THE HARDROCK™

WINTER/SPRING 2021

SOUTH DAKOTA MINES

THE HARDROCK™

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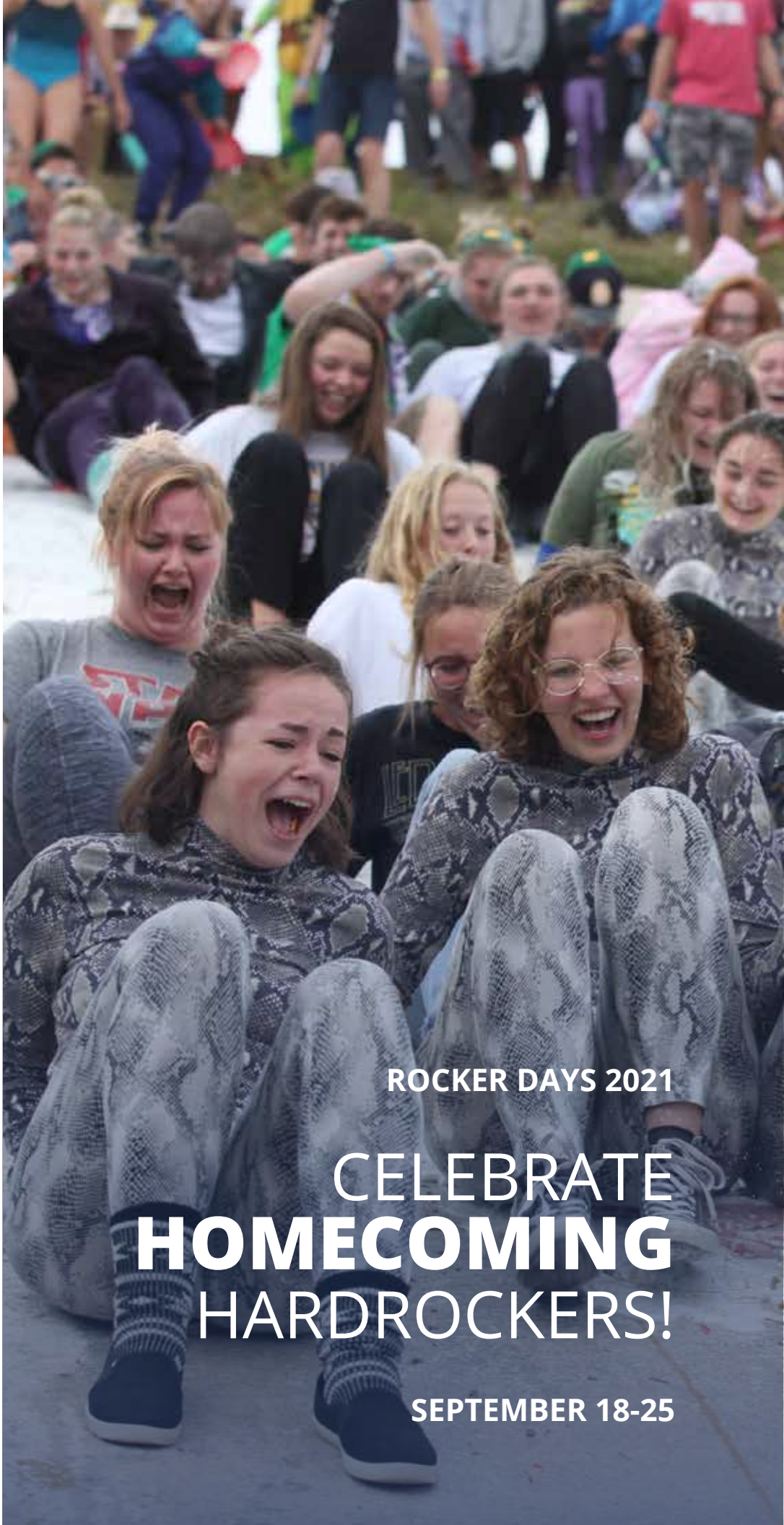

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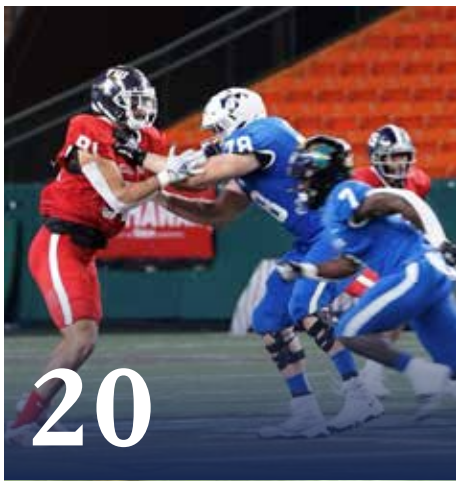

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Dear Hardrockers,

HERE WE ARE IN A NEW YEAR—with some amazing achievements in the rearview mirror and exciting developments ahead! While COVID-19 certainly made last year difficult, we want to celebrate the good that emerged from this unprecedented time. The South Dakota Mines family showed their compassion in dealing with illness and loss of loved ones and their ingenuity in adapting almost overnight to a new way of doing things. We came together and stood as one, making me proud to be a member of the Mines family.

The generosity of alumni in responding to the financial need of our students when COVID struck warms my heart. Your donations helped so many when summer jobs, internships, and some full-time job offers were lost or rescinded, yet bills and basic needs still had to be met. The students and I are deeply grateful for all your help with not only the COVID Emergency Fund, but also for your ongoing support of scholarships, programming, and capital projects. Thank you.

Last year was also a year of change internally, as the Alumni Association and the Foundation merged to form the Center for Alumni Relations and Advancement. Thank you again to all those who helped make that happen and to those who continue to work to integrate our efforts and services. Stay tuned…we will be launching a new merged website soon. We hope you find it more informative, easier to navigate, and a place to keep up with all the latest news and events at South Dakota Mines.

We are also eagerly anticipating the start of another much-needed project on campus – the replacement of the Mineral Industries Building, which houses the mining engineering and management, geology and geological engineering, and materials and metallurgical engineering departments. The new building will make South Dakota a pioneer in the next generation of mining technology. It will allow South Dakota Mines to continue supporting the Department of Defense, help the nation meet its strategic need for critical mineral resources, aid in securing our country's energy independence, and create new jobs in the region. We will continue to work with the State of South Dakota, the university, private companies, and individuals to raise the funds needed for construction.

Let's not forget the Reunion! Alumni Reunion Lite is on for July 8-10, 2021. We are hopeful that COVID vaccination rates will be sufficient to allow many to attend. It is an abbreviated version of a normal five-year reunion, but it is packed with plenty of fun and time to visit with fellow Hardrockers. Visit the CARA website for details and registration.

We have much to look forward to in 2021. The future is bright, and I know the South Dakota Mines family will continue to work together to make the most of it. Thank you for all you do for your alma mater – whether it is through your time and talent or your financial support, it is greatly appreciated.

Stay well and Hardrocker strong,

Julie Carver

JULIE CARVER
(GeoE 86)

LOOKING BACK

90 years ago

1931

President O'Harra declares a holiday; students work to survey and clear the land for what will become O'Harra Stadium.

50 years ago

1971

KTEQ college radio begins operations after 21 years without a campus radio station.

(photos here)

35 years ago

1986

Alpha Delta Pi is founded on campus.

10 years ago

2011

Grubby Statue and Grubby Green Plaza are dedicated on campus.

PHOTO CREDIT
travelsd.com

Dear Hardrockers,

We're emerging from the great challenges of the past year with exciting new opportunities that will make South Dakota Mines stronger than ever.

The state legislature approved $19 million in funding for a state-of-the-art Mineral Industries Building on campus. This building will house the Mining Hub, a CAT Lab, and a range of new classrooms and lab spaces. It will enable the advancement of cutting-edge research for years to come. Mines' ongoing partnership with the Sanford Underground Research Facility, and the underground autonomous robotic testing facility now being explored in partnership with Caterpillar is exceptionally exciting. The institution is on the verge of a new chapter in its long history of support for the mineral industries, and we hope continued alumni support will help turn these opportunities into reality.

The new Ascent Innovation building, which was completed this winter and will hold an official dedication in September, is home to many Mines-associated start-up companies and established businesses. Mines is at the center of the tech-based economic boom underway in the Black Hills. Success stories are plentiful, and the state of South Dakota's recent investment in bioprocessing research is likely to yield more innovation and entrepreneurship in the future. Our new Office of Industry Engagement is the latest addition to the culture of entrepreneurship at Mines that will continue to bear fruit in the years to come. If you left the Black Hills after graduation, and have always dreamed of returning, we might just have a job for you.

This year, we're hosting an advanced manufacturing conference on campus during the Rocker Days homecoming week. Come to the Black Hills to catch up on the latest manufacturing technology, and while you are here, catch up with old friends during the M Week celebration events.

Of course, I am also looking forward to seeing many of you at the reunion this summer on July 8-10. Vaccination rates in South Dakota are progressing among the fastest in the nation, so there's plenty of reasons to celebrate!

Warm regards,

Jim Rankin, PhD PE (EE 78)
President
South Dakota Mines

Ask the Mines Expert

Dr. Christine Mathews, PhD, MPH

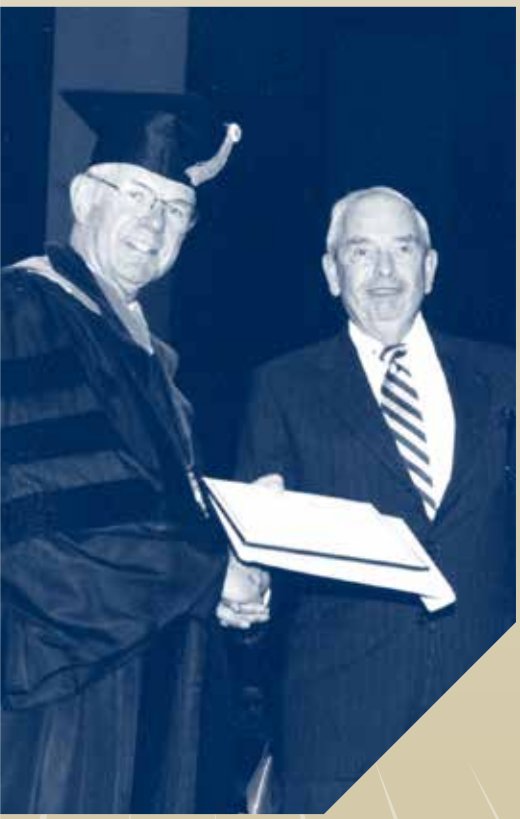
from the Department of Chemistry, Biology, and Health Sciences at South Dakota Mines

What is an mRNA vaccine and how does it work?

mRNA, like DNA, is a nucleic acid found in all living cells. DNA is located in the nucleus of the cell and contains all the instructions necessary for making proteins in the body. However, the cellular "machinery" for making proteins from DNA instructions is located elsewhere, outside the nucleus. Since DNA cannot leave the nucleus, messenger RNA (mRNA) carries a copy of the instructions from the DNA to the machinery for production.

mRNA vaccines include a piece of mRNA that carries a copy of the instructions for making the SARS-CoV-2 spike (S) protein wrapped in a lipid transport vehicle that allows the mRNA to get inside the cell. When mRNA enters the cell, the cellular machinery produces copies of the virus spike protein which can then be shown to the immune system, triggering a response to the spike protein in the form of creating antibodies. The antibodies made are identical to those that would be made after infection with SARS-CoV-2 and work by blocking virus from using their spike proteins to enter host cells. Having previously made antibodies is extremely beneficial because it can take up to 3 weeks to generate specific antibody responses. Antibody responses are further boosted with repeat exposures, which is the reason for two vaccine doses with most of the available COVID-19 mRNA vaccines.

Some key things to remember are that you cannot get COVID-19 from these vaccines and you are not protected from COVID-19 during the first weeks after the first dose. Presently, two doses are required to reach full protective antibody levels for most of the available vaccines. If you have had COVID-19 already, getting a vaccine is still recommended because it can help boost antibody and memory responses and could help prevent reinfection. If you have any questions or concerns, talk with your physician prior to getting vaccinated.



HIGH IMPACT
HARDROCKERS

Frank F. Aplan

FRANK F. APLAN *(MetE 48)*, one of the world's leaders in mineral processing during the 20th Century, was raised in Fort Pierre. He attended high school there until transferring to Pierre High School in his final year.

He enrolled at South Dakota Mines in 1941 aimed at a career in chemical engineering.

His studies were delayed by World War II. Aplan enlisted in the US Army at Fort Meade in 1942. He was initially sent to officer training at Syracuse University. However, this program was cancelled part way through, as the European war was not requiring more officers. Aplan was sent for infantry training and arrived in the European Theater just in time to participate in the Battle of the Bulge and the final stages of WWII. Since he had been stateside during the mid-war period, he was retained in Europe for a year after Victory in Europe Day.

He returned to Mines in the fall of 1946, switching to major in metallurgical engineering. He graduated in 1948 and went on to earn degrees from Montana Mines (MS 1950) and MIT (ScD 1957). He worked in both industry and education. From his alma mater, he received the Guy March Award and Distinguished Alumni Award. His other honors and distinctions (national and international) are too numerous for this page and, along with details of his productive career, are to be found on the university research blog, **sdsmt.edu/Research**.

