

The background of the entire page is a close-up, slightly blurred photograph of numerous green hard hats. Each hard hat features a prominent yellow letter 'M' on its front. The hats are piled together, creating a textured, repetitive pattern of green and yellow.

THE HARDROCK™

WINTER 2014

SOUTH DAKOTA



SCHOOL OF MINES
& TECHNOLOGY



THE HARDROCK™

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Cover image: Freshman enrollment jumped 20 percent last fall, which pushed production of the "frosh" beanies into overdrive.

Pictured left: A wintery stream just below the Sanford Underground Research Facility in Lead, South Dakota



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When the skies turn a harrowing shade of pale and hailstones rain devastation, Mines' new weather research plane, a refitted A-10, will launch into action.



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Dear Alumni and Friends,

The mission of our Alumni Association is “to advance the interests, influence, and reputation of SDSM&T by fostering and developing the continuing interest and active support of its alumni and friends.” The Alumni Association Board of Directors (see list at left) has identified five core focus areas that are vital for the continued growth of the Alumni Association and SDSM&T—participation, collaboration, communications, recognition, and funding. A new endeavor, the Mines Collaboration effort, directly addresses several of these areas.

As a completely independent Alumni Association, we work closely with our sister organizations—the university, the Foundation, and the Hardrock

Club—to advance the school’s growth while enhancing the quality of our graduates. On October 7 and 8, as Rapid City finished “digging out” of the Atlas blizzard, thirteen folks from these four separate and distinct organizations met as the Mines Collaboration Team to identify ways to advance our common missions. In these two days we made great progress, identifying four specific areas for joint improvement where we can change how we operate together for greater effect: engagement, communications, database, and fundraising. During the coming months, four task force teams will be working in these areas to improve our teamwork and the results that we collectively achieve.

During this year, I plan to travel often to participate in as many of our area alumni gatherings as I can, as you all are the heart and soul of our Alumni Association. I greatly appreciate the hard work of the area vice presidents to schedule and hold these fun local events. Please support their efforts by participating in events, get involved by volunteering to help with the event, or even consider becoming an area vice president. Watch the weekly *Hardrock E-News* for information on upcoming area events and see the alumni section of this magazine for pictures and highlights of alumni events held last fall. I encourage all of you to come out to the alumni gatherings—they are great opportunities to connect with your fellow alumni and share our common bond with our alma mater. I look forward to seeing you there!

Go Mines!

Carmen (Pauling) Adams (ChE75)

2014 President

SDSM&T Alumni Association

Flashback

This early 1988 photo shows School of Mines leaders on the blanket of flat ground whose landscape was to quickly change with construction of the Classroom Building. The building today is home to the Department of Interdisciplinary Sciences and its humanities courses, as well as the Department of Military Science, the Apex Gallery, and Java City.



125 years ago

Winter 1889

The Territorial Legislature issues its first general appropriations bill. The School of Mines receives \$33,500, and the federal government grants 40,000 acres of land to the institution. *School of Mines Bulletin #1* is published; the work, entitled “Preliminary Report of the Dakota School of Mines upon the Geology, Mineral Resources and Mills of the Black Hills of Dakota” was written by Dean Franklin R. Carpenter. It becomes standard in its field, and is still being sold today.

100 years ago

Winter 1914

The School of Mines football team gets a name, the “Hardrock Men.” Students and faculty make their first annual trek up M Hill to whitewash the “M.” Students stage a musical comedy, “The Girl in the Harem,” at the Elks Opera House to raise money for their baseball team’s planned trip to eastern South Dakota.

75 years ago

Winter 1939

O’Harra Field is officially dedicated; **Noel Gagstetter** (EE34), chairman of the Field Committee, speaks, along with Governor Jensen and Mines President Joseph Connolly. The football team continues the celebration, defeating South Dakota State 18-7, with more than 2,500 people filling the bleachers and several hundred more taking advantage of ramp viewing. Alumni and special guests arrive for the celebration, thanks to special train fares offered by the railroads. Registration reaches an all-time high with more than 400 students enrolled.

50 years ago

Winter 1964

Formal dedication of the Surbeck Center takes place on October 24. Dr. Norman Vincent Peale, influential clergyman who espouses the *Power of Positive Thinking* and is known for his inspirational messages, delivers the keynote address at the ceremony. Also attending the dedication are **L. Homer Surbeck** (MetE24), Governor Archie Gubbrud, and Ernest Wilkinson, president of Brigham Young University.



Hardrockers raise the Homestake Trophy after defeating Black Hills State University at home in September. The School of Mines averaged nearly thirty-nine points a game during the 2013 season, finishing with a six-win, four-loss record, its second winning record in more than twenty-eight years.



Dear Hardrocker Friends,

When Darren Clabo from our Department of Atmospheric & Environmental Sciences told me that he was predicting forty inches of snow in Rapid City on October 4, he was excited. “We will be studying a storm like this for decades!” The rest of us were not so excited. Darren’s prediction was right. For the campus, the October blizzard meant two days of canceled school, and more than thirty trees lost and another seventy damaged. For some of the families and friends of many of our staff and students who are ranchers in western South Dakota, it was a terrible loss.

But for me, it was also a reminder of just how wonderful this school is.

When the subcontractor who is supposed to do snow removal didn’t show up, the football team, the basketball team, three fraternities, and a lot of volunteer students and staff shoveled out the campus and cleared the downed limbs. One of the fraternities had chainsaws. (I don’t know about you, but it never would have occurred to me to bring my chainsaw to college.) Our students allowed us to reopen the campus safely.

This is a hands-on, get-the-job-done university.

It is also a purposeful place. When thousands of homes across western South Dakota were still without power in the wake of the storm, my husband and I were able to get through the snow to campus. When the world around them was covered in three feet of snow, there were dozens of students scattered at tables around Surbeck. They weren’t playing cards or watching television. They were studying.

Our school is growing. We welcomed a freshman class that is 20 percent larger than last year’s freshman class. But the essence of Mines remains strong. It is a welcoming, purposeful university that expects hard work and excellence. It’s a joy to be part of it.

Sincerely,

A handwritten signature in black ink that reads "Heather". The signature is stylized with a large, looped 'H' and a cursive 'eather'.

Heather Wilson, DPhil
President
South Dakota School of Mines & Technology

Student wellness center receives \$2 million gift



Construction will begin in April on the new student wellness and recreation center, thanks to a \$2 million gift from alumnus **Stephen D. Newlin** (CE76). The gift, combined with a \$6.7 million tax students approved through increased fees, will allow the \$8.9 million project to move forward. The new facility will adjoin the King Center and provide more than 34,000 square feet of new or remodeled space.

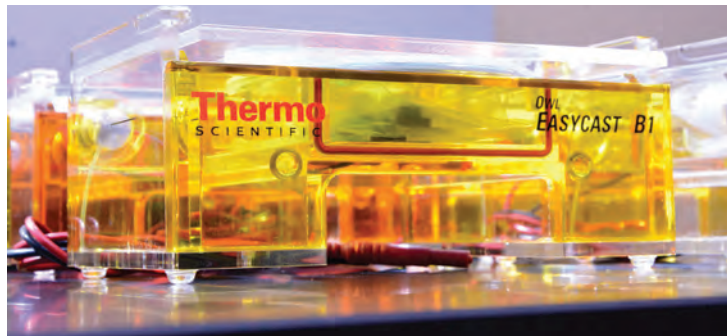
Newman Center opens for student & community worship

The Newman Center, whose focal point is a 120-seat chapel, opened just west of campus last fall as a permanent worship and fellowship center for students, faculty, and community members alike. The new center was built under the auspices of the Cathedral of Our Lady of Perpetual Help, which owns the land.

Whiting Petroleum gives \$40,000 for geology program

Whiting Petroleum Corp. has given \$40,000 to the School of Mines Department of Geology & Geological Engineering for student support and recruitment of students interested in energy sector careers. The partnership between the university and Whiting will also enhance efforts to build collaborative geoscience research, education, and outreach efforts.

3M biochemistry lab unveiled thanks to \$200K gift



A new 3M Biochemistry Laboratory was unveiled last fall in the Department of Chemistry & Applied Biological Sciences thanks to a \$200,000 gift from 3M. The gift helps to support a two-semester biochemistry course with complementary lab experiences and new lab equipment to provide training to students.

Hardrocker athletics receives \$1 million gift

The Hardrock Club received a \$1 million gift bequeathed by Elsie Rogge, whose husband, Elmer Rogge, attended Mines in 1928 and 1929. The Rogges remained friends of Hardrocker Athletics throughout the years, including establishing the Elmer & Elsie Rogge Athletic Scholarship.

Wilson inaugurated as 18th Mines president

Heather Wilson was inaugurated as the eighteenth president of the School of Mines on October 3 in a ceremony change prompted by the oncoming record-breaking fall blizzard, Atlas. The inauguration was combined with the Fifth Annual Mines Medal Dinner and Award event honoring Anna Balazs, PhD, of the University of Pittsburgh. South Dakota Governor Dennis Daugaard assisted in the award ceremony, which attracted more than 500 guests. Former US Ambassador to Finland Barbara Barrett delivered the inaugural address.

For more Mines news visit news.sdsmt.edu.

Karlin: Pushing education's frontiers

Sandwiched in between her research on holistic learner development and teaching industrial engineering students, Jennifer Karlin, PhD, gives back to her profession. The School of Mines associate professor was honored last fall with a prestigious national award named for a former Mines faculty member.

The Ronald J. Schmitz Award honored her outstanding contributions to the Institute of Electrical and Electronics Engineers' Frontiers in Education (FIE) Conference series for her steering committee activities and, especially, her organization, coordination, and management of the 2011 FIE conference held in Rapid City.

Schmitz, the award's namesake, was an electrical engineering professor at the School of Mines for many years and was one of the early founders of the Frontiers in Education conference.

Karlin is comfortable working on a national stage. With her research expertise focusing on holistic learning and the impact of engineering education on economic development, she was among a select group of her peers invited by the National Academy of Engineering to participate in the Washington, DC, meeting on "Surmounting the Barriers: Ethnic Diversity in Engineering Education."

In 2006, Karlin received a National Science Foundation CAREER award to continue her study of organizational and student learning, determining the relative organizational health of colleges and departments of engineering and correlating this to changes in student intellectual development.

Norton models perfect balance, makes his impact

Parker A. Norton (MS CSc08) seems to have it all figured out. As if pursuing a doctorate doesn't take up all of one's time, he is employed as a key member of the climate-modeling team at the US Geological Survey, and is a hands-on father of three daughters.

His research has already proven a critical resource to experts in forecasting weather and climate changes. But despite his impact on the world, Norton, 2013 Mines Medal Graduate Research Fellow, makes time to coach girls' soccer and volunteer as a sound engineer at his church.

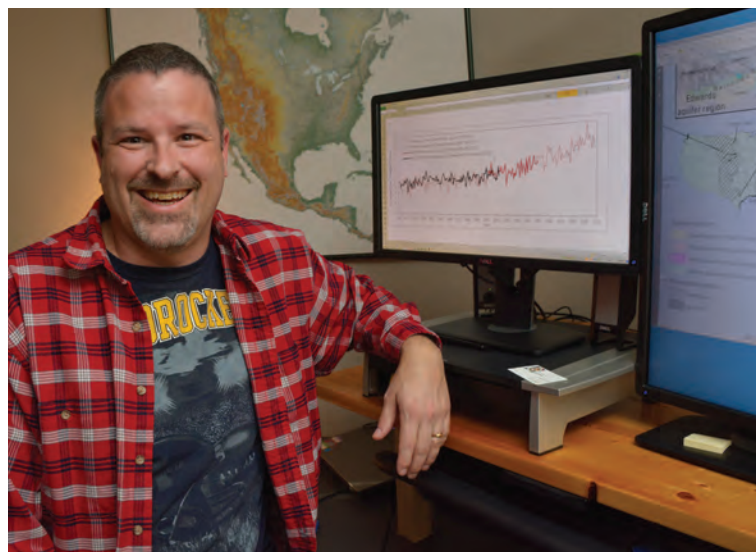
He's teamed up with his wife to face head-on the work-life balance with which so many struggle. "I could not have come as far as I have without the support of my family. My wife, Suzanne, and three girls, Sarah, nine, Isabella, six, and Anna, seven, have been patient and supportive of me as I've pursued my PhD," Norton says.

His research involves long-term simulations of North America's climate. Among the projects to which he has contributed: developing a water budget for Sheridan Lake, analysis of stream flow trends in the Missouri River watershed, groundwater modeling, and regional climate model studies.

Norton earned his bachelor's degree in computer science in 1992 from Azusa Pacific University in Azusa, California, and his master's degree in computer science in 2008 from the School of Mines.

