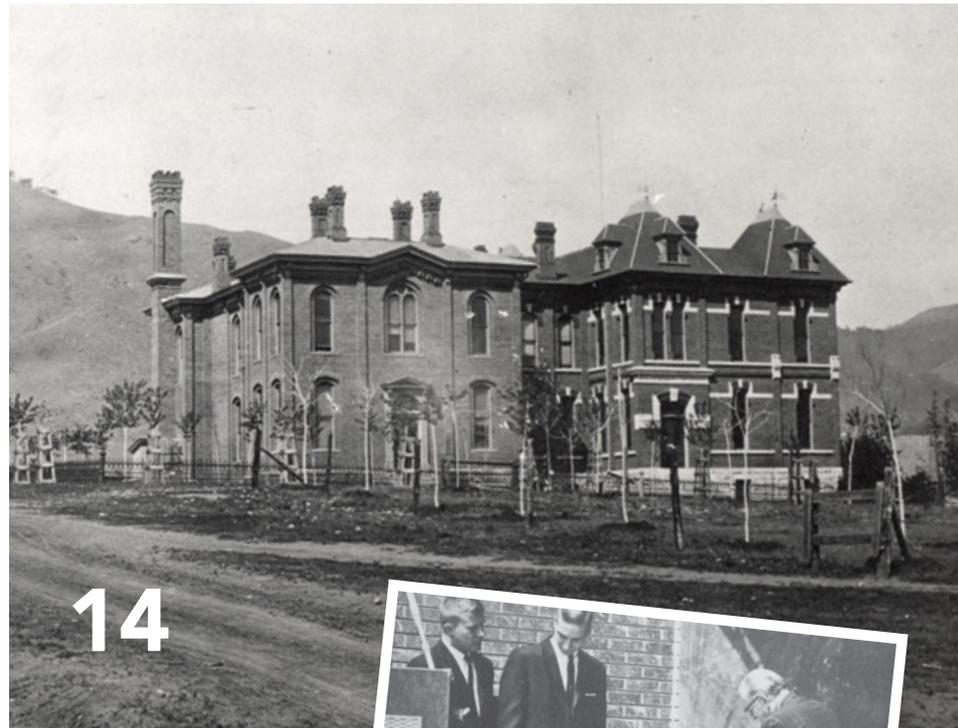
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WEB EXTRAS | MULTIMEDIA minesmagazine.com

 **Alumni Travel: The Grand Canyon** "To once again put humanity in the perspective of geologic time made me feel simultaneously insignificant but yet totally a part of this great universe we all share," says one alumnus, who rafted the Grand Canyon with Professor Steve Sonnenberg PhD '81 on this year's alumni association trip.
csmaa.smugmug.com/Travel/GrandCanyon/June-2014

 **Faculty Recognition** Sandra Woodson and John Humphrey received this year's Alumni Teaching Awards.
minesmagazine.com/2014-alumni-teaching-awards

 **A Summer at the Arecibo Observatory** Student Lexi Humann is in Puerto Rico to design and build a robot—without wireless control—that will clean the telescope's fragile surface.
minesmagazine.com/author/alexishumann/

 **Blastercast** Undergrad Abe Eng interviews faculty on subjects ranging from pesticides in our water to the hydrology of Mars. Search for "The Blastercast" in your iTunes app.

 **In Brief** Business Insider ranks Mines degree as #1 most underrated | Professor Marcelo Simões awarded Green Energy and Technology Award | \$1MM from DOE to Mines for solar energy storage research | and more
minesmagazine.com/inbrief-summer2014

Icons indicate additional online content



Video



Photos



Text



Audio

Cover photo: One of the only photos we've ever seen of the first School of Mines building, taken c. 1876, is discussed in Editor's Take, p.5. Courtesy: Golden History Museum, Dan Abbott Collection

ACADEMIC ADVISING OVERHAUL

Apparently, the authors of ["Overhaul to Academic Advising Aims to Improve Student Retention," spring 2014, p. 6] believe that what [the school is] doing is a good thing. I, for one, do not subscribe to that point of view.

There must be a point at which persons are "cut loose" to succeed or fail on their efforts. Students will be pulled through high school; now you suggest that special measures be taken to pull them through university. No doubt parents who are funding large tuition bills are supportive, as are, I imagine, many students. But having been helped, and ultimately graduating, what will be the next step? I would suggest that it is kinder, and much less costly

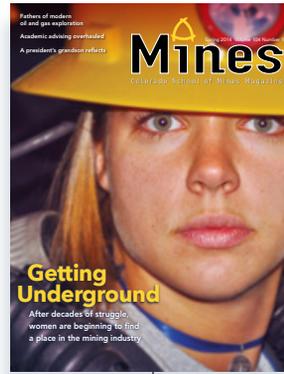
(as the cost of this "help" is inevitably reflected in the tuition bills for all students), to allow failure...

I studied at Mines in the 1960s. At that time, I cannot recall the term "retention" being used, although we all had a feeling that the dropout rate was high... There were a number of reasons behind these statistics; nevertheless, there was never a feeling that this was ever a matter for anyone but oneself. Good advice, I'd suggest.

Neil Murdock '68
via minesmagazine.com

GOLF IN HOUSTON

I want to thank you for putting another article in the spring 2014 *Mines* magazine



about the Houston Golf Tournament and how our group has raised over

\$500K for scholarships. It has been a pleasure to be a part of getting that effort started for 10 years and to participate in the golf tournament since its inception. Thank you for all you and your staff do for the Mines community. It is great to read what is happening through the magazine.

Dean D. Stoughton '75, MS '78

CORRECTIONS

Former Mines student turned pro-soccer player Tesho Akindele plays in Denver on October 18, not August 18 as listed in the spring 2014 issue (p. 9).

Also, in the caption on p. 19 of "Fathers of the New Science" in the spring issue, we incorrectly named Gerard Demaison. *Mines* regrets these errors.



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Comments and suggestions are welcome.
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or 303.273.3294. Just need to update your address?
Go to minesalumni.com/update.

Spirited Photobomb and Farewell



If you were expecting the summer issue sooner, I apologize—"Building History" was some time in the making. It's a brief history of Mines through the lens of campus architecture (with a few digressions along the way) and it has been a lot of fun (and work) to put together.

Amie Chitwood and I spent countless hours poring through thousands of old photographs and referencing dozens of historical documents. Deb Melani conducted interviews with individuals throughout Golden, including the campus architect, alumni and local historians—Rick Gardner was particularly helpful. Using records from the office of Capital Planning and Construction, we charted the growth of campus (total square footage of all buildings) 1874–2014, and graphed them alongside enrollment data that we cobbled together from three different sources. You'll find the resulting graph interesting, but it's only available online—there wasn't room to include it in the print edition.

The most exciting find was the photo featured on the cover, showing the original School of Mines building. For years, the only depiction I'd seen of the early campus was an idealized sketch of three stately buildings. The photo on the cover—donated last year to the photo archives of the Golden History Museum, where we stumbled across it—reveals a much grittier reality.

But interesting as it is to see the building, the photo would not have made the cover if it weren't for the group of students in the background standing on the tower of the School of Mines. We didn't even notice them until we magnified the image; once we did, we realized that the photo was probably taken after the split with Jarvis Hall and students from the School of Mines hadn't been invited to pose for the photographer, so they photobombed instead. Whether that's the truth or not, it's the earliest photograph we know of that features Colorado School of Mines students, and we are excited to share it with you.

Working on this story has given me an even greater respect for historians and the amount of time required to reconcile fragmentary, disparate and contradictory information from the past. Even this relatively short article, aimed at satisfying the curiosity of casual readers, has required a massive effort. For history buffs seeking more, we yield to professionals like Gardner, whose books and manuscripts are piled high in Arthur Lakes Library and elsewhere.

Please write us (magazine@mines.edu) if your research casts additional light on anything mentioned here. I will read your letters with interest, but I won't be editing them. After 7½ years and 23 issues, I am stepping down as editor of *Mines* magazine. It's been an honor to serve the Mines community in this role, which has given me the opportunity to meet so many extraordinary individuals and retell their stories.

Thank you for sharing. Thank you for reading. Thank you for your support.

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

SENIOR DESIGN

Engineering Assistive Technologies

Three creative projects aimed at improving the safety and mobility of people with disabilities appeared at the College of Engineering and Computational Sciences Spring 2014 Trade Fair. The two we detail below received special recognition.

BETTER BRAKES, SEAT FOR FOUR-WHEEL MOUNTAIN BIKES

Mechanical Engineering Professor Joel Bach was at the No Barriers Summit in Telluride, Colo., last summer when he heard about some problems faced by Crested Butte's Adaptive Sports Center in providing downhill mountain bikes that were safe and efficient for quadriplegic riders whose core and grip strength is compromised. Bach brought this information back to Mines, and the senior design team CSM FourCross was formed.

The team of seven focused on improving the bike's braking system and seat safety, receiving advice and guidance from their advisor, Paul Panozzo MS '97, as well as Bach and Assistant Professor of Mechanical Engineering Anne Silverman.

The braking system in the original design consisted of traditional bike brakes reversed so they face the rider. With hands strapped or taped to the brake levers, riders would brake by pushing or leaning forward. However, unintentional braking was hard to avoid: firstly, riders tended to sit leaning forward, resulting in some forward pressure on the brakes; secondly, steering required some forward pressure. In CSM FourCross' design, small pedals are attached to motorcycle throttle-style twist grips connected to the brake levers. With hands strapped to the twist grips and forearms resting on the pedals, riders brake either by rotating the grip through wrist action, or by leaning



Joel Bach, Thin Air Images

The brake system and seat back on this fourcross bike received design improvements that increased rider control and safety (photo shows bike prior to modifications). The CSM FourCross team included Clayton Boatwright '14, Emily Hixon, Abigail Krycho, Hannah Margheim '14, William Pietra '14, Jacqueline Stabell '14 and Brian Stack '14.

forward and lowering their elbows. Since the system is spring-loaded, riders are able to rest their hands on the pedals and steer without braking.

For the new seat back, the goal was to prevent hyperextension of a rider's back during a crash. The team's design includes a hinge for angle adjustment, a series of panels for height adjustment based on the level of spinal cord injury, and an elastic strap to support the rider's core.

Throughout the design, testing and manufacturing stages, the team learned the importance of putting the person with the disability at the center of the process.

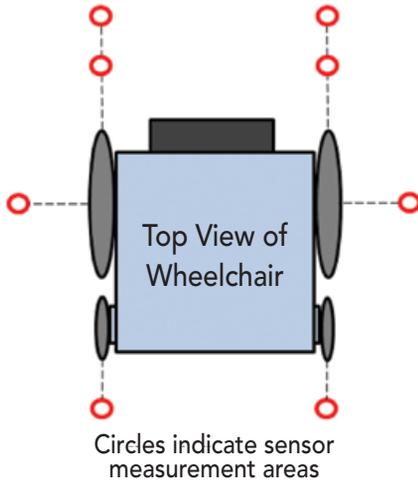
Adaptive Sports Center Program Director Chris Read says this project has the potential to increase participation in their

programs. "Previously our participants didn't have the best equipment options. These new designs will be very helpful," he says.

Trade Fair judges were also impressed. Out of the 42 projects presented, the CSM FourCross team was awarded first place overall.

SAFER WHEELCHAIR MOBILITY

Jered Dean '04, MS '09, associate teaching professor and director of the Engineering Design Program at Mines, took a personal interest in the work of Colorado AdvantEdge; as their client, he challenged the seven-member team to design a wheelchair sensor system that would detect drop-offs and prevent his



Senior Design team AdvantEdge, composed of Erika Blair '14, Michaela Hammer '14, Justin Loeffler, Julia Morin, Katherine Poffenbarger '14, Kendrick Stalnaker '14 and Kevin Tornes '14, designed a wheelchair with extra sensors to allow the owner—a 13-year-old girl with cerebral palsy—to stop it before the system did, giving her more control.

niece, 13-year-old Katherine Dean, from driving over them. Katherine was born with cerebral palsy and uses a 286-pound electric wheelchair for mobility.

Assisted by advisor Yitz Finch and technical consultant Atef Elsherbeni, the Dobelman Distinguished Chair and professor of electrical engineering and computer science, the team designed a system that can detect a drop-off of three inches or more in a variety of light levels and ground compositions using eight distance sensors mounted on every side of the chair.

“Engineering decisions are often made solely with efficiency in mind,” says team member Justin Loeffler. “Our project allowed us to make decisions that would most benefit the user while still keeping efficiency in mind.” One of those decisions was adding extra sensors—at extra cost—to allow Katherine to stop her chair before the system did it for her, giving her more control and a feeling of independence. The work of the Colorado AdvantEdge team was recognized at the Trade Fair with the Kid’s Choice Award.

—Kathleen Morton

 Watch videos of how the new brakes work and what it's like to ride one of these bikes at minesmagazine.com/fourcross.



Project: Wounded Ego

UPWARD MOBILITY Amputees aged 3 to 70 came to campus May 3 for a running and mobility clinic cosponsored by Mines and Hanger Clinic, an orthotic and prosthetic services and products provider. Nearly 40 participants had the opportunity to receive individualized biomechanical assessments and learn fundamentals of running with prosthetics, including stretching and strengthening. There was even a section just for kids. Anne Silverman, assistant professor in the Department of Mechanical Engineering, worked with Hanger Clinic to organize the event with other faculty and students from Mines. “The goals of the running clinic align well with the biomechanics program at Mines in that it encourages a healthy lifestyle, improved mobility and increased activity in people with musculoskeletal disabilities,” Silverman says. She expects that Mines will continue to help grow and host the event with Hanger Clinic in future years.



Nick Sautiffe

SPRING COMMENCEMENT

Another wave of Miners was congratulated by proud family members and welcomed into the alumni community on May 9, 2014, at a ceremony where Clarence Cazalot Jr., retired chairman, president and CEO of Marathon Oil, delivered the keynote address.

The Numbers:

Bachelor’s degrees: **594**

Master’s degrees: **193**

Doctoral degrees: **39**



Thomas Cooper

PRESIDENT'S CORNER

Not the Lazy, Hazy, Crazy Days of Summer Here

As you read through this issue of *Mines* magazine, I hope that you've had a chance to enjoy your summer by spending time in the mountains, on the beach or your own favorite place. Here in Golden, the pace does slow down a bit mid-May through mid-August, but our campus is anything but sleepy.

Many students take advantage of the increasing number of summer session classes. Summer session is a great way for students to stay on track with their four-year graduation goal or to pursue an area of interest outside their field of study.

Faculty and students from around the globe visit Mines to conduct research projects, and many members of our community study, teach and conduct research abroad during the summer. In fact, many of the McBride Honors Program students are in Barcelona, Malaysia, Australia or the U.K., combining internships with the study of local history and culture.

Hundreds of students participate in field session. It may take place near to or far from campus, but summer field session is often

remembered by alumni as one of their most rigorous and valuable experiences at Mines. The intensive hands-on, team-based, immersive learning environment helps prepare students for what's to come in their professional lives.

We're also preparing for our incoming classes—not just for this fall, when we anticipate our largest and most qualified incoming class to date, but filling the pipeline for many years to come. Mines hosts numerous outreach programs and activities to give middle and high school students a taste of the Mines experience, including STEM-related programs for underrepresented students. Some of these programs focus solely on middle school students from Denver Public Schools and others attract high school sophomores and juniors from across the country. Students also ultimately benefit from our annual Teacher Enhancement Program, where K-12 educators enroll in for-credit courses ranging from a single day to multiple weeks.

Summertime offers us many opportunities to continue our activities of the academic year and explore new ideas. It might be those "lazy, hazy, crazy days of summer," but at Mines, the work goes on. Enjoy the rest of your summer!

—M.W. Scoggins

MEDICAL RESEARCH

Children's Hospital and Mines Announce Second Round of Research

After piloting several successful research collaborations in 2013 between Children's Hospital Colorado, the University of Colorado and Mines, four new projects have been announced for 2014.

Modeling Metabolics

Cecilia Diniz Behn, assistant professor of mathematics at Mines, is working with Melanie Cree Green, assistant professor of pediatric endocrinology at UC Denver, to develop a protocol to assess tissue-specific insulin resistance in pediatric patients with polycystic ovarian syndrome, a common cause of female infertility that is also linked to type 2 diabetes and cardiovascular disease. Diniz Behn's role will be to develop a mathematical model of glucose and insulin dynamics that quantifies key aspects of metabolism in different tissues.

Prosthetic Hands

Ozkan Celik, assistant professor of mechanical engineering at Mines, Anton Filatov MS '14, a mechanical engineering doctoral student at Mines, and Richard Weir, associate professor of bioengineering at UC Denver, are paving the way for smaller prosthetic hands. Currently, the gearboxes and motors in these systems are rigidly coupled. Their goal is to develop a system for transferring torque across a joint, which would allow motors and gearboxes to be housed in separate sections of a prosthetic finger; this would allow for more compact designs.

Rotationplasty

Anne Silverman, assistant professor of mechanical engineering at Mines, and Travis Heare, associate professor of orthopedics at UC Denver, are gathering data on the muscle and joint function of people who have undergone rotationplasty, a surgical procedure offered as an alternative to amputation above the knee. When a tumor necessitates total removal of a patient's knee, the remaining portion of the leg can be rotated and reattached to the thigh, allowing the ankle to function as a new knee joint. Their results will inform surgical methods and rehabilitation protocols to maximize mobility in people who have undergone this procedure.

Targeted Drug Delivery

Brian G. Trewyn, assistant professor of chemistry and geochemistry at Mines, and Colm Collins, assistant professor of pediatrics at UC Denver, are developing a targeted drug delivery system for the treatment of inflammatory bowel diseases. Trewyn's role will be to develop nanoparticle polymers whose surfaces are chemically designed to adhere only to diseased cells, allowing for the targeted delivery of drugs that are embedded in the polymer particles. Trewyn says this approach to targeted drug delivery has many potential applications beyond IBD.