BUILDING THE

Entrepreneurial Ecosystem

PHOTOS BY
Andy Greenman

South Dakota Mines has a long history of innovators who turned their ideas into successful businesses.

SOME PAST SUCCESSES include Daktronics, RESPEC, RPM & Associates, C-Lock, and a long list of others. The latest crop of newer companies that were spurred by innovation on campus or by enterprising alumni include VRC Metal Systems, Nanopareil, Darceo, Property Meld, and many more.

In 2021, the tech sector in the Black Hills is entering a new chapter with the Ascent Innovation building (cover photo). The facility is situated between the university and downtown. It connects the business center of Rapid City with the Mines campus, and it is the heart of the new tech-based economic boom now starting in the Hills. The grand opening of the Ascent Innovation building is set for Thursday, Sept. 16, 2021. It's a huge milestone in the effort to spur tech-based economic growth in the Black Hills.

Like all milestones, this one wasn't achieved overnight; it includes decades of past work involving many players who helped forge current successes. One of those players is Butch Skillman (ME 73 / MS ME 74). He served as assistant professor of mechanical engineering and director of the university's Office of Tech Transfer. In 2005, Skillman worked with Terry Rock (ME 70) and others to help create the Engineers Make Great Entrepreneurs (EMGE) speaker series and scholarship competition. EMGE continues

to this day on campus and has inspired hundreds of students over the past 16 years.

These past successes didn't come without challenges. Skillman found some frustration during his tenure in the effort to build what President Rankin calls a "culture of innovation and entrepreneurship" on campus. "About 10 percent of what makes a great entrepreneur actually is taught in an engineering education," says Skillman. "We worked with those on campus like Dr. Dan Dolan in the CAMP program and others to get students to grow as team players and leaders. We encouraged them to recognize and observe traits in themselves and others that lead to success."

> "It's amazing how fast our students learn once you show them the basics of how to build a business model and how to pitch an idea. They really shine and make us all proud."

Today, the university has developed the popular Shark Tank-style CEO Business Plan competition on campus. Top student teams are eligible for thousands of dollars in awards and a chance to attend the Governor's Giant Vision Competition, which Mines students have won six years in a row. "It's amazing how fast our students learn once you show them the basics of how to build a business model and how to pitch an idea. They really shine and make us all proud," says Joseph Wright, associate vice president for economic development at Mines.

Great ideas abound, but a collaborative support system on campus and in the community is needed to nourish those ideas into actual businesses. Some found success despite the hurdles. Mike Boucher (MS CS 91) developed Dakota Scientific Software in the mid-1990's at Mines. The company employed innovative algorithms that enabled supercomputers to undertake complex problem solving and analysis. He sold the business to Sun Microsystems, the first of two of his start-ups acquired by Fortune 500 companies. Boucher gives credit to then-President Richard Gowen for being a mentor and advocate. "It is easy to say we would not be here without him," he says.

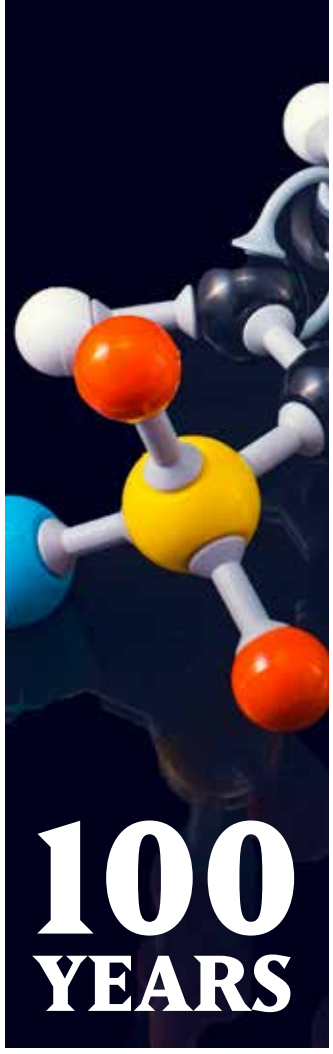
Gowen and Boucher worked with others to attract a grant from a local economic development authority to boost entrepreneurship at Mines. "But for the most part there was not a focus on entrepreneurship in Rapid City at the time," says Boucher. "For example, it was hard to find an accounting firm that knew how to take advantage of the research and development tax credit, just to pick one concrete thing." Boucher says an infrastructure to support people at each stage of business development is critical for creation of an entrepreneurial ecosystem where innovation can flourish.

This type of support system is exactly what is being built in the Black Hills today. Boucher is a member of Mines' Entrepreneur-In-Residence (EIR) Program that provides experienced mentors to university business startups. Mines is also working to support faculty innovation and research alongside a range of programs to encourage student innovation and entrepreneurship. "We're fortunate that our faculty file three times more invention disclosures than the national average," says Wright. He helped start a number of programs to boost tech transfer on campus including the EIR program and an annual conference that connects angel investors with university innovators. Mines is also working together with business and government leaders on many fronts. The new Office of Industry Engagement, led by Wright, is creating and maintaining partnerships with the local economic development authority, Elevate Rapid City and the Ascent Innovation Campus, along with Ellsworth Air Force Base, the Sanford Underground Research Facility, and a myriad of high-tech businesses and organizations in the region and around the world.

Ecosystems are fragile things; they don't evolve overnight and must be nurtured to thrive. They must be defended from internal and external threats. The ecosystem supporting the technology-based economic development in the Black Hills has some challenges to overcome and gaps to fill, but success stories are unfolding every day and there are many bright spots on the horizon.

"One of our biggest challenges now is to continue to grow our network. We have so many talented Mines alumni who can assist young entrepreneurs and start-up companies and we hope to see them come forward," says Wright. Like all endeavors, a system supporting positive economic growth in the Black Hills will take ongoing cooperation and hard work. Fortunately, Hardrockers have great capacity for both.

Inside Ascent Innovation



1921
ChE

2021
Mi

of Chemical Engineering *at* Mines

Chemical engineers are responsible for many things we take for granted today, such as nylon, Kevlar and Teflon; the mass production of antibiotics such as penicillin; and the cracking of hydrocarbon molecules that give us gasoline and jet fuel.

In a sense, chemical engineering began during the Bronze Age, when people made bronze by melting copper with tin. The defining moment in the history of chemical engineering is generally recognized as the Industrial Revolution.

South Dakota Mines was founded in 1885, during the Second Industrial Revolution (1870-1914). Mines experienced notable growth between 1915 and 1922: enrollment increased from 30 to 180 students. The Department of Chemical Engineering was established in 1921 with a lone faculty member: Andrew Karsten. Although Karsten worked closely with two chemistry faculty members, he was the sole chemical engineering faculty member for almost 20 years. He remained at Mines for a total of 38 years.

In 1923, the first three chemical engineering graduates – two women and one man – received bachelor's degrees. The department began offering master's degrees in 1935.

Two more faculty members were hired in the 1950s, and the department became nationally accredited. The original Chemistry and Chemical Engineering Building, which was designed by chemical and mechanical engineering students, was dedicated in 1957.

In the 1970s, biology became part of the department, and three more faculty members were hired. The biochemical engineering emphasis was developed in the 1990s. The department's PhD program began in 2007.

In 2019 biomedical engineering's BS, MS and PhD programs joined the department. Mines' biomedical engineering program works in conjunction with its sister program at the University of South Dakota.

Through the years, the chemical engineering department has worked hand in hand with the chemistry and biology departments. President Charles Ruch restructured all academic departments during his tenure (2003-

2008), resulting in the current Department of Chemical and Biological Engineering. The department currently has 10 faculty members and about 180 students.

Chemical engineering students at Mines can choose to specialize in advanced materials (nano materials, polymers, ceramics, materials processing, corrosion, or solid state/semi-conductors), biomedical engineering, energy technology, environmental engineering, or petroleum engineering. A specialization in biochemical engineering is also offered. Many chemical engineering students are active in the Mines student chapter of the American Institute of Chemical Engineers (AIChE); the Mines chapter was recognized as one of 15 AIChE outstanding student chapters in the 2007-2008 academic year.

Chemical engineering graduates have historically been employed at companies such as Dow Chemical, Chevron, and Exxon, and more recently at LyondellBasell and POET and food industry at companies such as Cargill, ADM and Tate and Lyle.

The department's core research areas include bio- and renewable energy and fuels, biomedical engineering, bioprocessing and biochemical engineering, computer simulation and modeling, molecular biology and biotechnology, nanotechnology, polymers, separations, and thermodynamics.

Research is conducted at the Composite and Polymer Engineering (CAPE) Laboratory on campus, the Sanford Underground Research Facility located at the former Homestake Gold Mine in Lead, and the 2 Dimensional materials Biofilm Engineering, Science and Technology (2D BEST) Center at Mines.

Three notable current research projects led by Mines chemical engineering faculty members have received a total of $32 million in National Science Foundation grants.

The largest grant is funding a project which focuses on the environment microbes occupy when they attach to surfaces, creating what is commonly known as a biofilm. This project includs researchers from SDSU and the University of South Dakota.

The second project will form a new collaboration between Mines, USD, Montana State University, and the University of Nebraska at Omaha to collect data and analyze and predict gene responses and biofilm characteristics influenced by surface properties.

The third project, which began in 2017, is researching the life cycle and makeup of microbes found in the depths of the Sanford Underground Research Facility and other extreme environments.

As the field of chemical engineering continues to evolve, the next 100 years will see major advances in renewable energy and materials development, biomedical engineering, biofuels, biochemicals, and access to food and clean water, predicts Robb Winter, PhD, professor of chemical engineering and coordinator of the biomedical engineering program at Mines.

1921 Department of Chemical Engineering established

1923 First ChE graduates: two women and one man

1935 ChE master's program established

1957 Chemistry and Chemical Engineering building dedicated and ABET accreditation

1970's Biology added to department

1998-2000's Biochemical engineering specialization developed and Cargill Biochemical Engineering Lab established

2007 ChE PhD program established

2016 Veurink Chemical Engineering Unit Operation Laboratory dedication

2017 CBEC building Ribbon Cutting

2019 Biomedical engineering BS program established

2017-2020 Three projects yield $32 million research funding

100 YEARS

A BRIGHT FUTURE IN MINERAL INDUSTRIES

South Dakota Mines was founded 136 years ago to support the mining and mineral industries. Today, the core disciplines of geological, metallurgical, and mining engineering remain an integral part of the regional economy.

MINING ALONE HAS A $2.5 BILLION ANNUAL IMPACT on the state of South Dakota and the university is launching a new chapter in the effort to advance mineral industries technology. These efforts not only increase environmental stewardship, but also catalyze economic development in the region.

State lawmakers understand the potential. They funded a $19 million investment in a new Mineral Industries Building on the Mines campus that will advance the future of science, engineering, and technology. The current building lacks the modern infrastructure required for advanced research and teaching and is in desperate need of replacement. The new facility will provide the needed resources for the existing programs to thrive and grow. This state-of-the-art facility will lead to new discoveries, spur creation of new high-tech companies, and help attract new employers to the area.

There is a bright future in the mineral industries already unfolding with much more to come. Here are a few examples of exciting work currently under way:

- **Public-private partnerships** are being leveraged in a new multidisciplinary entity called the Mining Hub, which explores cutting-edge technology such as autonomous vehicles, artificial intelligence, robotic mining, and a new era of environmentally sustainable mining practices.
- **Mines faculty and students are undertaking research** that could revolutionize the future of energy by tapping the massive well of geothermal heat deep inside the earth as part of a study at the Sanford Underground Research Facility (SURF) in Lead.
- **New and innovative products** and manufacturing methods are being created from mined and recycled minerals with innovative research funded by private industry, NASA, the DoD and the National Science Foundation.

Renderings not indicative of final architecture and for illustrative purposes only.

Private industry is also lining up in support. Caterpillar is supporting the creation of a new laboratory at Mines to explore state-of-the-art mining technology; this will include collaboration with Western Dakota Tech and local industry. A new agreement with Caterpillar is also exploring transforming part of SURF into an underground robotic mining test facility. These developments have the potential to open new frontiers in safe and environmentally-sound mining practices pioneered right here in the Black Hills.

A new Mineral Industries building provides a highly skilled workforce, and a lead on emerging technologies.

Caterpillar is one of many industry leaders. Nucor and a wide range of other companies are also committing millions of dollars to this project because they recognize the fantastic opportunities that evolve from collaboration with Mines. A new Mineral Industries building not only provides these companies with a highly skilled workforce, but it also gives them a lead on emerging technologies that will boost their bottom lines.

The project is moving forward quickly. Ground breaking is expected in 2022 on a location between the O'Harra Building and the James E. Martin Paleontological Research Laboratory with the new building expected to open in 2023.

South Dakota Mines invites alumni to partner with us to influence the education of students who will be the next generation of leaders.

FOR MORE INFORMATION
sdsmt.edu/MI-Building

91 YEARS YOUNG

For 91-year-old Lowery Smith (GeoE 51), resiliency is the key to a long, fulfilling life.

Smith's parents were teachers on the Pine Ridge Reservation, where they moved from Michigan in 1938. Smith's father volunteered to be a Navy recruiter during World War II. The family moved to Rapid City when Smith was in ninth grade.