His mastery of computer skills coupled with his interest in the physical sciences have enabled Norton to become a critical resource for the climate modeling community, according to William Capehart, PhD, atmospheric sciences associate professor at Mines. Capehart and John Stamm, PhD, USGS hydrologist and Mines adjunct professor, nominated Norton for the Mines Medal Fellowship.

The National Center for Atmospheric Research is adding one of Norton's tools to its software for its global and regional models.



Norton is tackling problems of national importance and "has the potential to place Mines in the national spotlight for his research," Stamm says, adding that no one else at the USGS is doing the kind of work Norton is "because it is so difficult. One simulation requires months of computer time on a supercomputer."

Climate modeling is important because it helps to improve "understanding of the earth's system and how the many pieces of our planet interact and influence each other and how humans exert an influence on it," Norton says. "Climate modeling allows us to not only verify observed phenomena but also model what-if scenarios based on our understanding of behaviors of the physical world that otherwise would not be possible."

Norton expects to earn his doctorate this spring and plans to continue his work with the USGS in climate and hydrologic modeling.

Sawyer charts course for national AIPG



Selected as president-elect of the American Institute of Professional Geologists (AIPG), **Foster**

Sawyer (MS Geol90, PhD Geol06), Department of Geology & Geological Engineering, will oversee the 6,000-member worldwide organization.

He's already made his first resolution: "to increase engagement between AIPG and students in geoscience departments" nationwide.

Sawyer sees a supply gap. Despite the importance of earth sciences and a clamoring for experts in the field, projections of geoscience graduates fall short of expected demand, he says.

He believes the missing link lies in education. "It is largely incumbent on faculty to prepare students

for successful entry into careers" and "closer relationships between faculty, and ... AIPG helps to better prepare students for the professional world."

A twenty-year AIPG veteran, Sawyer speaks from experience. He joined AIPG to strengthen his credentials and interact with geoscientists on issues facing the profession.

The issues are as compelling as they are complex, the kind that reveals how people's impact on

where they live affect how they live. Challenges include maintaining an adequate supply of energy in an environmentally responsible way and balancing human and environmental needs, a holistic philosophy that is a key tenet of AIPG.

As Sawyer charts his course, he's grateful simply for the chance to "give back in some small measure to the field which has provided so much opportunity and satisfaction in my career."

Intellectual diversity difference in genders

Engineers who embrace intellectual diversity not only communicate better with teammates but recognize the need to look at problems from multiple perspectives. It's not just about designing a solution but creating one that truly understands the customer's needs.

This is why many companies actively train employees on typologies as a standard part of team building and why School of Mines Industrial Engineering (IE) researchers are giving them a head start by bringing awareness and coaching to Mines faculty and students.

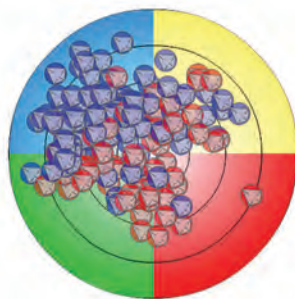
"Many qualified students leave engineering, and a contributing factor may very well rest in a typological mismatch between many entering freshmen and the highly analytic nature of the curriculum," according to **Stu Kellogg** (MS EE82), PhD, head of the Department of Industrial Engineering, which has focused on intellectual development for seven years.

Failure to acknowledge hard-wiring differences between not only the genders but also the manner in which a highly technical education is delivered may exacerbate a declining interest in STEM subjects.

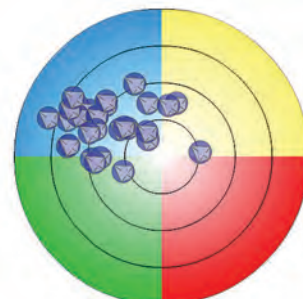
"Despite considerable research to the contrary, many engineering and science faculty members continue to believe that students leave science, technology, engineering, and math (STEM) fields either because of poor academic preparation or because they lack the motivation to persist in the academic rigor found in the STEM disciplines," Kellogg says. A local study at the School of Mines in 2009 showed fewer than 10 percent of the students who left the STEM fields at Mines did so because of academic difficulty.

The traditional engineering curriculum is highly analytical. Students who have a different typology may choose to leave the discipline when, in fact, they may make excellent engineers in an industry which requires innovation, task orientation skill sets, or engineers with a creative thought process.

FIRST YEAR STUDENTS



SENIOR STUDENTS



The difference between typical first year engineering students and typical seniors is stark. Quadrant key: analytical/blue, conceptual/yellow, task orientated/green, and empathetic/red.

Kellogg has been studying the impact of intellectual diversity and is using data to train faculty members campus wide.

The findings are stark. First-year students are fairly uniformly distributed over all four quadrants—conceptual, task-oriented, empathetic, as well as the expected analytical. By the time they are engineering seniors, however, the same students were highly concentrated in the analytical quadrant. "This is not altogether bad. After all, technical skills are important," Kellogg says. "Students in the conceptual, task-oriented, or empathetic areas often possess the technical skills but quite often do not choose to stay in an engineering curriculum. This is particularly notable with women, who can do well in engineering but who are more likely to possess a profile that embraces a societal context not often found in engineering."

While the IE department is training faculty members throughout campus, it starts at home. Industrial Engineering majors consistently score a half step to one full step higher on the intellectual scale than others in their peer group, according to Kellogg's research.

For the Farkes it's all in the family

Jerry Farke's earliest memories of Mines always emerge with the summer's hazy heat. Along with his five older siblings, he'd pile into a car with his mom and dad, **Greg** (EE71), and head for the Hills, leaving east river in the rearview. "I came here a lot as a kid for family vacations," visiting campus and camping in a tent.

As time wore on, his sleeping quarters at home grew more spacious as two of his brothers followed in their fathers' footsteps and enrolled at Mines. **Andy**

(Geol03), the eldest, studied geology. His other brother, **Joe** (ME08), found his calling in mechanical engineering.

Six years passed and suddenly it was Jerry's senior year in high school. After winning a science fair, he applied for a 2008 summer scholarship at the Air Force Research Laboratory (AFRL) in New Mexico—the same scholarship Joe had earned.

The immersive experience sealed his fate. Machinery proved an irresistible allure, and that fall

he came to Mines.

Alumni Association Director **Tim Vottero** (Chem84) says legacies such as the Farkes' run deep. "There are certainly second, third, and perhaps even fourth generation alumni who span multiple decades, as well as numerous siblings and family member alumni from the same generation."

Now a senior in mechanical engineering, Farke has an impressive breadth of experiences. He's had three AFRL internships and one at Nucor Steel, studied abroad

in Denmark, joined Engineers and Scientists Abroad in Mongolia, then landed another internship at L3 Communications.

Less than a year from graduation, Farke's open to all future possibilities. "There's nothing I'm shying away from."

Joe can't wait for his brother's career to begin. "You always have a Mines family, no matter where you are." For the Farke Hardrockers, that's truer than most.

Carnegie Hall, TV, Mines...and barely 15

The first thing noticeable about student Arjun Ayyangar is his family. Family members are everywhere.

Mom, Sudha, and grandmother, Saroja Krishnaswamy, greet guests in the apartment lobby; eleven-year-old sister Aparna waits with Arjun just inside the door. Father **Narasimhan “Vijay” Ayyangar** (ChE89), is there, too, via Skype from New Jersey.

The family’s tight-knit relationship is understandable. After all, Mines’ newest prodigy is barely fifteen years old himself. If he were from any other family he might be a high school freshman. Instead, he’s a college freshman.

Born and raised in New Jersey, Arjun is so young he hadn’t yet taken the ACT when he enrolled in his first semester of Mines classes last fall. Because of this he took on a limited number of credit hours, eleven, and technically wasn’t allowed to call himself a freshman until this spring semester. By the time the fall term ended Arjun was armed with an initial ACT score of twenty-four and twenty-one credit hours under his belt, including a summer chemistry course and six online computer science credits taken in New Jersey. Arjun is now officially enrolled as a math major but plans to pursue a double major, adding physics.

Except for his Mines calculus course, things have, for the most part, come easily to Arjun in his young life. His talents with a toy keyboard at the age of three caught the attention of his parents (neither of whom is a musician), so they enrolled him in a variety of music courses. Arjun was home-schooled, in fact, for the sole

purpose of allowing him more time to devote to music.

By the age of four he was the youngest child ever picked to compete on NBC’s prime time series “America’s Most Talented Kid.” At six he was featured in Animal Planet’s “The Most Extreme: Tough Babies” in an episode that drew a parallel between the extreme learning ability of an octopus in the animal world and a person in the human world. He has performed at the International Music Festival in Ohio since 2003 and has played in world-famed venues such as Carnegie Hall and Madison Square Gardens.

After first conquering the piano, Arjun mastered the harp, organ, and violin, and is also studying several exotic instruments, including the tonbak and veena. This year his father established a \$1,000 music scholarship in Arjun’s honor at the School of Mines, where he sings in the University Choir.

Memory is a hallmark of a gifted musician, and Arjun can play anthems of all countries of the world on the piano from memory.

His family is so devoted to his success that they moved across the country just so Arjun could attend Mines. Sixth-grader Aparna researched where they should live so that she would be in the Southwest Middle School district. Father Vijay’s job as a software configuration manager did not allow him to move, so the family Skypes with each other for three to four hours every night.

With a futon, kitchen table, and small TV purchased at WalMart, Arjun and his family live simply in a two-bedroom apartment in the southwest side of town off Sheridan Lake Road. Arjun’s



mother takes him to school. She has maintained her remote employment as a software engineer with a mortgage company and sometimes sits in a parking lot near campus to complete her work while Arjun is in class.

With the world at his fingertips, years to change his career path multiple times, and the intellect to succeed at seemingly any job he sets his mind to, just what does this fifteen-year-old want to be when he grows up? “Possibly a math professor.”

Mines leads security printing and anti-counterfeiting center

The School of Mines will serve as the lead institution for the newly created Center for Security Printing and Anti-Counterfeiting Technology (SPACT). The center will receive \$300,000 in start-up funding from the state for new projects to address the nation's security and counterfeiting problems.

SPACT research at Mines has already led to the creation of QR codes that remain invisible in ambient lighting but are readable with a near-infrared laser and can be scanned using a smart phone. Use of this technology could thwart

counterfeiting, detect national security breaches, and be used in many other applications.

Research over the past three years has resulted in three patent disclosures and negotiations for its commercialization.

Other SPACT research and development includes creating non-toxic fluorescent inks for printing on pharmaceuticals, developing techniques to determine the source and authenticity of pharmaceuticals, security printing of covert markings and

labels and electrospinning of tagged fibers and fabrics.

Jon Kellar (MetE84), PhD, and **Grant Crawford**, (MetE04), PhD, of the Department of Materials & Metallurgical Engineering, are lead researchers of the new center, which is a collaborative effort with the University of South Dakota and South Dakota State University. The new center is a natural extension of earlier efforts, which have also included developing methods to authenticate Lakota art and artifacts and detect fraudulent pieces.

Mines also received a \$200,000 research innovation grant award to upgrade existing laboratories and to develop state-of-the-art laboratories for large-scale production in advanced manufacturing.

"Our researchers are at the forefront of advanced manufacturing and anti-counterfeiting technology. We hope to use these awards to continue to grow the research done at Mines and transfer technology to industry to create better products and more high-paying jobs," says Mines President Heather Wilson.

Sinking Sin City: Perils of fissures in the land out west

Kurt Katzenstein has always found the larger-than-life an irresistible allure. Even 22 years after Mt. St. Helen's north flank collapsed, producing the largest landslide-debris avalanche ever recorded, he knew he had found his master's degree.

But in 2004, the mountain roared back to life, and his fieldwork came to an end. This serendipitous stumble in his research pursuits sent him seeking a mentor who suggested a shift in study, one of an equally sweeping scope, invisible to the naked eye.

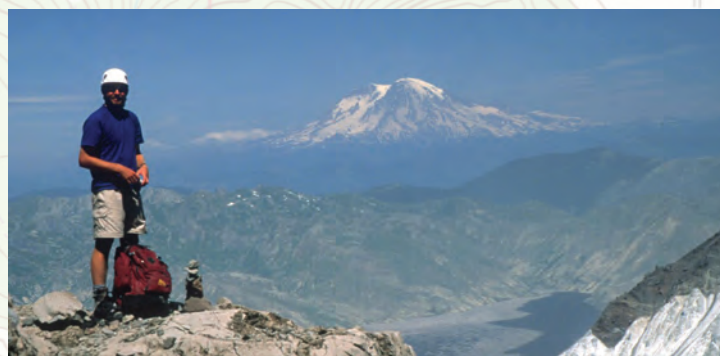
"You're looking at a huge chunk of the earth, but you can see how the land surface is deforming on a centimeter scale from space. You see small, minute changes on the earth, something you'd never see even if you were walking on the ground," says Katzenstein, PhD, Department of Geology & Geological Engineering.