—Nick Sutcliffe

WATER RESEARCH

Water-Energy Education Center Launched

Articles in the media and discussions about hydraulic fracturing often focus on water: how the additional demand will be met without limiting local supplies, how to protect groundwater, and how water co-produced with oil and gas will be treated and handled for disposal or reuse. Finding reliable answers to these questions is not always easy, especially since conflicting studies and information can lead to mistrust among stakeholders.

Created with a \$3 million gift to study and enhance awareness of water challenges in the petroleum industry, the ConocoPhillips Center for a Sustainable WE²ST (Water-Energy Education, Science and Technology) at Colorado School of Mines is the first major partnership between a university and the energy industry that is primarily charged with studying water issues related to the production of unconventional oil and natural gas.

With expertise in water resources and treatment technologies, hydrology, and oil and gas, Mines is a natural fit for the new center. “Unconventional energy development is an important component of U.S. energy security and a key bridge to a cleaner energy future,” says John McCray, head of the Department of Civil and Environmental Engineering at Mines and primary author of the proposal to ConocoPhillips. “Water is a precious resource in the arid West. We need to help industry develop best practices that will protect water quality and water supply.”

The center’s research will be organized around several broad thematic areas: source water/water supply; water treatment as it relates to unconventional energy development; integrated water management issues, including protection of freshwater resources; and the related social issues, including community perceptions, corporate social responsibility and communication among stakeholders.

“We are currently soliciting proposals from faculty to help us develop specific research projects within these themes,” says Terri Hogue, associate professor of civil and environmental engineering and director of WE²ST. “Our goal is to advance technologies that will make the industry’s processes more efficient and improve public perception. Improved on-site water treatment systems, for example, can be not only more efficient for the industry but also less disruptive for local residents when compared to trucking water to off-site locations.”

Having the center study the social side of water sustainability and unconventional energy production was of particular interest to ConocoPhillips. “We cannot be a leading exploration and production company without also being a great water

company,” says Al Hirshberg, executive vice president, Technology & Projects, ConocoPhillips. “This initiative is an important extension of our existing global efforts around water sustainability.”

The social research conducted at the center will be directed by Jessica Rolston, Hennebach Assistant Professor in the Division of Liberal Arts and International Studies. Rolston, an anthropologist who studies the sociocultural dynamics of extractive and energy industries, will begin by researching public perceptions and views on energy production, and how communication between stakeholders can be improved. “There’s been a lot of social science research for the nation as a whole, and for communities on the Marcellus Shale, but these studies have not focused on stakeholder perceptions about unconventional resources in Colorado or in other regions in the U.S.,” Rolston says.



One of the reasons ConocoPhillips selected Mines for the new WE²ST center is the potential for valuable collaborations with existing water programs on campus. AQWATEC is a good example. This photo of faculty and students from AQWATEC outside their mobile lab was taken during a trip devoted to analyzing co-produced water from oil and gas wells in southern Colorado’s Raton Basin. Left to right: Nathan Hancock ’07, MS ’08, PhD ’11, Pei Xu (former research professor) and Andrew Wait ’10, MS ’12.

“We need to take public perceptions of the risks and rewards of unconventional energy development into consideration up front in the planning process,” McCray says. “As engineers, we like to think we have a handle on the risks of any project, and while that may be true from a technical standpoint, we have more to learn about the potential impacts of energy development on a community. We all hope to develop solutions that will benefit both the general public and water-reliant industrial stakeholders.”

—Carol Chapman

SPORTS

Personal Best Follows Brain Tumor Recovery

Mines track and field runner Neal Anderson '12, MS '14 doesn't view the brain tumor that derailed his senior year of athletic competition in the same light as others.

"The brain tumor was kind of like ... just another injury. Obviously a little more severe and it caused a lot more worry for the people I love, but in my mind, I don't think I've done anything that special," Anderson says.

He was forced to quit training in fall 2012 for the NCAA South Central Regional Championships and NCAA Division II Cross Country Championships when the tumor was diagnosed. Though benign, it had to be surgically removed, keeping Anderson off the track and field team for the following spring season. With one semester of eligibility remaining, he began building for the spring 2014 season, but the Bettendorf, Iowa, native encountered a long series of leg issues. However, with extra rehabilitation and training he was back on the track in April, preparing for the last event as a collegiate runner.

Needing to better his time to qualify for the 2014 NCAA Division II Outdoor Track & Field Championships, Anderson took part in the Mines-hosted (and aptly named) Last Chance Meet on May 10. With pace-setting from teammate and returning national



Neal Anderson (left) placed a personal-best sixth in the 3,000-meter steeplechase at the NCAA Division II Outdoor Track & Field Championships in May, 19 months after undergoing surgery to remove a brain tumor.

runner-up Tyler Curtis '14 in the 3,000-meter steeplechase, Anderson recorded a time of 9:27.59—the 22nd best Division II time in the nation in an event in which the top 20 runners advanced to the championships.

After two runners opted not to take part in the event, the door opened for him to return to the NCAA Championships two years after earning All-American status in the event in spring 2012.

Placed in the second heat during the preliminary races, Anderson once again used the help of Curtis, who paced the pair into the 12-man finals a day later.

"It was awesome. For me just to make it to the finals this year was

way more than I was expecting. If it had ended there, that would have been a great cap to my career," Anderson says. "But it didn't end there," he adds with a smile.

The day of his final race, nerves were high, but Anderson knew he had an opportunity to complete another goal. Just before the gun fired, he calmed himself with simple resolve: "Let's make it hurt, and we'll see what happens."

What happened was Anderson's best time in the event in his career. He set a new personal record on the way to a sixth-place finish and another All-American honor, helping his team to a 14th-place finish in the country. For the second year, Curtis finished as the national runner-up in the event.

"The sixth-place finish was great, but the biggest thing for me was I PR'd [set a personal record] by 11 seconds," Anderson says. "It was definitely the best I've ever done both mentally and physically and the most fun I've ever had in a race. I don't know that there's a better way to end a collegiate running career."

The metallurgical and materials engineering graduate will begin work later this summer as a design engineer in the propulsion division for ATK Aerospace in Salt Lake City, Utah.

—Colin Bonnicksen

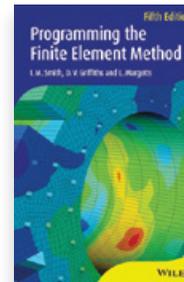
BOOKS

Just Published



Plastics and Sustainable Piping Systems

Plastic fluid handling systems consultant David Chasis '61 has assembled a compendium of his articles educating the marketplace on the benefits and design features of plastics in general and plastic piping systems in particular. More than 250 photos, charts and tables are included in this book, intended for professional engineers, students, installers, code officials and end users. (Industrial Press, 2014)



Programming the Finite Element Method, Fifth Edition

The latest edition of D.V. Griffiths' textbook on how to develop computer programs to solve engineering problems using the finite element method includes a number of revisions related to parallel computing, thermal stress analysis, plasticity return algorithms, convection boundary conditions and interfaces to third-party tools such as ParaView, METIS and ARPACK. Intended for undergraduate, graduate and postgraduate students in civil and mechanical engineering, applied mathematics and numerical analysis, the work includes exercises and website hosting software. Griffiths, a civil engineering professor at Mines, coauthored the book with I.M. Smith and L. Margetts. (Wiley, 2013)



Decision Analysis for Petroleum Exploration, 3.0 Edition

John Schuyler '72, MS '77 has updated and rewritten Paul Newendorp's classic 1975 text. Now in handbook form, the book is based on more than 330 learning objectives from risk and economic decision analysis classes that Schuyler has been designing and teaching since 1990. His career has primarily involved capital investment decisions in the petroleum industry, with experience in exploration and production, energy lending and management consulting. (Planning Press, 2014)

GRAND MESA SLIDE Soon after the massive landslide that killed three men on the Grand Mesa in western Colorado on May 26, Paul Santi PhD '95, professor and head of the Department of Geology and Geological Engineering, accompanied by Karen Berry, interim head of the Colorado Geological Survey, toured the site as members of an advisory group assembled by the Mesa County Sheriff's Office. Using LIDAR, the CGS calculates the volume of the slide at 39 million cubic yards—four times larger than the recent Oso slide in Washington state. The photos Santi took that day—undoubtedly one of the most extensive online collections documenting the event—leave a strong impression, but Santi says they still don't adequately convey the scale. Chris Nocks '03, MS '06, a former student of Santi's whose parents own land a few hundred yards from where the slide stopped, echoes the sentiment. "Seeing it just takes your breath away," says Nocks, who looks forward to spending time with his former professor in the coming months when Santi returns to conduct a slope stability analysis for Mesa County on the precarious upper portion of the slide area.



Paul Santi PhD '95

 View more images of the slide at minesmagazine.com/GrandMesa.

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STUDENT SPOTLIGHT

Where the Exceptionally Gifted Fit In

Harboring aspirations that one's child will grow up to be gifted is normal enough, but in fact life can be painfully difficult for children whose abilities lie far outside the bell curve. Isolated from their peers, with ravenously hungry minds that frequently go unchallenged in traditional classrooms, they can become miserable and depressed.

Taking a flexible and understanding approach to such situations, Mines has been able to accommodate several such families in recent years. "There is no formal program," says Admissions Director Bruce Goetz. "Intake has come through personal contact, and only after the student takes individual classes as a test."

One such student was Dylan Jones '07, who graduated at the age of 16 with a bachelor's degree in math and computer science and a minor in bioengineering and life sciences, and went on to study at the University of Colorado School of Medicine.

Another 16-year-old is on track to graduate this December with a bachelor's in computer science. Santiago Gonzalez, who began taking classes at Mines when he was 12, will then remain at Mines to earn his master's degree in the same discipline.

Able to count to 20 in three languages by the age of 2, Gonzalez was reading about minerals and rocks from a college textbook before he ever attended elementary school. By age 8, he was studying programming languages, building a website (hacaduda.com) and creating apps. Today, he is fluent in more than 10 programming languages and has written 16 applications.

Coming to Mines and finding a place where he fit in has proved life changing for Gonzalez and his family, but prior to coming to Mines, they went through some tough times. The difficulty began in first grade, where he was being asked to do simple arithmetic by day and reading Stephen Hawking's "A Brief History of Time" by night. Trying to talk with classmates about rocks and geology brought rejection and isolation. Reminded constantly that he wasn't "normal," his lively and fun-loving demeanor turned dark. The following years offered some respite, thanks to a handful of perceptive and flexible teachers, but fifth grade was one of the toughest years of all, and by the time he left elementary school, Gonzalez was having nightmares.

Looking for solutions, his parents had him tested a second time (the first time was when he was 6). Nearly all his indicators came back at the level of a third-year graduate student, so they enrolled him at age 11 in a community college, where he learned computer

graphics and genetics. School, he discovered, could be a positive experience.

In June 2010, Mines Computer Science Professor Tracy Camp organized an event to show gifted and talented high school seniors the kinds of opportunities available in her field. Hearing about it, Vanessa Gonzalez, Santiago's mother, contacted Camp to ask if her son could attend. "Of course," was the professor's enthusiastic response.

Camp recalls how, during the day and a half at Mines, which included visits with computer-savvy professionals at Google, Oracle and Lockheed Martin, "Santiago's questions just blew me away."

She encouraged Vanessa to let Santiago attend Mines. "We didn't know that was a possibility. We hadn't even thought of it," Santiago says. He took test classes in the 2010–2011 school year, and enrolled full time in fall 2011.

In addition to his regular classes, Santiago got involved in developing a sensor network for measuring building occupancy under Associate Professor William Hoff in the Department of Electrical Engineering and Computer Science. Later, he moved on to work with wireless sensor networks under Camp, refining ways to monitor internal stress in earth dams as part of the Mines Smart-Geo interdisciplinary program for study and development of intelligent geosystems.

"When I look at Santiago now, I don't think, 'There's our 16-year-old Mines student,'" says Camp.

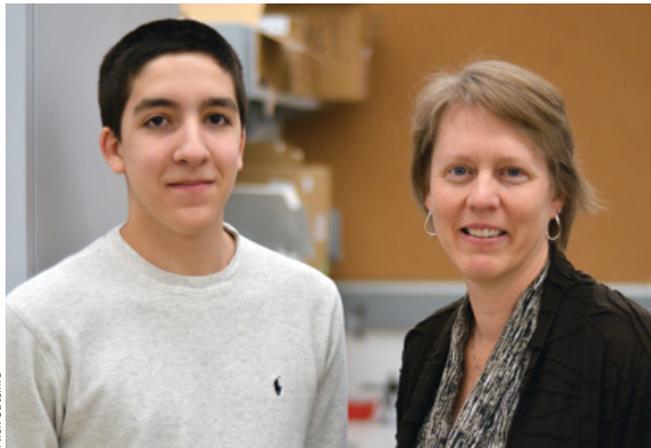
"He's another member of our community and is doing quite well." This becomes apparent on first meeting him. He seems relaxed. He smiles easily and greets passersby, who respond using his family nickname, Santi.

Occasionally, when he's not in class or conducting research, Santiago tutors both graduate and undergraduate students. "He is having office hours for me this semester," says Camp. "He's very patient and methodical. Students appreciate the help and come back for more."

Santiago is grateful to have found a learning environment where he truly belongs. "The students are here to learn, so it's a great environment," he says. "During the whole time I've been here, I haven't run into one person who was annoying or mean—students, faculty, everybody. I've gained social skills working with other students. There are lots of really, really smart people here."

And more keep coming every year—of all ages. After successfully completing classes during the 2013–2014 academic year, 13-year-old Jaden Davidson will formally enroll at Mines in August.

—Rob Neilley



Nick Sutcliffe

With the help of Professor Tracy Camp (right), Santiago Gonzalez came to Mines when he was 12. Now on the verge of graduating, he's more grateful than ever to Mines, where he discovered an educational environment that is satisfying his ravenous appetite for knowledge.

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Building

Much of Mines' 140-year history is recorded in its architectural landscape, telling a story of exploration, war, economic depression, philanthropic largesse and technological innovation.

1906 GUGGENHEIM HALL
1908 GYMNASIUM

The construction of Guggenheim Hall in 1906 shifted the center of campus to the west, as shown in this c. 1916 photo. The Gymnasium (right) was demolished in the 1950s to make way for the Arthur Lakes Library.

History

By Debra Melani & Nick Sutcliffe

Campus structures reveal Mines' past

Fine architecture has been associated with Colorado School of Mines since its earliest days, from the work of 19th century Colorado designer Robert S. Roeschlaub, creator of the Central City Opera House, to Bohlin Cywinski Jackson, designers of the iconic glass-cube Fifth Avenue Apple Store in New York City. To mark Mines' 140th anniversary, we use architecture to retrace the institution's journey from a small, one-building technical school on the American frontier to the globally respected university of applied science and engineering it is today.

THE PRIVATE YEARS

Mines was first conceived in the 1860s when a man with a vision rode into town from Boston. Set on taming the silver-and-gold-crazed Wild West, Bishop George Randall's dream of bringing education and religion to the frontier included building a small, three-building campus in Golden.

Architecture on a grand scale was part of the reverend's strategy to communicate the significance of the educational enterprise. Three buildings were constructed, each with a discrete purpose: **Jarvis Hall**,* a preparatory/military school; Matthews Hall, a divinity school; and the **School of Mines**.

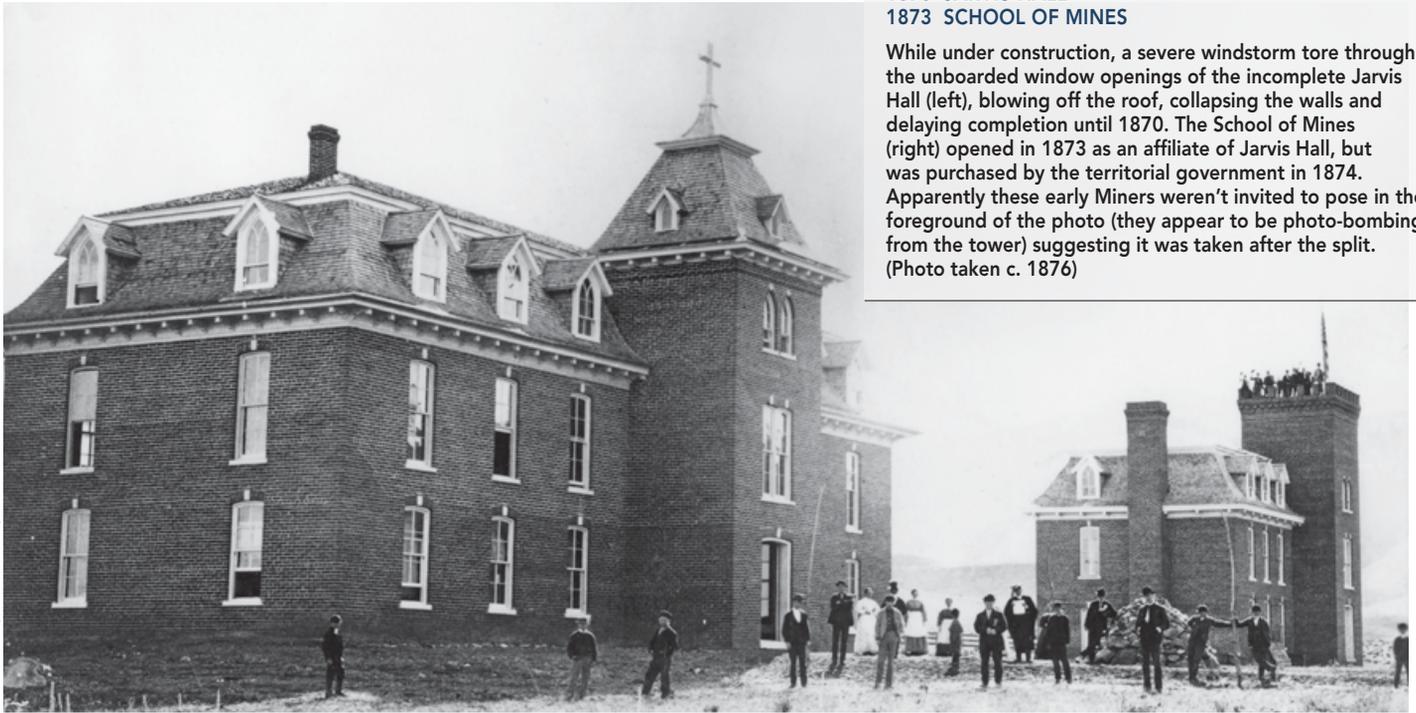
"Bishop Randall was truly a visionary," says Richard Gardner of Golden-based Gardner History and Preservation. "He thought all three of these schools were important to the future of the territory, especially the School of Mines."