Smith graduated from Rapid City High School and subsequently enrolled at Mines; he played football and was on the track team at both. The stakes were a little higher at Mines: in order to compete in sports at that time, a student had to pass 12 credit hours. Smith was enrolled in 17 hours, six of which were in physics.

"If I didn't pass physics, I wouldn't be able to compete [in sports]," he said. So he studied with a tutor – and passed.

"You never know where somebody's going to make a difference for you," he said.

Smith obtained a bachelor's degree in geological engineering in 1951, and went on to work at Exxon, Hercules Power Company, and the J.L. Shiely Company, and served as president of the Minnesota FracSand Company. In 1989, he started his own company, Ag-Lime Sales, Inc., which he ran until 2016 – retiring at the age of 87.

Shortly before retiring, Smith became depressed. The losses of family members and close friends who hadn't lived to be his age were weighing on him. He read a book called The Gift of Years: Growing Older Gracefully by Joan Chittister and was particularly inspired by the chapter called "Dreams." He then decided to get back into sports with the goal of competing in the National Senior Games.

Each state has its own National Senior Games-sanctioned competitions, at which a senior must qualify in order to compete in the national games. At the 2017 Minnesota Senior Games, Smith won medals in singles racquetball, shot put, discus and javelin. At the national competition that year, he participated in singles and doubles racquetball, shot put, discus and javelin; he received a silver medal in doubles racquetball and ribbons in the track events.

Then, due to a rotator cuff injury, Smith was no longer able to throw the javelin.

In the 2019 Minnesota Senior Games, Smith won gold medals in discus and shot put. At the national competition that year, he won gold medals in singles and doubles racquetball, the bronze medal in shot put, and fourth place in discus.

Smith is featured in promotional commercials and videos for Blue Cross Blue Shield of Minnesota, a sponsor of the Minnesota Senior Games.

Through the years, Smith has always remembered Mines. He has many fond memories of times spent with the Twin Cities alumni group, especially floating on inner tubes down the Apple River in Wisconsin.

"I miss those times," he said.

He and his wife, Mary Ann, sponsor an athletic scholarship for Mines students.

"I'm very grateful for the good educational foundation I was able to get there," he said.

PHOTO CREDIT
Blue Cross and Blue Shield of Minnesota

MINES CELEBRATES **10 YEARS** OF THE TIOSPAYE SCHOLAR PROGRAM

Ripples *Become* Waves

In the **Lakota** language, the word **Tiospaye** means "extended family." That's exactly what the Tiospaye program on the South Dakota Mines campus has become for so many **Native American students**.

The Tiospaye Program, launched in 2010, was funded by a 10-year-grant from the National Science Foundation. The program, led by Mines professor Dr. Carter Kerk, is designed to help increase the number of Native American students in science, technology, engineering, and mathematics. And it has done just that. In December 2020, the program graduated its 50th student.

Now at the end of the 10-year grant, Kerk is working to secure private funding to continue a program he sees as instrumental in ensuring that Native American students on campus have the support to succeed. For more information, contact Kerk at **Carter.Kerk@sdsmt.edu**.

Meet four of the 50 Tiospaye graduates who are not only succeeding but thriving in their STEM professions.

Jacob Phipps

CHEM 14

Project Manager with the US Environmental Protection Agency, Region 9, California

Without the Tiospaye Program, Jacob Phipps wouldn't have graduated from South Dakota Mines. But he did, and today the 29-year-old alumnus, an enrolled member of the Muscogee Creek Nation tribe, is a remedial project manager with the US Environmental Protection Agency in San Francisco, Calif., overseeing the cleanup of abandoned uranium mines in the Southwest and particularly on the Navajo Nation.

Jacob grew up in Phoenix and was a first-generation college student when he entered Northern Arizona University with a full-ride scholarship to play football and study chemistry. After two years, the load of chemistry and DI football took its toll. He went looking for a change and eventually connected with athletics at South Dakota Mines. He arrived on campus in 2012, and from the start faced a challenge.

"I had never been far away from home," he says. "When I moved to South Dakota I fell into a dark place. I was unhappy." Fortunately, he eventually connected with Tiospaye mentor Dee LeBeau. Suddenly, he felt more grounded and comfortable. "She was a really big part of my life when I was at South Dakota Mines," he says.

He became more deeply involved in the Tiospaye Program, joined the American Indian Science and Engineering Society, and developed friendships with other Native American students. The experience brought him closer to his Native American culture, which prompted him after graduation to work in positions that help Native American populations: Indian Health Service, the Inter Tribal Council of Arizona, and the Columbia River Inter-Tribal Fish Commission.

After graduating from Mines in 2014, Jacob went on to earn a master's degree in environmental science and engineering from Oregon Health and Science University. It's a program he was unaware he even had an interest in until Kerk recommended he consider an environmental internship. That newly found interest led to Oregon and eventually the EPA. "It's the folks you meet along the way … they led me to where I am today," he says.

Jessica Muxen

IEEM 10 / MS IEEM 13

Senior Associate Industrial Engineer at Collins Aerospace, Iowa

When Jessica Muxen first arrived at South Dakota Mines in 2005, she was a single mother of a baby boy wiht little money and few prospects. Today, Muxen is a senior associate industrial engineer at Collins Aerospace. She credits the Tiospaye Program for helping her get there.

"It's programs like Tiospaye and people like Dr. Kerk who helped me become an engineer when it was never anything I thought I would or could even do," she says.

Muxen's parents met in the US Army. Her mother is Native American and grew up on the Pine Ridge Reservation; her dad is Creole and grew up in Louisiana. When her parents divorced after leaving the Army, Muxen lived with her grandmother in Pine Ridge while her mother worked in Rapid City.

Thanks to her good grades in high school, she landed a scholarship to Carthage College in Wisconsin. She describes herself at that time as "aimless." She dropped out after freshman year and returned to Rapid City, where she worked at Walmart and reconnected with a high school boyfriend. They married and "the veil came off," she says of her ex-husband's abusive nature. She tolerated the abuse until the day she witnessed her husband screaming at her two-week old son, LeRoy. Muxen says she packed her bags and left the next morning.

Working minimum wage jobs in Rapid City, she was "just barely getting by" when she enrolled at Oglala Lakota College for accounting. That led to a meeting with a fellow student who also attended Mines and encouraged her to apply. "I took my first class at Mines, Algebra II, and I loved it. I loved the campus, I loved the challenge. Maybe I was finally ready. I had a goal in mind."

Muxen went on to earn bachelor's and master's degrees from Mines, all while raising her son. She leaned on the Tiospaye Program and her fellow Native American students for support and encouragement. Tiospaye provided scholarship support as well as a place where she felt at home.

"I think having the opportunity to be with a community that will support you when you're new at it … it's a huge help," she says of Tiospaye. "The only way I was able to get through Mines was the support."

Logan Gayton

CEE 17 / MS CEE 19

FMG Engineering, Rapid City

When Logan Gayton first arrived at South Dakota Mines in 2012, he was perplexed by fellow students who didn't finish drinks or left goodies half eaten.

"Students who got care packages from home and left half of it … not finishing it," he says. "Those were some cultural shocks. I would have never done that."

Gayton, an enrolled member of the Cheyenne River Sioux Tribe, would never have done that because growing up his family "didn't have a lot of anything above necessity." Raised primarily by a single mother in Rapid City, Gayton and his three brothers learned early to take nothing for granted.

From high school on, he worked a job to help pay his way. In his senior year at Rapid City Central High School, Gayton was forced to quit extracurriculars to get a job because money was tight.

From the start at South Dakota Mines, he took advantage of what the Tiospaye Program had to offer – scholarship money, programming, mentorship, and, most importantly, a sense of community. "Tiospaye definitely made it easier," he says. "When you go to college and you come from a certain background, some students just can't relate. It was a way to find other people who come from similar backgrounds. We were all broke in the same color."

What he also found in Tiospaye was fellow students who wanted to help each other succeed. "We were in service to each other to make sure we all made it," he says. "I had three other friends who were in civil (engineering) and when we all took classes, we took them together. It made it fun and easier to succeed together."

Still, it wasn't easy. Near the end of his bachelor's program, Gayton was working four part-time jobs in addition to going to school.

With the support of Tiospaye and fellow Tiospaye students, as well as his wife Dani, Gayton went on to earn his bachelor's and master's degrees in civil and environmental engineering. Today, he works as an engineer with FMG Engineering in Rapid City and has plans to someday get his PhD and possibly teach. He credits Tiospaye for helping to make it all happen.

Heather Rogers

EE 18

Assistant Electrical Engineer with Burns & McDonnell, Arizona

Heather Rogers was 12 years old before her family had running water and electricity in their home on the Navajo Nation.

Growing up, she witnessed family members and peers struggle with alcoholism and drug addiction. But one thing she had in her corner was a drive to make things better in her community and the expectations of her family that she would get an education and succeed.

Rogers, an enrolled member of the Navajo Nation tribe, developed an interest in STEM in high school. "I knew I liked the STEM fields, and they're promising careers," she says. "Plus, I really wanted to do meaningful work, and this was my way in."

After high school, she landed a scholarship to play basketball at Scottsdale Community College, where she earned an associate's degree. From there she moved to another junior college where she continued to play basketball, but she wanted more academically.

She learned about South Dakota Mines and was eventually offered a Hardrocker basketball scholarship. By 2015, she was on campus, but the transition was difficult. Rogers didn't bond with fellow players who she felt couldn't relate to her upbringing. She was far from home, facing rigorous academics, and feeling alone. "I felt different. I felt out of place," she says. "It was rough. After my first semester I was ready to throw in the towel."

Tiospaye made the difference. "I got really involved in Tiospaye at the end of my first semester, and that saved me," she says. "The other students in Tiospaye came from the same places I came from. They understood the struggle of having so many people depending on you."

Tiospaye created a supportive community of students who work together to succeed. "My second and third year I made some of my best friends there on the basketball team and in the Tiospaye Program."

Now working at Burns & McDonnell, Rogers is back in Arizona and focused on growing as an engineer. "My 10-year-goal is to learn all I can and then hopefully transition some of that back to my home community," she says. "I want to see my work have a positive impact on people … to make an impact on where I come from and the people who I belong to."

FIGHTING FIRE WITH FIRE

Black Hills Information Security—Hackers for Hire

ON ANY GIVEN MORNING, you might find Jordan Drysdale inside the coffee shop that sits adjacent to your corporate headquarters. You probably wouldn't notice him. He looks like an average patron, nonchalantly blending in. If you do happen to notice him, maybe you think he's texting a friend. One of your employees might walk in, groggy and in need of coffee. Without being noticed, Drysdale captures an image of the employee's name badge on his cell phone.

Fifteen minutes later, Drysdale is back in his hotel room where he has his colleague, Kent Ickler, print a badge that is identical to your company's, but sporting Drysdale's image. Ickler stays in the hotel in communication while Drysdale goes back to the company headquarters and picks a lock on the side of the building.

"If you wear a suit and a tie and look normal, no one ever assumes you are picking a door lock," he says.

By 9 a.m., Drysdale has gained full access to the building. No one notices or checks his fake name badge as he wanders the hallways and offices, and in minutes he is inside your server room.

"By lunchtime I have compromised the entire network," he says. "Ickler is back in the hotel room cracking passwords for me, so in a short period I have gained access as domain administrator and taken over all of their network systems and infrastructure. It's basically game over for this company in less than four hours."

The life of Drysdale and Ickler might sound like a spy movie, and in some ways, it is.

Companies all over the world hire Black Hills Information Security (BHIS) to help reduce vulnerabilities and increase security by finding and exploiting their weak spots and then offering employee training and security solutions that reduce vulnerability.

"Pick the industry and we have likely found ways to compromise them. We physically break into banks, medical facilities, manufacturers, universities, you name it – physical entry is rarely the problem," says Drysdale.

Sometimes physical entry isn't necessary. Ickler is an expert at social engineering. He mines social media accounts, websites, and even court documents for personal information. He can also access nefarious sources that have released compromised data in past breaches. Social security and credit card numbers are not as private as they used to be. "Once you are an information security analyst, you realize how compromised you already are," says Ickler. With all this information, Ickler can then put together a target profile to learn a great deal about a specific company employee. "So when we call a company's help desk to have that employee's password changed, and they ask a security question like, 'What was the color of your first car?' We have that answer ready." To gain further access or information, BHIS can also put together a "red team", a group of hackers who use coding skills and other tactics to compromise the security of a client company.

Following their work, Black Hills Information Security provides an analysis for their customers that helps them understand and mitigate the risks. BHIS can then train their clients to protect personal and corporate information. Finally, they engage in threat hunting where they can actively seek out and identify cyber attackers. "Our main goal is not to prove that we can hack into a company, but to help the customer develop a series of on-point solutions and technologies that will improve the overall security of

the company. Testing should never be adversarial, but collaborative," says John Strand, CEO and company founder.

Strand takes a rising-tides-raises-all-ships approach to the industry. The team at BHIS develops popular open-source and free tools, publishes educational blogs, and gives informative webcasts for the information security community. BHIS personnel are now sought after to speak at conferences around the world.

"In this industry, there are a lot of huge players who are venture capital backed and their goal is to make money and nothing else," says Ickler. "By offering affordable training and broad industry support, our CEO John Strand has taken a different path."

including at BHIS-hosted events like the immensely popular Midwest Hacking Festival in Deadwood. Both these companies are moving into the new Ascent Innovation Campus this spring where they will have the resources needed to continue their growth.