Katzenstein is using Interferometric Synthetic Aperture Radar (InSAR), a geophysical technique that uses radar data to investigate surface disturbances from space. The tool measures movement resulting from phenomena including volcanoes, earthquakes, and groundwater pumping.

Recently, a colleague contacted Katzenstein to investigate apparent land subsidence in southern Utah. Katzenstein's colleague had seen fissures scribbled across the landscape, the type caused by land subsidence—a decrease in the earth's elevation.

His colleague theorized that municipal groundwater pumping had caused an overdraft condition in the region, prompting the surface to subside. Yet the local water board was unconvinced.

Katzenstein used InSAR to generate a map showing the extent of deformation. He found areas of maximum deformation and fissures clustered around regions of municipal water withdrawal,



proving that land subsidence from groundwater production caused the fissuring.

The type of insight InSAR affords is critical in the west's water-starved regions.

"Phoenix and Las Vegas are other well-known places where fissuring has occurred as a result of groundwater pumping." Water coming in and out of aquifers must be carefully monitored to avoid overtaxing the system. And "if you have subsidence issues, you're losing storage capacity for water."

Despite its significance, InSAR data is often relegated to academia. "(Monitoring) groundwater pumping with InSAR has been active for fifteen years in the academic world, but a lot of regulatory agencies don't know about it. In industry, the software cost is \$50,000 to \$80,000. But in academia, we can get the software developed by NASA's Jet Propulsion Laboratory for free when it's used for research."

And in the arid land out west, the knowledge it helps to produce is priceless when it protects a resource worth its weight in gold.

Life after landing: Building a habitat on the moon

For some, impossible is a dare, not a declaration. Grocery bag plastics engineered to stop a bullet. Building a habitat on the moon.

Both involve manipulating a material's structure on the molecular level, an enduring fascination for David Salem, PhD, that emerges in his current research.

Partnering with NASA, Salem, director of the Composites and Polymer Engineering Laboratory, Departments of Chemical & Biological and Materials & Metallurgical Engineering; Marc Robinson, PhD, Department of Civil & Environmental Engineering; and **William Cross** (MetE84), PhD, Department of Materials & Metallurgical Engineering, are developing structural thermal insulation composites for space habitats. The goal: achieve the ultimate trifecta, lightweight materials with high thermal insulation and strength.

The challenge is formidable.

On the moon, "you can go from -150 to 120 degrees Celsius in a single lunar day," says Robinson. In this essentially vacuum environment, habitats must be pressurized from inside, requiring high strength. As for weight, transporting materials to the moon runs about "\$30,000 per pound."

Drawing inspiration from polar bear and musk ox fur—materials so well insulated that neither animal appears on infrared photos—researchers have come up with possibilities including biomimetic hollow fibers integrated with aerogels and syntactic foams.

The difficulty lies in a delicate balancing act. Aerogels, while a powerful insulator, shatter at a mere touch. And the greater the amount of high-insulating hollow microspheres in syntactic foams, the worse the mechanical properties.

But an intricate combination of elements is yielding encouraging results. Using a unique processing technology, researchers eschew bigger micro channels in favor of creating smaller nano channels in polymer material, which improves strength and reduces heat loss.

The materials "look promising," Cross says, and are being tested at NASA—with potential insulation applications on earth.

But no matter the journey, from space colonization to polar exploration, each discovery draws further from demanding the impossible and closer to defying it.



The business of ergonomics taps a new talent pool

From retina scans to fingerprint swipes, biometrics is booming. Despite the technology's ubiquity, many have yet to be reached. "We want to provide the means for additional workplace opportunities for folks who maybe don't have the opportunity now because of disabilities."

That's Adam Piper. He's building a biometric adjustable workstation prototype with Dean Jensen, both PhDs in the Department of Industrial Engineering. The workstation will adjust from wheelchair to standing height and sport a display on a moveable arm. It all began "at the nuts and bolts level, literally." But a partnership with Black Hills Works, which provides vocational opportunities for the disabled, soon sparked new ideas.

While ergonomic concerns called for adjustability to be built into the design, researchers are now working to incorporate biometrics, as well. By using biometrics to recognize the specific user of the workstation, design adjustments could be automatically activated at the swipe of a finger, similar to one-touch car settings that adjust mirrors and find the driver's favorite tunes.

And businesses stand to benefit.

Piper notes that hiring locals with the requisite skills and experience who simply require a modified workspace expands the talent pool.

"Lots of deployed people are coming back highly skilled but might require physical accommodation to help them rejoin the regular workforce," Jensen adds.

Piper sees it as a societal obligation, to minimize or remove barriers blocking reentry—especially in a market already beset by difficult prospects. "It's hard enough without a physical disability to enter the workforce. How much harder with (one)? ... I feel there's an obligation to do everything we can."

Their first prototype is slated for completion this semester, a timeline thanks in part to student involvement ranging from programming and design to project integration and hardware assembly.

As for what the future holds? "It's hard to say ... but I like to think at the School of Mines we'll become known as folks who can engineer a better working life and a better life in general for people who have obstacles they need to overcome," Piper says.

Facing nature's fury



When the skies turn a harrowing shade of pale and hailstones rain devastation across the heartland, the damage can be staggering. These monstrous storms attract adrenaline addicts who find adventure born in a supercell—and scientists who study their anatomy in hopes of stymying their calamitous effects.

In the early 1950s, scientist and adventurer Paul MacCready, of Meteorological Research, Inc., had a daring, new idea: a research aircraft capable of penetrating hailstorms.

Though dismissed as too dangerous, the notion persisted and found an advocate in Richard Schleusener, MacCready's acquaintance and director of the Institute of Atmospheric Sciences (IAS) at the School of Mines.

They petitioned the National Science Foundation (NSF) tirelessly, and in 1966 the NSF commissioned MacCready and his associate Robin Williamson to examine possible aircraft. One aircraft emerged, an ideal combination of cost, maintainability, and performance—the T-28. Modifications finished in 1969, and the aircraft began test flights in Rapid City.

That summer ownership was transferred to Mines' IAS, one of the nation's premier hail research groups, deemed best suited by the NSF to operate the aircraft.

More than three decades and 900 missions later, the T-28 reached retirement, and Andrew Detwiler, PhD, **Donna Kliche** (MS, Mtro90), PhD, and Paul Smith, PhD, Department of Atmospheric & Environmental Sciences, went hunting for the next generation of storm penetrating research aircraft.

A rugged, combat aircraft, the A-10 was a prime candidate for atmospheric research, but the US Air Force remained resistant to authorizing the jet for civilian use.

Through the prompting of Mines' research partner, the Center for Interdisciplinary Remotely Piloted Aircraft Studies (CIRPAS) at the US Naval Postgraduate School, an A-10 was transferred from the Air Force to the Navy.

The aircraft is now resting in Oklahoma, where the company Zivko Aeronautics will prepare it for operation as a storm research aircraft, adding to an eventual \$13 million total in modifications paid for by the NSF.

Slated for flight in 2014, the A-10's capabilities will be unparalleled. "There are dozens of weather research planes worldwide. However, none have the capability to sample in thunderstorms with hail, lightning, icing conditions, and turbulence," Detwiler says. And Mines will have the market. Due to the expense and specialized mission, building another storm-penetrating aircraft remains unlikely.

The aircraft's primary purpose will be to conduct cloud microphysical, chemical, and electrical studies.

Successful data collection is partly a fine-tuned combination of altitude, payload, and station time. As the aircraft climbs to higher altitudes, the air gets thinner, and the engine can't suck in enough air to develop the power needed to keep the aircraft in flight. With



the T-28, flight was restricted to less than 25,000 feet, well below storm tops. The A-10 allows researchers to fly higher, to 35,000 feet, and cover more of the storm.

The other half of the research project is piloting.

Detwiler explains that the A-10 will be operated by CIRPAS and its contractor Zivco. However, "in addition to having very qualified pilots, you need to have the right people on the ground directing those pilots," Kliche adds. The Mines team will guide the storm flights, drawing on their T-28 experience, and provide support for conducting missions, and analyzing and distributing data.

During projects, research teams stay in local motels near airports, typically gathering to listen to a morning weather briefing. Based on the forecast, they plan a mission and set a time to be on standby. When a storm develops, aircraft personnel are asked to launch within a thirty- to forty-five-minute window.

The A-10 will carry onboard a small aircraft weather radar, but "when you get into the thunderstorm environment, the radar is unreliable. So the work really needs guidance using a large weather radar on the ground," Kliche says. Mission scientists watch the radar data and relay information about storm conditions to the pilot.

As they wait for the A-10, Detwiler, Kliche, and Smith will be preparing to organize data for distribution to scientists worldwide.

The A-10 will fly as part of coordinated field studies involving radars, balloon-launching teams, mobile surface vehicles, other research aircraft, and satellite remote sensing. Scientists will use the combined results to improve their understanding of severe weather, leading to better forecasting and warning strategies.

"Working with a one-of-a-kind research platform is very thrilling and the dream of many scientists. We're really fortunate to have a platform that puts the School of Mines on the map," Kliche explains. "Everyone knew that the T-28 was developed and operated by scientists at Mines, so with the A-10 we will continue the tradition."

And like MacCready's vision more than sixty years ago, the A-10 will take to the tarmac and soar.

ENROLLMENT RISING

ROI makes Mines the clear choice for incoming freshmen

With her pick of universities at hand, Bobbi Strange was afforded the luxury of a clear decision when it came time to enroll in college. Nothing else compared to the South Dakota School of Mines & Technology. Not the University of Arizona, not the University of Minnesota, and not even the Colorado School of Mines, with its proximity to Strange's hometown of Westminster, Colorado.

Of all the six other universities she visited, only the South Dakota School of Mines & Technology offered geological engineering. The next closest offered a broader geology major. "I'm kind of a rock fanatic. I've had a passion about it since the fourth grade, so this major was very important," she says.

All the other stars in the geologic heavens aligned, too. At \$19,000 for a non-state resident's tuition, board, and fees, the price was right; with a student-faculty ratio of 14:1, the size was appealing. The hands-down dealmaker, though, was something a little more intangible—the warmth of sincerity and friendliness, which Strange says she experienced as soon as she stepped foot onto campus for her initial visit a year ago. Strange immediately felt at home, unlike at other campuses she visited.

"Everybody was really welcoming, and I just knew I belonged here and could be part of the Mines family. I toured a lot of other campuses, but everywhere else just felt like they wanted me for my money or as a number on the books. Here, I felt like I was on a personal level," Strange says. "Admissions really helped me out answering all my questions about financial aid and, literally, about everything. Having that feeling of knowing that I wasn't just a body who was attending really helped. I literally had them on my speed dial because I called them so much."

Strange and 553 other first-time freshmen have come from thirty-five states and seven other countries to help drive Mines enrollment growth of nearly 9 percent. The increase in freshmen enrollment

alone was 20 percent. In a climate where job prospects for college graduates nationwide are stagnant overall and when many families are asking themselves whether the cost of college is worth the investment, more students are choosing Mines.

Besides the attractive tuition, both Strange and first-time freshman Collin Parker, of Durango, Colorado, cite Mines' exceptional average starting salary of \$62,400 and placement rate of 98 percent as reasons they chose the university.

"These were all very big incentives for coming to Mines. When I was touring schools, no one else had a giant billboard stating that their grads make more money than Harvard's grads," says Parker, referring to the billboard campaign, which followed a *Bloomberg Businessweek* story comparing the starting salaries of Mines graduates to those of the Ivy League institution. "I think that, as well as drawing in all these new freshmen,

these stats are a testament to the quality of our school and reflect how much the industry knows that."

All majors offered at the School of Mines pay off immediately with outstanding average starting salaries. At \$72,333 and a 100 percent placement rate, Strange's choice of geological engineering is the highest of them all.

"It was a huge factor, especially with my family, because I come from a low-income family. It became more apparent where I needed to be and what I could afford. It's amazing. I couldn't believe that the out-of-state tuition here in South Dakota was actually cheaper than tuition for in-state in Colorado," she says.

A mechanical engineering major, Parker is enrolled in the university's largest program, with 606 undergraduate students. The average starting salary for an ME graduate from Mines is \$60,280.

Colorado, home to both Strange and Parker, is the biggest supplier

"I'm kind of a rock fanatic. I've had a passion about it since the fourth grade, so this major was very important."



Bobbi Strange, Westminster, Colorado





ENROLLMENT RISING

of Mines students outside of South Dakota. This year fifty-nine freshmen are from Colorado. Other rapidly growing areas for the university are Minnesota, with seventy-nine first-time freshmen, Nebraska with thirty, California with seventeen, and Wyoming with fifteen.

