

CONTENTS

@COLORADOSCHOOLOFMINES 

Mines has a global reach, and we're seeing just how far that extends with Flat Blaster in 2024. A printable cutout of Blaster can be downloaded, colored in and carried with you on your adventures throughout the year. Snap photos of your Flat Blaster wherever you go—whether it's a vacation, business trip, a hike or even just out and about in your community and post them on social media using the hashtag #flatblaster. You might even be eligible to win prizes throughout the year. Learn more and download your FlatBlaster at 150.mines.edu/fun.

→ Follow Mines on social media for more great shots of the Mines community and Golden and to keep up with everything happening with your fellow Orediggers.



VENTURING INTO NEW POSSIBILITIES

Two new buildings on the Mines campus bring building an innovator's mindset to the forefront of the Oredigger experience. **18**



INSIDE MINES



Top news at Mines **8**
More improvements coming to Edgar Experimental Mine
Mines contributing to Colorado-Wyoming Climate Resilience Engine
Michael Coors '06 appointed to Mines Board of Trustees



The Mines History Archive preserves the Mines story—and Oredigger memorabilia. **7**



Mines' men's and women's indoor track and field teams make history. **10**

BIG IDEAS



Mines alumni are taking golf technology to the next level. **12**



Mines researchers are contributing to advancements in biomechanics. **14**

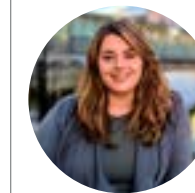


The Mines Venture Fund's first investment will help improve wound healing. **17**

ALUMNI NETWORK



Zack Bennett '99 is helping the Mines community take their ideas from concept to reality. **24**



After a positive mentorship experience through a career change, Catherine Smith '14 is now helping others find similar support. **28**

SKILL SET



Mines alumni play important roles in designing and building new campus spaces. **34**

On the cover: Mines students get to work on a variety of projects that help cultivate an innovator's mindset in the new Labriola Innovation District and the Beck Venture Center on campus.

MINES@150 BREAKING RECORDS FOR CAMPUS IMPACT

The Mines community has accomplished a remarkable feat: About 27,000 people and organizations—including **7,000 alumni**—contributed **\$462 million** to the Campaign for MINES@150 to date. Nearly **85 percent of the individual gifts received were \$1,000 or less**, proving that gifts of all sizes add up to big impact.

The campaign is in the home stretch, but you still have time to make your mark on MINES@150.

INVESTMENT IN STUDENTS



- 254 new undergraduate scholarships
- 23 new graduate fellowships
- 6 communities of scholars

MINES SIGNATURE STUDENT EXPERIENCE



- First professional development program for students
- Outdoor sports facility upgrades
- Support for veteran students

ENTREPRENEURSHIP, INNOVATION & BUSINESS PROGRAMS

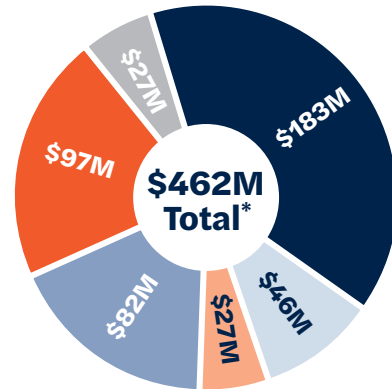


- Labriola Innovation District and Beck Venture Center
- First professor of practice in economics and business
- Innov8x entrepreneurial challenge program

PURSUIT OF EXCELLENCE & DISTINCTION



- Edgar Mine facility improvements
- Energy leadership and research programming
- Heavy Construction Studio



- Investment in Students
- Mines Signature Student Experience
- Entrepreneurship, Innovation & Business
- Pursuit of Excellence & Distinction
- Non-Government Research Support
- Unrestricted/Undesignated

*10/1/2016-2/20/2024, numbers may be rounded

We're excited that these investments are already manifesting possibilities for our students, faculty, programs and the university. Read stories of how alumni like you have made an impact on the campaign.



HATS OFF TO MINES GRADUATES

Mines is offering graduating seniors a special 150th Anniversary Hat to celebrate the Class of 2024

When commemorating the university's 150th anniversary year, Mines wanted to honor its graduates in a unique way to mark the special occasion. In addition, many who are poised to cross the stage this spring missed a traditional high school graduation due to the COVID-19 pandemic. It became obvious that Mines had to do something meaningful to celebrate the Class of 2024.

All May 2024 graduating students were offered the opportunity to receive a 150th Anniversary Hat in honor of completing their Mines degree during this historic year. It is a new hat for a new generation that hearkens back to memories of the Senior Stetson that was a source of pride for many Mines graduates through the 1970s.

Two hat designs are being offered to graduating students—one that resembles the Senior Stetson and another based on a more traditional Western design. Graduating students will be able to customize their hats prior to Commencement using school-supplied branding irons to burn the Mines logo into the brim and crown.

- Learn more about this tradition and find more details about how alumni can get involved at 150.mines.edu/hat.

MINES MAGAZINE

Spring 2024 | Volume 115 | Number 2

[MINESMAGAZINE.COM](https://minesmagazine.com)

President and Professor
Colorado School of Mines
Paul C. Johnson

Editor, *Mines Magazine*
Ashley Spurgeon

Editorial Board

Luz Falcon-Martinez '05,
Andy Flynn '86, ME '98, Damian Friend '75,
Peter Han, Doug Mayo, Victoria O'Malley,
Jennifer Nekuda Malik, Kelly Olson,
Larry Preble '61, John Spear MS '94, PhD '99,
Rachelle Trujillo, Melanie Westergaard '87

Mines Alumni Board, Executive Committee
Melanie Westergaard '87, President
Santana Sanchez '17, Vice President
Nahjee Maybin '18, Treasurer
Mitch Kruse '85, Secretary

Contributing Writers

Lynn Clark, Jenn Fields, Emily Halnon,
Cassidy Hannon, Sarah Kuta, Emilie Rusch

Graphic Design

Gretchen Kershner

Photography

Agata Bogucka

Advertising Contact

Ashley Spurgeon
aspurgeon@mines.edu | 303-273-3959

Mines Magazine is published by
the Colorado School of Mines
Communications and Marketing Office
for alumni and friends of the school.



Share your thoughts

Email: aspurgeon@mines.edu
Mail: Mines Magazine, 1500 Illinois St.
Golden, CO 80401



Support Mines

Visit: weare.mines.edu
Call: 303-273-3000



Elevate your education

Visit: gradprograms.mines.edu
Call: 303-273-3678
Email: grad-admissions@mines.edu

THE BEST JOB IN THE WORLD

Upholding the value of a Mines education for 150 years and beyond

Some have said that being a university president is the toughest or even the loneliest job in the world, but I think that Vanderbilt University Chancellor Daniel Diermeier had it right when he recently wrote in a piece for *Forbes* that being a university president is the best job in the world—although I'd argue that being Mines' president is the best of the best.

After all, I get to spend time with some of the brightest students and faculty in the world. I get to see all that our dedicated staff do to support our community. I get to meet with alumni who are very passionate about their alma mater. On top of all that, this year we're celebrating our 150th anniversary and the many things we've accomplished leading up to it.

I'm incredibly grateful to everyone who has been part of our MINES@150 journey, as that work has been so critical to position Mines for success in the future. You've probably read of the many challenges facing higher education: fewer students going to college, tighter budgets, the politicization of education, student health concerns and even questions about the value of a college degree. We anticipated many of those, and through the MINES@150 initiatives, we're looking to succeed under conditions that many institutions are just hoping to survive.



I like to say that one of Mines' strengths is that we have always had a very clear mission, one we've always excelled at delivering and never deviated far from. We produce the talent, knowledge and innovations that industry and society need for prosperity. We work on things that matter. That's our lane. That's what the world needs from Mines. There should never be a question of the value or relevance of a Mines education.

Along those lines, this spring we added the final pieces to what may be the most comprehensive integrated Entrepreneurship and Innovation Ecosystem on any college campus by opening the Labriola Innovation District and the Beck Venture Center. Going forward, every student will get to experience what it's like to take an innovation from idea to reality, and we'll have support for students,

faculty, alumni and university partners to take their discoveries to market. We'll be able to say that Mines produces the talent, knowledge, innovations and the products and companies that industry and society need for prosperity.

I'm also excited about the progress we are making toward being the exemplar for alumni affinity and engagement. There are more opportunities than ever, and we need you to be mentors, advisory board members, speakers, champions and advocates for Mines. Please reach out and get engaged. I can't think of a better time to start than during Mines' 150th birthday year.

Go Orediggers!

Paul C. Johnson
President and Professor

Mines Archivist Lisa Dunn pulls items from the Mines History Archive to help tell the Mines story, spanning 150 years.