Growth of these companies seems like a safe bet. After all, in an ever-increasing interconnected world, the need for cybersecurity is not likely to dwindle anytime soon.

Needless to say, if you should ever run into Jordan Drysdale seemingly texting on his cell phone in a restaurant near your corporate headquarters, you might want to check your server.

> If you wear a suit and a tie and look normal, no one ever assumes you are picking a door lock."

This business model and philosophy are working for BHIS. "We went from one employee 12 years ago to 60 plus all over the world. We are among the top three or four global firms who do this kind of work. We interact daily with the upper echelon of information security professionals and we're centered in the Black Hills. It's a little hard to believe," says Drysdale.

Strand has also fostered numerous employee-owned companies under the BHIS umbrella. He is one of the founders of a company called Active Countermeasures, alongside Mines students and alumni **Logan Lembke (CSC 18)**, **Brian Fehrman (CSC 10)**, **Joe Lillo (CSC 15)**, **Lisa Woody (CSC 15)**, and **Samuel Carroll (CSC 15)** who all contribute to the creation of unique algorithms that analyze network traffic and detect anomalies to indicate nefarious cyber attackers. Drysdale and Ickler founded another of the businesses associated with BHIS called Defensive Origins that delivers cybersecurity training around the world,

Black Hills Info Sec Security Analyst Beau Bullock speaking at the annual Wild West Hacking Fest in Deadwood.

A Hardrocker in the HULA BOWL

When Jack Batho stepped onto the field at the 2021 Hula Bowl at Aloha Stadium in Honolulu, HI, he became the first ever Hardrocker football player to join the all-star game. He also accomplished something only a handful of other DII athletes managed to do this year —the Hula Bowl features the best college football players from around the world, and many are bound for the NFL.

"This gave me the opportunity to play in front of a bunch of bigger school athletes and scouts." says Batho. "It was good to experience some things we don't always see at the DII level and compare myself against those athletes."

Batho, a senior offensive tackle on the Hardrocker Football Team, is humble about his success. He credits head football coach Charlie Flohr and the rest of the coaching staff and administration for their advocacy that opened the door to this opportunity.

"I need to give a big shout out to the coaches and administration for pushing for a fall season despite the challenges of COVID-19," says Batho. "We were one of few DII schools that played. The hard work of coaches and staff to make this happen gave me the opportunity to go out and prove I can play at this level in my final season as a college athlete. They also advocated for me on and off the field and this helped me land the opportunity to play in the Hula Bowl," Batho adds.

Batho gives special credit to Coach Cody O'Neill, who despite undergoing heart transplant surgery in the fall, remained dedicated to helping him succeed.

"Coach O'Neill has done a lot for me personally and as a player. Despite his own challenges he was there for me, talking to scouts and NFL teams on my behalf. It meant a great deal to have a coaching staff that is really devoted to the athletes and the program," says Batho.

Batho graduates with a double major in mechanical engineering and pre-professional health sciences in May. He won't go straight to work as an engineer or scientist in a medical field; rather, he will continue to pursue his childhood dream of playing in the NFL. "I'm

continuing to train with our Hardrocker strength coaches, getting ready for a pro day. From there it's in the hands of the NFL teams. If I'm not selected in the draft pick, there's a chance I may get invited to a camp and signed after the draft. Until then, it's just training," says Batho.

"I can pour myself into football and not have to worry about what-ifs. Not many schools can offer that."

Even if Batho doesn't make the NFL, he has a bright future as an engineer.

"That's one of the reasons I came to Mines," says Batho. "I have an incredible fallback plan and there is a piece of mind in this," he says. "I can pour myself into football and not have to worry about what-ifs. Not many schools can offer that."

Regardless of where Batho ends up, his successes to date, both as an engineering student and football player, make many Hardrockers proud. Coach Flohr is among them.

"For a student athlete to come out of Mines with the opportunity to play at the next level as well as graduate with a double major in STEM says a lot about Jack and the type of person he is and how committed he is," says Flohr.

Batho's success also speaks volumes for the football program at Mines. "We want every athlete that comes to South Dakota Mines to have a complete experience," says Flohr. "We want to make sure they have a chance to excel in football, academics, and have a social life. We want to make sure every player has the best and most complete college experience they can."

For his own part, Batho maintains humility. "It's an honor just to be able to move the Hardrocker football program forward," he says.

Decades of DEDICATION

A LETTER FROM DEAN OF STUDENTS, PAT MAHON

In June I will be retiring. It has been an honor and a privilege to serve as the Vice President for Student Development and Dean of Students at South Dakota Mines for the past 21 years. The joy of coming to work has been centered around the students. Each day I have been reminded of the unique and individual qualities, backgrounds, and characteristics each aspiring Hardrocker brings to the campus, along with their individual struggles, joys, and aspirations.

The memories are endless. The reminiscences start in the fall of the academic year and include new student orientations—M Week with beanie and senior hats, coronation, standing at the base of M Hill making sure everyone returns safely; Career Fairs; Family Weekend; Veteran's Day Salute; Diwali; Parade of Trees; Martin Luther King Jr. Day of Service; Engineers Week; Cultural Expo; Children's Easter Egg Hunt; Student Leadership Hall of Fame Induction; CAMP competitions; club and organization functions (i.e., attending weekly Student Association and Circle K meetings, semester meetings with the Greek Advisory Board). Each semester, I thoroughly enjoyed the drama club presentations (played the dead dean in one play and was cast in the movie production of Snooze); wonderful vocal and instrumental music concerts; Native American honoring ceremonies; and close to perfect attendance (sans COVID restrictions) to cheer on the Hardrocker scholar athletes, especially during the BHSU rivalry contests! The culmination was reading the names of each graduate who walked across the stage during the fall and spring commencements (and giving virtual greetings in 2020 due to COVID).

As student development team leaders, we've strived to collaborate across campus and the broader community to provide students personal and professional development opportunities and services in a safe, healthy, and inclusive environment. Residence hall capacity doubled, including expanding west of campus, which has helped create a safer neighborhood. The Surbeck Center experienced two major renovations and an expansion is once again in the planning stages.

There is so much more on the horizon for future generations of Hardrockers including renovations to the Devereaux Library and the new Mineral Industries Building. Though the future is bright, it isn't easy. I've marveled over the years at the dedication of colleagues who operate on meager budgets to make South Dakota Mines thrive in a highly competitive recruitment environment.

My wish for South Dakota Mines is increased support from alumni, friends, and industry partners. This comes in many ways—by telling the Hardrocker story and encouraging aspiring scientists, engineers, and entrepreneurs to enroll or fostering retention through motivational classroom presentations and social conversations at area alumni events. Sometimes it's in the form of rocks—Dusty Swanson and his family donated a boulder from their quarry which marks the entrance at St. Joseph and University Loop; Josh Sting implemented the spirit rock in 2003 which has been painted hundreds of times announcing upcoming events; Jim and Connie Green donated a bronze statue of Grubby—a favorite location for treasured photos. The Student Emergency Fund created by alumni who received assistance along the way is augmented by Campus Ministries organizing the self-serve food shelf. Gifts that honor student life – like the Brass Life Award which provides study abroad opportunities, and the Stephen D. Newlin Family Wellness & Recreation Center and Fraser Gym, providing students a place to gather and take care of their health. Hardrockers share memories that brought them together at the Pearson Alumni & Conference Center.

As my husband, Tom, and I head into a new chapter of our lives, we will be returning to my childhood home at the foot of the Big Horn Mountains near Sheridan, Wyoming. As forever friends of South Dakota Mines, we are endowing a scholarship. Contributing to future students who have the potential to make positive societal impacts and to the institution that has provided us with purposeful experiences is gratifying.

Best Always,
Dean Mahon

ADA LOVELACE

The Very First Computer Programmer

Born in the 19th century, Ada Lovelace lived in a world that expected very little from her intellectually. Yet, Lovelace is believed to be the very first woman in history to write computer programming code.

South Dakota Mines assistant professor Erica Haugtvedt, PhD, has studied Lovelace's fascinating life along with Mines mechanical engineering professor Duane Abata, PhD. Haugtvedt plans to present a paper at the ASEE Women in Engineering 2021 conference.

"If Ada had not been a woman, we would probably already know about her," Haugtvedt says. "But mathematicians of that time thought women were incapable of studying math at this higher level. She was not widely known by regular people for her mathematics during her lifetime."

Lovelace was the only legitimate daughter of the scandalous poet Lord Byron. Although she never knew her father – her parents separated when she was a month old – she grew up in an upper-class household. Her mother, Anne Isabella Noel Byron, was a mathematician herself and recognized the same talents in her daughter. Lovelace studied with tutors throughout her childhood, and when it came time to marry in 1835, she was lucky enough to marry a man who supported her mathematical interests.

In 1834, she began studying with astronomer and mathematician Mary Somerville, who introduced her to famed scientist Charles Babbage. At the time, Babbage was working on his "calculating machine," the original concept for a programmable computer.

After Babbage presented his research in Italy, Lovelace translated the document for him. But it was more than a simple translation. In the footnotes, Lovelace added her thoughts and notes on the machine plans, complete a hypothetical program for that machine with loops and branches. "This is actually what people claim was the first computer program," Haugtvedt says. "She predicted computer science. And she was doing all of this in a sitting room." At the time, Lovelace had three children under the age of 8.

Unfortunately, Lovelace received no widespread recognition for her accomplishments until much later, Haugtvedt says. "Only in the 2010s did it become increasingly well known that Ada Lovelace was arguably the first computer programmer. Some scholars are finally giving her credit for what she did with math and programming."

Haugtvedt will present a STEAM Café talk in the fall of 2021 on the life of Ada Lovelace.

CLASS notes

1950s

Jack Goth (MetE 50) "We continue to be in lock down at Vi (luxury senior living community) during this epidemic. We did get our first shots. We all hope things will get better soon. I remain in good health in spite of cabin fever."

Lowery Smith (GeolE 51) "2020 was a tough year with pandemic, politics, and losses of good friends. Mary Ann and I spent a good part of the year at our cabin on the north shore of Lake Superior and in quarantine in a rental house in Hawaii. Thankfully we had good Internet service for Zoom meetings with friends and family and good books to read but it sure isn't what we planned to do in Hawaii. We were able to reserve a week at the Game Lodge over the 4th of July so we can attend the Mines reunion. Hope to have a group from our family join us. I recall many hikes up M Hill since my graduation, 70 years ago this spring."

Roger Baird (EE 53) "I am sharing the sad news of Donna's passing. She was with me, our daughters, Allison and Andrea, and grandson Zachary when she passed on January 5, 2021. As with every New Year we send greetings and hope for a Happy New Year in 2021. Donna and I have had 91 happy years of life and over 68 years which we enjoyed together in marriage. Donna started noticing significant effects of pulmonary fibrosis over two years ago and went on hospice December 15, 2020. Donna wants all of you to know how blessed and happy she has been with her life. Raising our two daughters, Allison and Andrea, has been followed with sons-in-law followed by six grandchildren and, so far, two great grandchildren. Thank you to everyone for your friendship and all that you have meant to Donna during her lifespan. Burial will be in the Black Hills National Cemetery near Sturgis. Please do not send flowers. We will be advising you later of Memorial plans and suggestions for donations in her memory. I am planning to attend the South Dakota Mines All School Reunion in July. I am looking forward to seeing classmates and close friends who were also originally from northeast South Dakota, **Roy Strom (EE 53)** [Groton], **Harold Hanson (EE 53)** [Langford], and **Jim Morrison (ME 51)** [Aberdeen]."

Pete Vossos (Chem 56) "My wife and I are fortunate in that all of our kids and grandkids live near us. Therefore, we have been able to get together with all of them often for holidays, birthdays, etc. We mask up to go out to shop and to run errands. The COVID scare has caused us to cancel all out-of-town trips, but I am hoping to make the reunion this summer. Hope to see a bunch of old timers, so you all stay healthy!!"

Max Gassman (ME 56) "After graduation, I worked at the John Deere Product Engineering Center, Waterloo, Iowa, for 30 years as a machine designer. I then worked as a Professor of Mechanical Engineering at Iowa State University for 25 years. Gail Evans from Belle Fourche and I were married August 5, 1955. We have 2 sons, 7 grandchildren, and 4 great grandchildren. We are retired and living in Ames, Iowa."

Roger Stapf (ME 56) "Having graduated 65 years ago, contacts grow slim. We are in Ft Myers, FL, doing the virus sheltering thing with activities limited. At least it is warm! I keep in e-mail contact with **Jim Green (ME 64)**, who lives in the Black Hills. He was a CAT colleague and had a fine career. Also got a holiday message from **Keith Carriere (ME 57)** who still lives in Connecticut. He and I were co-ops at CAT in the summer of 1955. Marlene and I celebrated our 63rd

anniversary last June. All our family, (kids, grandkids, and great grandkids), live in the Metro St. Louis area so when we head up north in the summer, family contacts are close. The virus has limited things and most of them were working from home. I still treasure my time at Mines. Brothers **Roland Stapf (ChE 38)** and **Floyd Stapf (EE 50)** were Miners who preceded me. Last time out to M hill, I found their names on the plaques."