“Our stock is rising and more great students are applying to Mines. This certainly puts pressure on our facilities,” acknowledges university President Heather Wilson, adding that the university will continue to grow up to about 3,500 students but will “do that at a rate that allows us to keep the quality of our program high.”

It’s Strange’s concern, too.

“For the school to be expanding means it’s getting out there as a nationally recognized school, and more people are finding us. And getting the word out has helped students find out. I just worry because I don’t want it to get too big. I do love that this school is small and I could say that for a lot of students here,” Strange says.

As a student senator, Strange and her peers are sorting out a plan to increase parking and access for students, as well as work with administration on the Master Housing Plan, which is exploring the possibility of building an additional residence hall to accommodate the growing enrollment. The School of Mines has entered into an agreement with alumnus and developer **Hani Shafai** (CE87) to manage and assume long-term leasing responsibility for both the new Rocker Square I and II apartment buildings just west of campus. Though privately owned, the twin buildings will be managed by the Office of Residence Life for the exclusive housing of approximately 250 students through the year 2024.

Considering a national need for science, technology, engineering, and mathematics (STEM) education and long-range employment forecasts that all but guarantee engineering graduates a job, Mines students can expect the upward trend to continue.

STEM occupations are anticipated to grow 1.7 times faster than non-STEM career fields between 2008 and 2018, according to the Office of Science and Technology Policy within the Executive Office of the President.

Nucor Steel, for example, employs a wide variety of engineers, from metallurgical to agricultural to computer, says **Terry Rasmussen** (MetE91), Mines alumnus and recruiter for the Fortune 500 company.

“There are metallurgical, mechanical, electrical, civil, and computer engineers throughout Nucor, along with a growing interest in industrial engineers, and we often have engineers with a safety minor move into our safety departments. Many other engineering disciplines are scattered around Nucor such as ceramic and chemical,” Rasmussen says. “We have found that the Mines students Nucor hires into intern/co-op or full-time positions usually fit into our culture very well.

ENROLLMENT RISING

Nucor encourages young engineers to move into leadership roles early in order to develop management skills that can allow them to transition into supervisory and management roles in the future.” With twenty graduates hired since 2009, Nucor has become the second largest employer of Mines graduates in the past five years behind Kiewit, at thirty-two.

There aren’t enough STEM-trained employees going into the workforce, according to the STEM Education Coalition, whose central mission is to inform federal and state policymakers on the critical role STEM education plays in the country’s competitiveness and future economic prosperity. In the current overall market, unemployed people outnumber job postings by 3.6 to one. In contrast, STEM job postings outnumber people by 1.9 to one.

By 2018, the bulk of STEM jobs, 71 percent, will be in computing, followed by traditional engineering at 16 percent, physical sciences at 7 percent, life sciences at 4 percent, and mathematics at 2 percent.

In order for America to maintain its role as a world leader in medicine and other science-based disciplines, STEM education has become a

national priority. The White House last spring announced it would dedicate \$3.1 billion toward STEM education at the secondary level.

A focus on STEM education is a “key enabler to restoring the US as a leader in education,” says **Anne Putnam** (ChemE05), a lead process engineer for Dow Chemical Company. “Improving the perception of STEM careers and increasing the number of students choosing those majors are critical for the continued prosperity of the US and its manufacturing sector.”

“The nation needs more well prepared leaders in science and engineering, and we will help meet that challenge,” Wilson says. “Mines provides a great education at a price families can afford. There is no easy degree at Mines and industry knows it, which is why so many top tier companies recruit on our campus.”

Jason Lemont (CSC02), Raven Industries engineering manager who recruits at Mines, agrees.

“I am a strong believer that the need for engineers and scientists in the US is one of our larger problems and therefore a great opportunity for students and future engineers. I say this because of the opportunity for the strong quality of life that engineering provides and also for our country’s future as a world leader in research and development. Our ability to fill this demand will have a large impact on the position and direction of our nation moving forward,” Lemont says. Raven has a strong demand for electrical and software engineers but also hires across many disciplines.

Along with its return on investment, most students agree Mines’ charm includes the many opportunities for hands-on experiences.

Parker specifically points to the Center for Advanced Manufacturing Production program, which uniquely allows freshmen the opportunity to join a competitive team that builds unmanned aerial vehicles, concrete canoes, race cars, and even video games.

“While many universities are emphasizing distance education and massive classes, Mines is not,” President Wilson says. “We are high-touch in addition to being high-tech. Our graduates are not just ‘book smart’ they are ‘hand smart.’”

Mines’ growth rate of 8.9 percent is far surpassing that of its sister public institutions within the state. Headcount at three other universities was down in the fall, and at the two other universities where it was up, the next highest percentage growth was 1.3 percent at Black Hills State University.

Like at Mines, though, enrollment at peer engineering institutions throughout the country is growing as students and their families realize America’s need for engineers and scientists.

Consider these statistics from the 2013 My College Options survey, which is compiled using data from the Bureau of Labor Statistics (BLS) and the Economic Modeling Specialists International (EMSI):

- In 2012, the country’s STEM workforce surpassed 7.4 million workers and is expected to grow significantly through 2018, to an estimated 8.65 million workers.
- Science and engineering occupations are projected to grow at more than double the rate of the overall US labor force through 2018.
- Currently, 600,000 manufacturing jobs are going unfilled in spite of current economic conditions.
- In a four-year period between 2011 and 2015, an estimated 1.7 million jobs will be created in cloud computing in North America.
- Another noteworthy increase in STEM jobs has come courtesy of mobile apps technology, which has fostered a 311,000 job growth in the app economy.



Abby Labahn Phoenix, Arizona

Mining Engineering major, emphasis on management

Q: How did you learn about the School of Mines?

A: My dad **Rick Labahn** (EE85) went here.

Q: How many other universities did you consider?

A: I considered a few other universities, but when it came down to deciding in my senior year, the School of Mines was by far my first choice.

Q: Why did you choose the School of Mines?

A: I always knew I wanted to be an engineer, and there were so many reasons why this was the best place for me. Even though my tuition is out of state it is still very affordable. The job placement rate is amazing, and that was a big deal. Being able to get a job after college is hard, and I wanted to know I had a very high chance of having a job before I graduated. The School of Mines is affordable, yet has one of the best engineering programs. Also, I missed the Hills very much from when I used to live in Spearfish. Arizona was way too hot for me! Lastly my dad went here, and it feels good to know that I'm following in his footsteps and making him proud.

Q: What are the best or most unique things about Mines?

A: I love all the traditions like all the school songs and going up M Hill and many other things. Not a lot of other colleges have things planned for freshman like we do.

Q: Have you been surprised by anything here, something you weren't expecting?

A: I was more than surprised by this school. It has been so much more fun than I ever expected. Of course the school is known for its academics but there is so much more to it. The traditions, Greek life, intramurals, sports games, etc. It exceeded my expectations by a mile.

Q: Why do you think the enrollment growth is so healthy at the School of Mines?

A: I think maybe the school has really been trying to get its name out there more. The perks are so good, though, too, and I think maybe students are realizing that job placement is a big deal now.



Cody Dilger South Saint Paul, Minnesota

Chemical Engineering major

Q: How did you learn about the School of Mines?

A: I knew about the School of Mines from my grandma because my great uncle came to this school and became a computer engineer.

Q: How many other universities did you consider?

A: I was looking at three other colleges, the University of Wisconsin Stout, University of Minnesota Twin Cities, and Iowa State University. I visited the U of M and Iowa State, and Mines. I was accepted to all four schools, including Mines.

Q: Why did you choose the School of Mines? What are some of the most unique things?

A: I chose this school because I didn't really want a huge school to go to despite the colleges I chose. The amount of money was a huge deal. This school is less than half the cost of all the other schools I applied for. I think the fact that all the teachers want you to ask for help and are very social is a positive about this school.

Q: Is there anything you wish Mines had?

A: I wish the school had a swimming team. I was a swimmer for my high school.

Smart Kid CAMP

A dusty, makeshift road winds through the open pasture, ending at a hill crest that shelters a lake below. Only a hot wind and the cattle lowing shatter the silence.

But on the far edge of the ridge, there's a group gathered, their faint chattering barely perceptible across the way. Suddenly the talking stills into a single, rhythmic chant: Ten. Nine. Eight.

It grows louder, breathless with anticipation: Three. Two. One.

A hot blast of dirt careens into the air, a shower of soil and sod in perfect sync with excited exclamations and cheers.

Welcome to summer camp. The Mining and Explosives Engineering Institute, one of eight camps offered by Youth Programs at the South Dakota School of Mines & Technology.

The goal is nothing short of an educational revolution, encouraging students to roll up their sleeves instead of raising their hands. Telling them to take the time to tinker, to fail, to be fully immersed and deeply committed to the problem at hand. And if they do, they'll find novel insights and astonishing new approaches until the feats they accomplish amaze even themselves.

Zach Schmitz is a sixteen-year-old musician from Sioux Falls. He's attended several music camps, but his passion lies in the lab.

"I looked online for opportunities. This (chemical and biological engineering camp) is one of the first results I found. And Mines is renowned for its expertise in chemical engineering."

He lives for lab fermentation, and the potential applications of a ChemE degree blew his mind. "I was aware of chemical engineering before, but this was an eye-opener." The undergraduate program offered more than one way to wear a white coat. "I could be a surgeon or work in the lab."

It's his fellow junior and sixteen-year-old Darian Carter's first time at camp, too.

Hailing from New York City, she heard about the institute over the loudspeaker during the science research program at her high school. Her current project focuses on beta carotene in carrots, a substance she's trying to genetically engineer into other food.

But she says the Mines program offers something her project doesn't:

face time. Each camp is developed and taught by professors who are at the top of their fields.

Across the way in the mathematics and computer science building, a robotics camp is in full swing.

Two young men look up sheepishly as the professor enters, stepping right into the middle of robot wars, classroom edition. The first student acknowledges that they may have "knocked a few screws off some of the robots" but all in the name of programming knowledge. "It was mutually-sanctioned," the other hurriedly explains, pausing, "with my partner."

Over in the corner, freshmen from Hermosa and a Deadwood junior are huddled over the screen, puzzled by an issue with remote controlling.

McKayla Stratmeyer, fourteen, is the veteran of the pair. "This is my fourth camp. I've done space, chemistry, physics, and now computer science. But this is my favorite so far."

An unknowing, early-teen practitioner of *Lean In*, the best-selling book by Facebook COO Sheryl Sandberg that highlights gender differences in the workplace and encourages women to pursue their goals, McKayla is interested in attending Mines and is puzzled at the reference. "I'm just interested in programming," she says simply.

Director of Youth Programs Shawna Delaney says that's the point. "We hope to spark an interest in STEM (science, technology, engineering, and mathematics) in students and keep that alive through our summer camps."

Youth Programs has undergone a major overhaul during her tenure, a strategy designed to provide a higher-quality, more in-depth, and specialized experiential learning environment to high school students.

"Our camps are limited to sixteen students to ensure ample one-on-one time ... (including) as many hands-on activities as possible. Our goal was to reduce passive learning" through field trips and different teaming and leadership activities throughout the Black Hills, she explains.

All of the current camps are new to the eight-year program. And this year, she's adding one more.

“The biggest change for 2014 is going to be a 3D printing camp with the mechanical engineering department. It’s called “To the 3rd Dimension and Beyond! Mechanical Engineering in the New World” and will allow students to design products from concept to prototype using CAD and 3D printing,” says Chris Marshall, a program assistant.

The camp joins the “ASM Materials, Metallurgy, and Forensics Institute;” “Chemical & Biological Engineering Institute;” “Robotics Camp; Geology Rocks!” “Youth Field Camp in the Black Hills;” “Fossils: The Path of the Paleontologist;” “Mining and Explosives Engineering Institute;” and “Power Camp: Electronics and Computers in your Hands.”

This breadth of offerings is matched by the availability of opportunity. Delaney notes that there are scholarships available for students, and Marshall adds that new discounts will be available beginning this summer. Participants who pay before April 1 will receive an early registration discount of \$25. Campers who register with a friend or are referred by alumni or faculty members will receive a \$50 discount.

The college preparatory opportunity is priceless. Throughout these week-long sessions, students live in the dorms and decide if a major is right for them.

And when the only blast left is one of fall colors, smart kid camp is sure to be the highlight of the summer.

2014 Summer Camp Sign-Up

Find out more about the eight two-week summer camps at www.sdsmt.edu/learn



THE HIGH NOTE

Feiszli's career crescendoes

"I'm hearing fur. It's not fur; it's feeeeahr," James Feiszli, DMA, instructs the nine men and fourteen women who make up just half of the Concert Choir. Always conducting, he moves between the baby grand's ivory keys to within a foot of the first row of singers.