During construction of the first building, Jarvis Hall, Randall learned that it took more than architectural beauty to withstand Golden's powerful winds. "The wind lifted the roof off and dropped it back down, crushing the walls," Gardner says. Undeterred by the setback, Randall soon had hammers swinging again, and on September 3, 1873, three years after Jarvis Hall had opened its doors, all three buildings were operational for the first time. Aged 63, Randall had seen his vision realized, but he had almost no time to enjoy it, dying three weeks later on September 28.

Meanwhile, a political ruckus had broken out, with opinion pieces in the Rocky Mountain News and Colorado Transcript decrying the fact that public funds were being used to support the School of Mines, then owned by the Episcopal Church. The controversy was brought to a close in 1874 when the territorial government acquired the school, creating the Territorial School of Mines, Colorado's first public institution of higher education.

Operating independently, the three schools continued to share the campus until 1878, when fires burned Jarvis and Matthews halls to the ground—the first by accident, the second by arson.

*Building names in bold indicate a photo is included.



1870 JARVIS HALL
1873 SCHOOL OF MINES

While under construction, a severe windstorm tore through the unboarded window openings of the incomplete Jarvis Hall (left), blowing off the roof, collapsing the walls and delaying completion until 1870. The School of Mines (right) opened in 1873 as an affiliate of Jarvis Hall, but was purchased by the territorial government in 1874. Apparently these early Miners weren't invited to pose in the foreground of the photo (they appear to be photo-bombing from the tower) suggesting it was taken after the split. (Photo taken c. 1876)

With their campus decimated, Gardner explains, all three schools took refuge in the building now occupied by Golden's Old Capitol Grill on Washington Avenue. A decision was made to merge Jarvis and Matthews halls and move to Denver, and plans to establish the School of Mines in Golden were put into action.

PLANTING NEW ROOTS

Golden citizens donated the land, the Colorado General Assembly doled out the funds, and the first building of the new campus, the **Chemistry Building**, opened for classes in 1880. Professor in Charge Milton Moss passed the reins to Albert C. Hale, whose title was soon changed to president, a position that earned him \$2,500 a year. In 1882, Moss was awarded an honorary engineer of mines degree, one year ahead of Mines' first commencement ceremony that included just two graduates: William B. Middleton of New York and Walter H. Wylie of Los Angeles.

The inaugural building grew into a connected trio of stately structures during that first decade, with the final south wing designed in 1890 by Roeschlaub. Formally named Chemistry Hall, the conglomerate was more commonly referred to as "Old Main." "Everything about the School of Mines was in it," Gardner says, from labs to libraries and gymnasiums to geology exhibits. An 1891 catalog boasts, "The organization of the School of Mines of Colorado resembles that of the best technical schools of the United States ... it is now in fact what it has long been in intent, a 'School of Applied Science.'"

In 1894, in need of space to house the new physics and drafting departments, the school hired Roeschlaub to design Engineering Hall, which faced the south wing of Old Main across a lawn, encircled by a walkway still in place today. Creating a quad of sorts, the two Romanesque Revival buildings gave the growing campus a collegiate structure for the first time.

The striking contrast between the untouched exterior of Engineering Hall and its modern interior reveals a chapter of

its history. In 1916, as part of an agreement with the school, the Bureau of Mines used Engineering Hall to refine a significant quantity of radium. Detailed in the February 1919 issue of Mines magazine, the work was clearly carried out at a time when the dangers of radiation were poorly understood, and the thorough decontamination process that followed years later involved removal of almost all of the building's interior.

Around the turn of the century, a boom in the assaying business prompted construction of a new **Assay Building** and lab renovations, funded with the school's first monetary gift: \$25,000 from the chairman of the board of trustees and former student Winfield S. Stratton. A mining magnate who discovered the Independence Mine and launched the Cripple Creek gold rush, Stratton gave the check to President Regis Chauvenet to use as he saw fit. The state later reimbursed funds for the Assay Building, freeing the gift to go toward construction of **Stratton Hall** in 1904. In 1950 the Assay Building and adjacent heating plant were joined, and the building renamed **Chauvenet Hall**.

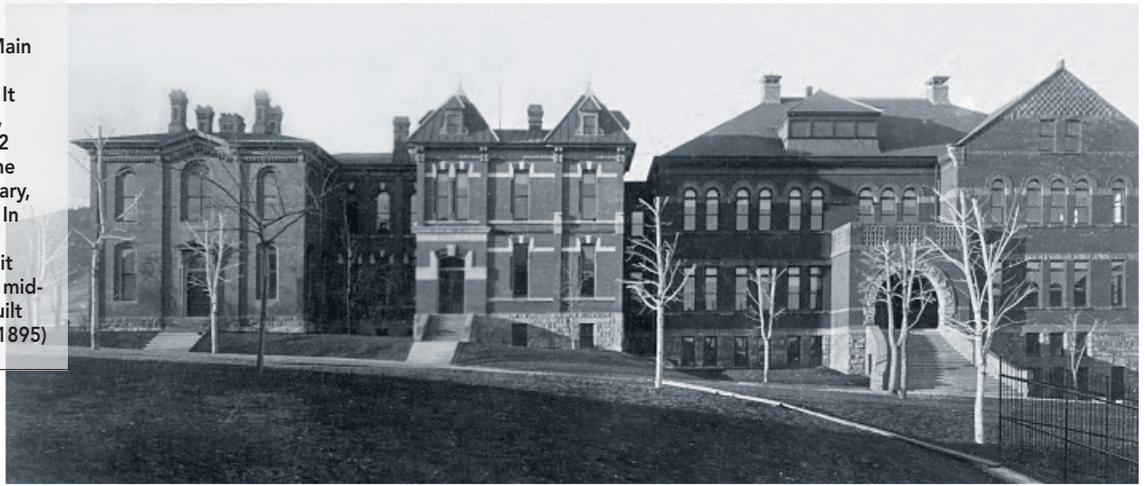
GROWTH

From 1890 to 1907, enrollment grew from 65 to 298. **Guggenheim Hall** was added in 1906, providing students with a new library, more classrooms and an auditorium. With its stately proportions and skyward golden-domed tower visible from town, it immediately became the focal point of campus.

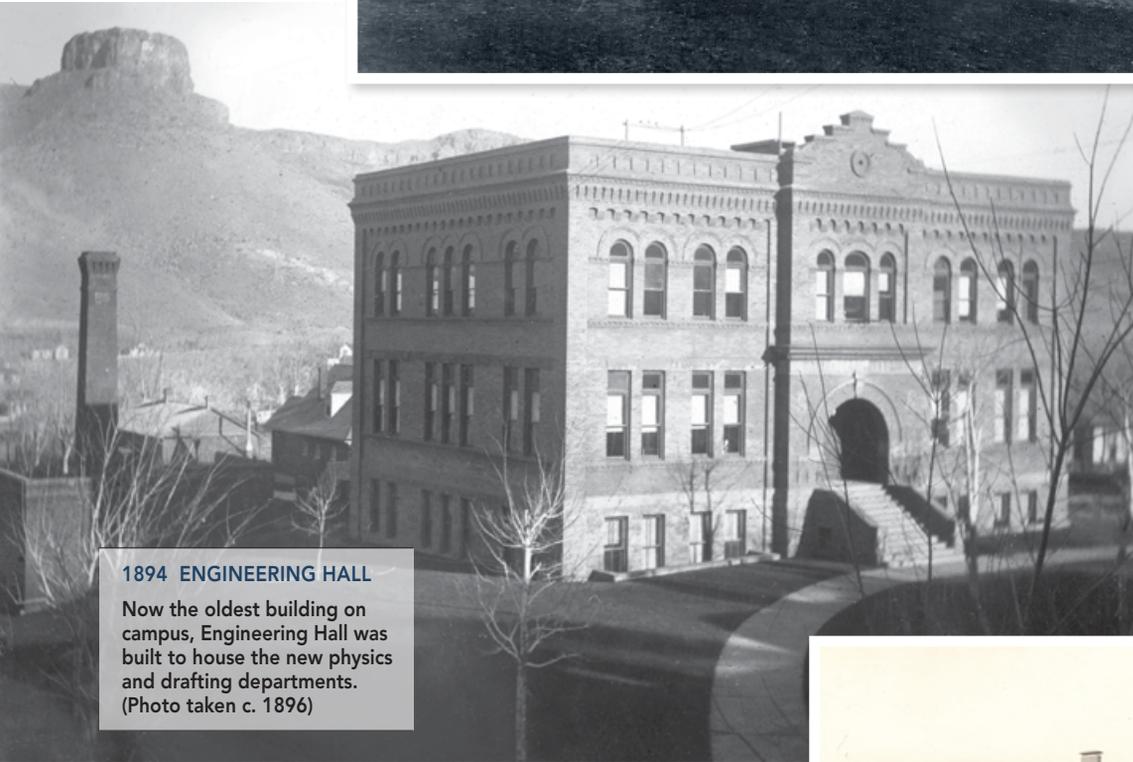
Funding for the building came from an \$80,000 donation from Simon Guggenheim, a wealthy Denver businessman, politician and philanthropist whose family made their fortune in mining and smelting. It was the largest monetary gift to a state institution at the time. When presenting the keys to John P. Kelly, chairman of the board of trustees, Guggenheim said, "Wealth has its duties no less than great intellectual and spiritual acquirements.... I know of no greater pleasure than in sharing my success with the institution which means so much to our commonwealth."

1880 CHEMISTRY BUILDING (also known as Old Main)

For a quarter century, Old Main was the school's administrative and educational center. It consisted of three buildings, constructed 1880 (left), 1882 (middle) and 1890 (right). The final addition included a library, auditorium and gymnasium. In 1906, it was superceded by Guggenheim Hall, although it continued to stand until the mid-1950s, when Hill Hall was built on the site. (Photo taken c. 1895)



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Denver Public Library

1894 ENGINEERING HALL

Now the oldest building on campus, Engineering Hall was built to house the new physics and drafting departments. (Photo taken c. 1896)

1900 ASSAY BUILDING 1904 STRATTON HALL

A boom in the assaying business at the turn of the century led to construction of the Assay building (left). This building was later joined to an adjacent heating plant in 1937 and renamed Chauvenet Hall. Stratton Hall (right), initially called the Hall of Metallurgy, was indirectly funded with a gift from board chairman and former student Winfield S. Stratton. (Photo taken c.1904)



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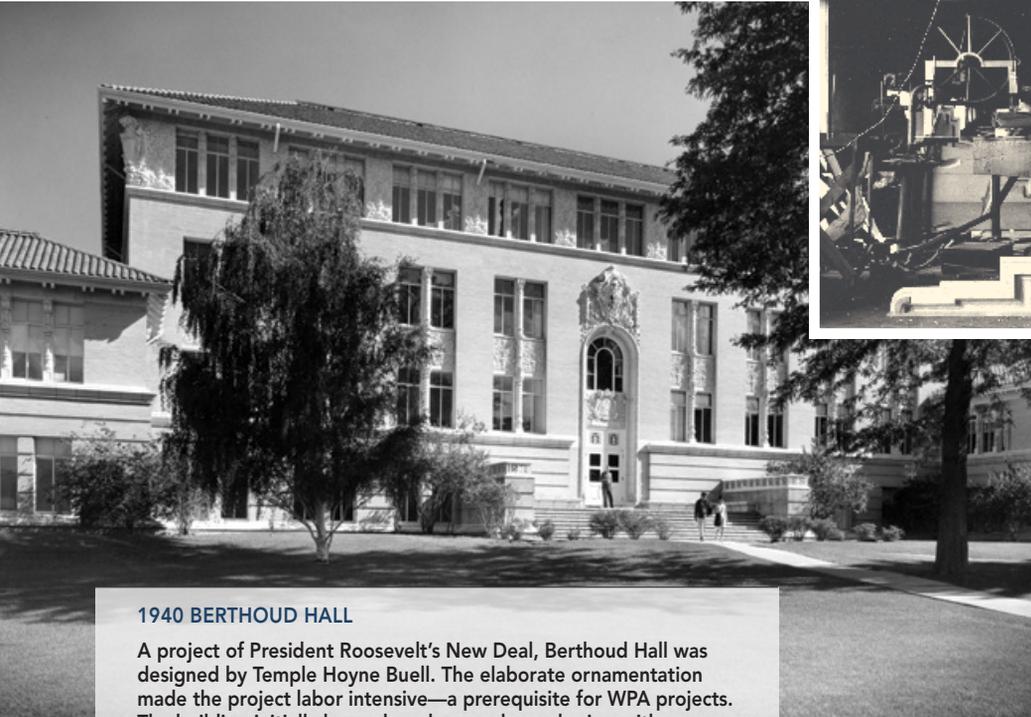
Another Mines icon came two years later when the “M” was constructed on Mount Zion. Since it slopes away from campus, Professor Joseph O’Byrne stretched the letter to be tall enough to appear proportional when viewed from campus. Lights were added in 1932.

Athletics, from cricket in the Jarvis Hall days to football starting in 1888, was always a part of campus life, and facilities have been updated over time. In 1908, the spacious new **Gymnasium** was built just north of Guggenheim Hall, a huge improvement over the cramped gym in the basement of Old Main.

In his book, “Rocky Mountains to the World: A History of the Colorado School of Mines,” Wilton Eckley notes Mines’ surprising success on the gridiron, grabbing undefeated seasons and championship titles despite having the most rigorous course of study and the fewest players of any other school in the early Rocky Mountain Conference. Though Mines may have lost year after year to the very much larger University of Colorado Boulder before that school left the conference in the early 1940s, they came away from the very first match-up in 1890 having won 103–0.

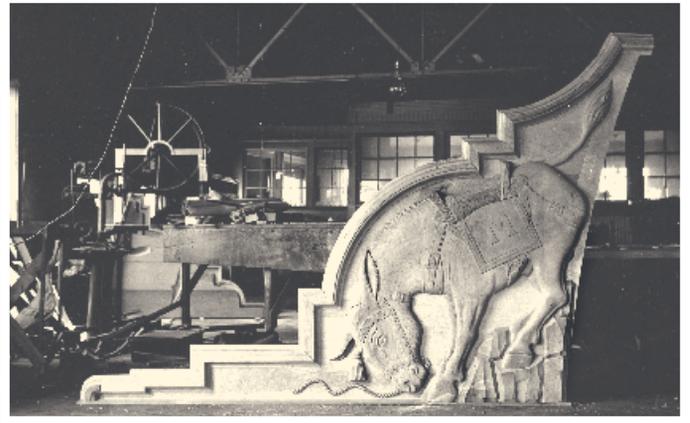
THE WAR YEARS

In the early 1900s, war took its toll on campus, slowing growth and, in 1918, resulting in all male students of sufficient physical fitness being enrolled in the Student Army Training Corps, classifying them as soldiers who could be asked to serve at any time. Every Mines student fit the description—all were strong and male. (Although the first woman, Florence Caldwell, graduated from Mines in 1898, as of 1949 only two other women had earned degrees.)



1940 BERTHOUD HALL

A project of President Roosevelt's New Deal, Berthoud Hall was designed by Temple Hoyne Buell. The elaborate ornamentation made the project labor intensive—a prerequisite for WPA projects. The building initially housed geology and geophysics, with a portion designed to accommodate the Geology Museum.



1937 STEINHAUER FIELD HOUSE

The architect who designed the Field House ("Steinhauer" was added to the name in 1949), incorporated a bucking burro and other imagery into the terra cotta castings placed at either end of the building. He was later asked to incorporate these into graphics for the school's first logo.

1971 GREEN CENTER

The first privately funded building at Mines for many decades, the Green Center heralded in a new era of philanthropy at Mines. Home to the Department of Geophysics, it also created much needed event and research space. (Photo taken 1972)



highly ornate Spanish Colonial Revival style, which may seem an extravagant choice for the time, but Campus Architect Chris Cocallas explains that WPA projects were required to provide employment to the maximum number of workers, so they often exhibit a high degree of craftsmanship.

A portion of Berthoud Hall was designed to house the Colorado School of Mines Geology Museum, an extensive collection of rocks and minerals begun by Professor Arthur Lakes before the split with Jarvis Hall. As early as 1876 the collection won national recognition, when Lakes came away from the grand Centennial Exposition in Philadelphia with an award for "best geological exhibit." In 2002, after outgrowing the space in Berthoud, the museum was moved to an expansive new facility at Maple and 13th streets, where its thousands of annual visitors can now view

During the Great Depression, enrollment declined from 601 in 1932 to 491 in 1934, making it hard for President Melville F. Coolbaugh to spearhead any capital construction projects. However, when the government launched its Works Progress Administration projects under the New Deal, putting unemployed Americans to work on public construction jobs, Mines gained two new buildings: Steinhauer Field House and Berthoud Hall.