Chuck Speice (GeolE 57) message from **Chip Speice (GeolE 84)** "I had COVID in September, had some great business news; however, it all pales compared to my dad's passing, the most important event in my life the last year. I have great memories of hunting and fishing with my Dad, my best friend and mentor." While at the South Dakota Mines, Chuck lettered in football, wrestling, track, and basketball. After graduation he went to work for Shell Oil Company where he spent his entire career of 34 plus years. He and his family moved frequently until 1968 when he ended up in New Orleans.

Stuart Ulfers (EE 58) "Frances and I just celebrated our 70th wedding anniversary and are doing well. We are a little tired of being shut in, but hopefully not for too much longer. A big hello to all our friends at Mines."

John Burggraff (ME 58) "I am still in the Seattle area living in retirement on Vashon Island. I follow the South Dakota weather when you get snow. We don't see much snow, just rain."

Bruce Johnsen (CE 59) "Many thanks for continuing to keep us in the loop and thinking about Mines and our many classmates and friends. By my count, we are in Day 322 of Shelter-in-Place and I have only been 40 miles away from home during that time. For those who know me well, my wings have been seriously clipped! My consulting with family businesses and partnerships continues, with just enough clients to keep me on my toes, intellectually, and keep me off an easy chair watching TV all day. We live on a hill, so when the gym is closed, walking up and down or biking on the nearby hills and valleys gets my heart pumping. I am hoping to get to the reunion to see many classmates and friends."

Ren Whitaker (ChE 59) "Bev and I have lived in Shell Point Life Care facility in Fort Myers, Florida, since 1961. Beverly was admitted to the memory care facility in January 2020 within Shell Point with Alzheimer's disease. Before entering the memory care treatment facility, Bev would have sudden spells of not knowing Ren and would flee from the condominium afraid of the stranger in her condominium. Since treatment in the memory care facility, Bev has recognized and known me and that has been a true blessing. Because of the COVID-19 isolation, I have only been able to see Bev once a week. We are praying for an end to the COVID-19 isolation so I can visit Bev on a more frequent basis."

Richard Maki (MetE 59) "I spend the winters in Sun City West, AZ, and play golf 5 times a week. I recently received the first COVID-19 shot at the Allstate Football Stadium Parking Lot. This was a lesson in organization as 10,000 vaccinations were administered the day we received our first shot. It took 35 minutes to get through the line which included 15 minutes of wait time after the shot. There were lots of volunteers. My business, Range Rocks and Minerals, Inc., is still active in the reclamation of iron ore spill that resulted from rail and dock loading. I spend the summers in Alexandria, MN, close to the youngest daughter and her family. I see son Jon Maki (MetE 82) frequently in the summer for fishing and golf. His wife Kelly helps with the business accounting. I continue to be grateful to my education at Mines for a career that has been now going for 62 years and it is fun every day."

Bill Richardson (ME 59 / CE 67) "Shirley and I are just playing hermit in Las Vegas. We moved here from Tucson ten years ago to be nearer daughter Sonja, grandkids, and the great granddaughter. Alas, Sonja died of pancreatic cancer in 2016. There are now five great grand kids. The big thing is that our health is good. Of course, there's the normal run of ailments, but nothing serious. We've become 'The nice old couple who walks to the mailbox every day'. I am pretty active in my model airplane club, but gradually backing off. My stepson, **Kent Christopherson (MinE 80)** is back in Rapid. I had a good career (although it wasn't quite what I'd expected). Retirement is good. I often think of the large part the School of Mines has been in my life. I think we're all

privileged to have had SDSMT in our backgrounds."

1960s

Carl Coad (Math 60) "We are still living in Olathe, Kansas, and haven't done too much because of COVID-19. I had my aortic heart valve replaced last June. I needed 4 stents in my arteries. It was done by the TAVR method and I was in the hospital only 2 days. I don't think we will be able to make it to the reunion in July. Inge hasn't been able to travel for a while, now. I always enjoy reading the class notes in each issue."

Dave Rogers (ME 60) "Like most fellow Mines alums, I have had very little personal contact with the world this past year. However, I have had several very nice phone conversations over the past few months with **Jon Anderson (ME 60)**, **Dave Coe (CE 60)**, **Ken May (CE 61)**, and **George Peacore (ME 60)**. I realize how blessed I am to have had relationships and friendships with people like them over these past 70, yes 70, years. While Dave (Custer HS) didn't go through high school in Rapid City with the rest of us, I could write several paragraphs of experiences I have had with each of them, starting in junior high in 1951 (Dave was well known even in junior high). I lined up two of them with their future wives, was Best Man at two of their weddings, and have memorable experiences with all of them in junior and senior high school, at Mines, and post college. As I think back to George and Marcia (Spiker) Peacore's wedding, Guy March probably had mixed emotions, as George was stealing Guy's Secretary. Guy was still teaching at the time, as well as serving as Alumni Director. I hope to see the above four, as well as many others, at this summer's Alumni Reunion, one of Guy's many legacies."

Joe Kulik (GeolE 61) graduated with a Master of Arts in Theology from the Augustine Institute. He continues to support awards to Geol/GeolE students and field camp awards.

Jon Spargur (ME 61) "There was no international travel for Jeannie and me this past year. We are still thinking about the reunion in 2021. We did three beach trips to Hilton Head and Isle of Palms SC in August, November, and December. I always look forward to reading about the latest activities and developments at South Dakota Mines. We received our COVID-19 vaccinations in January 2021. Online continuing education courses, other virtual activities, and meetings have helped fill in for the lack of travel, eating out, and visiting many places."

James Wilhelm (Chem 62) "I retired from Pfizer ten years ago, where I worked on diverse projects; of note, vaccines for HIV and hepatitis B, based on the adenovirus vector, the platform used for some COVID-19 vaccines. I am living in Pittsburgh near my daughter and her family. I participated in an informative ZOOM session last fall with local alum **Tony Fishovitz (EE 80)** and President **Jim Rankin (EE 78)**. I also spend part of the year in San Francisco, where my son and his family live and enjoy bicycling, gardening, music, pottery, and expanding my knowledge of mathematics and astronomy. I never stop learning! Best to all."

Tom Warborg (ChE 63) "After all these years, I am still in touch with a number of my SDSMT Triangle brothers including **Bruce Johnsen (CE 59)** and **Gordie Lienau (ME 64)** who are part of the "The M-Team" (Mines and Monsanto) which gathers at my cabin for a week of skiing at Crystal Mountain, WA, each February. Getting together less frequently, but still in touch, are brothers **Bob Stofft (CE 62)**, **Larry Henry (CE 65)**, **Tom Snyder (ME 62)**, **Norm Carlevato (Ex 62)**, **Butch Olson (ME 61)**, and **Dick Lauritsen (GeolE 62)**. Momentos from my '57-'63 sojourn at Mines are shown in the attached photo, which also shows me with Carol, my wife of 57 years. I am looking forward to Reunion 2021."

Oliver Petik (EE 64) "I spent the last 15 years of my career working for L-3 Communication as a Project Engineer working on Communication Systems for the US Army. I retired in October 2005. Mary and I have remained in Salt Lake City and we have organized a local Mines Alumni Chapter. We enjoy the high desert climate, the mountains, skiing and Utah's National Parks. With Mary working as a travel agent we have been to the Cook Islands, New Zealand, Europe, the UK and Ireland. We were about to depart for Spain when COVID-19 hit. Needless to say, we have been home bound for the past year. I have occupied my time by building furniture, turning pens, trap shooting and working on family genealogy. In July we will celebrate our 55th anniversary with a family reunion in Lemmon, SD. Our son Jason is the CEO of the Regional Medical Center in Sidney, NE. His wife is a surgical nurse there. Our daughter Jill is an ER Nurse in Medford OR. Just after Labor Day 2020, a horrible fire burned down two towns and missed her hospital by 1 mile. Our oldest grand daughter is graduating in May from the Univ of SD with a doctorate in Occupational Therapy. Her younger sister is at the Univ of Mary in Bismarck with plans to become a speech therapist. Now that we have had our 2 COVID shots, we plan to be at the Mines Reunion in July."

Tex Longcor (EE 64) "I can't say enough about seeing Machu Picchu with Theresa in a February/March 2020 visit to Peru and Ecuador. Of the wonders of the world we've seen, these Inca treasures and mysteries top the list."

Sam McClenahan (ME 65) "I won't be able to make it to the reunion in July. The July 7 date is in conflict with our family reunion date at the lake cabin. Every year the California portion of the family joins the Minnesota portion of the family on the 4th of July. We stuff 19 people into a cabin for about 7-9 days each summer. We usually try to get together twice per year, but due to COVID, that did not happen this year."

Loren Anderson (EE 65) "As of December 15, 2020, I have retired. At 77 years old and with 55 working years, I have been employed by General Electric, United Technologies, and Ford Motor Company ending up in Canton, Michigan. Somewhere in there I was in the US Army for 2 years, located at Ft, Huachuca, AZ. All those jobs and yet no gold watch. So much for tradition. My family included four children, six grandchildren, and six great grandchildren. I am now a widower and engaged to Larisa. She is an amazing lady who was a medical doctor in the Soviet Union. She has lived in the US for 25 years. During the pandemic, we see only each other. It keeps us sane."

Don Holzwarth (ChE 68) "Sandi and I are enjoying 51 years of marriage and spending our retirement years in the great State of Texas, and travel about half the time. We enjoy Airstream camping, Viking cruises in the warm months, and skiing in the snowy months. We recently spent 3 weeks skiing from Santa Fe to Durango to Telluride. The photo is from skiing Purgatory (Durango Mountain). Our 3 kids and 6 grandkids who live in Portland, OR; Libertyville, IL; and Aachen, Germany remain our greatest joy. We hope to see many of you at this reunion."

Harold Bross (MetE 68) "I am glad to see that Mines is functioning as close as the new normal allows. We have considered moving back to South Dakota, but, after 45 years in the South, we consider 45 F to be freezing. I talked to an old buddy the other day who told me that the temperature in South Dakota was 19 F. Our high that day was 70. We did nothing and went nowhere during 2020. I have type 2 diabetes which makes us worry about travel during the time of COVID. We cancelled three planned airline trips (including 2 weeks on the Danube) plus three road trips to our Destin, FL, condo. We have stayed home only venturing to the local grocery and hardware stores. Occasionally, we order takeout. Surprisingly, we are becoming comfortable being hermits. We stay busy

by donating or throwing out house stuff, doing yard work, reading, and watching TV. In addition, Marge likes to cook and I like to eat."

John Synhorst (EE 68) "Anna and I managed to do a 40th Anniversary cruise in January 2020 to the Caribbean before the pandemic. We spent time in Puerto Rico playing tourist before boarding our ship. Our touring in Puerto Rico was limited due to earthquake activity. I was disappointed that the Arecibo Telescope was closed due to damage from the earthquakes. But we did enjoy the tours of the West Indie Islands (Barbados, Antigua, St. Martin, and the US and British Virgin Islands). The food was great. The colonization and pirate history were fascinating! The photo was taken at the Fort Morro (Castillo San Felipe del Morro), San Juan, Puerto Rico."

Jim Crouch (MinE 68) The COVID-19 lock downs have driven us to have and tend a very large garden as well as spend more time working with our half acre orchard than we have in the previous 49 years on the farm. We picked apples until an 80 mph+ windstorm blew most of the remaining apples off the trees as well as brought down two 80-year-old cottonwood trees. However, we have loads of apple everything including apple juice and it was all a worthwhile project. I was even driven to doing some genealogy about the Crouch family ranch northeast of Creighton, SD. My Grandfather Crouch homesteaded in 1909, bought additional land and moved the family out in spring 1910. My cousin is **Barth Crouch (GeolE 70)**."

Charley Chambers (ME 69) was selected by AREMA (American Railway Engineering and Maintenance-of-Way Association), a North American railway industry group, to be recognized as an Honorary Member during the AREMA 2020 Virtual Conference and Expo for his work in the railroad industry for over 50 years. Only one Honorary Member can be selected each year. In the 138 years of existence, Charley is the 65th Honorary Member. The honor recognizes individuals of acknowledged eminence in railway/transit engineering or management and of high ethical and professional standards, who have contributed substantially to the profession and the association. Charley gained practical engineering knowledge working for many railroads including the Chicago, Milwaukee, St. Paul and Pacific Railroads. He served as assistant chief engineer for the Montana Rail Link and continued to develop project management skills and joined Hanson Professional Services in 1997 as senior railroad engineer working in Bellevue, WA. He served as a regional vice president of Hanson until he retired in 2017. He is currently a senior railroad consultant. Congratulations Charley. President Fraser would be very proud of your accomplishments!!!

Paul Fauss (ChE 69) "I have lived in the Rapid City area for the last fourteen years after retiring from Albemarle Corporation. I spend most of my time playing golf if the weather permits. I volunteer as the chairman of the Supervisory Committee at Highmark Federal Credit Union and serve on the board of our water system and have held various positions at our church."

1970s

Jerome Wright (CE 71) "I am currently more retired than in the past and hope to travel more when the pandemic goes away. I have very much enjoyed working on continued research on water conservation, soil health, and the value of water. I am expecting that some post research papers will be published soon."