His passion and demand for excellence has been honored by the CASE Carnegie Foundation with the US Professor of the Year for South Dakota award. It's a serious recognition of his life's work and commitment to the profession, mostly accomplished in a place where, compared to a liberal arts institution, music plays second fiddle to science, technology, engineering, and mathematics.

That he persevered and rose to such a feat is almost overwhelming to him on most days. Feiszli grew up the son of a "brilliant" bassist and tuba player drafted into war, the fourth of six children, including a brother who showed musical genius at an early age and taught for a while and a sister who earned two music degrees herself.

"I spent most of my childhood trying to get noticed. I sang in church and those kinds of things, but I wasn't going to be a music guy. I kind of fell into music in college," says Feiszli, who finally started to play the tuba, his first instrument, in the seventh grade, old for a "guy" who would end up making a career out of music. He didn't take his first piano lesson until stepping onto the campus of Mount Union College. Even now he considers himself a "hacker" at best on a variety of instruments. His expertise is in choral directing.

After earning a bachelor's degree from Mount Union in Ohio, he taught music for six years in the public schools while pursuing a master's degree from the University of Akron. Feiszli describes this as an extremely formative time, as he began as band director, took over the choirs, and eventually decided to devote his life to choral music. After earning a doctorate from Arizona State University, he came directly to Mines in 1983, at a time when the school had three extracurricular music clubs, one music lecture course, one non-tenure faculty position, sixty students performing fifteen times a year—if you count combined concerts with high schools around the state—and a rehearsal room in the physical education center.

He arrived at the science and engineering institution thinking it would be a pit stop to another university where he could guide career-track musicians, knowing that if he stayed too long he would essentially halt any loftier musical dreams. "Despite other successes I've had, competitions won, performances abroad, etc., sometimes I feel like my peers don't respect me because I don't teach music majors. I struggled with that for a long time," Feiszli reflects.

Despite knowing that he would never direct music majors at the School of Mines, that music department resources at an engineering school would be limited, he has unrelentingly demanded excellence

not only of himself but of his students for the past three decades.

Today, the School of Mines offers eight academic music ensemble courses, five music lecture courses, employs three music faculty members, enrolls 350 student musicians performing at more than 100 events a year, and performs in its own Music Center building.

Not so long ago he committed to a simple and yet profound decision that brought a sense of peace with his career choices and, by extension, his life. He simply let go. "About four years ago I just gave it up. I stopped worrying about it. Who cares what the music profession thinks of me. My students are wonderful. I got the Music Center, and my university appreciates me."

He did once apply for a choral director position at another college and later learned he was not invited even for an obligatory interview because he had been teaching music at a non-music-degree-conferring university.

Despite his misgivings about the perceptions of others, it's a fact that Feiszli is well-known throughout his profession as a pioneer in bringing together other choral musicians for the common good. In 1993 he founded what would become ChoralNet, an Internet choral music sharing site for directors worldwide, long before the Internet became a mainstay. For twenty years he spent twenty hours a week running ChoralNet until it merged with the American Choral Directors Association (ACDA).

"I can only imagine it's a rare event to have a music professor selected (as a US Professor of the Year), but then very few of my music colleagues can claim to have changed the face of choral music. I believe Dr. Feiszli can make that claim and did affect a seachange," says friend and colleague Gary Weidenaar, president, Northwestern Division ACDA, and choral director at Central Washington University.

New university president Heather Wilson has publicly supported Feiszli from day one, even giving him a shout-out in her acceptance speech. "For thirty years Dr. Feiszli has developed the habit of excellence in hundreds of engineers and scientists through music. He is relentlessly demanding, and his students love him for it."

Indeed, they do.

Former student **Jessica Hartman** (ChE03), now a Delta Airlines manager in Atlanta, says Feiszli's mentorship changed her life. "As a woman at an engineering school, my focus should have been solely on chemistry, fluid dynamics, and heat transfer. ... He challenged me to become a better version of myself. The opportunities that set me up for success can be traced to my time studying under Dr. Feiszli. How to persevere. How to communicate without words."



2013 Distinguished Alumni



Five alumni who have set themselves apart in their professions and in their communities were honored at the 168th commencement ceremony December 21.

Celebrated as 2013 Distinguished Alumni recipients:

- **Laurie Chamberlin** (ChemE75) worked for Cargill, Inc. for thirty-eight years before retiring in 2013. He was involved in modifying Cargill's high-fructose corn syrup process for the soft drink industry. He has been a champion in the BioChemical Engineering initiative, which has provided approximately \$1.3 million in support to Mines. He has been active in Habitat for Humanity, United Way, and other service initiatives.
- **Jeane Hull** (CE77) is executive vice president and chief of technology with Peabody Energy. She has also worked for Mobil Chemical Company, Rio Tinto, and Kennecott Energy Corporation and has served on the School of Mines University Advisory Board, as well as various boards and councils for other institutions. She is also active in Big Brothers/Big Sisters, Science Fair for northeast Wyoming, and has been a foster parent.
- **Roger Kiel** (GenE58) has held positions with Bell Telephone Laboratories, Xerox Corporation, Color Systems Technology, Accuprint Corporation, and Symbol Technologies Corporation, during which time he published fifteen juried papers in professional journals. Kiel has served as a Mines campus recruiter, national co-chair of the SDSM&T Foundation's "Building the Dream" campaign, and as member of the Alumni Association Board.
- **Rob Mudge** (MetE76) co-founded RPM & Associates, Inc., a manufacturer providing specialty metal parts to plants, aerospace firms, and the Department of Defense, in 1982 and has since created two spin-off companies. Among the numerous boards and civic positions on which he has served: the SDSM&T Foundation Board of Trustees and the Rapid City Economic Development Partnership.
- **Larry Schmaltz** (CE79) has held positions as project engineer and manager with firms involved in hazardous waste management and remediation and geotechnical consulting. He spent three years with the US Air Force on the B-1 Bomber program. In 1992 he became president, CEO, and founder of A2L Technologies, Inc., which was asked in 2001 to provide on-site consulting services at the World Trade Center's Ground Zero site.

Legacies remembered:

Mines loses two former, long-term presidents

The School of Mines family lost two longtime former presidents last fall, each of whom presided over significant growth periods of enrollment or infrastructure.

President Richard A. Schleusener, who died September 11 at the age of eighty-seven, developed the first armored weather airplane for the School of Mines. President Harvey Fraser, who passed away November 10 at the age of ninety-seven, was a decorated World War II veteran and civil engineer who sparked a campus building boom.



As fourteenth president, Schleusener, PhD, led the School of Mines from 1975-1986. During his tenure, enrollment peaked to nearly 3,000 students and the institution celebrated its centennial.

His academic background was in meteorology and atmospheric sciences. In 1959, while working at Colorado State University, he began serving as a consultant to the School

of Mines' newly created Institute of Atmospheric Sciences (IAS), and in 1964 Schleusener became IAS director.

IAS projects during his tenure included:

- Armored airplane, a T-28 WWII plane modified with armor plating and sophisticated instruments used to study hailstorms for many decades
- Research and experiments in cloud seeding
- Multi million dollar grants for the Institute of Atmospheric Sciences



President Fraser, PhD, served as the thirteenth president of the School of Mines, from 1966-1975. Known as the infrastructure president, Fraser led construction of Devereaux Library, the Electrical Engineering/Physics building, Palmerton Hall, and what is now called the King Center.

A retired US Army brigadier general, Fraser graduated tenth in his class at the US Military

Academy and went on to build a distinguished military career during World War II.

He was a first lieutenant stationed in Hawaii when Pearl Harbor was attacked by the Imperial Japanese Navy on December 7, 1941. He and his troops in the 51st Engineer Combat Battalion were awarded the Presidential Citation for their heroic efforts in holding a forty-mile line in the Battle of the Bulge. He received the 1999 General Patton Award for his battalion's work in halting the German offensive, as well as for his post-military career achievements.

1930s



Ralph O'Neill (CE36) and **Eileen Peterson-Gersic** (GeolE75) spent several days this year working on early Folsom, South Dakota, history (east of Hermosa). Ralph was born near Folsom in 1907. Ralph and Eileen are working together to document early residents and history for the area first settled in the 1870s. Both Ralph and Eileen's relatives arrived in area in the 1880s as homesteaders. *We are saddened to report that Ralph passed away on December 18, 2013, at the age of 106.*

1940s

Donald Dittman (ChE42) moved from snowy upstate New York to St. Augustine, Florida. He is ninety-three and in good health except his hearing. He made trips to the Chicago area, where his daughter lives, and twice to Biloxi, Mississippi. He gave up his driver's license and lives with his niece.

Harry Head (EE49) is still enjoying life at ninety. His family is doing well. His youngest son, John, retired from the Army JAG Corp this year.

Norman Menyuk (Phys48) was pleased to read in the *E-News* about the Zimmerman brothers' trip to Turkey. He is particularly glad that it gave him a chance

to contact **Bob Zimmerman** (Phys48) to say hello after an interval of more than sixty years and find that he is doing well. Norman adds that all is well on his end, too.

Raymond Roby (ME49) said he is still going at the age of ninety.

Armand Sedgeley (CE49) said he has been a member of the SDSM&T Alumni Association for sixty-four years and counting.

Floyd Stone (CE49) shares he is doing fine for a man who is ninety years old. He is still driving his car. He and his wife, Anne, recently took on an assisted living plan, which has been a blessing for their well-being. All five children, along with their nine grand and great grandchildren are doing well.

Bob Winkler (CE43) has been a full-time Florida resident for the last two years. He has Parkinson's disease but, in spite of difficulty walking, plays eighteen holes of golf twice a week. His wife Kathy is a good golfer but has learned needle point and does not have time for golf. She shot a hole in one two years ago. His son, Jim, and his wife, Karen, who live in San Diego visit often, and study the many birds there. They are going on a tour in the Everglades with a famous photographer during their next visit.

MEMORIALS

Edward C. Deland (ChE43)

James L. Ennenga (CE47)

Thomas F. Malone (GenE40)

Robert K. Martin (Phys49)

Ralph O'Neill (CE36)

David R. Toland (Geol41)

George R. Whitehead (EE43)

Robert C. Zimmerman (ChE47)

1950s

Fred Beeman (GeolE50) just had his ninetieth birthday and does not feel much different. His wife, Bette, is fine, and their girls, Linda and Susan, live nearby now. Everyone is in Arizona, and he expresses that time marches on.

Harold Brandeberry (EE52) shared that moving at his age is tough.

Louis Buchholz (EE50) and wife, Hennie, moved in with their daughter and her husband at the foot of the beautiful Greenhorn Mountains, elevation 6,600 feet. He said he has not paid income tax since 1988. He reports that they are happy and healthy.

Carl Buttemeier (EE59) does part-time reliability work for B/E Aerospace. Both granddaughters are now in college. He says they are all doing OK.

Roger Dean (CE57) says retirement is good and birthdays whiz by. His wonderful wife of fifty-five years keeps him on task. He and Barb wish the best to all Miners.

A.L. Dougal (CE50) is now taking painting lessons at the age of eighty-nine. So far he has done five landscape paintings; one is displayed in the lobby where he lives.

Albert Gilles, Jr. (GeolE52) said they have had a lot of snow. During the October blizzard, they got five feet, and then ten days later got another eighteen inches of snow. He said it is very white this year, and it is early!

Bob Hayes (MinE51) is temporarily staying with his daughter in Fresno, California. He emailed that he has had some medical problems and spent some time in a Golden Living Center in Fresno. However, he assures that his permanent address is in Keystone, South Dakota.

Bruce Johnsen (CE59) had international work or travels in 2013, and he has more plans for 2014. He visited campus in October and found it alive and well, much to the credit of President Wilson and all the dedicated faculty and staff. He encourages the good work.

Gordon Johnson (ME52) shares all is well with him and his wife, Evelyn, but admits it is an ongoing battle with Father Time. Since they no longer have their motor home they stay pretty close to home. Their family visits them.

Howard Opp (EE57) has five great grandchildren, ranging in ages from newborn to ten years. Their parents live in Alabama, Kentucky, and Texas. With a lot of planning, one may someday become an SDSM&T graduate.

Robert Prunty (ME50) has been back in Rapid City for seven years. They enjoy their time with family and friends and especially still enjoy the Hills.

Donald Range (EE51) and wife, Marge, moved into a Westhills Village villa in Rapid City.

Morris Range (EE51) lost the love of his life, Edie, on June 3, 2013, after 59 years of marriage. Family and friends joined in a wonderful celebration of her life.

Bob Sacrison (MinE51) is as pleased as can be that Heather Wilson was named president.



Gene Skinner (GeolE53) of Spokane met with **Marlene Nelson** (ME74) of Seattle last summer to discuss alumni from each side of Washington state. Both have served the School of Mines for many years and continue to work for our alma mater in the Pacific Northwest. Thanks go to you both for your many years of service!