SHARE YOUR MINES HISTORY

The Mines History Archive wants to preserve Oredigger stories

The Mines History Archive at the Arthur Lakes Library tells the story of Mines and its community, from past to present. That means there are a lot of stories to tell spanning 150 years—and there are a lot yet to be recorded.

The archive's current collection includes many school publications and "official" documents, but they don't put the "color" into the school's rich and colorful history, according to Lisa Dunn, the library's archivist. That's where Mines alumni come in.

The library is looking to expand its collection and fill in gaps in the Mines timeline, particularly more recent history, such as from the 1960s to the present. Mines alumni are the best people to help fill in those gaps with their personal collections of Mines memorabilia, print or digital photographs, video and other materials that help tell the story of their time at Mines.

ALUMNI CAN DONATE ITEMS SUCH AS:

- Scrapbooks
- Standalone photos
- Rare issues of the Senior Day newspaper
- Event programs

- Written personal histories
- Collectible objects
- E-Days memorabilia

The best part of donating to the archive? All items are welcome. Dunn looks at every donated item to determine how it contributes to Mines' story. You never know which items can provide new insights on student life over the years—student-drawn cartoons, a class field trip T-shirt, a senior Stetson autographed by class members. Even if you don't think your items are old enough to be "history" yet, they will be, and they're worth preserving.

The Mines History Archive is open to the public by appointment, and Mines alumni and students are welcome to peruse and reminisce about all the unique aspects that make them Orediggers.

➔ Have items to donate to the Mines History Archive? Contact Lisa Dunn at ldunn@mines.edu to arrange a donation or learn more. Find more information about the archive at libguides.mines.edu/specialcollections/giving.



IMPROVEMENTS COMING TO EDGAR EXPERIMENTAL MINE

The Freeport-McMoRan Foundation made a \$1 million gift to the Edgar Experimental Mine Modernization Plan. It's the company's second \$1 million gift in 10 years, establishing Freeport as the mine's biggest supporter since Mines purchased the facility in 1921.

"We recognize the importance of learning facilities like the Edgar Mine in attracting and retaining students and faculty to help ensure a future talent pipeline," said Tracy Bame, Freeport-McMoRan Foundation president. "We value the long-term partnership we've built with Mines to make sure future mining engineers receive high-quality, real-world education."

Edgar Mine is likely the largest and most sophisticated of five university-owned mines in the United States and the only one with a Wi-Fi-enabled underground classroom. The mine serves as an underground laboratory for future engineers responsible for finding, developing and processing the world's natural resources. Many Mines departments conduct training and research there—some supported by industry—including work on improving mine safety and environmental impact.

MINES CONTRIBUTING TO \$160M COLORADO-WYOMING CLIMATE RESILIENCE ENGINE

Mines will serve on the governance board and contribute to research, innovation and workforce capacity development through a newly funded \$160 million initiative focused on driving innovation in climate resiliency in Colorado and Wyoming.

The U.S. National Science Foundation recently announced that the Colorado-Wyoming Climate Resilience Engine is an inaugural NSF Regional Innovation Engine (NSF Engines) awardee. The CO-WY Engine will initially receive up to \$15 million for the next two years, totaling up to \$160 million over 10 years.

Mines will be a member of the governance board of CO-WY Engine, representing executive research and innovation leadership, as well as diversity, equity and inclusion access. In addition, Mines will advance use-inspired research solutions and address community needs related to environment, water resources,



smart buildings and communities, integrated energy solutions and extreme weather resiliency, as well as access to research capabilities, instrumentation and modeling.

"The Colorado-Wyoming Engine represents a uniquely collaborative innovation ecosystem, building upon the strengths embodied within our region," said Walter G. Copan, Vice President for Research and Technology Transfer at Mines. "A core contributor to the CO-WY Engine has been the Colorado Energy Research Collaboratory, a partnership of the leading research universities in the region together with the National Renewable Energy Laboratory."

Leading the effort is Northern Colorado-based Innosphere Ventures. Other partners include Colorado State University, University of Wyoming, University of Colorado Boulder, University of Northern Colorado, University of Colorado Denver, Metropolitan State University of Denver and the community college systems of Colorado and Wyoming. Federal labs, including NREL, National Center for Atmospheric Research (NCAR) and National Institute of Standards and Technology (NIST), are also involved, as are economic development, policy and industry partners in both states.

Overall, the goal is to advance the region's research and commercialization efforts focused on sensing, monitoring and predictive analytic technologies for climate resiliency spanning methane emissions, soil carbon capture, earth sensing, water scarcity, wildfires, extreme weather and other aspects of climate resilience innovation, workforce and economic development.

→ For more information about CO-WY Engine, visit co-wyengine.org.



MICHAEL COORS '06 APPOINTED TO MINES BOARD OF TRUSTEES

Michael Coors '06 was appointed to the Colorado School of Mines Board of Trustees by Gov. Jared Polis. Coors will serve a four-year term on the board through December 2027.

Coors is the chief executive officer of CoorsTek, Inc., a privately held global supplier of technical ceramic materials based in Golden, Colorado. The company serves a wide variety of industries including semiconductor, aerospace and defense and medical orthopedics.

Over the past seven years, Coors has helped to chart a new strategic direction for CoorsTek, which included recruiting a new executive leadership team and reorganizing the business into a functional reporting structure. As part of this shift, the company significantly increased its R&D investment, building a state-of-the-art materials center in Golden, reduced its manufacturing footprint by 30 percent while expanding top-line revenue and global reach.

Coors is also helping to lead a \$550 million revitalization project that will convert CoorsTek's oldest historic manufacturing site into a technology-focused, mixed-use hub in downtown Golden, reinforcing the Coors family's long-term commitment to and investment in the region.

Prior to joining CoorsTek, Coors served as chief executive officer of Outlast Technologies, a world leader in thermal management solutions used in temperature regulation in textiles, batteries and other uses.

Coors holds a bachelor's degree in mechanical engineering from Mines. He currently serves on the boards for the Adolph Coors Company, CoorsTek Inc. and Leadership X, as well as the Mines Venture Fund.



Photos by Aidan Lanchoney/RMAC

SWEEPING SUCCESS

Mines' men's and women's indoor track & field teams make history as RMAC champions

For the first time in program history, Mines' men's and women's track & field teams swept the team titles at the RMAC Indoor Championships this spring, holding off challenges from the University of Colorado Colorado Springs to bring home a pair of championships.

Altogether, the Orediggers collected eight gold medals, 10 silver medals and eight bronze medals, propelling the men's and women's teams into RMAC history. Here are some of the highlights from the competition:

- Loic Scomparin was named the 2024 RMAC Indoor Track & Field Male Athlete of the Meet. Scomparin claimed a first-place finish in the men's 5,000-meter race and second-place finishes in the 3,000-meter and mile races.
- Hannah Miller's pole vault of 4.27 meters set a new RMAC women's all-venues pole vault record and



moved her to the No. 8 overall vault in NCAA Division II history.

- Aidan Bennet and Hunter Potrykus claimed a co-title in the men's pole vault with vaults of 4.96 meters.
- Scomparin and Zoe Baker earned gold medals in the men's and women's 5,000-meter race.
- Everett Delate earned a repeat 60-meter hurdles crown.
- Aryelle Wright and Tim Thompson swept the men's and women's 800-meter run, with Wright winning a new RMAC Championship record time of 2:09.68.
- Aani Hardesty, Randi Higashi, Grace Galvin and Aryelle Wright

made up the 4x400 relay team, earning a gold-medal finish with a final time of 3:50.28, the second-fastest time in program history and a track record.

SPORTSWOMAN OF THE YEAR

Sportswomen of Colorado named Mines pole vaulter Hannah Miller as the 2023 Colorado Sportswoman of the Year in college track & field.

In one of the nation's strongest track & field states, Miller stood out for her incredible 2023, which included the NCAA Division II indoor pole vault national championship and the outdoor national silver medal. Mines' Female Athlete of the Year, Miller earned USTFCCA First-Team All-America honors in both seasons,



was a First-Team Academic All-American and was the RMAC Field Athlete of the Year indoors. She broke the program and RMAC indoor pole vault records at 4.16 meters and had an outdoor best of 4.17 meters. Her national title was the first for Mines women's track & field since 2004, as she cleared five bars without a miss in Virginia Beach.

Miller earned her Mines degree in quantitative biosciences and engineering in December 2023 and is currently competing in her final season of eligibility. Her 2024 season best of 4.11 meters ranks third in NCAA Division II.

Founded in 1974, Sportswomen of Colorado is a community-based organization that supports and honors female athletes, celebrates their achievements and recognizes those whose efforts have advanced girls' and women's individual and team sports endeavors.

➔ For more on Mines Athletics, visit minesathletics.com.



Mines makes it easy to create your legacy

New! Mines has made it as easy as pie to create your will with a new tool called Giving Docs.