Jim Swartz (ChE 71) "Maureen and I, along with her 96-year-old mother and 100-year-old aunt, got our first COVID vaccine doses in early February. We got shots through all four windows of our car. It was a very well-organized drive-through system. I am still teaching and conducting research at Stanford. Our three kids are doing well with Lauren helping coordinate Airbnb's COVID safety program and

Scott in med school. I am hoping for a positive response to an "encouraged" proposal to ARPA-E that I submitted with four colleagues. We proposed to develop a technology that would make commodity chemicals from glucose and part of the CO2 now being released from bioethanol facilities. I am also working on a couple of medically-focused projects."

Dale Thomason (CE 71) "I retired in 2014, have been in Texas for the last forty-one years, and currently live in Granbury which is thirty miles south of Fort Worth. Our five daughters and thirteen grandchildren make family time top priority. We are healthy and happy and are anxiously waiting for the pandemic issues to get under control. I still make it back to Rapid City occasionally and always stop in to see how the Mines has grown."

Roger Olsen (EE 71) "I retired at the end of 2019 from primary care medicine after 38 years in Sequim, WA. Since then, I have been pursuing my passion of golf which has saved my sanity through the pandemic. I have two sons. One is a physicist working at a cancer center in Poulsbo, WA, and the other is a primary care physician in Portland, OR. I've had my first COVID-19 immunization and am looking forward to being able to spend time with my kids and to travel."

Lloyd Marsden (ME 72) "I am well and too busy. Retirement from full-time work has led to lots of volunteer work locally with church and youth organizations. I am recording music for services, helping with youth building fishing poles, helping neighbors and others. I have also contracted to build furniture. Currently I am working on a very large conference table for our downtown theatre. I have also taken some time for just creative works on the lathe making bowls, platters, ornaments, and earrings on the wood lather. Hope to do some metal casting when the weather warms up. The pandemic has really crimped our style for traveling and visiting. We are home now but hope to get out in March after we are vaccinated. I have had some good visits with **Keith Mutchler (ME 71)** and **Mads Andenas (CE 71)** over the winter months. We made lots of jelly, jam, and wine this fall. Now we bake bread weekly. We miss the in-person visits and card playing."

Stuart Calhoon (ME 72) and his wife Liz are leaving their Los Altos, CA, home of 42 years and moving to Provincetown, MA, to be near their son, Brian. "It will be hard to leave the California climate, but even the San Francisco Bay Area can lose its sheen. It is time to move on."

Steve Clark (ChE 73) "I have retired from Dow Chemical and am living in Kalamazoo, MI. My wife and I live next door to our daughter and family. We have been lucky to be quarantined next door to our grandsons, ages 5 and 7. They keep us active (just today we made a snow fort). The downside of the quarantine is that we have not seen our 2 granddaughters in Colorado for over a year. We are hoping to be in Rapid City for the Stevens High School 50th reunion for the class of 1971."

Mark Fischbach (ME 73) "I have been enjoying my retirement from electrical construction since the end of 2018. My last 2 major projects were the new Golden State Warriors Arena (Chase Center) in downtown SF and the SR-99 Bored Tunnel project in Seattle - both huge and amazing projects. We sold our home on the Monterey Bay (Aptos/Seascape, CA) in August 2019 (purchased in April 1979) and bought a home in Coeur d'Alene, ID in October 2019. We love it here - twice the house for 1/3 the price - seems like everything here is half-price vs CA. Rose continues to work part-time in retail and also drives for Uber and we have a 2BR 1BA lower floor which we have listed on Airbnb - has done very well since COVID restrictions eased here in June 2020. Would love to see some DSP brothers or Tech friends here for skiing or golf and am looking forward to the Tech and DSP reunion in July."

Lindell Sunde (ME 74) likely has the only Mines "Grubby" Corn Hole Board in the United States!!

Carmen (ChE 75) and John **Adams** welcomed a visit from **Mike Alley (GeolE 73)** and Deb Kullerd to Whitefish, MT. "We enjoyed time together, a boat ride, and a chairlift ride to the summit of Big Mountain (Whitefish Mountain Resort) with selfies with and without masks. Mike shared a bottle of Lagavulin with John while they were here! Good friends, good times!"

Richard Gjere (CE 74) didn't have much to report and says he is doing about the same as Otis Shinkletoot predicted. Richard thinks Otis may have been in his Physics class at Mines. Only Richard could send a Class Note like this!!!

Randy Porterfield (ME 74) "I spend winters in Oklahoma and summers in the Black Hills just outside Deadwood. I am trying to retire but still do some consulting with Aramco. My last trip in Nov/Dec was difficult with COVID in the air. I keep in contact with **Gary Christman (ChE 75)** and **Marv Larsen (ME 74)** and am planning to attend the reunion this summer."

John Kwyzla (EE 75) "I retired on November 6, 2020 after 45 great years in the electrical construction industry. I started my career in Omaha, NE, with Southern Electrical Contractors (a division of Peter Kiewit & Sons) as a Project Engineer and ended my career in Omaha, NE with Miller Electric Company as a Senior Project Manager. Having lived in 11 states and been involved with multiple kinds of projects, I have settled down in Bella Vista, AR, for retirement with my wife Deanna of 48 years this coming June. We enjoy our 5 grandchildren and look forward to relaxing and doing things when life slows down a little."

Dan Carpenter (CE 76) "While visiting the Black Hills from Tucson this summer, I enjoyed socializing at the 19th hole of the Meadowbrook Golf Course with **Bill Keller (ME 71)**, **Bill Klapperich (CE 73)** and **Larry Simonson (EE 69)**. I also had a chance encounter and dinner with **Randy Powell (MetE 75)** in Spearfish and **Joe Feeley (Ex 78)** in the Bear Lodge Mountains. I shared a fresh-caught walleye lunch in Mobridge with accomplished fisherman, **Steve Erdmann (CE 74)**. That was followed by a social distanced chile lunch with **Rick (EE 76)** and Pam **DeSchepper** in Sioux Falls before returning to Tucson through Denver seeing **Jeff (CE 80)** and Debbie **Mashburn**.

Wayne (GeolE 76) and Margaret [Schriever] (MetE 77) Larsen "We are still alive and kicking near Tea although a very difficult bout with the COVID virus over Thanksgiving made us wonder. We are fully recovered and continue to work at the Tea Area School and Retirement, LLC respectively. Margaret has been working from home since March 2020. We are kicking around retirement, but not sure we are ready to do that yet. We are looking forward to getting the vaccine and hopefully attending the reunion this summer. We have our motel reservations."

Kirby Bakken (EE 77) writes that he's still enjoying working part-time as 'Not Your Average Geek' fixing computers, networks, etc., as well as working with 30+ former colleagues from IBM in designing a computer processor. He's living with his wife on a small hobby alpaca farm in southern Minnesota. "New knees a couple years ago slowed things down a little. Cycling and volleyball have helped recovery. Our two sons, Alan and Marlow, both pursued engineering degrees. **Alan (ME 10)** and **Karen (MinE 10) Bakken** live in the Salt Lake City area and Marlow (ChE from Rose Hulman) lives in the Madison, Wisconsin area."

Al Heggem (CE 78) "After 43 years, 6 between Boeing and Martin Marietta and the last 37 with federal government (10 with USAF & 27 with USPS) I have joined the retirement group, living in Huber Heights, OH. Two of our three sons live within 10 miles and the other is overseas working for the Federal Government after retiring from the USAF. Four of our six grandchildren live nearby also. My beautiful spouse of 41 years, Veronica, has almost adjusted to me being home 24/7."

Don Holzwarth (EE 78) "I retired in May 2020 after 23 years as a software engineer with 3D printing pioneer Stratasys. It was only in the last few years that 'rapid prototyping' became '3D printing' and anyone actually knew what it was. If you use Insight software the toolpaths are my code, and a fair amount else as well. I am now living in Minnetonka, a Minneapolis suburb, with wife Diane."

David Hoffman (ME 79) "I retired after 41-1/3 years of experiencing a great adventure in my career at John Deere. I had the opportunity to explore experiences in Engineering, Marketing, Sales, Customer and Product Support, Business Planning and leadership of our OEM business, all enabled by the excellent base I acquired

during years at Tech getting my ME degree. Dianne and I have lived in 10 different locations since graduation, including a great 3-year experience in Germany. Life has treated us very well, as we have been blessed with 3 children and 4 precious grandsons who we plan to focus much of our newfound spare time. I will be counseling them to consider Mines for their education. I am proud to say that I was the first Tech grad from my family and hometown but since graduation I have 10 relatives who followed in my path attending the School of Mines and I recently learned that one addition, my nephew's daughter, will join next fall! Dianne and I purchased a property on Lake Travis near Austin 1-1/2 years ago in anticipation of retiring in the hill country on the lake achieving a significant increase in number of annual boating hours. I traveled there after my last business trip in March of 2020 for a long weekend which wound up being my telework location for the rest of 2020. We have adjusted well during COVID, but after many years of more than 250K annual flight miles, we look forward to returning to the frequent global travel routine that has become our life for the last 25 years. I would love to catch up with the great friends who shared time with us at Tech and hope to join you in Rapid City in 2021!"

Kevin Meador (CE 79) "After 41 years in the Denver area we have pulled up stakes and moved to Timnath, near Fort Collins. We've spent the last two years planning, designing, and building a home. We moved in last November and are enjoying the new place. We are looking forward to catching up with a few old friends in July."

Cate Meyer (EE 79) "We had a local 'Tech Babe' gathering in January. **Karla Fossoy (ChE 79)** was the photographer, so she is not in the photo with the rest of us. **Jane Barnes (ChE 79)** came to Fort Collins on her annual trip south for the winter and was heralded by her 'gal-pals' local hostess **Stephanie [Dailey] Lane (ChE 80)**, **Cate Meyer (EE 79)**, and **Karla Fossoy (ChE 79)** with a variety of social activities. The multi-day events started with a gathering around the Fossoy fire pit, followed by a look-back through 'Tech' student newspaper issues and yearbooks in Cate's garage, and finished with a snowy-day adventure/hike in a local area preserve. The video from the fire pit was deemed too risque to post. Think 'Beanie Raid' and you will understand. We are all looking forward to the all-school reunion this coming summer so we can connect in person even if we still need to wear masks."

1980s

Doug Stalheim (MetE 80) "My international technical consulting business, DGS Metallurgical Solutions, Inc., which in the past 15 years I have traveled extensively visiting various clients around the world, came to a screeching halt in March 2020. The uncertainty that occurred with that sudden halt in my business operation was rather unsettling to say the least. It took a month or so to sort out how we might continue the business relationships working remotely from home, but by May we were off and running at a very fast pace using the various web conferencing mediums available to conduct business around the world. This resulted and continues to result in having to work with a very flexible time schedule to accommodate all the time zones that might be involved. While 2020 resulted in some reduced opportunities, there was enough work still available. In fact, with the work I had, I was even more busy than when I was traveling. 2021 is shaping up nicely and hopefully improve in the second half of the year starting to get back to some face-to-face customer interactions at least domestically. I think I can make it long enough to reach my desired retirement or at least partial retirement date of 2024 or 2025. We are being blessed with the upcoming birth of our 4th grandchild, a girl, and first child of our oldest son Andrew and his wife Vickie. We already have 3 wonderful energetic grandsons 12, 9 and 5 from our son Matthew and wife Katy. We are looking forward to welcoming our new granddaughter, Ruby Le, in early July. With my 2021 business work-load commitments and more importantly welcoming our new granddaughter, Lorene and I will not be attending the reunion this year. We wish everyone a safe and great time and will be there in spirit looking forward to a lot of pictures on Facebook and other social media. We will be at the 2025 reunion hopefully in a retired or at least semi-retired state, so see all then!!"

Mark Brown (ME 80) "Early October found this group of Triangles gathered at the Larson farm near Lemmon for some pheasant hunting! **Mark Brown (ME 79)**, **Brad Wade (MinE 77)**, **Tom Winkler (CE 79)** [and his sons Clay & Chase], **Alan Larson (ME 79)**, and **Kim Haarberg (MetE 79)** enjoyed the weekend and managed to knock down a few birds. The weather was balmy for ND even with the wind, and a great time was had by all. If anyone talks to Brad, be sure and ask him about that shortcut route back to Iowa via Bismarck!"

Dennis Dirks (CE 80) "I am still working and have for the last 40 years, all selling construction products for ARMCO/Contech. I started in Topeka, KS after graduating, moved to Billings, MT, to Casper, WY, to Helena, MT, for the next 30 years, and finally back to Billings 3 years ago where we plan to stay. Billings is where I met my beautiful wife Susan and she has been putting up with me for 36 years. I am planning to retire one of these days but as you can see by my picture I have too many kids and grandkids to quit without going broke. Susan loves buying grandkid things! I am proud to say that all of my children have earned college degrees and all have fulfilling careers. They have blessed us with 9 grandkids and another is on the way. Who knows how many more we'll get but we sure love every one of them. One of our sons and both daughters live within 15 minutes of our house and our oldest son lives in Longmont, CO. I haven't stayed in touch with many Mines alumni, but I do talk to some of the guys to keep me somewhat informed. I enjoy the fact that Mines was a part of my life and I enjoy hearing what's going on in the lives of old friends. I plan to be at this year's reunion barring any unforeseen craziness."

Stan Mueller (EE 80) with his daughter, Paiton, who is currently pursuing a Chemical Engineering degree at South Dakota Mines. Stan and his wife, Jackie, moved back to Rapid City in 2018 where he transferred with Philips Health Care. They just broke ground on their retirement home near Keystone.