Wesley Strampe (MinE52) has been able to visit campus more often as his granddaughter is a chemical engineering senior and has been active in sports. He feels there have been vast improvements since he left sixty-one years ago.

Ernest Sundstrom (ME58) and his wife are enjoying retirement in Georgia.

Owen Tripp's (ME50) wife, Yvonne, ninety, died November 3, 2013, at home, peacefully and without pain, in the presence of family. The cause of her death was congestive heart failure.

Vern Vigoren (GeolE57) advised that his wife, Bonnie, passed away on November 30, 2012, at the age of eighty. She had been sick for

several months. She is greatly missed after fifty-eight years of marriage.

Harold Von Colln (MinE54) retired in 1998 and has since been busy at a lake place near a former work site clearing land, building, and doing road work. He visited the SDSM&T Alumni Association office in November on his way from New York to New Mexico.

William Yates (EE53) sadly reports the loss of his wife, Edith, after fifty-seven years of marriage. She passed away in June.

Ward Zimmerman (ME50) emailed that the two surviving Zimmerman brothers, himself and **Dr. Robert (Bob)**

Zimmerman (Phys48), celebrated M Day in Istanbul, Turkey, on September 21, 2013. Robert made a presentation at a physics conference in Izmir, Turkey, and invited his older brother along to enjoy sightseeing. The brothers then planned a multi-week trip flying Bob's 1963 Mooney airplane around the East coast, visiting family and friends. Both brothers have private pilots' licenses.

MEMORIALS

Robert T. Bierne (MinE55)

Russell L. Hardy (EE51)

James E. Hye (CE51)

Robert L. King (Geol54)

Francis C. Koopman (GeolE50)

Kenneth L. Leiter (MetE55)

1960s

Chet Anderson (CE60) says that his first granddaughter is now at USC. There is a possible Miner in her sixteen-year-old brother in Los Angeles. There are four more grandchildren behind them and two great grandchildren.

Theodore (Ted) Andrews (CE62) and wife, Louise, both celebrated their ninetieth birthdays this year in good health. Louise enjoys her computerized embroidery machine and keeping up with the rest of the family through her computer. Ted golfs once a week, although badly nowadays, and bowls twice a week and reads a lot.

Edwards Bane (MetE60) claims that all is well with his family, which includes seven children, nine grandchildren, and one great grandchild. Among those, there are three Aggies, an LSU graduate, soon to be two CPAs, one teacher of deaf children, and another on the way to be a PhD. He is rehabbing a lower back fusion but is doing well.

Glenn Barber (CE60) retired but is working as a construction consultant for the Oglala Sioux Housing Authority at Pine Ridge Reservation.

Sam Begeman (ME64) updates that they are well and dry.

Charles Braden (ME66) moved to the Black Hills after being away forty-seven years. He said it feels like home to be back, and so far they have had “only” about five feet of snow ... in the month of October! He said that is a bit much, but even so they love being near family and the beautiful Hills.

James Brownhill (ChE69) retired in April 2013 and moved back to Colorado to enjoy blue skies, sunshine, and mountains.

Dick Chambers (ME66) is spending his thirteenth year as a mechanical engineer mentor for Team 399, a robotics team at Lancaster High School. This team is a member of For Inspiration and Recognition of Science and Technology (F.I.R.S.T.).

Carl Coad (Math60) is enjoying retirement after ten years. He enjoys family and friends and attends a lot of grandkid sports and other events.

Tom Crook (GeolE66) and his wife, Treva, now share a partnership with their oldest son, John, in their specialty garlic enterprise called Wallowa Mountain Garlic. Business is healthy through their website and local sales.

Jim Crouch (MinE68) finally retired and now only has to take care of their farm. They have been struggling with sugar beet harvests being in the mud created by nearly six inches of precipitation since September.

Archie Doering (ME63) enjoyed the fifty-year graduate event in conjunction with the spring commencement. He said the staff did an excellent job in rolling out the welcome mat for all guests. He shared it was a great event.

Mike Fischbach (ME64) moved to a townhouse in September after two years in an apartment, which he says was long enough. He is enjoying the new digs even though he is still unpacking a month later. His son, Sean, wife, Tammi, and their boys moved back to the Kansas City area last summer. As a grandpa, he has a lot of football games to watch with sixth-, eighth-, and tenth-grade teams. He has a lot of space for visitors, who are always welcome.



Ross Grunwald and Brian Tucholke

Ross Grunwald (Geol64) and **Brian Tucholke** (Geol68) are pictured at Brian's office at the Woods Hole Oceanographic Institution (WHOI) in Woods Hole, Massachusetts. Brian has been a marine geologist at WHOI for many years and has published extensively in the field. Ross spent the summer at WHOI between his junior and senior years at Mines and later got his MS in geological oceanography from the University of Hawaii. He and Brian just missed each other at Mines. Brian started as a freshman in the fall after Ross graduated the previous spring and left just before he returned to Mines to work on his PhD.

Alan Freiberg (ME68) fully retired from consulting work two years ago. He continues to fly his airplane, and recently flew from Alabama to Pierre last June to attend his fiftieth high school reunion. He was amazed there were a lot of “old people” there.

Don Gapp (GeolE60) is completely retired after the third attempt. He lives in Coronado, California, in the middle of San Diego Bay, and also maintains a house in Sturgis, where he spends several months every year. He sees a lot of Gloria and **Vernon**

Bump (GeolE61) and **Cathie LeRoy Draine** (GeolE69). His wife, Marion, got new knees this winter, so they intend to hit the ground running soon. If you are in either of their locations, they welcome you to get in touch.

C. Tom Gorder (MetE60) shares this year has been a difficult year. He lost both his brother and his wife, Anita, in March. He has moved to Tuscaloosa, Alabama, and has enjoyed his time there.

CLASS NOTES

Marvin Hammer (ME63) and his wife, Karel, took a motorhome trip to ten National Parks, beginning in the Black Hills. He missed his fiftieth reunion but was able to visit campus during their trip. He said he barely recognized it compared to fifty years ago. He said the Surbeck Center is beautiful. Folks on campus were very nice to an 'old' alumnus.

Sidney Hansen (ChE68) has been actively involved for many years providing vision and investing financial resources in areas of research, economic development, master planning, and other opportunities for the SDSM&T campus, and looks forward to working with the new president.

Donald Holzwarth (ChE68) and wife, Sandi, are enjoying retired life. They travel about half the time. They just returned from a trip to Europe to visit their son, **Jared Holzwarth** (ME00), and his family. He works for Sixtron, which makes reactors that are used in LED manufacturing. He and Sandi celebrated their forty-fourth anniversary in October.

Mel Klasi (Math62) greatly enjoyed his fiftieth reunion of the class of 1962. He only wishes more of his classmates would have been able to attend.

Fred Knight (GeolE63) sadly reports that his wife, Virgean, passed away on July 4, 2013.



The Hansens with Dr. Marc Robinson and Tony Kulesa

MR Hansen (CE69) and wife, Barbara, caught up with professor Marc Robinson and graduate student **Tony Kulesa** (CE12) in Beijing, China, with a day of touring and a nice meal. Dr. Hansen and Barbara are spending one year teaching in Mongolia. Dr. Robinson and Tony presented at the sixty-third International Astronautical Congress on modeling the thermal and mechanical properties of syntactic foams.

John Larson (ChE67) finally retired from DuPont after more than forty years of employment. He plans to stay in Southeast Pennsylvania and bounce grandsons on his knee.

Bob Miesen (CE61) still lives in Houston, close to his three children and six grandkids. He is fortunate to be able to travel, do some consulting work, sing in his church choir, and volunteer for the Alumni Association, which he enjoys. He claims that the best thing he has ever done was meeting his wife, Becky, in Hawaii, fifty years ago. He offers that if you are ever in the area, be sure to call.

Richard Moen (MetE62) and wife, Mary Jo, are more retired than ever and enjoy it. They just returned from a two-week tour of Ireland. At this stage, command attendance at grandkid activities in western Washington seems to occupy a significant portion of their free time.

Leonard Neugebauer (CE69) is enjoying retirement. He is still serving South Dakota as a member of the South Dakota Board of Technical Professions.

Bruce Orton (ME61) enjoys hunting and fishing in the great North Dakota outdoors. He is living in Dickinson, near the famous Bakken Oil Development.

Dickinson is now one of the fastest growing areas in the US. He is looking forward to warmer weather in the Southwest.

Mil Peterson (CE61) made it to South Dakota to hunt pheasant again this past October, as he loves to go to South Dakota in the fall. He is hoping Texas figures out how to get its bird population back up.

Robert Rasmussen (ME65) has been retired since 1998. He and his wife, Sandra, are snow birds and have houses in Wyoming and Arizona. They have kept in contact with **Tom Kuhl** (GeolE68) and **Danny Hoshino** (ME65), whom Robert sees every year at a golf tournament they all work. He also just made contact with **Jim Woods** (ChE65).

Roger Roehl (ChE66) still calls Midland, Michigan, home. They winter in Florida. He and Myrna enjoy retirement and golfing when time permits. He is hoping to get back with Builders for Christ soon. He is recovering from cancer treatment and is cancer free, for which he feels blessed.

Halvdan Saethre (ME68) spent six weeks in Norway in March and April visiting friends and relatives. It was the first time in eighteen years. He enjoyed days in Bergen with **Freddy Frydenbo** (ME68) and **Rolf Gulbrandsen** (ME67). After being back in California, **Oistein Nyberg** (CE67) stopped by his home in Truckee.

Harold Schaefer (ME63) expressed that the May fifty-year graduate reunion was terrific. It was his first time attending a Mines graduation ceremony, including his own because he was in the Army in 1963. Everything about the school impressed him and he says he envies the current students. The Alumni Association treated the Class of 1963 like royalty in his opinion, and he encourages everyone to attend when it is their turn. He extends a big thank you to Dee Raymond, **Tim Vottero** (Chem84), and **Paul Gnirk** (MinE59).

Charles Schmidt (MetE63) greatly enjoyed the Class of 1963 reunion last spring. He enjoyed seeing a bunch of guys he had not seen for fifty years. He and wife, Rosemary, sold their home in St. Louis last December and now have two residences. A summer home in Bend, Oregon, and a winter home in Phoenix, Arizona. They have kids and grandkids in both places. He looks forward to getting together with Phoenix alumni in the winter months. He finally touched base with **Jim Matthesen** (Phys63), with whom he attended the same schools from the first grade through SDSM&T.

Tom Snyder's (ME62) son, Jon Snyder, is currently running for a second four-year term on the Spokane, Washington, City Council. He has eight grandchildren.

Jon Spargur (ME61) and his wife sold their home in North Bethesda, Maryland, in February, retired in March, moved to Cary, North Carolina, in April, and traveled to Germany and France in June. Now they are taking it a bit slower and are spending more time with their grandchild, meeting new neighbors and friends, learning how to enjoy retirement, and planning more vacations.

Kathleen Stechmann (Math69) moved into a townhome this year. She appreciates not having to take care of a yard and the outside of a home. She has enjoyed traveling some within the United States. She has enjoyed seeing **David Bender** (ME69), **Diane** (Math69) and **Dave Hammond** (GeolE69), and **Ann Parkhill** (Math69). She also appreciated visiting the school and seeing all the changes since 2010.

James Sykora (Chem68) is going on eleven years since he retired from Goodyear as a senior tire design engineer on the GM Team. He said it was a blessing that Goodyear decided to retire him (after thirty-five years of service), as his wife's Multiple Sclerosis requires him to be a full time helper (and all-around nuisance) around the house. To make life even easier on both of them, they moved into a condo in November 2012, and he now enjoys watching neighbors mow lawns and shovel snow. He found the alumni site



Keith Mutchler with 1960s alumni in Denver

Immediate Past Alumni President **Keith Mutchler** (ME71) gathered a small group of 1960s-decade alumni for lunch in Denver last August. Pictured below are (l to r) **Bill DeGroot** (CE69), **Keith Mutchler** (ME71), **Marv Truhe** (ME67), **Gary Young** (CE66), and **Marty Amble** (CE68).

while surfing the web one day, and said he is embarrassed to say he should have signed up long ago. It is nice to see such a well-maintained and informative website.

John Synhorst (EE68) is teaching part-time as an adjunct lecturer at the California Maritime Academy (CMA). He is currently teaching electrical circuits lab courses. CMA has a quasi-military atmosphere with the cadets wearing uniforms and many programs licensed by the Coast Guard.

Ken Trompeter (ME62) sends a reminder to SDSM&T that growth is good, but quality is job one!