Plans for the 37,000-square-foot **Field House**, completed in 1937 and renamed after trustee Frederick Steinhauer in 1949, were drawn up by architect Jules Jacques Benedict, who incorporated elements of the school's first logo (that he designed) into the terra-cotta castings that flank the windows on either end of the building.

Along with athletics, the building has served numerous functions over the years. One of the more unusual was after World War II when veterans, keen to take advantage of the GI Bill, swelled Mines' enrollment from a low of 170 in 1945 to 1,285 by 1949. For single war veterans accustomed to cramped military accommodations, solving the severe housing shortage that ensued was a lot less complicated than it was for married students. One solution involved parking 35 trailers inside Steinhauer Field House, where, according to Eckley, tight quarters and shared bathroom facilities were reportedly awkward at times, but the result was a tight-knit community that long maintained its bond.

Renowned architect Temple Hoyne Buell designed Mines' other New Deal building. Opened in 1940, **Berthoud Hall** was named after the school's first geology professor and inaugural board member, Edward L. Berthoud. The building is remarkable for its

Building on a New Scale

MID-CENTURY INFRASTRUCTURE

Funded by a state tax dedicated to capital improvements on Colorado's public university campuses, many construction projects were completed during the 1950s and 1960s, creating a backbone of infrastructure that supported decades of future growth.

1952 Coolbaugh Hall Named after Mines' longest-serving president, Melville C. Coolbaugh (1925–1946), the \$1 million building was dedicated to chemistry education and research.

1954 Bradford Hall The first residence hall built on campus marked the beginning of a new era in student housing, which, until then, had relied on fraternities and private homes. Randall Hall followed in 1957, and Morgan and Thomas Halls were added in 1967. In 1964, a former fraternity was remodeled, creating the first accommodation for women on campus.

1954 Alderson Hall Built to house the departments of petroleum engineering, and chemical and petroleum refining engineering, the building was named in honor of Mines President Victor C. Alderson

(1903–1913 and 1917–1925), who established the first petroleum engineering curriculum at Mines in 1921. A major addition was completed in 1994.

1955 Arthur Lakes Library Built on the site of the original Gymnasium, the library was expanded in 1978, nearly doubling in size.

1958 Hill Hall Constructed on the site of Old Main, the new home for metallurgical engineering was named in honor of Nathaniel P. Hill, a U.S. senator and inaugural member of Mines' board of trustees. A major addition was completed in 1998.

1960 Volk Gymnasium A vast improvement over existing athletic facilities, the Gymnasium was renamed in 1974 after an

outstanding student athlete, Russell Volk '26, MS '31, who served on Mines' board of trustees, as president of the Colorado School of Mines Alumni Association and on the board of the Colorado School of Mines Foundation.

1963 Meyer Hall Constructed as a home for the physics and geophysics departments, the building was named for Paul Meyer, a medical doctor in the Golden community and a Mines math professor starting in 1883.

1964 Ben H. Parker Student Center Initially called College Union, the facility was renamed in 1970 in honor of Mines' former president and trustee, Ben Parker '24, MS '32, Dsc '34. The building underwent several additions and renovations in the 1990s and 2000s.

meteorites and a moon rock alongside the most comprehensive collection of Colorado specimens anywhere.

The museum is just one example of Lakes' legacy at Mines. Oxford-educated, the professor's tireless curiosity and enthusiasm for educating students through field study shaped the curriculum in ways that remain in evidence today, and it is fitting that one of the hubs of intellectual life at Mines, the **Arthur Lakes Library**, bears his name.

ACCELERATING GROWTH

Completed in 1955, the library is one of a long list of buildings constructed in the 1950s and 1960s that were funded through a state tax dedicated to capital improvements on Colorado's public university campuses (see "Mid-century Infrastructure," p. 19). Though less notable from an architectural standpoint, the infrastructure provided a foundation for the period of rapid growth to come. By the early 1970s, the number of students attending Mines had doubled from a mid-1950s level of around 1,000, and by fall 1980, enrollment exceeded 3,000.

The **Green Center**, coming at the end of a three-decade-long

building boom, was the first privately funded capital project on campus since Guggenheim Hall in 1906. Built in 1971 on land purchased by the state, the \$3.5 million needed for construction was contributed by individuals, foundations and a \$1.7 million gift from Cecil and Ida Green. As detailed in Professor Emeritus Bob Weimer's "125 Years of Earth Science Programs at CSM: Lessons for the Future," the Greens had been discussing a gift to fund a new home for geophysics with then-Department Head John Hollister; however, when President Orlo Childs joined the conversation and shared the vision for a much larger facility that, in addition to housing geophysics, would serve campus in numerous other ways, he was able to win their support.

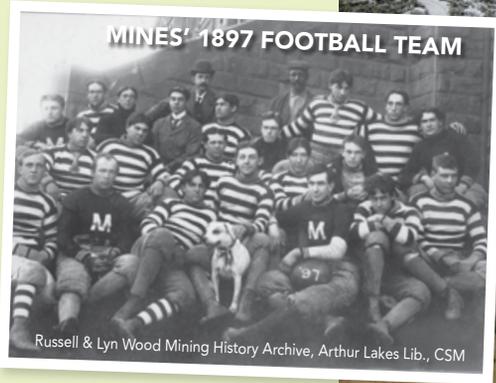
OPEC's oil embargos and climbing oil prices were an important factor driving growth through the 1970s, but when prices fell in the early 1980s and students found that their hard-earned and highly specialized degrees weren't winning them jobs after graduation, enrollment tumbled from 3,239 in 1982 to 2,268 in 1988. The impact on Mines was severe, but it would have been a lot worse if shaky mineral prices in the mid-1970s hadn't already launched an initiative to diversify Mines' degree offerings.

Upgrades to the Oldest Football Field in the West

While Campbell Field has had many different names since October 7, 1893—when the first game of football was played there against the University of Denver—its location has remained the same, which makes it the oldest football field west of the Mississippi and the fifth oldest college football field in the nation.

Befitting such a distinguished venue, work is now underway on the new **Clear Creek Athletics Complex**.

Funded with \$21 million in private support, the new facilities will feature the newly named, 5,000-seat Marv Kay Stadium at Campbell Field, locker rooms, training and sports medicine facilities, updates to the soccer field and improved lighting for the track and field complex. *Expected completion: summer 2015.*



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ATHLETIC FIELD C. 1920



CLEAR CREEK ATHLETICS COMPLEX (under construction)



More at giving.mines.edu/bigwin.

The idea was that, in addition to the existing mineral-industry-related programs, students would have the opportunity to earn general engineering degrees with mechanical, electrical or civil specialties. However, implementation was going to require dramatically expanding the Basic Engineering Department, which was already sharing cramped quarters with the Department of Mining Engineering in Chauvenet Hall and overflowing into Stratton. Clearly, the strategy would require a new building, and state funding was not forthcoming.

A solution was unexpectedly provided by George R. Brown '22, a mining engineering graduate and partner in one of the world's largest construction companies, Brown & Root (now KBR). According to Jim Riddle '69, MS '74, in the middle of dinner during a campus visit in 1976, Brown asked how he could help the Department of Mining Engineering. Without missing a beat, Department Head Thys Johnson responded by saying they needed a new building, and Brown inquired how much that would cost. Johnson described to Riddle and others the next day that he'd answered with \$4.4 million—a figure based on back-of-the-envelope math—and almost immediately Brown had signed a check from The Brown Foundation for the full amount and handed it to his rather surprised host, President Guy T. McBride.

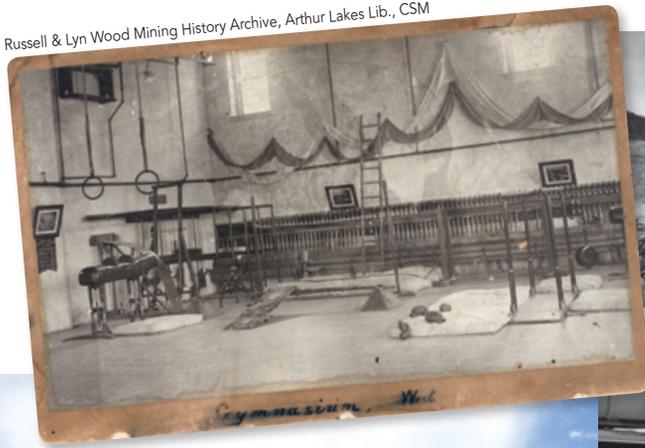


1980 BROWN HALL

When **Brown Hall** opened in 1980, the \$5.5 million building had been built to accommodate

both the mining engineering and basic engineering departments, the latter occupying one-third of the space. The additional \$1.1 million needed for the facility had been donated from private sources, including individuals and foundations.

The building's 78,000-square-foot expansion in 2011 coincided with a reorganization of the Division of Engineering into the College of Engineering and Computational Sciences. All other divisions and departments were reorganized the following year into the College of Applied Science and Engineering and the College of Earth Resource Sciences and Engineering.



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Thomas Cooper, Lightbox Images

from top

1890 OLD MAIN GYMNASIUM

Mines' original gym space was in the basement of the third addition to Old Main and contained pulling weights, swinging rings, parallel bars and other equipment that led some to describe it as the best equipped school gymnasium in the state.

1960 VOLK GYMNASIUM

Replacing the old Gymnasium (photo on p. 15), the new gym was renamed after Russell H. Volk '26 in 1974 in honor of his athletic accomplishments (he earned a record 15 varsity letters in intercollegiate sports) and his broad involvement with Mines.

2007 STUDENT RECREATION CENTER

The largest building on campus, the 150,000-square-foot rec center has become a hub for student activities—athletic, social and recreational.

Ultimately, the strategy to diversify was a success, but it took time. Total enrollment didn't returned to 1982 levels until 1996, and by then 27 percent of students were pursuing engineering degrees under the renamed Division of Engineering—almost twice as many as the next largest program, chemical and petroleum refining engineering.

Despite the slump in enrollment during the 1980s and 1990s, the skillful advocacy of President George Ansell and the unflagging support of State Representative Tony Grampsas provided funding for several substantial additions and renovations, most notably the Ben H. Parker Student Center, Alderson Hall and Hill Hall.

A NEW ERA

Since 2000, Mines has undergone a period of rapid and sustained growth that is unparalleled in school history. Enrollment for 2013–2014 was more than 60 percent higher than in 1999–2000, and the same period has seen steadily rising admission standards. The combined square footage of campus facilities have also expanded by 60 percent since 2000, with the greatest gains seen in residential and recreational facilities—space for teaching and research will be catching up for some years to come.

With the state budget coming under increasing pressure, most construction since 2000 has been funded through bond issuances, student fees and private donations. However, one notable exception is the **Center for Technology and Learning Media**, opened in 2001, under President John U. Trefny's leadership. The first academic building of the new millennium, CTLM created a variety of technology-rich learning environments and facilities that have contributed to Mines' emergence as a leader in innovative teaching techniques, particularly studio physics.

In 2002, Trefny also oversaw the launch of the **General Research Laboratory building, which provided a new home for the Geology Museum**. Consisting of a public wing devoted to the museum and three floors of research labs, the facility continues to boost Mines' public visibility by attracting thousands of visitors to campus every year and numerous high-profile research projects.

In 2007, after five years of planning, the 150,000-square-foot **Student Recreation Center** was opened. The largest building on campus, it quickly became a centerpiece for recreational and social activities for the expanding numbers of students living on and around campus.

Over the last three years, two large residence halls have



ELM HALL



WELCOME CENTER

In the Pipeline

Along with the Clear Creek Athletics Complex, two other major construction projects are underway—one nearly complete and one just getting started.

Elm Street Residence and Dining Hall

Comprising a 500-seat dining hall and 200-bed residence hall in a 94,000-square-foot facility, the new building is located north of Weaver Towers (built in 1979 and recently refurbished) and west of Maple Hall (completed in 2011).

Expected completion: fall 2014 (residence hall) and spring 2015 (dining hall).

Welcome Center This 32,000-square-foot building, located on the northwest corner of 19th and Illinois streets, will house office and event space for the alumni association, foundation, admissions and public relations. *Expected completion: summer 2015.*

doubled student accommodation east of 6th Avenue, and for the first time this fall, the entire incoming freshman class will be housed on the main campus. Adding a healthcare facility—the privately funded W. Lloyd Wright Student Wellness Center—and barring traffic from the middle of campus with a large pedestrian plaza, has helped an academic village take shape in the heart of the Mines campus—a goal that current President M.W. Scoggins has made a priority.

Along with student life facilities, two new academic buildings have been added in recent years. The first, completed in 2011 and funded through student-approved fees and state appropriations, is a sleek, 78,000-square-foot addition to **Brown Hall**, which almost doubled the building's overall size.

The second, completed in 2012, created a new home for the Petroleum Engineering Department. The \$27 million **Marquez Hall** was funded entirely through private giving. Interestingly, the lead gift—\$10 million in matching funds from the Timothy and Bernadette Marquez Foundation—was announced in 2005 by Timothy Marquez '80, who hadn't stepped foot on campus for 20 years. Designed by Bohlin Cywinski Jackson, the building's capacious glass atrium, cantilevered awning and clean, modern lines make it the most avant-garde structure on campus and a source of pride for many.



2012 MARQUEZ HALL

This 87,400-square-foot, \$27 million home for the Petroleum Engineering Department, designed by NYC Apple Store architects Bohlin Cywinski Jackson, is LEED Silver certified and contains a 3D visualization lab, computer classrooms, research centers and informal gathering areas.

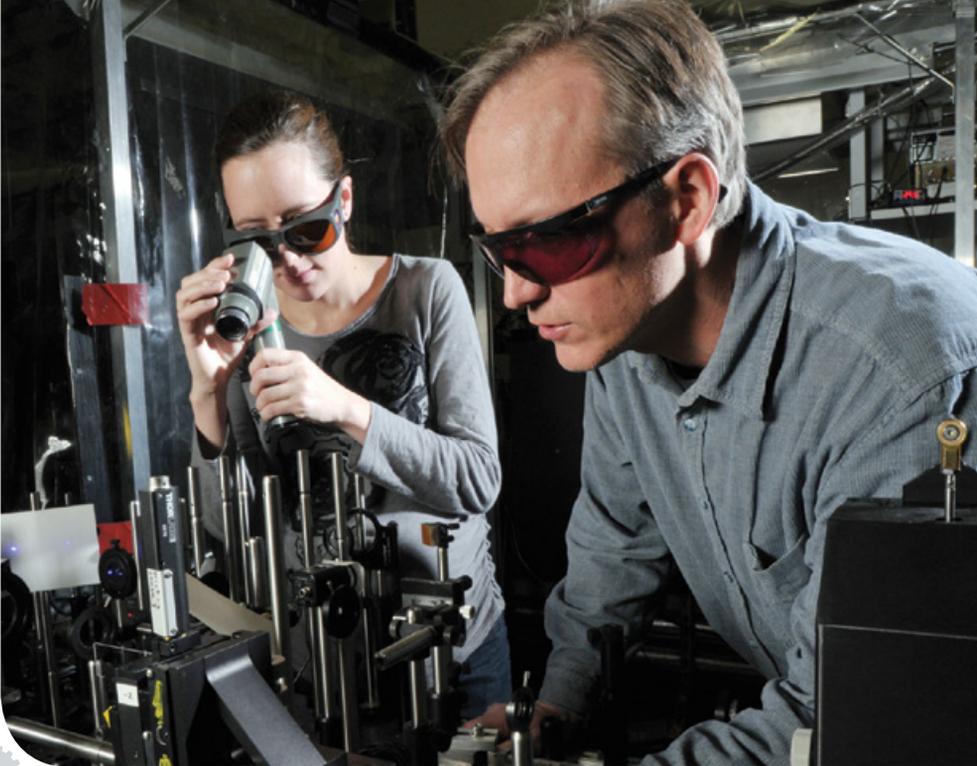
More buildings are planned and paid for (see "In the Pipeline," p. 22), and the school recently

received \$14.6 million in state funding for a high-priority \$45 million cornerstone academic building that will replace Meyer Hall. In addition to creating a new home for the Department of Physics, the building is envisioned as a hub for interdisciplinary research, particularly within the recently formed College of Applied Science and Engineering.

It's a project with interesting and transformative potential at an institution that has undergone so many transformations in its 140-year journey. Over the span of two lifetimes, Mines has been built up from a small school consisting of one building on the American frontier, to what it is today—a competitive and well-respected university of applied science and engineering. And the pace of change is quickening. **M**



More photos and history: giving.mines.edu/mines140



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ENGINEER A VIBRANT GLOBAL FUTURE**



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COLORADO SCHOOL OF MINES
FOUNDATION

ALUMNI NETWORK

ALUMNI WEEKEND 2014

Why You Come Back to Mines

If Mines was so tough to get through and the goal was simply to “get out,” why do so many return for Alumni Weekend? “Mines is a tradition in our family and so are reunions,” says 50th reunion attendee and volunteer organizer Jim White '64, whose father (Edwin F. White '36) and sons (Eric '89, MS '93 and Scott '89 White) also graduated from the university. “Mostly, we enjoy sharing stories. I feel fortunate that 1964 was a close class and we have had several members help organize each of our reunions. We look forward to it and have a lot of fun in the planning as well as the reunion itself.”