Tim Walter (ME 80) "I moved to Nashville in 2017 to pursue a music career. My artist name is Tim Wolf. A recent single 'Born In South Dakota' is really about being from South Dakota. You can hear it on all the streaming platforms under Tim Wolf (Spotify, Apple Music, iTunes et al). It will be on my upcoming album, 'Everything I Learned in Grade School', which will drop in September if all goes well, and physical copies will be available for purchase at that time. I also plan to release a vinyl version of the album. You can find me on all social media platforms as @thetimwolf. I'd love to hear from fellow Hardrockers. My website is www.thetimwolf.com. Life is great. I am literally living my dream. Without doubt, my 4 years at Mines were some of the richest of my life."

Mike Koch (MinE 80) "After 19 years as Chair of Pathology and over eleven hundred medical students, I am retiring from teaching at the USD Sanford School of Medicine. It has been a great experience, but it's time for someone a bit younger to take over and for me to take on some new challenges. I will continue as the Chair of the Department of Pathology (20th year in that position) and have accepted the position of Laboratory Director at the Sioux Falls VA Medical Center. I trained at this VA as a medical student and as a resident and really enjoy working with our veterans. Mary, my lovely wife of thirty-six years, and I purchased our retirement home in the Black Hills (Nemo) last year and are looking forward to relocating there permanently after I make the move to full retirement. We are blessed with four fantastic children. Tiffany, our eldest, is a Major in the Army. She just completed a two-year assignment at the Pentagon and is looking forward to her next tour of duty. Kate owns and operates her own photography studio in Sioux Falls, is married, and has two wonderful (yes, Grandpa Koch is quite biased on this) children, Amari (9) and Beckham (5)."

Kelsey Koch (Che 12) is a 2016 graduate of the USD Sanford School of Medicine and is currently finishing up a General Surgery Residency at the University of Iowa. **Kevin Koch (EE 14)**, is married, lives in Sioux Falls, and recently accepted a position as a regional sales representative for Square D. Mary and I get to the Hills frequently and try to attend all of the home football games. It is really great to get back and reconnect with the growing number of Mines graduates who are moving back to the area."

Alejandro Valdivieso (MS MetE 80) has been elected to the National Academy of Engineering as an international member. At Mines, his mentor was **Dr. Maurice Fuerstenau (GeolE 55)**. He continued graduate studies under **Dr. Douglas Fuerstenau (MetE 49)** at the University of California, Berkeley. After receiving his PhD in 1988, he returned to his native Mexico where he is a professor in the Institute of Metallurgy at the Autonomous University of San Luis Potosi. Among the numerous awards that he has received for his teaching, research, and international service was election to the Mexican Academy of Science. Dr. Valdivieso is the fifth graduate of the Department of Materials and Metallurgical Engineering to have been elected to NAE.

Kevin Strachan (ME 81) "I retired from ConocoPhillips after a blessed 35+ year career of globetrotting drilling oil and gas wells. My wife and I settled into a community north of Houston, TX. I needed something to stay busy so I started a handyman business. It keeps me busy, out of trouble, and pays for extra beer and pizza. The lockdown has limited our international travel and we are getting itchy feet for getting back to Malaysia and Thailand again where we have homes. We have been able to travel around the US the past couple of years with good friends enjoying the sights and out of the way restaurants and bars. I am looking forward to seeing more of this beautiful country. I had a "wake up" call last year that told me that I am no longer 9' tall and bulletproof. Life is short and precious, and one needs to enjoy every minute that God gives us. Therefore, we purchased a sports car for our beer and pizza runs, although sometimes it takes a couple of hours for the pizza delivery."

Alan Hartman (ChE 83) "I retired at the end of December 2020 after over 36 years of federal service in R&D projects and management positions for material applications in the steel, titanium, and melting research. I'm very grateful for my education and career journey. I'm enjoying retirement and look forward to exploring the bucket list with my family in the future."

Gene Rye (EE 84) "I finally achieved escape from Oklahoma. I am still working remotely for Boeing from my house in Andover, MN, the same place I lived in while working for BAE in Fridley until 2009. I will slide into full-time retirement by mid-April and plan to spend a fair chunk of time at my Pickerel Lake property in northeast South Dakota. I plan to pick up the rock work in Minnesota and start preparing my Minnesota lake house for eventual relocation. It will take a few years and lots of improvements to turn a large wood tent into a 4-season house."

Timothy Thum (ME 84) "I retired last spring after 31 years at the University of Wisconsin-River Falls as senior facilities engineer. In spite of the pandemic, I have been enjoying retirement by helping my wife Marilyn with gardening, cooking and enjoying our one-year-old grandson. I also keep busy with tennis, golf, bicycling, hunting and fishing."

Jack Hazel (ChE 85) "I have retired from ExxonMobil after 35 years of service. It has truly been a wonderful experience over all these years covering 12 different positions, traveling the world spanning 20+ countries, and living overseas. I was blessed to work with some of the finest people in the world across many cultures and across multiple businesses/industries. It has been a fantastic journey! Carol and I are planning to retire in the Hill Country north of San Antonio with a recent purchase of a lot and will start to build our retirement 'party home' in hopes that we will have lots of visitors. I plan to also stay involved in my many volunteer activities to continue serving those in great need. Please reach out to me if there is anything I can do to help the School

of Mines with high school recruiting, talking to potential students, advisory boards, etc. I will now have plenty of time and am always willing to help."

Darryl Feterl (EE 86) "I have had a long run with Seagate (1993 to 2020) and was let go due to downsizing last fall. I have been casually looking for work but am seriously considering retirement. All options are on the table."

Ray Wuolo (MS GeolE 86) reports that **Dave Dahlstrom (MS Geol 86)**, classmate and co-worker at Barr Engineering Company passed away suddenly on February 10, 2021 due to complications related to cancer treatment. Dave fondly remembered his graduate school years in Rapid City, especially the Halloween parties and the many friends he made with classmates and particularly with faculty members who made an impression on him greater than they can know.

Steve Simon (PhD Geol 89) is saddened to report the passing of his colleague and thesis advisor **Jim Papike (GeolE 59)** and Jim's wife of 62 years, Pauline, in Rapid City in December after battles with illnesses. Jim had a long and distinguished career and mentored many students who also went on to successful careers. "We had a Zoom gathering of about 20 of Jim's students, post-docs and colleagues and his oldest daughter on February 11, on what would have been Jim's 84th birthday. It turned out to be a very memorable event."

Wayne Mills (ME 89) "I am looking forward to getting back this spring for the ME IAB meeting assuming COVID does not further delay the in-person meetings. I retired from John Deere after 30+ years in December after the company did a significant reorganization. I plan on staying in the Waterloo / Cedar Falls area, for the short term and will be starting a new DIY / handyman teaching business while fixing up a home in 2021. I still need to put a few finishing touches on "what I want to do when I grow up in retirement" and am looking forward to having more time to enjoy every day that life has to offer." The photo is from river salmon fishing in the Kenai Wilderness (Alaska).

Angie [Schofield] Stucker (ChE 89) graduated from Southwest Minnesota State University (Marshall, MN) in 2016 with a Bachelor of Arts degree (English - Professional Writing and Communications). "I want to share something new I am trying. As I have a degree in writing now to go with my engineering degree, I decided to try a monthly blog to hone my skills while working for self-improvement through learnings and sharing with others. It is very scary for me to try this, but I have had a lot of fun doing it so far. Sean (ChE 89) and I are very anxious to see many friends at the July reunion."

1990s

Kevin Jones (EE 92) "Despite uncertainty, there were many things to celebrate this past year. We had a high school graduation, a significant wedding anniversary and a wedding. I have been working at MTS Systems in Eden Prairie, MN since August 2005. During that time, I have served as a Senior Application Engineer and as a Global Application Engineering Manager. My role involves technical B2B sales leadership for our mechanical testing solutions. I work with fellow alums, **Steve Lemmer (ME 91)** and **Greg Stayer (ME 02)**, who lead the design efforts of our testing solutions. Sherri has been a stay-at-home mom for most of the last 23 years. Don't let the "stay-at-home" label fool you, though! She keeps busy taking great care of the rest of us, leading miscellaneous projects and being involved in women's ministries at our church. In June, we celebrated our 30th wedding anniversary. Regarding our "kids", Matthew is a seventh grader and is showing promising signs of becoming a future engineer. He has an inquisitive nature and excels in math and science. Hannah graduated from high school in May and was able to participate in a late commencement ceremony in July. Despite the need for smaller gatherings, she was able to celebrate with several of her classmates. Bethany, our oldest, was married in December and we gained a son-in-law, Andrew Spaulding. The two of them are college graduates and have settled in the Twin Cities for now."

Steve (ChE 96) and **Kelly [Cowles] (IS 92) Olson** "In early 2020, Steve accepted a position as Wells Engineering Manager with Shell UK in Aberdeen, Scotland. The family finally made the move

from Houston in late August. With the current COVID-19 restrictions in place, Steve is working from home. Kelly is endeavoring to obtain her UK medical license, along with completing her fellowship in Integrative Medicine. Elizabeth entered the 9th grade at the International School of Aberdeen and has made many friends from around the world. We are hoping that the restrictions will lighten up this spring so that we can get out and explore the country. In the meantime, we have been able to go on a few local hikes and visit some castles!"

Navin Govind (MS EE 93) is the Founder and Chief Executive Officer at Aventyn, an innovative Digital Health company committed to developing and delivering clinical evidenced secure Connected Information Processing solutions for the healthcare enterprise based in Carlsbad, California. "I want to share with you the successful launch of our COVID-19 platform towards mitigating COVID spread and meet long hauler challenges. Project Coromec's aim is a real time COVID-19 epidemiology registry to assess the feasibility of monitoring subject infection progress using Vitalbeat digital therapeutics monitoring platform for remote patient monitoring and integrated chronic disease management with mobile app, AI-bots, IoT Wearables and cloud computing algorithms developed, in part, by digital therapeutics company Aventyn, Inc. The IRB clinical study underway is designed to validate and provide evidenced treatment options as designed for long term chronic illness."

Rod James (EE 94) "I retired from 3M Facilities Engineering in St. Paul, MN, two years ago after 24 years. I have really been enjoying retirement with my wife Waltraud in our house close to Stillwater, MN. Over the years we have traveled extensively and have been to every continent except Antartica (maybe next year). My wife is originally from Austria and we travel back yearly to visit her mother. We were sailing around the tip of South America last March when we were informed that our next port of call in Chili was closing due to COVID. Our cruise ship barely made it there in time. We were forced to quarantine for 14 days on the ship before they let us on shore to fly home. It was a bit nerve-racking and we were happy to get home. Besides travel my hobbies include woodworking, running, photography, hiking, camping, canoeing, and spoiling my grandkids. I would love to hear from follow classmates at rdjames72@gmail.com."

Avery Schick (ME 95) "In April of 2020, I assumed additional responsibility for Global Telehandler Product Support, alongside my current duties of managing the Caterpillar Telehandler Alliance. We continue to live in Cary, NC."

Mike Haase (IE 96) "Lisa finally got her wish and we moved back to her home state of Nebraska. I am part of the team opening a new plant for Hormel Foods in Papillion, NE. Now we can visit her folks in 50 minutes instead of 5 hours and, with my niece close by, we see my brother and his family a lot more often as well. I hope all is well in Rapid City."

2000s

Don Watzel (IS 00) "I am currently in my fourth year at Dayweather, Incorporated working as a meteorologist for our 5-state radio network and road impact forecaster for the Transportation Management Center of the Wyoming Department of Transportation. Prior to Dayweather, I worked 12 years as an Air Quality Meteorologist and Air Dispersion Modeler in the government and private sector. My wife Rachael and I live in Cheyenne, WY, where she works as the Business Services Coordinator at the Laramie County Public Library. We have been married for three years."

David Sellars (CEng 01) "I live in Ohio and have worked remotely for a company in Washington, DC Metro for about 10 years. I lead Research and Development at a healthcare tech company called DrFirst. I have several patents in AI that are used to aid interoperability in healthcare (think hospitals, clinics, and pharmacies). These designs are currently serving over 6M medication records per day with consumable healthcare data moving around between thousands of clinicians across the US and Canada. I also run a non-profit along with my wife Tracy. We have a weekly radio broadcast that covers 11M potential listeners across Ohio and many of the neighboring states."

Erin Lachman (ME 01) "I have been with Vermeer for almost 10 years and am currently responsible for the engineering functions within our Freeman, SD, facility. Our main products support the recycling and forestry business unit. My wife Leah just received her RN license and works in the ER in Freeman. My daughters

are 24, 9 and 7 and we have 2 grandsons. We keep busy with our younger daughters being involved in horse shows and other activities. I am also involved in the local volunteer fire department."

Batzaya Tumur (MS ChE 02) "For the last three years my business partner and I have run Microbiological Testing & Consulting, LLC in Chicago, IL, providing microbial, sterility, and preservation testing, as well as R&D formulations, for clients in the personal care industry. During the pandemic, we became an essential business assisting our clients in the development and testing of hand sanitizers that met FDA and CDC guidelines. We were grateful that our business continued to thrive through the pandemic, allowing us to add staff during a time of record unemployment, and enabling us to help our clients thrive as well."