Regardless of the size of your estate, you can create a will to support the causes that are most important to you.

It's safe, secure and free.

For more information, go to plannedgiving.mines.edu



SCAN ME!





The Mines tour of the PING headquarters culminated in a viewing of PING's "Gold Putter Vault" where they store over 3,000 gold-plated putters that commemorate individual golfer's victories with PING clubs. President Paul C. Johnson is seen here surveying the long history of PING golfer champions.

IN FULL SWING

Mines alumni bring a new level of drive to engineering golf technology

BY SARAH KUTA

In 1980, the average driving distance of professional golfers on the PGA Tour was 256.89 yards. By 2023, that figure had ballooned to 299.9 yards—a nearly 17 percent increase—with many individual golfers averaging more than 300 yards per drive.

What changed? Today, golfers are more athletic, coaching has gotten more sophisticated and golf courses are in better shape. But, perhaps most importantly, golf clubs and balls have improved—all thanks to engineers.

Several Orediggers are helping to push the sport's equipment forward by working as design and product engineers at top companies like PING, Callaway and Edel Golf. They're enhancing golf clubs, balls and other types of gear—including mobile apps—to help golfers at every level improve their game.

Thanks in large part to these equipment advancements, pro golfers are now hitting the ball too far at some courses. As a result, manufacturers will need to meet new standards set by the United States Golf Association and the R&A starting in 2028. Under the new rules, announced in December 2023, golf balls cannot travel more than 317 yards under specific testing conditions. Only balls that meet these criteria will be considered conforming and, thus, eligible for use. Golfers can expect to lose between 5 and 15 yards of driver distance, depending on their skill level, because of the change.

Golfers have mixed feelings about the new rules, which have collectively been dubbed the "golf-ball rollback." But the sport's governing bodies have put similar restrictions on golf club manufacturers over the years—and those limitations have only made engineers more creative.

"The big misconception by the golf consumer is that there's not much more manufacturers can do because they're capped by regulations," said Marty Jertson '02, vice president of fitting and performance at PING. "But that's definitely not the case. Put a wall around a good engineer and they'll figure out a way to get around it."

BETTER TECHNOLOGY, BETTER EQUIPMENT

Today's golf clubs are lighter, stronger, more forgiving and more aerodynamic than ever before. Golf balls, meanwhile, have also been optimized for aerodynamic performance, spin and height. And, every year, engineers manage to come up with new innovations that make the gear better and better.

Many of those improvements have resulted from rapid advancements in artificial intelligence, software, data analytics and computing within the last decade. These technologies help golf engineers save time, money and energy—and, ultimately, allow them to innovate more quickly.

In the past, for example, engineers had to build various golf club prototypes then take them into a

wind tunnel for testing. From there, they had to analyze the data, tweak their prototypes and repeat the entire process all over again. Now, they can do much of this work using software and computer simulations.

"Companies can fully model a club, run intensive flow and impact simulations, quickly produce a prototype to the exact specifications, put that prototype in a swing robot and use a radar-detection system to gather important data points," said Gavin Jones '22, a design engineer at Edel Golf. "We are entering a new era of club design, backed by the immense amount of engineering knowledge and technology that is readily available."

Engineers are also using new technologies, such as 3D motion-capture systems, to gather huge amounts of information about how clubs perform in different conditions. They can then feed that data into predictive models to optimize clubs for different goals, such as hitting the ball farther or straighter.

"Companies like Callaway are now able to collect data on all the different scenarios in which golfers swing a golf club and then design products based on that information," said Preston Smith '20, a research and development product designer at Callaway. "Only recently has this

digital workflow matured to create products sold to the masses."

SOLVING PROBLEMS

Jertson, Jones and Smith may make it sound easy but, even with these recent technological advancements, designing golf equipment is challenging. By far the biggest hurdle? Human variation.

"We have some literal rocket scientists at PING, and they all say golf clubs are way harder to engineer than rockets because of that human element," said Jertson. "It would be very easy to optimize our clubs for a robot, but we can't do that. We have to optimize for humans. And sifting through that messiness of human beings and how they respond to different tools is really hard."

Mines graduates are some of the best candidates for overcoming these and other challenges in the industry because they're comfortable solving tough problems, they know how to work both individually and collaboratively, they're good communicators and they're self-motivated, said Jertson.

In addition to their strong work ethic and discipline, many Orediggers are also active. Even if they don't play golf specifically, this helps them understand the relationship between equipment and athletes.

"Many of them are out playing sports, biking or skiing, so they are not only familiar with engineering discipline, but they are also aware of their own bodies and coordination, which makes designing athletic equipment a lot easier," said Jones. "Learning engineering in a place like Golden is perfect for this reason."

MINES' GOLF LEGACY

Golf is a core part of Mines' identity. Now in his 18th season at the helm of the men's golf team, Tyler Kimble has led the Orediggers to multiple RMAC championships during his tenure. In addition to coaching Jertson and Smith during their time at Mines, he's also coached several all-American golfers at Mines, including Jim Knous '12, who played golf professionally for more than a decade and is now working for PING as a fitting and education engineer.

Mines also hosts annual golf tournaments in Golden and Houston to support student scholarships. A memorial golf scholarship has also been created in honor of Michael Lee '14, a decorated Mines golfer who died in December 2020.

➔ Support Mines' golf tournament scholarships and the Michael Lee Memorial Scholarship at wearemines.edu/supportminesgolf.



➔ Mines alumni, faculty, staff and family members enjoyed a special tour of the PING headquarters in January 2024 and learned about the roles Mines alumni play in elevating the golf industry. They were able to watch as professional golfers tested clubs on PING's private driving range and putting green.

COMBINING SCIENTIFIC EXPERTISE

A new joint industry program will explore the potential of geologic hydrogen

BY EMILIE RUSCH

Mines and the U.S. Geological Survey established a joint industry program supported by leading international companies in the energy industry to study the potential of a low-carbon alternative energy source: geologic hydrogen.

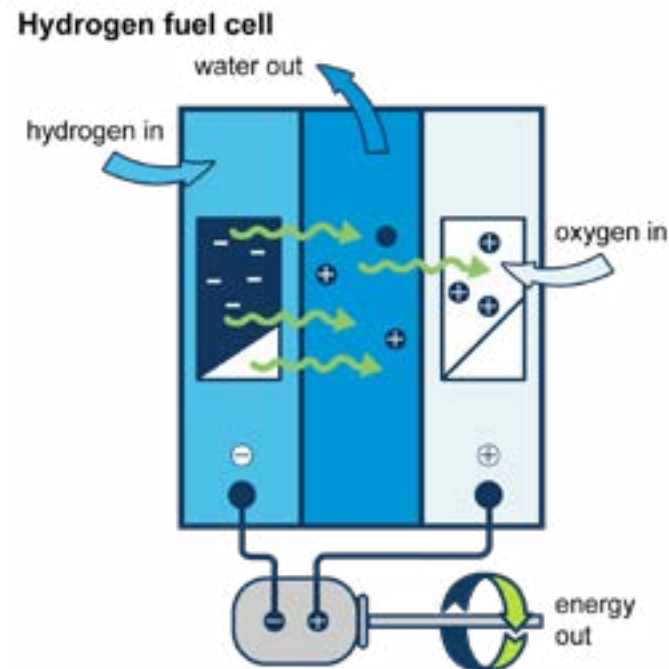
“We have a perfect opportunity to merge our scientific expertise in Colorado School of Mines and the USGS to tackle this exciting potential new addition to the alternative energy mix,” said Geoffrey Ellis, a research geologist with the USGS Energy Resources Program and director of the new joint program.

“This is the first collaborative effort on geologic hydrogen between a federal agency and academia,” said Mengli Zhang, co-director of the Center for Gravity, Electrical and Magnetic Studies and co-lead of the new joint program for Mines. “With the combined expertise in electromagnetics, gravity and magnetism in mineral exploration and exploration seismology for natural gas at Mines, we are uniquely positioned to tackle the subsurface exploration research in geologic hydrogen.”

Geologic hydrogen is a naturally occurring gas with significant potential as an energy resource. It is also a resource that could help reduce the climate impact of many industries that cannot easily be electrified—everything from heavy-duty transport (air travel) to steel manufacturing to industrial heating.

Most hydrogen today, however, is manufactured using natural gas, requiring large amounts of energy and releasing carbon dioxide that is often left unabated. Current methods for reducing the carbon footprint of producing hydrogen include capturing and storing the carbon dioxide produced, or by using renewable electricity to split water molecules—both more costly than traditional hydrogen manufacturing.

As an alternative, scientists with Mines and the USGS have begun investigating the hydrogen gas that naturally exists beneath the surface of the Earth. Preliminary research suggests that vast quantities of hydrogen may exist in various rock formations, both in the United States and around the world.