Rekindled friendships, blue skies and Mines pride marked the events on campus April 24–26, 2014, when alumni from the classes of '79, '74, '69, '64, Golden Miners ('35–'63) and others celebrated their return to the school that helped launch their careers. Choosing between tours that highlighted campus architecture, labs and landscape, and presentations by professors on water in the West and other timely topics, alumni took the opportunity to reacquaint themselves with campus and reconnect with classmates.

We hope to see an equally strong showing of alumni next year; watch for our save-the-date announcement.

 Find more photos of Alumni Weekend at photos.minesalumni.com.



Caryn Homsher MS '13

(Left to right) John Briedis '64, James Holley '64, Al Geyer '64 and Dale Teeters '64 caught up at the President's 50th Reunion Class Breakfast.



Nick Sutcliffe

Among the group that joined Professor Emeritus Bob Weimer (center front, wearing bolo) on the Weimer Geology Trail Walk during Alumni Weekend, many were his former students.



Amie Chitwood

Beta Theta Pi fraternity brothers (left to right) Robert Watkins '69, Thomas Sylvester '69 and Dan Evans '69 reconnected during a tour of the Edgar Mine.



Caryn Homsher MS '13

(Left to right) Sandi Erfurd, Jim Rheinheimer '64 and his wife, Tammy Rheinheimer, enjoyed the 50th Reunion Class Breakfast at the President's Residence.

MINES HISTORY

1964 Time Capsule Opened

A time capsule buried in the cornerstone of the student center in 1964 was extracted just prior to Alumni Weekend, giving the 50th reunion class an opportunity to see the contents during their class breakfast at the President's Residence on April 25. Placed in the wall on April 10, 1964, during the 30th annual E-Days celebration by William Burger, then dean of students and registrar, the capsule was retrieved during a ceremony in April by President M.W.

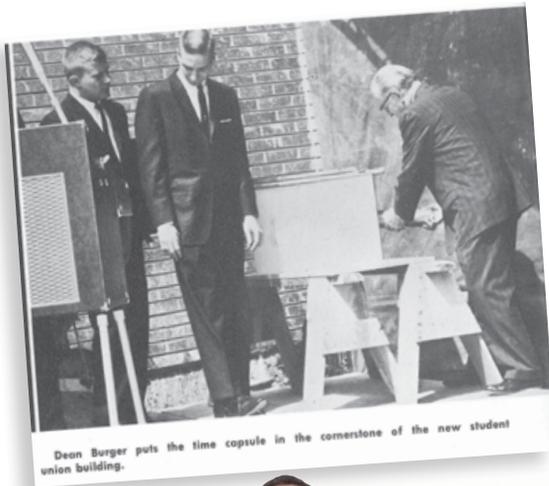
Scoggins and Dan Fox, vice president for student life and dean of students.

Its contents included a copy of *The Denver Post* with a headline announcing President John F. Kennedy's assassination, a copy of *The Oredigger*, and several rolls of film that documented construction of the formerly named College Union building. In 1970, College Union was renamed The Ben Parker Student Union and later the Ben H. Parker Student Center.

Later this year, a 2014 time capsule will be placed in the same location with a new marking stone that will indicate it should be opened in 2049, Mines' 175th anniversary year.



A display of the 1964 time capsule and the one to be buried this year were on display at the 50th Reunion Class Breakfast at the President's Residence.



Dean Burger puts the time capsule in the cornerstone of the new student union building.

This photo from the 1964 Prospector shows Dean Burger placing the original time capsule in the College Union building.

Vice President for Student Life and Dean of Students Dan Fox (below left) and President M.W. Scoggins opened the 1964 time capsule in April.



Caryn Homsher MS '13

Kathleen Morton



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COLORADOSCHOOLOFMINES

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Raymond Priestley '79
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Tim Saenger '95

Matthew Showalter '99

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minesalumni.com



**CELEBRATION OF ALUMNI
2014 Award Winners**

On April 25, the following individuals were honored for their contributions to Mines during the Celebration of Alumni dinner, one of the highlights of Alumni Weekend.



Awarded by Colorado School of Mines

Distinguished Achievement Medalists

Steven L. Mueller '75, President and CEO, Southwestern Energy

Candace S. Sulzbach '81, Teaching Professor, Colorado School of Mines

Mines Medalists

Anthony F. Corbetta '48, Sales Engineer, CF&I Steel (awarded posthumously)

Alfred T. Ireson '48, Manager of Leasehold Development, Shell Oil

Distinguished Achievement Medalist Candace Sulzbach (right), with host Kara Ninke '14

Awarded by CSMAA

Melville F. Coolbaugh Award

William R. Wilson '65, Director, Executive Vice President and Chief Financial Officer, TUVERA Exploration

Outstanding Alumnus Award

Duane J. Maue '90, Senior Financial Advisor, Merrill Lynch

Young Alumna Award

Magdalena A. Boogaard '00, Manager of Project Management, Evoqua (formerly Siemens Water Technologies)

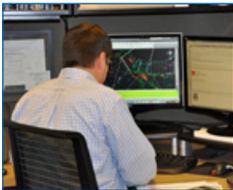


Read more about the awards, the 2014 honorees and past winners at minesalumni.com/awards.

Chelsea Panos



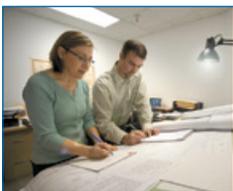
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CLASS NOTES

1954

Richard D. Ridley is a pastor for First Assembly of God church and lives in Mangum, OK.

1962

L. Duncan Creed is the owner of CC's Jewelry and lives in Green Valley, AZ.

Jack L. Rivkin is the chief investment officer of Altagris Investments and lives in Amagansett, NY.

1965

Michael R. DeSilva is a group executive for Newmont Mining and lives in Highlands Ranch, CO.

1966

A. Tom Peery is a spiritual director for Cenacle Retreat House and lives in Houston, TX.

1967

Robert L. Braddock is working for Jordan Cove Energy and lives in Evergreen, CO.

1969

William R. Casey Jr. 

Daniel W. Ferguson 

1971

Roger F. Ball is a software engineer for Alkire Ventures and lives in Lakewood, CO.

1972

Pamela R. Tittes is a consultant for Tittes Mining & Construction Consulting and lives in Gilbert, AZ.

Roy D. Willis is working for ABB and lives in Golden, CO.

1973

Darrell H. Christiansen is working for Pen Gas and lives in Castle Rock, CO.

Robert C. Mengis is a business analytics analyst for Harry & David and lives in Medford, OR.

Kent F. Perry is a VP of onshore programs for RPSEA and lives in Schaumburg, IL.

Gregory K. Staff is a project manager for NGL – Energy Partners and lives in Cypress, TX.

1974

Daniel L. Blakeman is a VP of engineering and project development for GBM Engineers and lives in Golden, CO.

J. Michael Boyles is a production geology learning advisor for Shell Global Solutions and lives in Fort Collins, CO.

William E. Brooks is a principal process advisor for Rio Tinto and lives in West Jordan, UT.

Douglas A. Brown is a services manager for T-Rex Engineering & Construction and lives in Houston, TX.

Fred W. Fest III is a principal mines site specialist for Mintec and lives in Tucson, AZ.

Michael J. Flanigan is an engineering manager for U.S. Bank Denver and lives in Westminster, CO.

Randal G. Grauberger is a senior transportation planning manager for Parson's Brinckerhoff and lives in Johnstown, CO.

Robert L. Heil is an area manager for Ensign Oil & Gas and lives in Frederick, CO.

Lawrence E. Lew is a manager of process technology for Chevron and lives in Napa, CA.

Richard D. Mittan is a container group manager for Strategic Distribution and lives in Westminster, CO.

Shane S. Mohammadi is a project advisor for Exxon Mobil and lives in Newport Coast, CA.

Thomas L. Tjossem is a director of engineering information technology for Southwest Energy and lives in Tucson, AZ.

1975

Susan B. Eaton is a business manager for Eaton Electrical Engineering and lives in Ashland, KY.

Roger C. Kipp is a senior structural engineer for R-Delta Engineers and lives in Rowlett, TX.

Frank J. Koss is part of the IT staff at the University of Texas and lives in Plano, TX.

1976

Alex B. Kilanski is a VP for Science Applications International and lives in Herndon, VA.

1977

J. Scott Gustafson is adjunct faculty for Mesa Community College and lives in Saint Petersburg, FL.

 denotes an individual who has recently posted photos at minesalumni.com



HONORING SERVICE Colonel (Ret.) Richard “Jack” Erfurd ’64, MS ’74, PhD ’79, pictured here with his wife, Sandi, was inducted into the Army ROTC Golden Buffalo Battalion Hall of Fame in May. Jack, whose three degrees are in metallurgical engineering, served with the 82nd Airborne Division, the 307th Engineer Battalion and the 84th Engineer Battalion (Construction) in Qui Nhon, Vietnam; he also commanded the 1st Maneuver Training Command and was the assistant division commander of the 91st Division.

In addition to military service, Erfurd spent 28 years in nuclear manufacturing (primarily for Rockwell International), during which he participated in more than 100 nuclear safeguard inspections—including the Japanese Fukushima Daiichi power reactors damaged by the earthquake and subsequent tsunami in March 2012.

Erfurd has received numerous military awards, including the Legion of Merit, Meritorious Service Medal 3rd Award, Army Commendation Medal 3rd Award, Army Achievement Medal, National Defense Service Medal, Republic of Vietnam Campaign Medal, Vietnam Service Medal, Army Service Ribbon, Army Reserve Components Achievement Medal, Armed Forces Reserve Medal and Parachutist Badge.



TRANSFORMING LIVES

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COLORADO SCHOOL OF MINES RECENTLY* RECEIVED 10 OUTSTANDING LEADERSHIP GIFTS AND COMMITMENTS:

Steve '64 and Dollie Chesebro' made a gift of \$174,679 in support for the Chesebro' Athletic Development Endowment Fund.

A bequest distribution of \$210,123 from the estate of **Bill H. Combs** will provide support for Mines Athletics.

ConocoPhillips made gifts and commitments of \$335,000 to support programs and initiatives across the Mines campus, including several academic departments, the Multicultural Engineering Program and graduate fellowships.

Hugh '49 and Ann Evans released \$793,215 from life income accounts with the CSM Foundation, including \$100,000 to establish the 10th Mountain Division Endowed Scholarship; \$392,841 to establish the Hugh W. and Ann G. Evans Endowment for Mining Engineering; and \$300,374 for general use.

Vernon A. "Bud" Jr. '64 and Kaye Isaacs committed \$250,000 in support for the Clear Creek Athletics Complex initiative.

Tom '80, MS '87 and Tamara Jorden contributed \$110,845 in support for The Mines Fund.

John P. '52 and Erika H. Lockridge contributed \$200,000 in support for the Blaster Scholarship Fund.

Phillips 66 contributed gifts totaling \$250,000 to support programs and initiatives across the Mines campus, including the Departments of Chemical and Biological Engineering, Electrical Engineering and Computer Science, Mechanical Engineering, and Civil and Environmental Engineering, the Phillips 66 SHIELD Scholarship Fund, Phillips 66 Freshman Underserved Scholarship Fund and the Multicultural Engineering Program.

Adam '95, ME '00 and Jamie Sayers gave \$522,500 in support for the Sayers Family Endowment, which provides scholarships for petroleum engineering students.

Whiting Petroleum Corporation gave \$100,000 in support for the Department of Geology and Geological Engineering and the Petroleum Engineering Department.

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

CH2M Hill Inc. made a gift of \$25,000 in support for the CH2M Hill Game Changer Internship Program.

A bequest distribution of \$25,000 from the estate of **Alex Chisholm '57** will provide support for the McBride Honors Program.

The Adolph Coors Foundation made a gift of \$75,000 to support the Adolph Coors Foundation Opportunity Scholarship.

A bequest distribution of \$41,365 from the estate of **Anthony F. Corbetta '48** will provide support for the Anthony F. Corbetta Endowed Scholarship.

Devon Energy Corporation contributed \$40,000 in support for the Devon Energy Corporation Scholarship Fund.

Patrick J. Early '55 made a gift of \$25,000 to The Mines Fund.

The Edna Bailey Sussman Fund provided \$65,159 in support for student environmental internships.

The Geophysics Fund made a gift of \$60,141 in support for the Geophysics Department Endowed Faculty Development Fund.

Gordon L. '50 and Jean Gray provided \$25,000 in support for the Gordon Lee Gray Endowed Scholarship Fund.

John H. Gray '64 provided \$50,000 in support for the Gray Family Endowed Scholarship Fund.

Marathon Oil Corporation made gifts totaling \$56,000 in support for scholarships, academic departments and faculty support.

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

Stephen M. and Betty Lou Neely contributed a mineral specimen to the Colorado School of Mines Geology Museum.

Panorama Orthopedics & Spine Center made a commitment of \$50,000 in support for the Clear Creek Athletics Complex initiative.

Alexander H. '69, MS '75 and Kathleen Paul contributed \$25,000 to the Robert J. Weimer Distinguished Endowed Chair in Sedimentary and Petroleum Geology.

Thomas W. '53 and Mary M. Rollins made a gift of \$25,000 to The Mines Fund.

Andrew P. '78 and Sherry P. Swiger made a gift of \$38,500 to The Mines Fund.

Don L. '56, MS '61 and Patricia Warner contributed \$27,000 in support for the Don L. and Patricia Warner Scholarship Fund, which is part of the Board of Trustees Honors Scholarship Program.

*The CSM Foundation received the gifts and commitments listed here between 2/25/14 and 6/4/14.



Robert A. Mitchell is GM, projects and facilities for Murphy Oil based in Calgary, AB, Canada.

Ronnie J. Vasquez works for Royal Public Schools and lives in Arvada, CO.

1978

Brady J. McConaty is a senior VP for Tabula Rasa Partners and lives in Houston, TX.

Monte A. Townsend is a well performance advisor for BP based in Houston, TX.

1979

Jeffrey A. Baumer is a manager of technical services for Williams Companies and lives in Denver, CO.

Nancy J. House is the chief geophysicist of Exco Resources and lives in Littleton, CO.

John B. Roucis is a senior staff research scientist for Chevron and lives in Hercules, CA.

James R. Sharpe is a senior engineer for Anvil and lives in Ferndale, WA.

Dave A. Thayer is president, Utah operations of American Pacific and lives in Parowan, UT.

1980

Scott K. Palm is a VP of strategy and corporate development for EP Minerals and lives in Reno, NV.

Kenneth W. Snodgrass retired from Shell Oil after a 24-year career in energy trading and 34 years in the energy industry.



ENVIRONMENTAL WORK

HONORED Karen Maestas '91, VP and senior project manager at URS, was honored by the American Council of Engineering Companies of Colorado as the 2014 Outstanding Woman in Engineering, which recognizes professional achievements of a Colorado woman engineer in a leadership position. Maestas' mine reclamation projects have grown annually from about \$500,000 in 2007 to more than \$8 million in 2013. "Being involved in successful environmental cleanups is one of the most gratifying parts of my job," she said, according to an ACEC/CO release. "It's amazing to see technology in action." On the right is the council's president, Greg Roush. Under her leadership, URS has been working with a university to test a biological approach to remediating elevated sulfate levels in acid rock drainage, and they are also looking into applying a common waste product of the beer industry.



MINERS MOVING UP Lakewood, Colo.-based Martin/Martin is making the most of its Mines alumni resources. Andrew Emmons '04, MS '06, Phillip Kriebel '00, David Kuntz '00, Jeff White '97 and Scott Paling '98 (left to right) were all recently promoted to associate at the civil and structural engineering firm.



FIELD CAMP FLASHBACK Mike Maslowski '80 shared these photos from his 1979 geology field camp, which was led by professors Rudy Epis, Keenan Lee (now emeritus), Emmy Booy, Robert Hutchinson ("Hutch") and Greg Holden. During the last two weeks, the group camped off in a field north of Ouray, Colo., shown above, left. "It was the end—that's why we're all smiling," Maslowski says. The group hanging off the car includes (left to right, back row) Richard Fraley '79, an unknown student, Stan Haskins '80, Jere Harper '81, Bruce Williams '80; (front row) Ron Uhle '80, Brian Bond '80, Maslowki, Juan-Carlos Barillas '80, an unknown student and Roger Eustance '80. The adjacent photo was taken "after mapping underground all day at the Camp Bird mine near Ouray with Hutch," writes Maslowski. "We thought we were real geologists and were happy to be back out in the sunshine." The slightly more disheveled group includes (left to right) Maslowski, Uhle, Williams, Harper and an unknown student.



EASTER JOY

Magdalena '00 and Eric '02 Boogaard welcomed son Marcus to their family on March 13, 2014, in Colorado Springs, Colo. "We look forward to bringing our little Oredigger to watch the Mines football team that Eric used to play for and introducing him to Blaster," Magi says.

SPORTS MATCHUP

Following a warm proposal in Maui while on vacation, Emily Freeman '09 and Benjamin Hughes '07 were married on a snowy day, March 23, 2013, in Littleton, Colo. More than 16 alumni attended, including best man Nicholas Peterson '03, MS '09 and groomsmen Ryan Hubbard '05, MS '06 and Adam Noelck '07. The couple met at Mines playing intramural soccer.



GIGGLY GIRLS Ben '03 and Cathie Easley's daughter, Myla, was born December 8, 2013, joining big sister Zora (4).



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Editor's Note: Alumni from the classes of 1981 to 2014 who have recently updated their employment information online or have uploaded photos to minesalumni.com are listed below. In addition, all class notes published in *Mines* magazine since 2008 are available on the site. When you visit, if you take a few moments to enter your latest information and upload some photos, we'll list your name here in the next issue. For online viewing instructions, click on Class Notes at minesmagazine.com.