Andrew Farke (Geol 03) "After more than a decade as the Augustyn Family Curator, director of research and collections at the Raymond M. Alf Museum of Paleontology / Webb School in Claremont, CA I will be stepping into a new role as the museum's director on July 1, only the fourth individual to hold this position since the museum's founding in the late 1930s. I'm excited to start this new phase in my career. I have travelled worldwide and have taken students on digs in many different places. The Webb School is a private high school with about 400 students from all over the world (13 different countries). It is set up like a college campus with dormitories and lots of facilities for research. The dinosaur museum is the only accredited one associated with a high school. Work goes on in our fossil collection during the pandemic, and we hope to reopen our exhibits to the public this fall. I always enjoy getting visits from Hardrockers when they're in the area. We are only 30 miles from Los Angeles and Disneyland. In addition to my museum duties, I've enjoyed keeping up with happenings in Rapid City via my role on the advisory board for Mines' Geology and Geological Engineering programs." *Andy has been described by his coworkers as a born teacher and someone who inspires others to do their best in the field and the classroom. He is someone who truly cares about the success of his students. He loves his job, his boss, the board, and staff. He is known for his big smile, too. He is respected and admired by all.*

Heidi [Peterson] Zens (Chem 03) "I moved to MN in 2006 to pursue my dream of becoming a Food Scientist and worked in the Analytical Lab of Land O'Lakes as a Technologist. In 2015, I began working in the Specialty Powders group as a Senior Technologist responsible for inventory, coating of snack products, bench top blending, specification system work, and beginning development projects for international customers. In 2020, right as the pandemic kicked into high gear, I was promoted to Food Scientist and support many big-name domestic food companies. I now develop spray dried cheese powder and dry blend seasoning products for snack food and baking companies. Most recently, I was able to develop the cheese powder for a new product in the market (Monster Pop)! I feel so fortunate to have a career where I get to play with food, colors, and flavors! I am also a mother of two incredible kids, Dominick (8) and Adelaide (6). We have been profusely bonding (very well I might add) as one of the many hats I wear includes a stint as a "virtual support teacher" for the 2020-2021 academic year while working from home full time (and on evenings and weekends when I can). They are doing great in school. I, on the other hand, am unsure I will pass Kindergarten and 2nd grade. Best wishes to everyone, perhaps we can see each other again soon!"

James (ME 05) and Dr. Amanda **Moisan** have moved to Houston, Texas. James is currently working in Suriname. "We plan on attending the 2021 reunion and look forward to spending time at Sylvan Lake with the Delta Sigma Phi crew."

Fanar Sefa (ChE 08) "The Sefa clan grew with another boy. Atlantic Sefa came to this world weighing 9 lbs 6 oz and measuring 22 inches long. Both Atlantic and his mother are doing well."

2010s

Jacqueline [DeMent] Melcher (CE 12) "I work for the USAF at Joint Base Charleston as the Flight Chief for Installation Management (oversee Environmental, Housing, Finance, Real Property and IT) for the 628th Civil Engineer Squadron. My husband is Active Duty and a Production Expeditor for the flight-line."

Travis Nelson (Chem 14) received his PhD in chemistry from the University of Nebraska-Lincoln in May 2020 and will start as a post-doctoral researcher in the lab of Professor Nate Hathaway at the University of North Carolina at Chapel Hill in the fall.

Lyndsey [Penfield] (ME 14) and Robert **Beyer** moved to Colorado Springs in the Fall of 2020. Lyndsey accepted a Manufacturing Job with Philips where she makes fiber optic catheters for atherectomy procedures. Her husband works from home designing tooling fixtures for a small engineering firm out of Wisconsin. They moved to Colorado to be closer to the mountains where they can mountain bike and explore in their Toyota 4Runner named Gus. Follow along on their YouTube channel "Adventures with Gus."

Gina [Rossi] (CEE 16) and Michael **Tinio** welcomed their daughter Josephine on July 7, 2020.

Timothy Magstadt (GEOE 17) and **Nishanthi Perera (GEOE 17)** married on June 27, 2020. Amidst a global pandemic, their celebration was limited to immediate family and was nothing like they were expecting! "We are happy that we were still able to get married during these difficult times to be able to celebrate a joyful occasion. We look forward to the day where we will be able to celebrate with our family and friends."

2020s

Adesh Naik (CSc 20), **Mangesh Sakordekar (CSc 20)**, **Shashwati Shradha (CSc/Math 20)**, **Sherwyn Braganza (CEng 20)** and **Craiy Rodrigues (ME 20)**, Fomento Scholars from Goa, India, enjoyed Goa-like weather in Rapid City as they celebrated their virtual graduation on December 19, 2020.

Eli Jeans (IEEM 20) "My graduation celebration was an amazing 3-man limit duck hunt with Justin Rush (IEEM student) and **Dominic Krause (MinE/GeolE 20)**. I will be working for Collin's Aerospace in Minnesota as I finish the last few classes for my graduate degree in Engineering Management at South Dakota Mines."

Find more class notes on our Facebook

facebook.com/SDMinesCARA

ALUMNI Gatherings

From left to right: Karl Knapp (CE 84), Larry Pearson (ME 72), Hunter Novotny, Austin Knapp, ***Jim Jannicke (CE 95), Pat Quinney (CE 70), Steve Grove (ChE 71), Bob Kelley (CE 58),*** Roger Wilson, ***Al Kurtenbach (EE 61), Brad Johnson (EE 92) and Ron Jeitz (CE 69).***

Another enjoyable and successful South Dakota Mines pheasant hunt this past December at Gunbarrel Ranch was hosted by **Steve Grove (ChE 71)**. The weather was perfect and the hospitality and cuisine exceptional. Most importantly, we raised another unrestricted $67,500 for South Dakota Mines scholarships. Plans are underway for another hunt at Gunbarrel Ranch near Wessington Springs on December 8-12, 2021. Contact **Ron Jeitz (CE 69)** at either ronjeitz@yahoo.com or cell (706) 817-1361 if interested. The first 12 to commit are in. It's great fun, good camaraderie, and all for a good cause - unrestricted scholarships. Gunbarrel Ranch is hunted only 4 or 5 times each year and Steve farms the ranch solely for hunting. The experience is always one to remember. Seeing the labs work the fields is like watching a symphony orchestra conductor—magical!

In Memoriam

*The names below include those who have passed (based on our database records) in the last 10 years, but whose names have not appeared in a previous **Hardrock** magazine. Please contact us if you know of any errors in this list. Going forward, it will be helpful if you share information about the passing of alumni you may know. The names below were received by March 24, 2021 and are listed alphabetically by year of graduation.*

Bob Malone (CE 43) 10/20/20
Frank Aplan (MetE 48) 11/3/20
John Vawrinek (ChE 49) 7/15/20
John Gardner (EE 50) 7/13/19
Owen Tripp (ME 50) 11/28/20
Doug Clarke (ME 51) 6/29/20
Calvin Kautz (ME 51) 2/21/21
Earl McCleerey (EE 51) 7/9/20
Fred Voigt (CE 51) 12/26/20
Robert Bangs (CE 53) 12/9/20
George Detlof (MinE 53) 9/1/20
Michael Ford (MinE 53) 10/17/20
Berton Hoyt (GeolE 53) 2/3/21
Wesley Simmons (ChE 53) 11/26/20
Robert Fuller (CE 54) 9/2/20
Roy Roadifer (GeolE 54) 12/8/20
Wade Sheldon (ChE 55) 9/18/20
Lewis Anderson (Chem 56) 12/22/20
Casper Arcilise (GeolE 57) 2/3/21
Lee Hanson (CE 57) 9/14/20
Warren Rice (ME 57) 1/26/20
Chuck Speice (GeolE 57) 11/17/20
Charles Elrod (ME 58) 10/18/20
Ernest Sundstrom (ME 58) 7/17/20
Rolly Wagner (MetE 58) 9/23/20
Kathleen Braun (Math 59) 3/10/21
LaVane Dempsey (CE 59) 4/24/20
Edimand Gilbertson (GenE 59) 1/5/21
John Mullan (CE 59) 10/31/20
Jim Papike (GeolE 59) 12/21/20
Gene Stienecker (GenE 59) 2/2/21
Bud Westre (ME 59) 10/5/20
Terrence Chase (ME 60) 11/19/20
Bill Gabbert (EE 60) 12/22/20
Fred Hornstra (EE 60) 9/15/20
Kenneth Thompson (Chem 60) 7/9/20
James Gudahl (ME 62) 6/15/20
George O'Clock (EE 62) 10/12/20
Scott Brekenfeld (MetE 63) 11/3/20
Jerry Cape (MinE 63) 6/18/20
Dan Matthaidess (ME 63) 12/17/20
Richard Russell (CE 64) 9/25/20
Bob Sliper (CE 64) 11/13/20
Fred Minter (MetE 67) 3/1/21
Jeanette Reyner (MetE 67) 6/23/19
Jerry Volk (ME 69) 1/21/21
John Hendrikson (ChE 70) 8/3/20
Keith Long (MS Chem 70) 5/17/19
Bob Norman (EE 70) 1/11/21
Charles Hintze (GeolE 72) 2/18/17
Russ Sievert (Math 72) 2/6/21
Dan Bierwagen (Chem 73) 12/12/20
Neil Simmons (GeolE 73) 12/14/20
Dale Stevens (MS CE 73) 11/29/20
David Buechler (EE 74) 2/14/21
Jim Campbell (MetE 74) 10/1/20
Lars Ditlev (MetE 74) 1/24/21
Gary Engel (CE 74) 10/25/20
Patrick Enright (CE 75) 7/28/20
Leonard Lippert (EE 75) 1/29/21
Dennis Hargens (ME 76) 9/13/20
Susie [Homelvig] Jorgensen (CE 76) 11/14/20
John Dolan (MS GeolE 77) 8/22/20
Philip Crackel (ChE 80) 10/8/20
Tom Kelley (CE 80) 10/15/20
Hsiao-Chu Tsai (MS MetE 80) 9/7/18
Carol (Wismer) VanSickle (ChE 80) 12/5/20
Doug Mastel (MetE 81) 3/20/21
William Kempf (CSc 85) 12/31/19
Paul Clark (ME 86) 5/7/20
Dave Dahlstrom (MS Geol 86) 2/10/21
Steve Walling (CSc 86) 8/14/20
Terry Collins (CE 98) 8/18/20
Chad Downs (CE 01) 3/11/21
Christopher Conaway (IS 11) 1/23/20
Brian Kelley (CSc 12) 4/3/14
Ryan Wudrick (ChE 14) 6/14/20
Grayson Young (IE 20) 11/20/20

FORMER FACULTY/STAFF:

Helen Amundson (Administrative Staff) 12/16/20
Joyce Godfrey (Secretary) 2/9/21
Sister Marmion Howe (Biology) 11/26/20
George O'Clock (EE faculty) 10/12/20
Jim Papike (Institute Director) 12/21/20
James Patterson (Phys Faculty) 10/22/20

REUNION 2021 Lite

SDSM&T

COME HOME HARDROCKERS

JULY 8-10

FIVE-YEAR REUNION

JULY 8 Golf Classic, Summer Nights

JULY 9 Tunnel Activities, Family Picnic, Academic and Athletic Open Houses, Social and Networking Events

JULY 10 Banquet Events

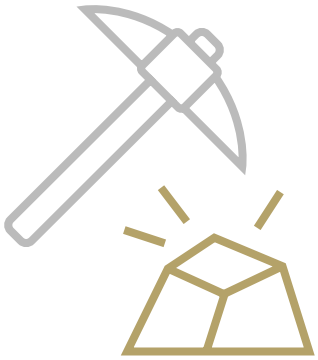
REGISTRATION REQUIRED AT
alumni.sdsmt.edu/reunion2021-registration

Update your contact information to receive information on reunion and events via email.

alumni.sdsmt.edu/connect/update-my-info

By the numbers

MINERAL INDUSTRIES BUILDING AT MINES



$2.5 billion

the annual impact of mining in South Dakota

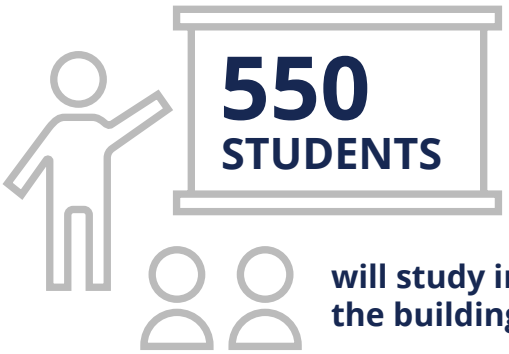
$34 million

FOR A NEW MI BUILDING

with $12 million needed from private and industry donations

$1 million

the size of two corporate gifts so far



550 STUDENTS

will study in the building

$522,513,003

total value of mineral industries products in South Dakota

3,030,000

number of pounds of minerals an average person uses in their lifetime

SOUTH DAKOTA MINES IS

1 OF 5 **universities in the nation that have all three mineral industries programs in one place**

faculty, staff, and researchers will work in the building

80,000

square feet in the new building

1885

year South Dakota Mines was founded in support of the mineral industries

SOUTH
DAKOTA
MINES

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

The next generation of mining technology starts at

SOUTH DAKOTA MINES

sdsmt.edu/MI-Building