This diagram shows how a hydrogen fuel cell functions, with inputs and outputs.

Image courtesy of the Energy Information Administration, Department of Energy

In the first industry-supported hydrogen exploration consortium in the world, researchers at Mines and the USGS will advance the understanding of geologic hydrogen systems, as well as develop surface- and subsurface-exploration technologies to locate the clean-burning gas beneath the ground.

“Fortunately, we are not starting from scratch here,” Ellis said. “We can adopt and adapt the learning that we have developed from many decades of research into other resources, such as mineral resources, petroleum and geothermal energy.”

TO THAT END, THE CONSORTIUM’S RESEARCH WILL FOCUS ON THE DEVELOPMENT OF FOUR KEY AREAS:

1. **A geologic “hydrogen system” model** that identifies sources, migration pathways and mechanisms, reservoirs, traps and seals leading to accumulations of hydrogen in the subsurface

2. **Surface exploration approaches, including remote sensing and surface geochemistry**, to refine our understanding of where hydrogen accumulations exist in the subsurface
3. **Subsurface exploration tools, including multiple geophysical tools, advanced signal processing and artificial intelligence tools**, to image geologic hydrogen systems and potential economic accumulations suitable for energy production
4. **3D reactive transport modeling** that integrates geology, geochemistry and geophysics to improve the understanding of hydrogen systems and provide guidance to the development of exploration strategies

“A major focus of the consortium is developing immediately deployable technologies,” said Yaoguo Li, professor of geophysics at Mines. “There’s a need and desire for exploration technologies that can be applied by industry in the near future to contribute directly to the energy transition, as well as for strategies that can be used by society to tackle the challenges in mitigating climate change for better human life.”

Funding for the research will come from a growing number of industry partners. Eight member companies have already signed on, including major players in the mining and energy industries and geologic hydrogen start-ups: BP, Chevron, Eden Geopower, Petrobras, Fortescue, Koloma, Hydroma USA and HyTerra.

The consortium began collaborative research between Mines and USGS scientists in September 2023. The immediate objectives are the scientific understanding of hydrogen systems, including mechanisms and conditions of hydrogen generation, migration and preservation, as well as practical tools to find hydrogen accumulation and identify the potential for enhanced hydrogen generation. The consortium will also emphasize educating researchers and engineers in this emerging field.

➔ Learn more about the consortium at geophysics.mines.edu/geoh2.

THANK YOU

for kicking off Founders Week and Mines 150th Anniversary with your OreGiver love on **#idigmines Giving Day!**



A RECORD-SETTING INCREASE IN DONORS AND REVENUE



1,327



\$456,748



ALL CAUSES TOOK HOME THEIR PERCENTAGE OF MORE THAN

\$145,000

MATCH/CHALLENGE/BONUS FUNDS

GRAND BONUS TOP WINNER WITH THE MOST DONORS OVERALL
VARSITY ATHLETICS

RAISING THE BAR CHALLENGE WINNER WITH THE GREATEST INCREASE IN DONORS (867%) COMPARED TO 2023
ENGINEERING DESIGN AND SOCIETY

Final results
idig.mines.edu



COLORADO SCHOOL OF MINES
@150 | 1874-2024

MOVING THE NEEDLE FOR MOVEMENT SCIENCES

Biomechanics expert Anne Silverman is playing a key role in a new NSF Integrative Movement Sciences Institute

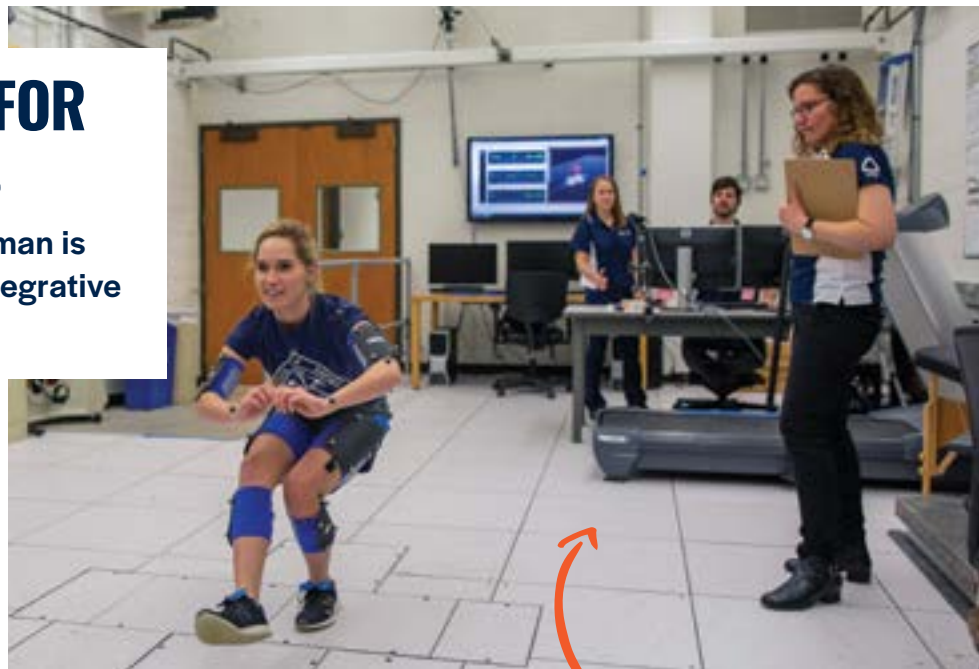
BY EMILIE RUSCH

There's still a lot to learn in the field of movement biomechanics, but a new \$15 million National Science Foundation institute is dedicated to improving our understanding of muscle mechanics and control. And Anne Silverman, associate professor of mechanical engineering at Mines, is on the leadership team as one of five co-principal investigators.

The new Integrative Movement Sciences Institute, announced as part of NSF's Biology Integration Institutes program and led by Monica Daley at the University of California, Irvine, will bring together experts from 21 institutions across the United States. for interdisciplinary research and training. By integrating investigations across different scales and timescales, from molecules to organisms and nanoseconds to generations, the institute aims to drive innovation in biophysics, physiology, biomechanics, neuroscience and engineering.

"This institute is going to transform the field of movement biomechanics," Silverman said. "The results of this work have clinical implications for understanding aging and movement disorders and applications for assistive technology development."

Over the next six years, the core research of the institute will focus on intrinsic muscle dynamics, neuromechanical control, resilience and versatility, risk-reward and learning, and diversity and convergence in motor systems. These cores will critically examine



Associate Professor of Mechanical Engineering Anne Silverman observes a biomechanics test in a lab on the Mines campus.

assumptions of current approaches, develop new experiments and models and construct a dynamic muscle movement paradigm to transform basic science, clinical applications and technological advancements.

At Mines, Silverman will lead the resilience and versatility work, conducting multiple biomechanical studies focused on the organism level and evaluating movement coordination.

"Individual organisms/people are inherently variable—we have different sizes, muscle strength, flexibility, muscle material properties, bone shapes. While variability is often something to control for in a scientific context, the institute is going to explore this variability to understand how organisms are resilient to varying environments and adapt to individual capability," Silverman said. "We all move in different ways given our past experiences and physical capability—we want to figure out why."

To do that, her team will conduct both experimental work and

musculoskeletal modeling and simulation at the organism level. Researchers will also integrate what is learned from other scales—biophysical models of muscle, tissue level dynamics and more—into whole body movements and simulations, to better link these scales of our underlying biology and our output movement behavior.

The institute will foster a collaborative community and provide over 450 trainees with interdisciplinary scientific training, inclusive mentoring, and a wide professional network over the next six years. The institute will create a training pipeline from undergraduates to faculty, transforming movement sciences by integrating disciplines, organisms and structural scales.

"Often our experiments and models are isolated in specific subfields or focus on a particular size scale," Silverman said. "With IMSI, we are discovering how muscles work on short timescales (less than a second) to generations (multiple lifetimes), and from molecules all the way up to ecosystems."

BETTER CARE FOR WOUND HEALING

Mines faculty-founded biomaterials company wins inaugural Mines Venture Fund I investment

BY LYNN CLARK

Colorado-based biomaterials company GelSana Therapeutics has received seed equity funding from Mines Venture Fund I, which invests in startups led by Mines faculty, staff, alumni, students and formal partners.

It's the Mines Venture Fund's first investment since it launched in December 2023.

GelSana was founded in 2020 by Melissa Krebs, associate professor of chemical and biological engineering at Mines. GelSana's first product is a novel polymer-based gel called Cleragel, designed to improve wound healing by reducing inflammation.

Krebs said the company will use the seed funding to push Cleragel to FDA registration and then to the clinical market next year.