1981

Michael K. Brandt
James J. Kleckner
Laura S. Klein
Michael J. Sullivan
David R. White

1982

Suzanne Budge
Matthew R. Earlam
Michael R. Kennedy
Eric J. Lauber
Kevin L. Smith

1983

David A. Disbrow
David R. Goddard
Randall L. Johnson
John A. Stafsholt

1984

William E. Dunning
Arvind K. Garg

Anya M. Gill
Jeffrey L. Quintana
Brett D. Smith

1985

Robert P. Daniels
Norman H. Nicholas
David C. Rampton
Joseph J. Rickard

1986

Lawrence R. Clark
John G. Kunkle
Robert B. Wilson
William D. Yearous

1987

Nikolay Korsunsky

1988

A. Milena Aguirre
Vivek Chandra
Michael G. Medberry

1989

William R. Arnold
Jay B. Knaebel
Jose E. Ramirez
L. Andrew Torres
John D. Zuklic

1990

Adriana Adarve
Paul E. Conrardy
Stephen A. Gornick
Adolfo Polillo

1991

William L. Bahn
Kimberly M. Goel
Michael A. Hebert
Peter H. Townsend

1992

Hans C. Hoppe

1993

Joe Don Sanders
Ross A. Thompson

1994

Brenda E. Head
Robert W. Patlovaný

1995

John P.J. Gorman
Justin W. Oleson
Lauren L. Torok

1996

C. Jason Pinto

1997

Safian Atan
Danielle Q. Baird
Tracy A. Brekel
Carol Holmes Butero
Steven H. Chang

Matthew J. Christopher
John G. Cichon
Aaron D. Close
Misty Coburn
Andres S. Cornejo
Joseph M. Evensen
Lewis M. French IV
Irina G. Gorysheva
Steen A. Jergensen
Tord V. Jonasson
Kimberly A. Lacher
Gregory P. Lafave
Joshua R. Laipply
Nathan J. Mead
Andrew P. Nowak
Joshua E. Pedigo
Gary L. Skipp
Ross W. Snare III
Ricky Sullivan
Frederick S. Thompson
Harry J. Wagner Jr.
Elizabeth J. Young-Dohe

1998

Judith A. Abrahams
Samuel J. Anderson
Charles E. Atchison Jr.
Steven M. Batchelder
Rashad Booker
Devin F. Boyce
Jason E. Butchko

Tammy L. Campbell
Shannon Lee Chavez
Ryan K. Christianson
Royal J.R. Downs II
Jason M. Engel
Keith C. Evanson
Wm. Todd Faulkner
John B. Fowler
Jason A. Frazee
Erik M. Freer
Keith A. Heasley
Jodi S.L. Heflin
Scott R. Henriksen
Tina K. Paul Joseph
James E. Kassian
Scott R. Kolstad
Nathan J. Kruse
Frank E. Lousberg
Bryan K. Luke
Anthony R. Manerbino
Jeremy J. Merrill
April E. Mestas
Jonathan L. Milford
Grant H. Mulliken
Clarice A. O'Hanlon
Roman Pinon
Eric C. Pleiman
Richard A. Putnam
Martha L. Quintos-Peterson
Benjamin T. Railsback
Mark B. Reineck
Patrick D. Sandoval

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STANDING, LEFT TO RIGHT

Stanley Gradisar Patent Attorney, Of Counsel
B.S., Mining Engineering, 1974

Matthew Ellsworth Patent Attorney, Shareholder
B.S., Engineering, with honors, 2003,
M.S., Engineering Technology Management, 2005
Top Graduating Electrical Engineer

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

Bruce Kugler Patent Attorney, Shareholder
B.S., Petroleum Engineering, 1981

SEATED

Doug Swartz Patent Attorney, Shareholder
B.S., Mining Engineering, Minor in Metallurgical
Engineering, 1982

Kristen Gruber Patent Attorney, Associate
B.S., Chemical and Petroleum Refining
Engineering, 2000

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CELEBRATING INNOVATION



Mark Jessop

TEAM-BUILDING EXERCISE Two alumni—Jimmy Mulligan '08, MS '10 (second from right) and Elijah Kempton '00 (far right)—were part of a team of five Assured Flow Solutions employees who ran in the 2014 Bolder Boulder 10K race on Memorial Day. David Livesay '00 (not pictured) also ran with the group.



PSYCHED SIBLINGS Dustin '03 and Stephanie '03 Bennetts had a son, Brock, born on February 24, 2014. Brock joins brother Beau and sister Kiera.



HAPPY IN BLUE Ibnu Harris Hasyim '08 and his wife, Winda Meriska, pose with their daughter, Kana, born on May 10, 2013, in Jakarta, Indonesia.

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 Bryan D. Sendelweck
 Lonnie G. Settle
 Matthew T. Sheahan
 Lisa M. Strassle
 Morgan B. Sykes
 Derek R. Trebilcock
 Cyndi M. Wheeler
 Roger K. Wissbaum
 Jason D. Yockey
 Masanori Yoshikawa

1999

K. Matthew Arnold
 Ben M. Bayer
 Aaron W. Bazar
 Rex L. Brown
 Matthew W. Caldwell
 Corinna A. Fenton
 David W. Frazier
 Luis A. Galarraga A.
 Gregory V. Griffith
 Jacob M. Hoban
 Ryan C. Holgate
 Steven T. Kendrick
 Joseph S. Keske
 Brian A. Kibler
 Thomas H. Maloy Jr.
 Grant A. Miller
 Rafael D. Montalvo
 Brian Edward Moore
 Tyler A. Morris
 Tathagata Tota
 Mukherjee
 Patrick M. Newman
 Shannon S. Ostendorff
 Monica C. Pavlik
 Mark J. Pietrak
 Michael L. Ratner
 Dennis B. Riffin
 Jenny R. Riley
 Aleksandr V. Safray
 David L. Sedarsky
 Noor Nazri Talib
 Bernadette J. Thornton
 Jason J. Timmes
 A. Anibal Troconis

Mellanie J. Webb
 Zachariah Weimer
 Tara Saunders West

2000

Adam B. Anderson
 Nikki M. Bautista
 Katie R. Elo
 Alma M. Fuentes
 Jason W. Gahan
 Andrea Trujillo
 Guajardo
 Tiani Jones
 Elijah C. Kempton
 David A. Kewley
 Daniel J. Larkin IV
 Kane K.T. Lee
 Louise Jacobsen Plutt
 Christopher Robinson
 Dax C. Routh
 Marcus D. Self
 Mollie K. Shatek
 Hyon K. Sim
 Philip J. Southworth
 Kelly T. Taga
 Jeremy C. Touchy
 Joshua A. Yurkanin

2001

Thaddeus D. Agar
 Zachary C. Ambariantz
 Daniel S. Baker
 Adam L. Ballard
 Brian M. Brandl
 Justin B. Cammon
 John P. Cann IV
 Efrain Davila
 Jonathan M. Elarde
 Daniel P. Flaherty
 Peter C. Gray
 Matthew P. Gronseth
 Juan-Carlos Guerra
 Dmitri N. Hudak
 Cynthia L. Johnson
 Thierry M. Kabbabe
 Christopher T. Karbach
 B. Aaron Kelley

Matthew J. Kupilik
 Rachel H. Newell
 Christopher M. Reidinger
 Jason F. Riccio
 Derek L. Richard
 Judy L. Rincon
 Laura C. Rojas
 Marcela Rosas
 Brian E. Scarborough
 Neil L. Smith
 Richard P. Spainhour
 Andrew D. Swint
 Michael C. Taliaferro
 Christian P. Veillette
 Lafe C. Wood

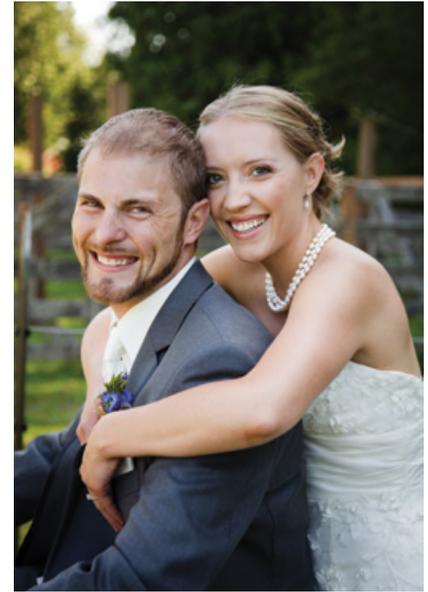
2002

Arief J. Andriyanto
 Nicholas E. Barrett
 Alan M. Baxter
 Jennifer L. Becker
 Eric J. Biegger
 Shawn C. Buell
 Christopher D. Bulson
 Robert A. Cambron II
 Benjamin T. Cooke
 Nichole S. Detering
 William Michael Drake
 Michael W. Eaton
 Gwendolyn E. Eberhart
 Michael W. Gabel
 Robert P. Gillis
 Brandon L. Gleeson
 James P. Gross
 Rene E. Hicks
 Jeffrey D. Jaco
 Martin R. Jertson
 Derek J. Johnson
 Cambrey S. Johnson
 David A. Katz
 Pavan Korada
 Giuseppe Liberati
 Lloyd C. Loveland
 Mohamed R. Mahfouz
 Traci J. Moran
 Eduardo J. Morillo

Terry C. Packer
 Melissa R. Phifer
 Michael A. Rasmussen
 Christopher J. Richings
 Glenn G. Ross
 Lauren M. Scott
 Adam G. Smith
 Craig W. Softley
 Justin T. Stolte
 Christopher R. Sutton
 Malia L. Walsh
 Jesse M. Warman
 Michael D. Widener
 Rachel V. Woolf
 Ezra Yacob

2003

Edward J. Alcock
 Danny D. Allen Jr.
 Matthew J. Alms
 Jason A. Alter
 Laurie M. Alzheimer
 Imran Alam Arain
 Jessica J. Ayers
 Janelle M. Bartscherer
 Kimberly M. Boitano
 Derek R. Bratton
 Sonia A. Buckmaster
 Justin H. Carlson
 Amy M. Crandall
 Britania N. Dahlin
 Rachel M. Debaillon
 Daniel J. DeSnyder
 Francisco A. Garcia
 Kelsey S. Gedge
 Kelly M. Hawkins
 Stephanie Marek
 Johnson
 Travis N. Johnson
 Toni Lee Martin
 Carolina C. Mayoral
 Michael T. McNish
 Anne M. Miller
 Michael P. Mitchell
 Christopher S. Nocks
 Reuma A. Cavalcante
 Oliveira



LOVE WALKS BY Karlyn Adams '10 and Jeffrey Armstrong '08, MS '10 were married at the Farm Kitchen in Poulsbo, Wash., on August 11, 2012, with a dozen other alumni in attendance. The couple started dating at Mines during Karlyn's freshman year; she lived in the Sigma Kappa house, next door to Jeff, in the Beta Theta Pi house. "We would always see each other walking to and from class," Karlyn says. "I had a bunch of friends at Beta and was over there on a regular basis. Jeff and I got to talking one time in fall 2006 when I was waiting for my friends, started dating soon after and have been together ever since!"



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STARTING OFF STRONG Cassia Roe '08 married Ryan Cadenhead '05 September 22, 2012, on Cottonwood Pass after completing the 4,125-foot climb on bikes from Buena Vista, Colo.—Cassia's hometown. Fifteen guests joined them on the ride and for a ceremony atop the pass, including Sarah Roberts MS '09, Nichole '07 and Mason '05, PhD '12 Kass, Harald Reinertsen '02, MS '04, Chase Farrens '07, Bryan Babcock '08, Ben Teschner '08, MS '11 and honorary Mines ski team members Johnny Klitzke and Paul McGregor. After returning to Buena Vista, Cassia and Ryan changed into wedding attire and biked to their second ceremony on a tandem cruiser. The couple met on the Mines ski team in 2004 and started dating the next year; they now live in Crested Butte, Colo.



TRIPLE HONORS Halker Consulting, a firm serving the energy industry that was founded in 2006 by Matt Halker '99, was named one of The Denver Post's Top Workplaces for 2014. The award was based on feedback from Halker's 100-plus employees. "People come first—that's how we've operated our business since day one, and that's the kind of culture that we strive to maintain every day," Halker says. Among those employees are a number of Mines alumni: (back row, left to right) Ed Adkins '96, Paul Davis '07, Jason Keenan '03, Jen (Conty) Christos '06, Weston Collins '12, Austin Dean '12, Andrew Zwickl '03 and Sarah Keese '14; (sitting, left to right) Brianne Brennan '07, Rick Gonzales '08, Matt Halker and Travis Hutchinson '07.

In the spring, the company was named Engineering Company of the Year at the Rocky Mountain region's Oil and Gas Awards gala and also received recognition as one of the 2014 Colorado Companies to Watch.



MATCH MADE IN ETM

Rachel Ballantyne MS '10 and Zach Meints '09, MS '11, who met in the Engineering and Technology Management program at Mines, were married February 2, 2012, at the Four Seasons Hotel in Denver, Colo. They welcomed their daughter, Zoe, on August 13, 2012.

Jennifer K. Pergola
Jonathan A. Roberts
Adam C. Rowe
Margaret A. Schissler
Dominic R. Spencer
Albert C. Templeton
Evan M. Tromble
Matthew R. Winkler
Alex J. Yuffa

2004

Rafael A. Bacigalupo
Heather L. Bader
Kevin L. Baird
Jonathan M. Ballard
Adam F. Behrle
Robert M. Connolly
Jered H. Dean
Dennis W. Dobbs
Victor J. Eifealtd
Jade M. Engel
Sarah E. Enoch
Renee M. Ereckson
Gretta E. Fosha
Justin A. Fosha
Sarah L. Hamm
Brett J. Hesterberg
Sarah E. Hoehne
Phu Tan Huynh
Jamie M. Jackson
Benjamin N. Kaan
Casey M. Kraft
Christopher J. Krier
Michael J. Kuhn

Elizabeth A. LaBarre
Aaron M. Lane
Jennifer E. Langer
Angelique N. Lasseigne
Jacklyn E. Leaf
Derek T. Lis
Laura A. Mauro
Colby G. McCarthy
Rebecca J. Mecum
Brandon C. Merkl
Jenelle M. Morris
Katherine E. Nakamoto
Samuel A. Pannunzio
Ryan A. Pavelka
Michelle L. Probasco
Terra M. Rogers
Tyler J. Slauter
Teresa K. Spann
Tyler B. Stamey
Teresa M. Steuart
Kristina D. Stoll
El Tahir Bailo Suliman
Crystal M. Sullivan
Troy R. Svigel
Ellen T. Swanson
Richard H. Tomlinson
Laine K. Valle
Graham P. Vlcek
Matthew M. Welker

2005

Michael J. Asheim
Brian J. Blaskovich
Maeve A. Boland

Jeremy P. Christopherson
Amanda L. Dolezal
David R. Farrar
Anthony D. Febbraro
Matthew J. Hazleton
Kristopher S. Hill
Kristin M. Horkey
Candra H. Janova
Geoffrey N. Johnson
Justin D. Keener
M. Eleanor Key
Ashley R. Lantz
David T. McMillan
Blake E. McMullin
Michelle A. Moorman
Rebekah Mullen
Jolene R. Mulumba
Neil N. Mushell
Jessica L. Olson
Nicole M. Pendrigh
John C. Pinkett
Laura Roberts
Matthew A. Sauer
Joan L. Schindler
DeLonna F. Schutt
Russell S. Stimatze
Kristin E. Stricklin
Robert D. Tatum III
Terri D. Wagner
Jeffrey C. Ward
Colin M. Wein
Andrew G. Welker
Daniel K. Winterholter

2006

James E. Bland
Matthew J. Ford
Andrew M. Govert
Wesley J. Graba
Shannon M. Greene
Scott W. Kemler
Lisa K. McDowell
Kelly L. McKirahan
Matthew N. Oedekoven
Jodi A. Quinnell
Kerri A. Stone
Craig A. VanHorn
Jared R. Wageman

2007

Zackory S. Akin
Sean M. Babiniec
Matthew R. Bowers
Corey J. Brill
Helena M. Chouinard
Brandon L. Crayne
Sandrine Deglin
Matthew J. Eyser
Myo T. Kyaw
Lia M. Martinez
Brandon W. Richardson
Nathanael M. Van Vorst
Charles L. Yarbrough

2008

Wendy E. Brost
Thomas E. Carrell III

D. J. Dardano
Alex Davidson
Andrea Ham
Adam Y. Hensel
Paul B. Johnson
Branden B. Kappes
Kathryn A. McClure
Sara E. McFarland
Rachel M. Nii Fahey
Andre C. Papineau
Misty Dawn Rowe
Sean P. Santos
Matthew C. Schreiner
Lucas C. Simmons
Melissa S. Stratton
Matthew R. Tevebaugh
Phillip W. Woods

2009

Jared Albers
Jonathan M. Banks
Skylar B. Cobb
Brent E. Driller
Mark Gelhaus
Ruixiang Gu
Alfredo J. Guariguata
Charles B. Harkey
Philip L. Hynes
Merrick H. Johnstn
Joseph D. Joshua
Dylan H. Klompenhouwer
Jonathan M. Lanning
Paula A. Lucero

Cody P. Margetts
Jacob J. Messing
Steven B. Meyerhoff
Jobediah J. Rittenhouse
Andrew R. Williams
Roberts
Leland G. Rothschild
Han Shen
Matthew J. Sinkey
Travis T. Smith
Sean M. Studer
Brandon D. Sullivan
Cesar O. Tovar
Eva I. Tuthill

2010

Kenan Biscic
John S. Chapek
Elizabeth J. Conover
Jeremiah M. Gorman
Brian V. Harris
Jacqueline S. Lagen
Electra L. Lamb
Justina D. Larsen
Benjamin W. Lowry
Rachael E. Madland
John R. Marshall Jr.
Kenechukwu C. Mba
Brian H. McLachlan
Kevin T. Mininger
Berengere D. Papin
Jeffrey R. Reindl
Justin M. Rotello



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MEP CONNECTION Rachael Cisneros '08 and Sabu Watanabe '08 married on August 8, 2012, in Morrison, Colo., having met in the Minority Engineering Program (now the Multicultural Engineering Program) the summer before their freshman year. Alumni in the bridal party included Rachael's sister, Allysia Cisneros '12, James Reeves '08 and DeaZhan Maize '06 (formerly DeaZhan Begaye). The couple had a son, Saburo, on August 8, 2014.