Brian Tucholke (Geol68) and wife, Anita, had a great trip to Australia and New Zealand for two months in the spring, sightseeing and fly fishing. They enjoyed a visit from **Ross**

Grunwald (Geol64) who visited in September.

Del Zambon (ME60) and his wife, Jean, celebrated their fiftieth anniversary in 2012. Having worked thirty-seven years for a San Francisco-based engineering and construction firm, they lived in seven states and four countries before retiring and returning to the Black Hills. That decision has proved to be one of their best. Rapid City is becoming a grand city and SDSM&T has sound leadership and is moving toward a solid new direction of growth with the inclusion of new fields of technology.

MEMORIALS

Leray J. Casteel (EE61)

William B. Jonas (CE62)

Gerald D. Kinsley (ME69)

Robert G. Ward (Math64)

1970s

Gary Callahan (ME70) and his wife Jeanne are enjoying retirement in Colorado. A bit of travel breaks up the year. They will winter in Arizona with a trip to Hawaii to see Jimmy Buffett on Waikiki in Honolulu, Hawaii, with Bonnie and **Dave Berg** (ME73), then off to Russia for the Olympics in February.

Laurie Chamberlin (ChE75) retired on June 30, 2013, and relocated to Hill City, South Dakota.

Bruce Demarcus (MinE73) is retired but doing extensive consulting work for various banks and projects. He is very active at his place just outside Lead/Deadwood and works with Knights of Columbus.

Louis Dorland (Phys77) and his wife, Susie, are happily retired. They enjoy riding their bikes, volunteering in the community and visiting their daughter in New York City. He is also able to spend more time with astronomy.

Roberta Eschenbaum (ChE71) spent the last seven years prior to retirement shipping waste from Idaho National Lab to the Waste Isolation Pilot Plant in New Mexico. Before that they shipped waste from Rocky Flats. She worked for Los Alamos Technical Association, Kaiser Hills Rocky Flats, and Bechtel-BWXT in Idaho.

Ronald Eschenbaum (ChE71) spent the last ten years prior to retirement working at various US nuclear sites shutting them down. He was vice president at Los Alamos Technical Association. He worked at Rocky Flats before the traveling started.

Melanie (CE79) and **Mark Fiegen** (ChE79) shared that their oldest daughter, Jane, married Nate Green on February 6, 2010, at Graham Chapel on the campus of Washington University in St. Louis. Both Jane and Nate are pursuing their PhD in history. Melanie made the cake, and their friend, Karen, designed and made the bridesmaid dresses. Retirement will have to wait, as they are planning for two weddings in 2014.

Terry Fiero (ChE70) and his wife, Pam, continue to enjoy great health in their retirement. They have lots of opportunity to spend time with their family, and for golf and travel. They are looking forward to a family reunion, a fiftieth high school reunion in 2014, and the SDSM&T five-year reunion in 2015.

Michael Higgins (ChE70) just completed a three-week journey around the world, which included stops in Tokyo, Beijing, Mongolia, Moscow, and London.

Steven Hinman (EE78) moved on last July, after twenty-three years at MWH. He is now working for Brown and Caldwell, still doing electrical engineering, power and controls, mostly for water/wastewater treatment plants and pumping stations. He now has a grandson, going on two, who has proved to be fun!

Dave Hobler (Math76) is enjoying his new career as a registered nurse in chemotherapy for Kaiser Permanente.

Wayne Kellogg (GeolE73) is staying busy working on a tribal water plan, which will encompass twenty-two counties in Southeast Oklahoma. He says he uses both his geology and engineering backgrounds on this project, so he finds it interesting. They were in the Black Hills last summer and saw his brother and cousin who live in Rapid City. They are hoping to get back again soon.

Richard Larsen (Geol77) and wife, Mary Ann, have relocated to the beautiful Spearfish area after thirty years in Salt Lake City, Utah. He is now part of the team involved in developing a rare earth mine in the Wyoming Black Hills. They are equidistant from their children and grandchildren, with their daughter in Corvallis, Oregon, and their son and granddaughter in Chicago, Illinois. Mary Ann has retired from teaching and is enjoying restarting her passion for oil painting.

Richard (Chi-Kuo) Loh (MS EE72) worked for Jet Propulsion Laboratory (NASA) for thirty years and was involved in Mars exploration, Earth science, and Deep Space Network engineering.



Tom and his baby

Tom Bender (MetE76) and wife, Luanne, sent a photo of Tom and his 'baby'.



1970s Singing Es with Dr. Chuck Thielen

During the 2013 Alumni Weekend, eighty alumni traveled to Rapid City and sang as an Alumni Choir in mass concert with the University Choir, Concert Choir, and Master Chorale to help celebrate SDSM&T Director of Music Dr. James D. Feiszli's thirtieth year at the university. Dr. Chuck Thielen, former director of the Singing E's, attended. He is pictured with five of his "boys" from the 1970s. From left: **Tom Zeller** (ME70), **Bob Case** (EE75), Dr. Thielen, **Lowell Kolb** (EE74), **Lorin Brass** (MetE75), and **Ken Miller** (CE75).

Kevin Meador (CE79) shared that it was good to see alumni and Delta Sig brother, **Tim Anderson** (ME77), at the football game with Colorado School of Mines in early September, even though the game did not go as planned. Go Hardrockers!

Clair Menning (CE73) is just finishing up his last project management assignment, in Malaysia, and heading into retirement after forty years with Mobil & Exxon Mobil Corporations. He said the company gave him the opportunity to live in nine countries on four continents, and to visit sixty-two countries in between. There will be no porch swings or golf games in the future. Instead, he and his wife have set up a charitable non-profit foundation that will now

consume their time and energy.

David Orton (EE72) and his wife, Phoebe, live in Eugene, Oregon. They have two married children and five grandchildren. Dave is employed by Cascade Sierra Solutions as a Consulting Program manager. CSS assists heavy duty trucking companies to improve fuel efficiency and to reduce harmful emissions.

Steve Pirner (CE72) is still with the South Dakota Department of Environment and Natural Resources (DENR) in Pierre, South Dakota. There are thirty-eight SDSM&T graduates in DENR, which is more than 21 percent of their workforce. Many area alumni attend the annual SDSM&T Alumni Tailgate Party at the Pierre Legion Cabin in

January each year. Next year (2015) will be the twentieth annual event, so plan a January trip to Pierre.

Thomas Sheldon (ChE70) retired at the end of 2013 after twenty-seven years working at MOM Brands.

Tary Schumacher (ME72) retired from Dow in late 2009 and spent 2010 and 2011 taking care of three grandchildren while his disabled veteran son completed his MBA. He joined a consulting firm after he graduated and has been working at Chevron in Procurement/Supply Chain Management since February 2012. Tary has all four children and all six grandchildren (the seventh is on the way) living within four miles. They do a lot of babysitting, and everyone swims in their pool almost every weekend during the summer. He had hoped to come back to Rapid City to play golf but work has been nonstop.

Larry Schmaltz (CE79) sold A2L Technologies, Inc., in December 2012 to Apex Companies, LLC, of Rockville, Maryland. The transition has gone well, and he is working for Apex as a national program manager, as well as managing the Florida operations.

Joseph Vig (CE71) wishes the best of luck to SDSM&T Alumni

Association President **Carmen Adams** (ChE75) and sends many thanks to Past President **Keith Mutchler** (ME71) who happens to hail from a great graduating class, in his opinion.

Donald Wiedemer (ME72) retired from Stanley County, South Dakota. The equalization office is to move back to the Black Hills. He and his wife, Melinda, live about nine miles south of Deadwood in a beautiful lot with lots of snow.

Glenda Williams (Chem75) and her husband moved back to Rapid City last March (2012) to retire, but her job followed them from Washington, DC. They love being back in the Black Hills, and enjoy seeing local Mines graduates **Steve Rennell** (ME75), **Linda Rausch** (ChE75), and **Gary Hamilton** (ME73). They hope to be at the next five-year reunion.

Mark Wismer (EE78) shares that **Clark** (EE06) and **Katie Wismer** (ChE06) are back in Rapid City now. Clark is at the cement plant.

MEMORIALS

Michael Green (ME72)

1980s

Bruce Anderson (CE81) turned fifty-five in September, retired, and became a grandpa. His oldest of three daughters, Katie, and her husband, Cuyler, had a daughter named Kerris Lillie. He will be visiting them in Columbus, Ohio. His middle daughter, Mary, lives in Rapid City, and his youngest, Julie, lives in the Twin Cities. For most of his career, he was a project engineer, managing construction projects for the US Army Corps of Engineers at Ellsworth Air Force Base. The last three years were spent mostly on the Yellowstone River in eastern Montana and then on the Missouri River in South Dakota.

Dave Crumrine (CE86) is staying busy building interstates and has had help recruiting additional Mines grads to add to their engineering and controls businesses in Iowa. They are a great fit for the Midwest work culture and continue to be some of their brightest additions. His oldest (Beth) enrolled at SDSM&T in the fall and Dave shared that it has been nice to reconnect with the school and see the progress. He gets prouder and prouder to call himself a Hardrock as the years go by.

Connie (MS CE85) and **Rod Determan** (MS CE85) are living in Omaha and loving it. Rod is at Nielsen Baumert, and Connie is at Kiewit Corporation. They enjoyed having **Jerry Logan** (MinE83) and his wife, Teresa, visit a month ago. Connie was fortunate to have Megan Bickal (an SDSM&T student) as her summer intern, and she has a niece, Kayla Inman, attending Mines. They have two great kids—Steven, seventeen, and Sarah, sixteen. Both are in cross country.

Tom Kelley (CE80) is the current national chair of Precast Concrete Institute (PCI). PCI is a national organization, which is the permanent body of knowledge, when it comes to Precast Prestress Concrete. Tom has been president of Gage Brothers, which played a significant role in the Rocker Square project, since 2001. He has been employed by Gage Brothers, located in Sioux Falls, since he graduated from SDSM&T. He and his wife, Julie, have four grandsons.

Kate Kleiter (Geol88) was able to attend the National AIPG Meeting in Rapid City in August 2012. She stated that it was nice seeing faculty from the Department of Geology & Geological Engineering. She gave a talk at the AIPG Meeting on Environmental Cleanup of the New Minnesota Twins Ballpark (Target Field).



Kevin Griese with family at pinning ceremony

Col. Kevin R. Griese (CE87) is the new assistant adjutant general for the South Dakota Army National Guard. A Transfer of Authority ceremony took place at the Joint Force Headquarters Readiness Center at Camp Rapid on July 13. As the assistant adjutant general, he is responsible for strategic planning, strength management, troop readiness, and mobilization support of the state's nearly 3,300 Army National Guard Soldiers.

Bradley Jolliff (Geol85) became the inaugural Scott Rudolph Professor of Earth and Planetary Sciences (EPS) in Arts & Sciences at Washington University in St. Louis.

Largo Resources Ltd. announced the appointment of **Michael Mutchler** (MinE85) to the position of Chief Operating Officer. Michael has most recently served as chief operating officer for Rainy River Resources, which was acquired by New Gold. Prior to his tenure with Rainy River, Michael served Kinross both as vice president of Project Development Services and as project director of the Paracatu Mine Optimization in Brazil. He also worked for twenty years with ASARCO Inc. in various roles.



Sheryl D. Gallagher

Sheryl D. Gallagher (GeolE83) was elected president of the Kansas City chapter of the American Society of Civil Engineers. She is senior project manager for Geotechnology, Inc., in Overland Park, Kansas. She joined the company in 2003 and has more than twenty years of experience in projects involving mines, slope stability, bridges, and roadways.



Patty Mamola

Patty Mamola, PE (CE86), is the new president of the National Council of Examiners for Engineering and Surveying. She is its first female president, accepting the office at the organization's ninety-second annual meeting last August. A resident of Reno, Nevada, Patty has focused her career on transportation, construction management, and analytical problem solving. She is one of the founding principals of the professional engineering firm Bowling Mamola Group.

Refai Taher Refai, PhD, (MS GeolE83) was a visiting professor at the Department of Geology & Geological Engineering at SDSM&T in June. Dr. Refai is a faculty member and chair of the Geological Engineering Department, University of Tripoli, Libya. He shared that after thirty years since his graduation from SDSM&T, he remains a good friend to SDSM&T, the state of South Dakota, and the United States.



Col. Lisa L. Zacher

Col. Lisa L. Zacher (Chem85), MD, FACP, FCCP is retiring after serving twenty-seven years in Army medicine. She has been selected as chief, Department of Medicine, Orlando VA Health System, Orlando, Florida, and was appointed as an associate professor of Medicine for the University of Central Florida.

Gene Rye (EE84) shared that for those of you who have tracked these things over the years; BBQ V continues to be under construction at the house in Midwest City, Oklahoma. It will be different in some ways than the others, but still stone and still massive.