"We are thrilled to receive this investment, as it highlights support for Mines-based entrepreneurs to translate the technologies we're developing on campus to the market," Krebs said. "I'm excited to watch Cleragel make a much-needed improvement in the care of chronic wounds."

Krebs said GelSana initially focused on resolving diabetic foot ulcers, which pose serious health and financial burdens for people with diabetes. In 2020, the company published peer-reviewed research that indicated hydrogel bandages could be game-changing in diabetes treatment worldwide.

Now, the company is developing a pipeline of hydrogel-based products that can be applied more broadly in wound healing. One will deliver time-released topical medications to reduce dressing changes and speed up wound healing.

"GelSana aligns with the Mines Venture Fund's mission to invest in companies that have converged academic excellence, entrepreneurial spirit, rigorous discipline and a strong network of Mines alumni

Associate Professor of Chemical and Biological Engineering Melissa Krebs founded GelSana Therapeutics to create novel wound dressing materials for improved healing with less inflammation.

to cause innovation," said Todd McLean, managing director of Mines Venture Fund Management. "We're particularly pleased to invest in a biomedical firm that will improve the lives of many people."

McLean said the fund will continue to invest in biomedical companies along with other disciplines Mines inventors are experts in, such as quantum computing and AI, robotics, energy technology and materials science.

"Working on the Mines campus gives us access to brilliant people who are going to change the world with their products and innovations," he said. "We're here to help them do it."

"We are incredibly grateful for the investors and investment committee members that have created Mines Venture Fund I to advance the innovations and companies being developed by our faculty, students, alumni and partners" said Mines President Paul C. Johnson. "We expect the number of opportunities to grow exponentially with time given how well-aligned our expertise is with the world's needs and with the growth of our research enterprise and the launch of our Labriola Innovation District, Beck Venture Center and their associated programming."

➔ Learn more about GelSana Therapeutics at gelsanatherapeutics.com.



VENTURING INTO NEW POSSIBILITIES

The newest additions to the Mines campus bring developing an innovator's mindset to the forefront of the Oredigger experience

BY ASHLEY SPURGEON

Mines has long been renowned for being innovative in the classroom and research labs—a reputation built on 150 years of encouraging cutting-edge ideas, supporting bold thinking and partnering with industry to advance technology in a variety of fields. And as the school progresses into its next 150 years of producing leaders in science, technology, engineering and math, it's providing new opportunities to help shape an innovator's mindset and set graduates up for success in industry and business.

At the heart of these new possibilities are two new facilities—the Labriola Innovation District and the Beck Venture Center. These additions—plus the opening of McNeil Hall in 2020—are the biggest physical change to the Mines campus since the opening of the CoorsTek Center for Applied Science and Engineering in 2018.

These new spaces support the Mines Entrepreneurship and Innovation Ecosystem, with a state-of-the-art network of facilities, programs, resources and business connections for Mines students, faculty and alumni to expand their reach and impact in the world. From groundbreaking research to signature student experiences, every aspect of Mines' academic community is dedicated to cultivating an environment where innovation thrives.

We spent some time in these spaces, learning how they are currently being used by Mines students and alumni and the possibilities they provide for the Oredigger community.

LABRIOLA INNOVATION DISTRICT

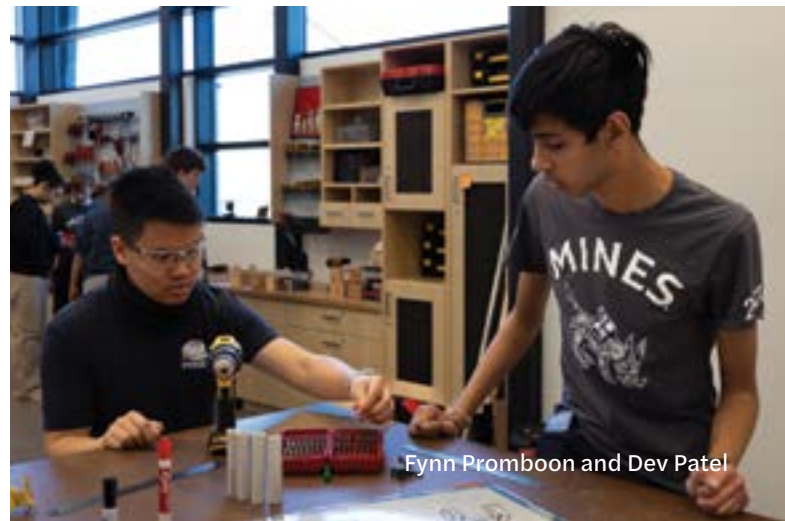
Mines' state-of-the-art, hands-on, project-based learning and making headquarters, the Labriola Innovation District is a dedicated place on campus where students can innovate, prototype, work in teams and develop into future industry leaders.

The multi-building district is comprised of a variety of spaces and programs designed to support and encourage students to be innovators and entrepreneurs. The following pages showcase each component.





Owen Randall, Nicholas Elliott and Ivanna Martinez



Fynn Promboon and Dev Patel



Students Erin Mills, Mayson Kalke and Josh Richardson work with teaching assistant Charles Burroughs to take apart their car to benchmark each subsystem's mass and design intent so they can understand full system functionality and where modifications can be made.



Students Hunter Bayles, Kasen Loveless, Greta Heitman, Gia Arelio, Seamus Henderson and Christian Burroughs meet to decide what to test next on their car.

Cornerstone Design students plan and build physical models from wood and PVC to redesign existing tools in a way that makes the tools more useful and less wasteful while keeping the manufacturing process simple and inexpensive.

LABRIOLA INNOVATION HUB

This 37,000-square-foot building centralizes campus makerspaces, adds specialized classrooms and incorporates much-needed student-project meeting spaces—all outfitted with the latest technology and equipment. Among the makerspaces and labs are wood and metal shops, a 3D-print and rapid prototyping makerspace, electronics lab, composites and paint shop and a tool check-out. They're surrounded by workspace and meet-up areas where student teams—for classwork, extracurricular clubs and competitions or just for fun—can iterate together. Mines' signature hands-on design experiences, Cornerstone and Capstone Design, also have dedicated lab spaces in the building.

The Labriola Innovation Hub is named in honor of lead donors Frank Labriola '52 and his late wife, Mary. Frank's generosity was driven by his passion for the entrepreneurial spirit at Mines as it helps drive the prosperity of our nation and the world.

"The new Cornerstone Design Workshop in the recently completed Labriola Innovation Hub is a welcome and needed facility," said Yosef Allam, director of the Cornerstone Design Program. "Students will be encouraged to work in both the dedicated Cornerstone Design Workshop, as well as other specialized fabrication shops throughout the Labriola Innovation Hub, as they explore and seek a variety of fabrication and assembly techniques to realize and continuously improve their designs to address real-world challenges and opportunities. The Labriola Innovation Hub's expanded capacity allows for more training and curricular programming built into Cornerstone learning activities each semester, while the world-class expanded capabilities further enrich student experiences in design and better prepare students for the future."

"The Thorson Design Center provides a modern and fully outfitted build space for our Capstone students and their projects. We now have the workspace to support all our projects, from smaller bench-top solutions to larger footprint projects built around the periphery of the room to the garage bays that support our large automotive teams and concrete canoe team," said Kristy Csavina, director of the Capstone Design Program. "The Labriola District is a collaborative space, and students will engage with many of the resources in their first-year design experience in Cornerstone Design. First-year students will now see the seniors working on more advanced projects and see the projects and opportunities available to them in their senior year."

Capstone Design students Jake Doyle, Jack Davis, Brody Perlick and Bella Williams work on a project to develop an automated machine capable of creating low-cost clear ice cubes quickly and consistently, allowing in-house production to lower the establishment's expenditures.



XWORKS INNOVATION SPACE

Next door to the Labriola Innovation Hub, the xWorks Innovation Space include 13 large-scale building bays for larger projects, such as the SAE Formula I race car teams and gas-to-electric car conversion senior design teams. It also includes a state-of-the-art Engines & Testing Lab, where students can work on traditional and alternative engines research.

"The Labriola Innovation District, including the xWorks Labs, embodies Mines' commitment to hands-on learning experiences. These spaces prepare Mines students to tackle the real, open-ended challenges they'll face in their careers, making their education more relevant and impactful," said Polina Ringler, assistant teaching professor of mechanical engineering.

"We're incredibly excited about having our automotive program situated in this dynamic setting. It enables us to provide a collaborative atmosphere and gives our students access to cutting-edge spaces and tools as they bridge the gap between theory and practical application."

Pictured here are students working in the xWorks Innovation Space on an Introduction to Automotive Design class project that involves modifying a 1/6-scale remote control car for a drag race. The course focuses on system-level engineering, requirements-based design and road-load estimation and characterization. The students practice class concepts through modeling and design projects and then get hands-on experience implementing and testing their solutions in the lab component.