LIFELONG MATES Kaitlin Soehner '11 and Jobediah Rittenhouse MS '09 were married August 10, 2013, at Beecher Island near Idalia, Colo., where they grew up together.



POP QUIZ Mic '09 and Meghan (Huenefeld) '09 Cozzens welcomed daughter Ellie on December 5, 2013. The couple, who live in Greeley, Colo., plan to celebrate their fifth anniversary in Golden this summer after a fortuitous start: Mic proposed to Meghan during a class at Mines. "The alumni association has been a vital asset to our career transitions and networking efforts," says Mic, who took a position with Leprino Foods in 2013.

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Ryan C. Sprackling
Naveen Thomas
Shannon M. Ulrich
Nicholas B. Wyatt

2011

Savannah L. Afoa
Grant C. Agee
Kevin M. Allen
Matthew C. Armijo
Ryan S. Browne
Jordan A. Carl
Kimberly A. Cox
Brent W. Dickinson
Mathew R. Everist
Gordon W. Galloway
D. Ryan Hild
Andrew K. Hoffman
Nathan C. Jorgensen
Meaghan E. Kenna

Callen C. Liles
Adam P. Lockard
Douglas J. Low
Richard M. Lucero
Fernando J. Martinez
Richard M. McAllister
Ricardo Mendez
William L. Nagle
Robert R. Nellums
Eric J. Nydegger
Peter D. Oczkus
Aaron J. Piper
Catherine G. Putnam
Kory L. Risky
Logan J. Ronhovde
Grant M. Schulte
Kyle R. Smith
Andrew W. Tillotson
Brian Wagner
Joshua A. Warner

Brant E. Wiedel
Michael J. Wilson

2012

Elif Acikalin
Brandon B. Andersen
Jasper T. Atwood
Levi M. Bates
Lauren N. Benta
Daniel C. Bittinat
Christian J. Clark
Sarah J. Cooper
Andrew A. Dalmau
Joshua S. Dinges
Patrick D. Eddy
Cameron C. Emerson
Aaron M. Frary
Midowa D. Gbededo
Ryon A. Gelo
Megan A. Gift

Joanna L. Graves
Madeline R. Green
Michael J. Grundy
Taylor M. Gunn
Brian E. Harclerode
Richard A. Hood
Michael D. Jones
Zen M. Keith
Brennan K. Kimura
Matthew G. LaBonte
Matthew R. Mapes
Kimberly N. Mizenko
Joshua R. Morain
Jonathan J. Reeves
Adam C. Schroeder
Luke D. Schweitzer
John R. Sherozman
Felipe Silva Ardila
Duane D. Smalley
David J. Thul

2013

Chance W. Adams
Tyler J. Bain
Jason S. Banning
Steven A. Bates
Ty A. Bereskie
Akiko L.C. Billings
Isaac K. Brost
Jennifer E. Buechler
Taylor B. Cable
C. Tyson Cook
Chad M. Daves
Levi N. Davis
Abbas Ebnonnasir
Charles M. Enloe
Matthew A. Erbes
Kenneth B. Finch
Kevin M. Flahive-Foro
Ryan J. Garvey
Thomas J. Gately

Joshua J. Geist
Brahim Ghrissi
Jacob G. Grasmick
Korey T. Harvey
Thomas E. Hearon IV
Emily M. Hildreth
Eliot T. Hill
Paul M. Holcomb
Nick P. Jones
Jonathan A. Knudtsen
Russell K. Lewis
Andrew W. Lick
Ryan A. Lucchese
Katie L. Mackey
Marissa R. Marin
Joshua A. Mathews
Matthew T. McNew
Paul M. Meier
Sean L. Mergl
Norimitsu Nakata

ALUMNUS PROFILE

Risk, Failure, Hard Work and Lots of Success

Some people pack their lucky rabbit's foot when they head to Las Vegas. Others make sure they take the right clothes so they'll look sharp night and day.

When Charles "Chuck" Shultz '61 went to Vegas for his honeymoon during his junior year at Mines, he took a slide rule.

"I still had homework to finish," says Shultz.

It wasn't the last time that Louanne, his wife, had to make accommodations for Chuck's education. Shortly after their return to Golden, field camp and summer school kept the newlyweds apart for six weeks.

But if the beginning of their marriage was a test, then they passed: The couple recently celebrated their 53rd wedding anniversary.

After graduating from Mines with a professional degree in geological engineering on a Friday, Chuck drove a packed trailer to Oklahoma City with his bride, reporting for his first day of work at Tenneco Oil on Monday morning.

"At the time, Tenneco and Shell were the only two companies that used geological engineers as geological engineers," he says. "I wanted to use my degree rather than be just a pure geologist or a pure engineer." Shultz put his education to work in a variety of exploration and production roles in the 28 years that followed. When the company was sold in 1988, he was senior vice president of international and marketing.

After the sale, he left Houston for Calgary, Alberta, to become president and CEO of Gulf Canada Resources.

"It was a position with a lot of risk in a different country and culture, but the business fundamentals were the same and Gulf Canada had a staff of top-quartile people," Shultz recalls. "Upon my departure in 1995, the company had made a remarkable recovery."



Ricardo Merendoni

Now, Shultz is chairman and CEO of Dauntless Energy, a family-owned upstream oil and gas firm founded in 1995. Its most significant project is an interest in the largest carbon dioxide-enhanced recovery-oil project in Alberta, which injects about 19 million cubic feet of CO₂ waste a day underground to produce oil previously considered unrecoverable. Shultz says it's the equivalent of removing 70,000 cars from the highway.

Dauntless is Shultz's "spare time" job that "often gets taken care of at night," he says with a chuckle. During the last 25 years, he has served on more than 29 corporate and not-for-profit boards, including Newfield Exploration, an independent company that specializes in the exploration and production of crude oil and natural gas; Enbridge, the largest oil pipeline in North America; Canadian Oil Sands; Matrix Solutions, a private environmental services company in Shultz's hometown of Calgary; and the Sinneave Foundation, a nonprofit organization that conducts research for autism.

In 1996, he was the founding chairman of Canadian Oil Sands, which holds 37 percent of Syncrude, one of the world's largest producers of synthetic oil from oil sands. He helped Canadian Oil Sands grow its value from \$400 million to more than \$5 billion. That same year, he was the founding chairman of Matrix Solutions, which now operates in four provinces in Canada. He has served on the Newfield Exploration board since 1993 and is currently lead director.

One of the more memorable board appointments was when he became the founding chairman of Graf Canada, a hockey and figure skate manufacturing company that has since grown into a significant player in the North American market. Shultz was elected chairman with the understanding that he would

Badri Narayanan
 Tony Nguyen
 Emily R. Nicholas
 Megan R. Oller
 Morgan C. Post
 James L. Priestley
 Aleksandr Reznik
 Marcus J. Ritosa
 Nathaniel Rubey
 Benjamin W. Salmson
 Morgan A. Seifert
 Torey E. Semi
 Amy L. Shaw
 Michael J. Slepicka
 Frances A. Smith
 Chad J. Stich
 Sindhu H. Thomas
 Benjamin C. Thomson
 Joseph Ming-Ju Tsai
 Christopher R. Waldeck

Ryan B. Wamble
 Aaron V. Wandler
 Na Wang
 Scott J. Warren
 Nicholas A. Waskewicz
 Heather L. Wilson
 Derek S. Witte
 Feng Xiao
 Tao Xu
 Loren M. Zeigler

2014

Katharine A. Courtright
 Zebany N. Cyr
 Grant R. Johnson
 Erica A. Kellenberger
 John Llan de Rosos
 Fausto M. Moraes
 Kevin N. Tornes



ONE YEAR IN
 Scott Greensides '12 and Kristen Tupper were married on May 25, 2013, in Littleton, Colo., with Andrew Mitchell '12 (groomsman standing farthest right) and Devin Sammon '11 (sitting left) in the wedding party. The couple recently moved to New Albany, Ind., for Scott's new job as an automation design engineer with Samtec.



Lauren Jacobs

Nearly 50 students have benefited from Chuck and Louanne Shultz's (center, front) scholarship fund, established in 2003 in support of Mines' swimming programs. Their daughter, Julie King '86 (front row, farthest left), swam at Mines; her husband, Scott King '85 (farthest right) is also a graduate.

never be seen wearing Graf skates on ice.

"I can't skate, and it would ruin the company's image," he says.

The first chair of the Mines President's Council, Shultz received the Mines Distinguished Achievement Medal in 1986. He currently serves on the Mines Foundation Board of Governors and as co-chair of the university's \$350 million *Transforming Lives* campaign.

Recently, the Shultzes established the Chuck and Louanne Shultz Scholars Program that supports the men's and women's swimming programs at Mines. "Our daughter was a captain of the Mines swimming team, and you always do what your daughter wants," says Chuck. The Shultzes have also committed a \$250,000 (Canadian) seed gift to the university to establish the Shultz Family Leadership in Humanitarian Engineering Fund.

Their daughter, Julie King '86, is just one of many family members to attend Mines, along with their son-in-law, Scott King '85, and Louanne's father (John Christmann Jr. '36), uncle (Charles Christmann '49) and nephew (John Christmann IV '88).

"I can't help but get a twinge on the back of my neck when I look up at the M on the mountain, whether it's during the day or night, because of how fortunate I was to get an education there," Shultz says. "I wasn't the best of students and I learned how to fail there. A successful career has some failures. At Mines, you learn how to fail. You don't fear failure as you forge ahead in your career. I think we have too many young people who fear failure and, as a result, they don't take risks. Helping young people succeed, whether in university or business, is the most satisfying reward there is."

—Brad Dunevitz



MEMORIAL DAY WEDDING Scott Ferguson '11 married Allison White on May 27, 2013, at the Craftwood Inn in Manitou Springs, Colo. Alumni who attended include Sergio Banuelos '11, Joe Giammaria '10, Angung Hariyadi MS '02, Jeremy Johnson '10, Daniel Krygowski MS '75, PhD '78 and Conor Pesicka '11.

ENGAGED IN TEXAS, WED IN CALIFORNIA Renee Francese '10 and Luke Richards '10 were married September 1, 2012, at South Coast Winery Resort in Temecula, Calif., among many Mines alumni. The wedding party included Daniel Moran '10, MS '12, Scott Wiedemann '10, MS '11, Jeff Dunn '09 and Roxanna Frary '10. Renee and Luke met on the first day of school their freshman year, both rooming on the same floor in Randall Hall. They started dating in 2007 and were engaged in 2010, when Luke proposed to Renee at sunset on the pier in Galveston, Texas, shortly after graduation. After they both finished graduate school at Texas A&M University, Renee and Luke moved to California, where Luke is a performance and flying qualities engineer for the Department of Defense at Edwards Air Force Base and Renee is a geophysicist for Chevron in Bakersfield.



RESEARCH IN STEEL AWARDED

A technical paper that highlights the development of third-generation advanced high-strength steels, co-authored by a Mines alumnus and two professors, has received a Finalist Medal from the American Iron and Steel Institute. Grant Thomas MS '09, PhD '12 (pictured), whose Mines degrees are in metallurgy and materials engineering, is a research engineer for AK Steel; John Speer is the John Henry

Moore Distinguished Professor of Metallurgical and Materials Engineering and director of the Advanced Steel Processing & Products Research Center; and Emmanuel de Moor is a research assistant professor. The paper, "Tensile Properties Obtained by Q&P Processing of Mn-Ni Steels with Room Temperature Quench Temperatures," discusses the enhanced formability of these steels, which is expected to result in lower vehicle weight and increased fuel efficiency without compromising safety.



WINNING LIFE Aden was born March 2, 2014, to Nathan '11 and Tandra Shultz. Ten weeks premature, Aden weighed in at 3 pounds 4 ounces and immediately developed pneumonia and sepsis. During the tenuous weeks that followed, he underwent three surgeries while recovering from pneumonia and hydrocephalus. He came home to his family on May 10, his original due date, with only low-flow oxygen to compensate for Denver's altitude.

ALUMNI: What in the world are you doing? Send us your photos and a brief description of your activities (for instance, getting married, growing your family, traveling, meeting other alumni) to magazine@mines.edu.



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IN MEMORIAM

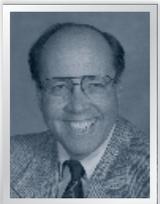
“When you are sorrowful look again in your heart, and you shall see that in truth you are weeping for that which has been your delight.”

—Kahlil Gibran



FREDERICK C. ALDRICH '48 of Findlay, Ohio, died April 23, 2014. Born in 1920, Fred served in the U.S. Army during World War II and later earned

a professional degree in petroleum engineering from Mines, where he was a member of Beta Theta Pi fraternity. For 31 years he worked for Marathon Oil, retiring in 1979 as manager of the planning coordination division. While with Marathon Oil, Fred worked in the United States, London and Geneva; he also graduated from the Harvard Business School Advanced Management Program in 1963. He was a registered professional engineer in Texas, a member of the Society of Petroleum Engineers and the American Institute of Mining, Metallurgical, and Petroleum Engineers, and a supporter of Mines as a member of the President's Council for several years. Fred was predeceased by his wife of 67 years, Ruth. He is survived by his daughters, Pamela Cordeau, Pennie Aldrich and Patricia Hillis; eight grandchildren; and five great-grandsons.



FRANK J. ANDERSON '64 of Richland, Wash., died November 7, 2013. Born in 1941, Frank earned a professional degree in geological engineering from Mines and, in 1968, a master's

degree in the same field from the University of Arizona. He was an assistant professor of geology at San Jose State University in California, and then worked as a geologist and environmental scientist at the U.S. Geological Survey in Virginia. Eventually he became division chief at the U.S. Office of Surface Mining. From 1984 until his retirement in 2006, he worked as an environmental consultant.

A vintage sports car racing enthusiast, Frank won the SOVREN Vintage Championship in 2012, driving his 1957 Alfa Romeo Guilietta. In his community, he coached youth soccer, mentored for the Boy Scouts and served his church. Frank was predeceased by his second wife, Jane; he is survived by sons James and Brendan Anderson; stepsons Gregory and Adam Altman; sisters Karen Armstrong and Jane Hart; and three grandchildren.



HERBERT J. ASHE '49 of Highlands, N.C., died August 29, 2013. Herbert was born in 1922 in Highlands and spent much of his childhood in Chile and Argentina. He was a

U.S. Navy pilot during World War II 1942–1945 before earning a professional degree in mining engineering from Mines, where he was a member of Sigma Alpha Epsilon fraternity. Herbert worked for Bethlehem Steel for most of his career, which had him living in Venezuela; Mexico; Bethlehem, Pa.; and Wheeling, W. Va. He was a consultant 1985–1999 and a member of the American Institute of Mining, Metallurgical, and Petroleum Engineers and the American Iron and Steel Institute.

At Mines, Herbert was a member of the Heritage Society and the President's Council; he established an endowment to honor the memory of his son, Timothy G. Ashe '78, who died in 1980 in a mining accident. Herbert was predeceased by his first wife of 50 years, Gloria; his second wife of 10 years, Enid; son Timothy; and brother-in-law John D. McIver '50. He is survived by his wife, Dorice; children Mary Ellen Madison, Michael Ashe and Herbert Ashe Jr.; brother Donald G. Ashe '50; nine grandchildren; and seven great-grandchildren.



MANUEL BETTENCOURT DIAS '50, MS '51 of Matos Lima, Portugal, died July 4, 2013. Born in 1920, Manuel was raised in Mozambique,

and was the first of his country to receive a scholarship to an American mining school. After earning a professional degree in geological engineering and a master's degree in geology from Mines, he wrote a three-book series, “An African Life,” about his experiences there: “An African Name,” “An African Career” and “An African Challenge.” He taught at UC Colorado Springs and was a gemstone faceter and jewelry maker. Manuel was predeceased by his wife, Christine, and their son, Dan Bettencourt '81. He is survived by friends and family worldwide, including Julie Kinder '83.



W. REX BULL of Golden, Colo., died March 16, 2014. Born in 1929 in Hull, England, Rex was a professor of metallurgy at Mines 1967–1995; his family says he felt

his great achievement at Mines was writing “The Profile of the Future Graduate” in 1980 as part of a faculty committee, which resulted in important changes to the undergraduate curriculum, including creation of the EPICS program. Rex earned a bachelor's degree in mineral dressing and coal preparation from the University of Leeds, moved to Canada for a few years, and then lived in Brisbane, Australia, where he earned a doctorate from the University of Queensland. He was a poet, photographer, rugby referee and supporter of musical events, serving on the board of the Jefferson Symphony Orchestra and Evergreen Chamber Orchestra. Rex is survived by his second wife, Peggy; children Marc Bull, Michelle

Bull, Dominique Fauble and Julian Bull; stepchildren Stephanie Ball and Joe Lyon; 11 grandchildren and step-grandchildren; sister Peggy Jackson; and ex-wife Denise Desbarats.