Clark Sorenson (CE88) accepted a new position with Nana Worley Parsons in Anchorage, Alaska, after sixteen years of employment at Alaska Anvil, Inc.



(l to r) Mark Janssen, Lance LeTellier, Kurt Selzle, Jeff Scheinost

Kurt Selzle (ME86) enjoyed a mini reunion of Mines alumni, and more specifically from Theta Tau Omega Chapter, at his June 29 wedding to Deborah Manning in St. Louis, Missouri, at the Contemporary Art Museum. As a side note, Kurt enjoys his growing real estate redevelopment business, in which he sees endless opportunity. Pictured are **Mark Janssen** (ME88), **Lance LeTellier** (CE89), **Kurt Selzle** (ME86), and **Jeff Scheinost** (ME86).

Georg Storaker (ME81) emailed that since graduation he has worked for ConocoPhillips in multiple locations around the globe and has had the pleasure to work with a number of colleagues from the School of Mines. Recently, he worked with **Willy Chiang** (ME81) and enjoyed sharing stories when they met in Norway, China, Houston, Libya, and other places. This year he relocated to Tripoli, Libya, to work with the National oil company of Libya for ConocoPhillips.

MEMORIALS

Anthony R. Anderson (EE86)

Christopher J. Bauer (EE85)

Michael L. Beals (ME82)

1990s

Rachel Hagen (ME98) and husband, Brian, welcomed their fourth child, Quinlan Cole. He joins big sister Kyra, eight, and big brothers Tyler, six, and Niall, five. Their growing family has made things tight in their house, so they listed their home in hopes to sell and buy a new home. Rachel has also gone back to work part-time at her previous employer, Modine Manufacturing. She and Brian are enjoying raising their family in Racine, Wisconsin, on the shores of Lake Michigan.

David Muck (CE94) has an addition to his family. Piper Jo Muck was born July 16, 2013.

Angelique “Angel” Shawda (Geol99) welcomed her second daughter, Gwendolyn Mae, in July, a bit earlier than her September due date. She spent some time in the NICU and was released just in time to take big sister, Evelyn, to her first day of kindergarten. Since she and Jon work for great companies, both have been able to handle the challenges of being the parents of an infant and the doctors’ appointments that go along with having a preemie.

MEMORIALS

Kevin Reich (ME96)

2000s

Kyle Coleman (ME01) recently spent a day on campus meeting with faculty and researchers. As an alumnus and one who sees a large spectrum of the innovation industries have to offer in his profession as a patent attorney, he was excited and proud to see Mines research and technology development is ever more cutting-edge, innovative and reaching new standards of excellence.

Beau Obrigewitch (CE00) has been working as a well integrity engineer with BP Alaska since January 2012. Prior to that, he worked at R&M Consultants in Anchorage, Alaska. He also passed the Principles and Practice of Engineering (Civil) during the April 2013 session.



Justin and Amanda Hill

Justin Hill (EE07) was married at a small ceremony in Telluride, Colorado, on June 15, 2013. His wife, Amanda, is a professional research assistant in the Department of Pediatric Oncology at the University of Colorado Anschutz Medical Campus. Justin is an electrical engineer at Lockheed Martin in Littleton. They met and had their first date on South Pearl Street in Denver. For the proposal, Justin decorated the now-closed wine bar that the pair visited on their first date with flowers and candles, and surprised Amanda by taking her inside the closed establishment and proposing.



Zoe Danelle and London Ann Zimmerman

Beth (IS07) and **Tom Zimmerman** (IS08) welcomed a daughter, London Ann, on October 27, 2012. She enjoys spending time with her big sister, Zoe Danelle, 3. Tom is currently working for C-Lock Inc. in Rapid City where they are developing and producing green feed cattle feeders, which are cattle feeders that quantitatively measure methane (CH₄) and carbon dioxide (CO₂) mass fluxes from cattle. He has been traveling all over the world to set up green feed.

Amy Ormseth (CE00) has been named the new district ranger for the Salida office of the US Forest Service. Amy is a civil engineer who has worked for the forest service in Nebraska, Idaho, and Wyoming.

Former Faculty and Friends

MEMORIALS

Dr. Harvey Fraser

(Former SDSM&T President)

LaVonne M. Johnson

(Former ROTC Secretary)

Dr. Alberto Lemut

(SDSM&T Faculty)

Dennis A. Norlin

(Former Library Director)

Dr. Richard Schleusener

(Former SDSM&T President)



1

1. Washington, District of Columbia: Alumni Group Photo (front row, l to r) **Karen Zapp** (GeolE79), Janet Truhe, Suzanne Everhart, **Merry Ortberg** (ME93), **Susan Law** (GeolE81), Carol Carswell, Susan Grodin, Nancy Tucker, Judy Doering, Sherry Mutchler; (back row, l to r) **Sonny Caputo** (CE55), **Guy Everhart** (CE63), **John Withers**, **Mike Mueller** (GeolE67), **Jerry Jarding** (ME74), **Bill Tucker** (GeolE56), Bruce Law, **Larry Carswell** (Math66), **Wayne Wilcox** (GenE58), **Doug Opp** (EE71), **Paul Gnirk** (MinE59), **Archie Doering** (ME63), **J.J. Pirtle** (MinE86), **Keith Mutchler** (ME71)



2

2. Baltimore, Maryland – ME and SWE students with 3M alumni (clockwise from left front) Cheyanne Herbert (ME), Jessica Banuelos (ME), Katelyn Kirsch (ME), Lisa Carlson (WiSE Director), Justine Sorenson (MinE), Kristy Rennick (IE), Holly Maudsley (ChE95), Tasha Timm (ME), Cassie Kulesa (IE), Andrea-Marie Babbs (IE), **Rachel Joseph** (EE13), Anna Hanson (MinE), Cassandra Tomac (ME)



3

3. Golden, Colorado – Tailgate Group at SDSMT vs. Colorado School of Mines



4

4. Golden, Colorado – Young Alumni and Future Hardrockers

AREA MEETINGS

5. M Week – Seniors Kirk Ehlke (CE) and Kati Johnson (ChE) point to their handiwork.



6. M Week – Alumni board members and volunteers at M Week Mixer (l to r) **Chuck Cox** (ME00), **Susan Banks** (GeolE75), **Mike Alley** (GeolE73), **Mitch Slusarski** (IE95), **Carmen Adams** (ChE75), **Keith Mutchler** (ME71), Sharon and **Tom Zeller** (ME70), **Anne Putnam** (ChE05), **Greg Hintgen** (EE99), **Delores** and **Roger Kiel** (GenE58)



7. M Week – ‘Frosh’ Heather Wilson and ‘Senior’ **Carmen Adams** (ChE75)

8. M Week – **Tom Zeller** (ME70) and **Carmen Adams** (ChE75) with Homecoming King and Queen, Eathan Doyle (CE) and Kelsey Kramer (IS)



9. M Week – **Jim Green** (ME74) and Connie Green with SDSM&T President Heather Wilson



10. M Week – Student Alumni Connection Golf Tournament



AREA MEETINGS



11. M Week – Alumni tailgate at ramp B68

12. M Week – Alumni tailgate crew at ramp B67

13. M Day Muster: Carson City, Nevada – **Harold Hanson** (EE53) and **Karl Bartel** (EE68)

14. M Day Muster: Berlin, Germany – (l to r) **Elaine and Kirby Mellegard** (EE72), **Frank Hansen** (CE73), **Lance** (CE98) and **Jerilyn Roberts** (ChE99)

15. M Day Muster: Houston, Texas – (l to r) **Michael Patten** (ChE95), **Tara Patten**, **Bre Lundin** (ChE06), **David Jackson** (ME70), **Gary Christman** (ChE73), **Margaret and Sheldon Roberdeau** (GeolE60); (not pictured) **Matthew Colvin** (ChE05), **Ken Simon** (CE81)



AREA MEETINGS

16. M Day Muster: Denver, Colorado – The Original Brooklyn's group (l to r) **Gary Young** (CE66), **Dave Henley** (CE80), **Brenda Henley**, **Nick Rogakis** (CE07), **Valeri Eisenbraun** (IS09), **Josh Meyers**, **Bill DeGroot** (CE69), **Mary DeGroot**, **Dave Kachelhoffer**, **Joni Kachelhoffer** (CE81), **Charla Kachelhoffer**, **Marty Amble** (CE68)



17. M Day Muster: Mitchell, South Dakota – **Keith Beck** (EE90), **Glenn Wilcox** (ME90), **Kevin Erdmann** (ME04), and **Matt Carda** (IS99) mustering at Nebraska vs. SDSU game.



18. M Day Muster: Rapid City, South Dakota – Coach Stacy Collins with **Paul Gnirk** (MinE59)



19. M Day Muster: Rapid City, South Dakota – **Carmen Adams** (ChE75) presents Helluva Engineer shirt to **Paul Gnirk** (MinE59)



20. Rapid City, South Dakota – Fall Career Fair (l to r) **Carmen Adams** (ChE75), **Darrell Sawyer** (Career Center), **Jim Guthrie** (MinE79)



21. Rapid City, South Dakota – President Wilson Welcome Mixer (l to r) **Greg Hintgen** (EE99), **Brandy Kean** (CE06), **Abe Kean** (CEng03), **Lance** (CE98) and **Jerilyn Roberts** (ChE99)





22. Minneapolis, Minnesota – Alumni and Friends Mixer (l to r) **Tonya Koller** (CE07), **Jason Koller** (ME06), **Scott Fritz** (IE04), **Matt Goeden** (CENG03), **Dave Wagner** (ChE69), **Manalee Johnson** (Chem82), **Carmen Adams** (ChE75), **Doug Johnson** (ChE83), **Doug Junker** (ChE85), **Kathy Stechmann** (Math69), **Charlie Murray** (IE03), **Jennifer Walz** (CE08), **Bob Dehler** (CE96), **Jeff Mallow** (Chem95), **Jack Mallow** (ME63)



23. Ulaanbaatar, Mongolia – Alumni and Friends Reunion (l to r) **Ch. Batbaatar** (M.S. TMgt06), **L. Uyangakhuu** (Uyangaa), **Ya. Sarnai** (wife of Ganbayar), **J. Ganbayar** (M.S. MES04), **M.R. Hansen** (CE69), **Barbara Hansen**, **M. Sugar** (M.S. CE05), **K. Enkhchuluun** (M.S. MES06)



24. Rapid City, South Dakota – 1970s Decade Mixer co-sponsors **Mike Alley** (GeolE73) and **Tom Zeller** (ME70)



25. Rapid City, South Dakota – 1950s Decade Brunch group at Arrowhead Country Club

AREA MEETINGS

26. Sioux Falls, South Dakota – Alumni and Friends Mixer (l to r) **Larry Ayres** (CE64), **Rosanne Bosch** (Chem89), **Eric Musil** (ME10), **Lance Mayer** (CE97), **Kris Lepine** (ME07), **Chris Klein** (MinE97), **Mike Grave** (ME09), **Tammy Klein** (IE96), **Greg Hintgen** (EE99), **Carmen Adams** (ChE75), **Jason Lamont** (CSc02), **Chris Bulian** (ChE03), **Mary Brass** (CE77), **Erin Lachman** (ME01), **Chuck Cox** (ME00), **Chad Bishop** (CE97), **Kim Bishop** (IE97), **Mark Grebner** (ME80), **Lorin Brass** (MetE75)



27. Rapid City, South Dakota – 1970s Decade Mixer (l to r) **Doug Miller** (GeolE75), **Lyle Steffen** (Geol70), **Mike Alley** (GeolE73), **Wayne Grace** (CE73)



28. Rapid City, South Dakota – 1970s Decade Mixer (l to r) **Lorin Brass** (MetE75), **Pete Birrenkott** (ME71), **Larry Pearson** (ME72), **Jim Green** (ME74)



29. Norfolk, Nebraska – Annual Nucor visit (second from left, l to r) alumni **Jon Kellar** (MetE84) **Jordan Smith** (MetE13), **Terry Rasmussen** (MetE91), **Blake Werning** (MetE09). Students (third from right, l to r) **Travis Zelfer** (MetE08), **JD Russo** (MetE10), **Jonathan Straetker** (MetE12)



FRESHMEN

the proof is in the numbers

553

The number of total freshman students

\$19,000

Mines out-of-state tuition and fees: more affordable than in-state tuition for Colorado residents at their home state universities

35

The number of **states** represented by the freshman class



7

Number of freshmen from foreign countries

20%

Growth in freshman enrollment since 2013

26.70

The average Math ACT score for SD Mines freshmen. Compared to the national average of 20.9

79

Number of freshmen from Minnesota

SOUTH DAKOTA



SCHOOL OF MINES
& TECHNOLOGY

501 E. Saint Joseph St.
Rapid City, SD 57701