Mines Teaching Assistant Professor Aubrey Wigner works with students Lucy Gilbert-Fagen and Kayla Long in McNeil Hall on 3D-printed prototypes as a method for iterating their designs quickly.

MCNEIL HALL

McNeil Hall houses state-of-the-art project-based learning classrooms, largely dedicated to first-year design challenge classes. Students learn how to advance their ideas from problem to concept to prototype and, finally, to product or startup. It hosted its first classes in September 2020.

McNeil Hall was named in honor of Charles "Charlie" McNeil '71 and his wife, Judy. The McNeils believe in entrepreneurship as a means to professional and personal success and want to ensure every Mines student has the opportunity to learn and grow through entrepreneurial instruction and hands-on experiences.



BECK VENTURE CENTER

The other half of the Entrepreneurship and Innovation Ecosystem is the Beck Venture Center. This facility combines unique spaces, supportive programming and rich resources designed to help Mines students, faculty and alumni successfully launch companies based on their breakthrough ideas, solutions and technologies, particularly those coming from the activities in the Labriola Innovation District.

The 31,000-square-foot coworking, event and innovation space is designed for entrepreneurs, investors, mentors, companies and students to connect and collaborate. The café and coworking space can accommodate up to 300 people who are developing their ideas, while the classroom and meeting spaces are suited for teaching the next generation of entrepreneurs.

Inside the Beck Venture Center, the Mines Venture Program provides support for Mines-affiliated startups to launch. Some highlights of the program include organizing and coordinating a world-class network of mentors and advisors, twice-a-year “look books” and demo days to showcase startups to the investor community, support from a highly curated network of service providers, and regular educational and networking programs.

The Beck Venture Center is named for lead donors Mike and Kelly Beck, the parents of two Mines alums. The Becks saw the growing Entrepreneurship and Innovation Ecosystem at Mines and designated their gift to catalyze the vision of turning student and faculty innovations into successful products and companies.

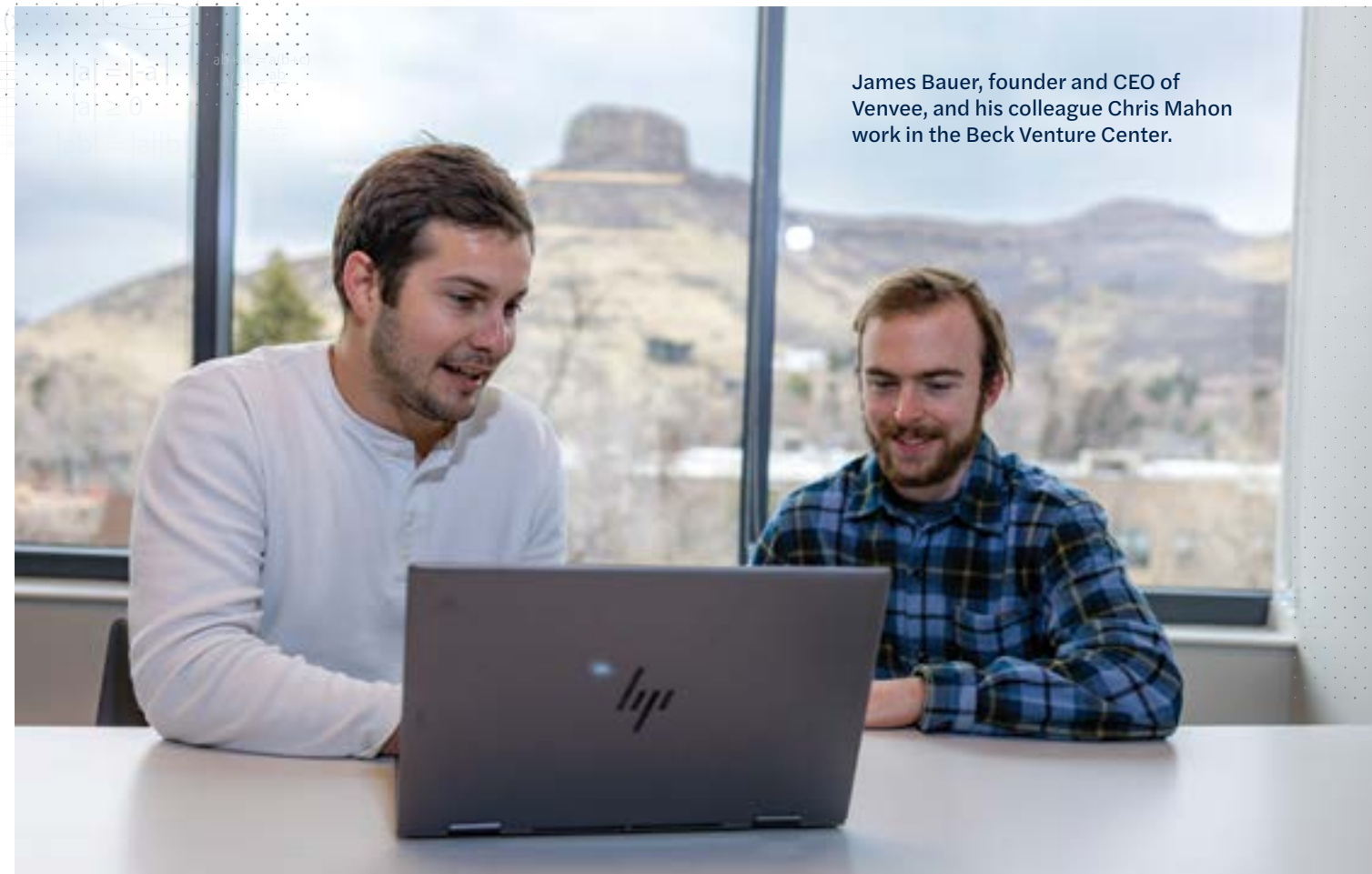


James Bauer '19, MS '21 is the founder and CEO of Venvee, a spatial artificial intelligence company that provides retail spaces with an end-to-end understanding of an in-store shopper's experience from entry to exit. Venvee was born out of and supported by the Mines Venture Program.

We asked Bauer about what it was like to be supported by the Mines Venture Program and the opportunities he gained through the experience of pursuing his ideas at Mines in this way.

MINES MAGAZINE: HOW DID VENVEE COME ABOUT, AND HOW DID THE VENTURE PROGRAM SUPPORT YOUR INITIAL DEVELOPMENT?

Bauer: Venvee evolved through a series of iterations driven by continuous learning. Like many companies, our initial concept isn't our current one. The Venture Program provided invaluable lessons in problem validation. A common pitfall for first-time entrepreneurs is



James Bauer, founder and CEO of Venvee, and his colleague Chris Mahon work in the Beck Venture Center.

focusing on a solution rather than identifying the problem, which is where my journey began. In 2021, the leaders of the Venture Program emphasized the importance of centering the problem and taught me strategies to confirm its existence. They only began teaching me “solution validation” once they were confident I had properly validated the problem. As we continued to understand where problems were, we were able to iterate on the value we intended to bring to the world.

MM: WHY DID YOU WANT TO START YOUR OWN BUSINESS?

Bauer: I've always been drawn to efforts that have no ceiling, where the height it could go was directly related to my personal ability to achieve. However, after a brief unsuccessful stint in conventional employment, I felt a disconnection between my ambition to rise and the limitations of a traditional career path. While this isn't universally true, I was discouraged by the idea of trying it again and instead wanted to see how far I could get on my own.

MM: HOW DO YOU THINK YOUR BUSINESS WOULD BE DIFFERENT IF YOU DIDN'T HAVE THE SUPPORT OF THE

VENTURE PROGRAM AND THE ENTREPRENEURSHIP AND INNOVATION PROGRAMMING MINES NOW OFFERS?

Bauer: Without the Mines Venture Program, Venvee wouldn't exist. I wasn't on a path to success independently, and the Venture Program helped me find the right direction and take my first steps toward building a successful business. Similarly, without the alumni network, Venvee would not exist. My commitment and determination were met by other Mines alumni with abundant entrepreneurial support, along with our initial equity-based financings.

MM: HOW DO YOU THINK THESE NEW SPACES ON CAMPUS, LIKE THE BECK VENTURE CENTER, WILL PROVIDE MORE POSSIBILITIES FOR WHAT MINES STUDENTS AND GRADUATES ARE ABLE TO ACCOMPLISH, EITHER AS ENTREPRENEURS OR IN GENERAL?

Bauer: These new spaces will foster industry-altering businesses and produce global innovators. Mines has always been home to some of the brightest minds in the world. By pairing these minds with resources to pursue their intellectual curiosities limitlessly, Mines will change the world.