PETER G. BURNETT
'43 of Denver, Colo., died December 5, 2013. Born in 1920, Peter attended Yale prior to graduating from Mines with a professional

degree in petroleum engineering. He was commissioned as an ensign while attending the U.S. Naval Academy. After World War II, Peter worked on oil rigs in Texas and Oklahoma; much of his professional career was with Standard Oil in Indiana and Ball & Associates in Denver. In 1965 he became a consultant in Chicago specializing in underground gas storage. Peter was a member of the President's Council at Mines for three years. He was predeceased by his daughter, Annie Burnett, and is survived by his wife, Georgia; children Priscilla and Peter Burnett; and one grandson.

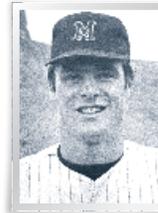


WILLIAM WEI-LIANG CHU '50 of Schenectady, N.Y., died November 1, 2013. Bill was born in 1921 in Nanjing, China, the eldest child of General Chu Pei-te, the army

chief of staff under Chiang Kai-shek and Wei-Quan Chao. Honoring his father's belief that rebuilding post-war China would require engineers, not soldiers, he made plans to go to Germany to pursue scientific studies. However, after the bombing of Pearl Harbor, he remained in the Philippines until the end of World War II, where he married Anne (Ling-Mei) Yang and had a daughter. Shortly after the end of the war, his wife died and he moved to the United States. Bill briefly attended the University of Southern California before enrolling at Mines, where he earned a professional degree in metallurgy and played on the tennis team. In 1952 he received a master's degree from Lehigh University, and three years later he became a U.S. citizen.

Bill worked for GE his entire career, from defense-related projects such as developing reaction control thrust for X-15 aircraft to the industry's first time-share system and magnetic thin-film recording head and media for disc drives, which served as the standard in CD and DVD drives. He was also involved in the

development of artificial intelligence vision devices. After retiring from GE, Bill founded TDA International with a partner to engage in two-way technology transfers with China. He is survived by his second wife, Ro Lin; children Mary Anne Winslow, David William Chu, Laurence Chu, Deborah Dejah and J. Michael Chu; sisters Jeanette Wu and Esther Yang; brothers Wei Yee, Wei Lee and Raymond Chu; seven grandchildren; and two great-grandchildren.



MICHAEL R. COLLODI
'72 of Frisco, Texas, died August 3, 2012. Born in 1950, Michael received a bachelor's degree in petroleum engineering from Mines, where he was an All-

American athlete in football and baseball, earning induction into the Mines Athletics Hall of Fame in 2000. He was drafted by the Texas Rangers but declared a free agent when he was unable to report due to a military obligation. Michael was working as a petroleum engineer when the Pittsburgh Pirates drafted him for its Class A team in 1973; he played for the Pirate and Los Angeles Dodger organizations before returning to his profession as a petroleum engineer. Michael is survived by his son and daughter-in-law, Michael Jr. '95 and Stacey '95 Collodi; son Richard Collodi; brother Barry Collodi; sister Karen Gale; and four grandchildren.



DAVID F. COOLBAUGH
'43, '47, DSC '61 of Golden, Colo., died March 13, 2014. Born in 1920 to Osie and Melville F. Coolbaugh, Mines' ninth and longest-serving president

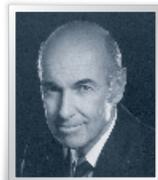
(1925–1946), Dave grew up on campus in Coolbaugh House. During his early years at Mines, Dave was briefly put on academic probation after his grades slipped. While he restored these by the end of the academic year, his father forbade his return to campus the following year, causing him to find work and live independently. After returning to Mines, he completed his professional degrees in mining engineering and geological engineering and, later, a doctorate in geophysics; he was also a member of Sigma Nu fraternity and Kappa Kappa Psi honor society.

Between his first two degrees, Dave served in the U.S. Navy in the Pacific theater in World War II as engineering

officer and executive officer, leaving with the rank of lieutenant. He worked as a consulting engineer before returning to Mines to complete his doctorate. After graduating, he worked at Mines as an assistant professor before moving his family to Mexico, where they remained 1964–1986, while Dave worked for Asarco Mexicana, Industrial Minera Mexico, Industrias Penoles and as an independent consultant.

Following the death of his wife, Kathleen, in 1986, Dave moved back to Golden, where he was a mining and geological consultant. He helped to create an exchange program that was finalized in 1988 between Mines and the University of Guanajuato in Mexico; the agreement formalized the link between the two schools for faculty and student exchange programs, joint research, undergraduate training, and postgraduate training and research, according to a July 1990 article in *Mines* that Dave authored.

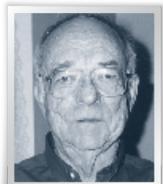
His many honors from Mines include Honorary Membership to CSMAA (1990), the Mines Medal (1990), the Outstanding Alumnus Award (1996) and the Coolbaugh Memorial Award (2002). He was a member of the Heritage Society and the President's Council at Mines, the latter for nearly two decades. Dave was predeceased by his first wife, Kathleen; son Jim; and siblings John '31 and Frank '33 Coolbaugh and Loie Mae Hinkley. He is survived by his second wife, Ruth; daughters Connie Leach and Margaret de Leon; four stepchildren, including Charles Crew '70; nephew Melville J. Coolbaugh '54; great-nephew Mark Coolbaugh '78; four grandchildren; and four great-grandchildren.



WILLIAM J. HOLTMAN
'43, MS '47 of Lakewood, Colo., died February 11, 2014. Born in 1921, Bill earned professional and master's degrees in metallurgical engineer-

ing from Mines, where he was a member of Blue Key honor society. He also graduated from Northwestern University School of Management. He served in the U.S. Army Corps of Engineers and then transferred to the U.S. Air Force as a pilot, where he flew in the China-Burma-India theater 1944–1946. Starting in 1947, Bill spent the remainder of his professional career working for Denver and Rio Grande Western Railroad, starting as chief metallurgist and eventually becoming president and CEO in 1978. He was chairman of Rio Grande Industries, the

holding company that controls D&RGW, and served as vice chairman until his retirement in 1992. Bill received the Distinguished Achievement Medal from Mines in 1974; he was also a member of the President's Council for more than a decade. He is survived by his wife of 66 years, Doris; son William J. Holtman Jr.; three grandchildren; and two great-grandsons.



CLEMENT A. LEHNERTZ JR. '52 of Centennial, Colo., died November 24, 2013. Born in 1927, Clem served in the U.S. Army during World War II and the Korean

War before completing his professional degree in geological engineering at Mines. After graduation, he worked as a geologist for companies primarily in Colorado, with a stint in Texas 1959–1968 at Exploration Engineering and then Texas Instruments. He returned to Colorado in 1968 as part of the remote sensing section of the Geological Research Department for King Resources, followed by work with Basic Earth Science Systems and Phelps Dodge, where he was staff photo-geologist. For six months in 1976, he was a chief consultant to Uriran in Tehran, Iran, and ended the year with Barringer Research in Denver as chief geologist and U.S. branch manager. He was also president of two companies, Calenco and Environmental Database. Clem was predeceased by his son, Paul. He is survived by his wife, Doris; children Mark, Chris and Cary; and four grandchildren.



GEORGE B. LUCAS of Lakewood, Colo., died May 1, 2014. Born in 1924, George joined Mines as an assistant professor in the Department of Chemistry and

Geochemistry in 1956, moving to Golden from Alabama, where he worked for Rohm & Haas' Redstone Arsenal Research Division. He was named associate professor in 1961, full professor in 1966 and professor emeritus in 1988.

George served in the U.S. Army 1943–1946 in the southwest Pacific and the Philippines. He earned a bachelor's degree in chemistry from Tulane University in 1948 and a doctorate in physical organic chemistry from Iowa State University in 1952. He also completed a postdoctoral fellowship at Northwestern University in 1953. George was predeceased by his

wife, Euphama. He is survived by his daughter and son-in-law, Euphama and Thomas '76 DeMars; three granddaughters; and 11 great-grandchildren.



THOMAS O. MILES '76, MS '85 of Littleton, Colo., died January 20, 2014. Tom was born in 1947 in Boone, Iowa, and attended Iowa State University for a

year, followed by two years in the U.S. Army. He was assigned to the Signal Corps and served in Vietnam for a year, earning two Bronze Stars. After his service, he skied for a winter before enrolling at Mines, where he earned a bachelor's degree in geophysical engineering. He worked at Newmont Mining for a number of years and then returned to Mines to complete a master's degree in geophysics. Tom's work focused on mineral exploration using time domain electromagnetics. He spent eight years working in Japan for Mitsui Mineral Development and then returned to the Denver area in 1999 as a consultant. He is survived by his brother, Jim.



EUGENE C. OLINGER '54 of Lakewood, Colo., died February 22, 2014. Gene was born in 1932 and grew up in Denver. He earned a professional degree in petroleum refining

engineering from Mines, where he was a member of Sigma Phi Epsilon fraternity and was on the varsity wrestling team. In the late 1970s, Gene became president of Dewco Water Equipment and then consulted through his own company, Denco Consulting, until he retired. He was a member of the American Institute of Chemical Engineers and the American Water Works Association. Gene was predeceased by his son, Brent; he is survived by his wife, Darlene; sons Keith, Dale and Chad; brother Richard; and seven grandchildren.



HUBERT M. RACKETS '42 of Eustace, Texas, died September 16, 2013. Born in 1917, Hubert attended Mines 1935–1937 and again 1940–1942, earning a professional degree in

petroleum engineering. For most of his career, Hubert worked as a geophysicist, starting with Carter Oil until 1955, travel-

ing to many countries in South America, among other locales. For the next four years he was chief geophysical interpreter for Petroleo Basileiro (Petrobras) in Rio de Janeiro, Brazil, and then moved to Dallas, where he worked for Texas Instruments 1959–1967. Hubert retired as vice president of Seiscom Delta United (formerly United Geophysical) in 1983 after 41 years in the petroleum seismic industry.

The art and science of faceting gemstones caught Hubert's interest in 1943, and he became a master faceter, serving as vice president of the Texas Faceters Guild in 1988. He was predeceased by his wife of 70 years, Helen, and is survived by his children, Barbara Skiles, Stephen Rackets and William Rackets; nine grandchildren; 17 great-grandchildren; and one great-great-grandson.



MARTIN C. STANGER '44 of Reading, Mass., died November 5, 2013. Born in 1922, Martin earned a professional degree in petroleum engineering from Mines. He served in the U.S.

Navy 1944–1946 and was a prisoner of war in Germany, according to his niece, Diane Ventre. After engineering trainee work at Sinclair Refining and Caltex 1946–1948, Martin spent two years as a plant operator and then inspector at Arabian American Oil in Dhahran, Saudi Arabia. He worked for Lago Oil & Transport in San Nicolas, Aruba (1951–1957), Creole Petroleum in Caracas, Venezuela (1957–1964), and Universal Oil Products in DesPlaines, Ill. (1965–1969). His work took him to Sydney, Australia; Helsinki, Finland; and Japan. Martin was predeceased by his wife, Irene, and is survived by his niece, Diane.



HENDRIK K. VAN POOLLEN MS '50, DSc '55 of Shawnee, Colo., died June 24, 2013. Born in 1927, Hank earned a bachelor's degree in mining engineering in 1948 from

the Technical University of Delft in the Netherlands, followed by master's and doctoral degrees from Mines in the same discipline. He joined Halliburton in Oklahoma in 1955 and Marathon Oil in Colorado in 1958. In 1966, he served on the U.S. Army Corps of Engineers' Panel of Consultants to study Derby, Colo.-area earthquakes; he later served

on a presidential panel to study the issue long-term.

Hank taught at both Princeton and Mines, where he was an adjunct professor of petroleum engineering beginning in 1969. That same year, he formed a consulting company in Littleton, Colo., that presented petroleum courses worldwide. He published more than 70 articles in technical and professional journals, authored and co-authored a number of technical books, and was awarded at least nine patents. Hank was predeceased by his son, Michiel van Poolen. He is survived by his wife of 17 years, Deanna; children (from his first wife, Elizabeth) Elsbeth Walkley-Jost, Bart van Poolen, Maarten van Poolen and Walter van Poolen; stepson Wade Naveja; and 10 grandchildren.



GERALD E. VAN SICKLE '58 of Eaton, Colo., died November 13, 2011. Born in 1936, Gerald earned a professional degree in metallurgical engineering from Mines, where he

was a member of Alpha Tau Omega fraternity. He completed Officer Candidate School after graduation and joined the U.S. Navy the same year. After a tour in Japan, Gerald earned a double master's degree from Massachusetts Institute of Technology in naval architecture and marine engineering. He designed a mine sweeping ship while stationed in Ohio, finishing his naval career in San Diego, Calif., in 1979 with the rank of lieutenant commander. Gerald worked as a civilian for the Navy until his retirement in 1990. He was predeceased by his sisters, Phyllis and Sharon, and is survived by his siblings, Betty Winborough, Shirley Smith, Robert Van Sickle and William Van Sickle.



FRANCISCO F. VIDAL '51 of Key Biscayne, Fla., died March 6, 2010. Born in 1930, Francisco earned a professional degree in mining engineering from Mines, where he

played on the varsity baseball team. His professional career included positions with Osborne Chappel Goldfields; Central American Goldfields (president); Panacobre (vice president); and Aurifera El Sol (president). He was a member of the American Institute of Mining, Metallurgical, and Petroleum Engineers; ASM International; American Society of Mechanical Engineers; and the Society for Mining, Metallurgy and Exploration. His wife, Zaida, died in 2011.



TERRIL E. WILSON '61 of Tucson, Ariz., died February 8, 2013. Born in 1937, Ted earned a professional degree in geophysical engineering from Mines, where he

was on the varsity track and field team. Later, he earned two master's degrees—one in mining engineering from Pennsylvania State University (1973) and one from the University of California at Berkeley (1985). Ted worked for the Energy Sources Division of Kaiser Engineers in Oakland, Calif., in the mid-1970s, and a decade later he was chief industrial engineer for Island Creek in Holden, W. Va. He received a doctorate from the University of Kentucky in 1998 followed by teaching positions at two universities: assistant professor in the Department of Mining and Geological Engineering at the University of Alaska in Fairbanks and adjunct professor in the Department of Mining and Geological

Engineering at the University of Arizona in Tucson. He is survived by his wife, Ann, and sister, Honie Crandall.



PETER YURCISIN '53 of Alexandria, Va., died November 2, 2013. Born in 1931, Peter received a USA Scholarship to attend Mines, where he

earned a professional degree in metallurgical engineering and was a member of Sigma Phi Epsilon fraternity. After graduating, he worked for General Electric until 1956, when he enlisted in the U.S. Navy Officer Candidate School in Rhode Island. While there, he worked on Navy air-launched guided missiles and rockets and earned a JD degree from Georgetown University Law School (1960).

From 1960 to 1986, Peter worked as a civilian for the Navy, first in its Bureau of Naval Weapons and then in Naval Air Systems Command. He was head of the Helicopter Compatibility Section—working with NATO and other military alliances—and was responsible for the systems specifications, standardization and related technology involved in major aircraft weapons systems acquisitions. Peter was the deputy assistant secretary of defense for total quality management 1986–1989 and then became senior vice president and general counsel of the American National Standards Institute. He practiced law throughout his life.

Peter was predeceased by his wife, Elizabeth. He is survived by his daughters, Nina Fernandez, Paula Yurcisin, Lindy Yurcisin and Kim Garrison; siblings Ann Koehnlein, Evelyn Houston, Daniel Yurcisin and Joseph Yurcisin; and six grandchildren.

—Compiled and edited by Amie Chitwood, Jo Marie Reeves and Nancy Webb

ALSO REMEMBERED

ENRIQUE P. BUGARIN '37..... unknown
JAMES J. BUNTING '90..... March 31, 2014
GARY E. BURTCHAELL '64..... October 20, 2012
NORMAN E. EASTMOORE JR. '51..... June 19, 2012
JOHN B. ENGLISH '40..... November 6, 2012
LARRY R. FAULKNER '59..... June 17, 2013
ROBERT E. FRIEND '49..... December 3, 2013
JACK E. GAINES '47..... April 19, 2006
WILLIAM H. HOMMEL '50..... February 27, 2013

WILLIAM D. HUNZEKER '65..... July 12, 2011
GEORGE F. JENKIN '38..... 1967
POW KHAMOURAI '40, '41..... unknown
HAROLD B. OVERSTREET '49..... April 16, 2010
JAMES R. PATCH '50..... January 22, 2011
DONALD E. ROE '74..... November 14, 2012
RICHARD C. SOARES '54..... February 9, 2012
MARK D. STECKLINE '90..... January 13, 2012

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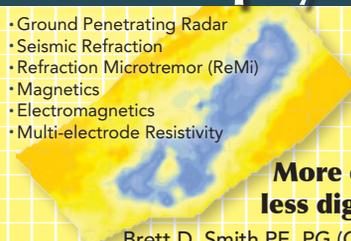
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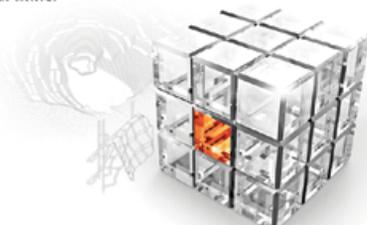
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Before senior Aubrey Preble came to Mines to study geophysics, she spent four years working as a deckhand aboard a variety of vessels, but mostly tall ships. The day her Floridian crewmate, Brittney, leaped into Alaska's Prince William Sound clad in her bikini and swam to a nearby iceberg, she was on a whale-watching boat. Standing on the ice, her friend was overcome by a fit of Florida Gator pride and clapped her arms together in a triumphant "gator chomp" before diving back into the water and returning to the boat, where Aubrey was standing by with a life ring and camera in hand. *(Photo first published in "High Grade," 2012)*



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