SUPPORTING NEW VENTURES

With two decades of entrepreneurial experience, Zack Bennett '99 is helping the Mines community bring their ideas to life

BY CASSIDY HANNON

Zack Bennett '99 has always been an explorer, curious about the unknown and figuring things out on the fly. That's certainly been his approach to starting new companies and in his new role as director of the Mines Venture Program and the Beck Venture Center on campus.

Bennett grew up dreaming of space and becoming an astronaut. "Over the years, the things that drove me to want to be an astronaut—technology and exploration—manifested into being a technical entrepreneur," he said.

Bennett knew even before graduating from Mines that he wanted to build start-ups. However, he was graduating college just when the dot-com boom turned into a dot-com bust. He spent almost 10 years at American Express in New York, working as an engineer, management consultant and executive. While he was there, he managed and launched numerous internal startups, but eventually, he grew weary of the politics and bureaucracy of a larger company.

Bennett's first startup was Loop Logistics, a logistics management software company for international NGOs, of which he was the founder and CEO from 2012 to 2013. After that company shut down, he moved on to help a group of private equity investors build and operate a



couple of well-funded startups. He then became the head of account management for the video platform, Idomoo. In 2014, he became the senior vice president of EVERYTHING, a London-based internet-of-things startup, and was tasked with leading their first U.S. office. He then founded clean-energy trading company Abaxx Technologies. Bennett even worked for a time at TechStars in Boulder, Colorado, as a startup mentor.

After this whirlwind of experiences, Bennett took a sabbatical to focus on the other aspects of his life he'd yet to fulfill. But it didn't take long for him to want to return to his business roots.

"When most entrepreneurs are done building startups the natural path is to become an investor. But I got restless—I couldn't just sit back and be passive. I needed to build again," he said.

He wanted to pass his extensive knowledge of the entrepreneurial world—the dos and don'ts—on to a new generation of Mines students. He learned by trial and error, but he wanted to save future entrepreneurs years of experience—and that opportunity came available when he was asked to step in and run the Beck Venture Center and the Mines Venture Program.

The Beck Venture Center and the Mines Venture Program are part of the university's Entrepreneurship and Innovation Ecosystem. Together, this center and program will help Mines students, faculty and alumni successfully launch companies based on their breakthrough ideas, solutions and technologies.

"WHEN MOST ENTREPRENEURS ARE DONE BUILDING STARTUPS THE NATURAL PATH IS TO BECOME AN INVESTOR. BUT I GOT RESTLESS—I COULDN'T JUST SIT BACK AND BE PASSIVE. I NEEDED TO BUILD AGAIN."

"I want to bring life and magic to the building and program," Bennett said.

He wants to fill the building with investors and entrepreneurs alike on a campus with the most up-and-coming intellectual property and technology. There are already a few companies working in the space, most of which focus on the clean energy transition.

Bennett attributes a lot of his success in the business world to the core values that Mines instills in their students. "Grit, it's part of our DNA here at Mines," Bennett said. "Building startups means working without a safety net." He can't think of a better group up to the task.

In the more than 20 years he worked as an entrepreneur, Bennett traveled back and forth from Silicon Valley to New York City, because there was never much of an entrepreneurial community in Colorado, he said. This new entrepreneurial programming will hopefully plant a flag in the state, Bennett said.

"I feel so lucky to be back here and hopefully have a small influence on Mines, which had such a profound influence on my life," he said.

SHERIDAN ROSS PC ATTORNEYS AT DIFFERENT PERSPECTIVES



Patent



Trademark



Commercial Litigation



IP Litigation

BUILDING ON TRADITIONS, CONNECTIONS AND IMPACT

A new online platform helps alumni become helluva volunteers

The M Climb. Oredigger Camp. Senior Capstone Design Showcase. Those may all sound like things exclusively for current Mines students, but Mines alumni are also often involved—and playing an important role. They're often volunteering their time and talents at these events, whether that's weighing rocks at the start of the M Climb, helping student groups work through engineering problems at Oredigger Camp, sharing their professional knowledge in a classroom and more.

There are many opportunities for Mines alumni to volunteer on campus—or in their local communities—and stay connected to their alma mater. And with the Volunteer with Mines platform, getting involved is easier than ever.

"We know a plethora of alumni volunteer to support Mines every year, but it was a patchwork method for individuals to get connected and find those opportunities," said John Griffin, associate director of alumni engagement. "This volunteer site now provides an easy platform for campus departments and initiatives to post their volunteer needs and be a one-stop-shop for individuals to find those needs. Instead of needing to stay in constant contact with departments, faculty or staff, individuals are able to log in to this site and see the host of available opportunities that span from student life to career development to academic support."

We asked Libby Booton '16, who has volunteered at a variety of events on campus over the past few years, for her perspective on the benefits of the volunteer experience and why she continues to give back to Mines in this way. This is what she shared.

IT'S EASY TO FIND OPPORTUNITIES AND SIGN UP— WITHOUT A HUGE COMMITMENT.

Booton always anticipated being involved with Mines in some way after graduating, but she wasn't sure what that would look like. But when she started volunteering with her sorority, Sigma Kappa, she realized she loved spending time with students.

"I started reading the alumni emails more closely and seeing volunteer opportunities in there and being able to book them online," Booton said. "It's really easy to sign up. It's not a big commitment. Everything is a little bit here and a little bit there. You just give what you can. And then over time, you kind of crave it."

IT'S A FUN WAY TO GIVE BACK—AND FITS WITH HER CURRENT CAPACITIES.

Since that first experience, Booton has returned again and again. She's been involved in Admissions' Discover Mines event, Oredigger Camp and the M Climb and often visits classes in the Physics Department and supports recruitment for Sigma Kappa. And she finds all these opportunities equally rewarding.

"There are so many ways I volunteer, and volunteering with Mines is probably the most fun," she said. "You hang out with students. You hang out with alumni. It rekindles the fire and love for Mines. I've never had a bad time volunteering for Mines."

Booton is able to contribute to Mines in a way that fits within her schedule while still making an impact.

"For me, it was an alternative to the donation requests I get as an alum," she said. "When you can't do much financially but you have the time, it's a really cool, alternate way to give back. I always leave happy and excited."

IT CAN BE A NEW WAY OF EXPERIENCING MINES TRADITIONS.

For Booton, participating in Mines traditions as an alum is not only special because they introduce new students to the Oredigger experience but because they also deepen her appreciation for those traditions.

"Last year was my first year volunteering at Oredigger Camp, and I thought it was so fun. I'm jealous I didn't get to do it as a student," Booton said. "That kind of stuff is so fun because it's some of my favorite parts

of Mines. Getting to be involved in them in a different capacity and helping those traditions carry on—or in the case of Oredigger Camp, seeing how these things are evolving—is really energizing. You get to do the really fun things you did as a student but from a different perspective."

IT'S A GOOD WAY OF BONDING WITH OTHERS IN THE MINES COMMUNITY.

While Booton originally volunteered at Mines to meet students and help enhance their campus experience, she has also built valued connections with other alumni.

"As I volunteer for different things, I run into some of the same people who are also volunteering. It's a social experience because you're connected with other alumni, not just with students," she said.

ABOUT THE VOLUNTEER WITH MINES PLATFORM

The Volunteer with Mines platform streamlines the ways Mines offers volunteer opportunities and connects with alumni in a way that is approachable and equitable. Alumni can see an assortment of opportunities and pick the ones that most interest them. Opportunities range from participating on campus directly to joining virtual events and engaging with the Mines community across the globe.

In 2023, the platform had **188 unique users** respond to volunteer opportunities. Those users responded to **48 volunteer opportunities** and logged **1,626.5 hours**.

The Senior Capstone Showcase was the biggest volunteer event to date, with **68 volunteers** judging projects. This spring's Showcase is on track to surpass that number of volunteers as they aim to recruit 100 volunteers to come to campus and judge senior projects.

→ Check out all the available volunteer opportunities and get involved at volunteer.mines.edu.



Alumni volunteers, including Marcin Koral '22, Dianne Campbell '83, Lynn Cain '86 and Libby Booton '16, participated in the M Climb in Fall 2023.



Catherine Smith '14 pictured with her parents after graduating with her bachelor's degree from Mines.

CREATING A SENSE OF COMMUNAL SUPPORT BY JENN FIELDS

After finding support through a career change from another alum, Catherine Smith '14 pays it forward

The theme of this year's Forces of Mines: Elevating Women Summit at Mines event, "Making the Career Leap," could easily describe a key career moment for Catherine Smith '14. Three years ago, Smith, a professional mechanical engineer, was considering a career change. She took her own leap, reaching out cold to another Mines alum for mentoring through the process, even though the two had never met.

At the time, Smith was using her professional experience in mechanical, electrical, plumbing (MEP) engineering to lead a team at a construction firm as an engineering project manager. She felt pigeonholed in retail and light commercial construction work, though, and wanted to transition to a new challenge, either into a different aspect of construction or even a new field, such as oil and gas.

Smith had signed up as a mentor for a Mines-sponsored mentoring program, and though she didn't connect with any students, she noticed that one of the other mentors in the program, Andrea Wescott Passman '98, was actively working in the oil and gas industry. Smith decided to send Passman a message on LinkedIn to connect and gauge Passman's interest in sharing her expertise.

"We started this mentor-mentee relationship for about a year, where she helped me get my head around switching industries and how to progress," Smith said.

Smith's professional licensure focused on HVAC and refrigeration, but she wasn't sure that knowledge would translate if she changed careers. "I was worried all my expertise I'd developed in the construction industry would be lost," she said.

It wasn't. Two years ago, Smith transitioned from managing the engineering design of commercial developments to managing equipment design for complex systems with design firm LDIS, where she is now a lead mechanical engineer specializing in ventilation and rotating equipment for oil and gas midstream projects.

"When I first transitioned to my current company, I felt the main thing I brought was my experience with ventilation. But actually, I had more applicable engineering and project management experience than I gave myself credit for," she said. "I made a concentrated effort to fill knowledge gaps and immerse myself in the company culture. I am happy that I made the leap."

But the success story of this mentor-mentee relationship didn't end there. Smith was already volunteering with the Women of Mines Interest Group, so when Passman stepped down from her role leading the interest group, she asked Smith to take over as the chair, giving Smith the opportunity to open even more doors to career growth for other women in the Mines community.

"We've all experienced something unintentionally sexist, like someone assumes you will take notes instead of lead the meeting or pass out water or coffee or that you're not the senior engineer on the project," Smith said. "It's hard—I think everyone expects it to be hard. But you can do it. Don't let anyone talk you out of it."

Smith is thankful to her mom, dad, mentors like Passman and the Mines faculty and staff who

supported her venture into a male-dominated industry. Despite being a natural for a career in mechanical engineering—as she said, she "was always one of those kids who would take things apart and maybe not know how to put it back together"—she still got pushback in her teenage years when she decided to apply to engineering schools. Ever since, she has volunteered or reached out to offer support to other women in engineering, and the work continues.

Now, as the interest group's chair, Smith is hoping to do more than provide networking opportunities for alumni and students and instead foster the kind of support through the Mines community that Passman was able to give her.

"IT'S HARD—I THINK EVERYONE EXPECTS IT TO BE HARD. BUT YOU CAN DO IT. DON'T LET ANYONE TALK YOU OUT OF IT."

"We're trying to create these events not necessarily to build a network or build professional development but build a sense of community," Smith said of the Forces of Mines summit. "And I want the students to see that strong community support is there for them. If you change industries or move to a new city, you potentially have a connection that can help. Knowing you're part of this group might make it easier to take risks."



Pictured left to right: Joseph Welch '93, MS '01, Annie Welch, Rowan Welch and Krista West-Welch

ALL IN THE FAMILY

With a long line of Mines graduates spanning more than a century—and counting—one Oredigger family carries on an impressive legacy

BY SARAH KUTA

As current Mines student Rowan Welch makes his way around the Mines campus, he often finds himself reflecting on the many family members who have come before him—and likely walked the very same paths he now takes to class each day.

Welch comes from a long line of Orediggers, spanning 124 years and counting: His father, his uncle, two of his great-grandfathers, his great-great uncle and his great-great-grandfather all earned

degrees from Mines. His older sister will graduate this year.

“I think of all the people in the family who have been in the same position as me,” he said. “It motivates me to be my best self and carry on the legacy.”

The family’s roots at Mines run deep. In 1900, Stuart Latimer Bruce became the first known member of the family to graduate from Mines, followed by his brother, James Latimer Bruce, in 1901.

James Latimer Bruce went on to have a long, successful career in mining engineering and mine management. While working in Cripple Creek, he met and married a schoolteacher named Leah Hills.

Their daughter, Janet Bruce, married M. Jordan Nathason '36, and they had a daughter of their own named Alasya Nathason. When she grew up, she married Robert H. West, the son of Randolph

M. West '37, who had been a Mines fraternity brother of M. Jordan Nathason.

Alasya Nathason and Robert H. West later had a son named Bruce H. West, who earned a degree from Mines in 1993. Bruce H. West’s sister, Krista West, met and married one of his fraternity brothers, Joseph M. Welch '93, MS '01.

When Joseph M. Welch and Krista West-Welch’s oldest child, Annie Alasya Welch, finishes her degree this year, she’ll be the seventh person—and the first woman—in the family with a Mines diploma.

The family tree is large and complex. But all the different generations are united by their shared love of the university, which they credit for their personal and professional successes.

“Mines creates graduates with a strong work ethic, perseverance, strong bonds of friendship and comradery,” said Krista West-Welch. “It attracts people who have a thirst for expansion of the mind and are not afraid to be challenged, humbled in defeat and still go back for more. It is no secret that Mines is rigorous, but this experience also adds to the familial dynamic. You know that many before you got through Mines, so you can too.”

The family shows off their Oredigger pride at every opportunity. They regularly wear Mines gear, have Mines bumper sticks on their cars, attend Mines football games and have hosted events for incoming first-year students and their parents.

They also help support students financially through the James L. Bruce Scholarship and the Harding-West Memorial Scholarship. The family gives back because they cherish their time at Mines—and because they want others to have the same educational opportunities they did.

They hope other Mines alumni will do the same, either by donating to existing scholarships or creating new ones.

“We all rise by helping others,” said Krista West-Welch. “Our family has always valued education, and we want to help to alleviate any obstacles for others.”

SAVE THE DATE

FALL 2024 CAREER DAYS

Sept. 10 & 11, 2024

with different employers each day

For more information, contact Associate Director of Employer Engagement Rebecca Martinez at **303-273-3205** or rebeccamartinez@mines.edu.

MINES.EDU/CAREERS

MINES

@ 150 | 1874-2024

LEADING WITH INTEGRITY

Two oil and gas executives share what it takes to sell a company's vision and build trust

Chris Valdez '00 and Ty Harrison '98 first met as Mines students and both were on the Oredigger football team. At that time, they could never have predicted they'd eventually be business partners, starting companies and working together on the leadership team for PureWest Energy, an independent natural gas producer in Colorado.

The duo's early careers ran parallel as they worked in similar oil and gas spaces, with Valdez working in commercial and technical positions and Harrison involved in the commodity and risk management side of the industry. Their paths converged for a time when they both worked for Encana Corporation before they pursued new opportunities and worked their way up into leadership positions at various organizations.

However, Valdez and Harrison knew they wanted to build something together. In 2017, they founded Middle Fork Energy Partners, a company focused on the acquisition and development of oil and gas properties in the Rocky Mountain region.

They ran Middle Fork Energy Partners for a few years before they had the opportunity to take over management of PureWest Energy in 2020. Now, Valdez leads PureWest as chief executive officer, and Harrison serves as the company's president and chief financial officer. In 2023, *The Denver Business Journal* named Valdez as a "Most Admired CEO" among 21 other top-ranking Denver-area executives, and PureWest was recognized with a "Best Place to Work" distinction. Valdez and Harrison place a high priority



Chris Valdez '00
CEO, PureWest Energy

on cultivating a positive, productive and inclusive environment for their employees while advancing the natural gas industry.

We met with Valdez and Harrison to learn more about the challenges they've faced in their entrepreneurial journeys and their thoughts on finding success as business leaders. Here is some of what they had to say.

MINES MAGAZINE: WHAT HAVE BEEN SOME OF THE BIGGEST CHALLENGES YOU'VE FACED AS ENTREPRENEURS, PARTICULARLY AS YOU'VE TAKEN OVER LEADERSHIP OF PUREWEST?

Harrison: When Chris and I started Middle Fork Energy Partners, it was sort of like running up a hill and falling down again. But the idea is to trust what you're doing and trust the process. I don't think we ever reached a point where we said maybe this isn't working, but we definitely reached a few points where we were wondering if we were going to land anything and if we should keep going. Dealing with those ups and downs and the trial-and-error aspects of the business is one of the more challenging things.

Valdez: When we were first looking for sponsors, we were a couple of guys who had never done this before. We had to sell our vision about what we wanted to build and how great we thought it could be. Luckily, we were successful. That plays into when we stepped in to lead PureWest. We inherited a large number of employees from the previous regime and had to sell those people on our vision and get them behind us. That was probably the most difficult thing—getting them to buy in quickly to what we wanted to do going forward and then ask them to execute it.

MM: HOW DO YOU MAKE THAT HAPPEN? HOW DO YOU CONVINC PEOPLE TO BUY IN WHEN THEY DON'T HAVE EXPERIENCE WITH YOUR LEADERSHIP STYLE AND YOUR VISION FOR THE BUSINESS?

Valdez: It's treating folks with integrity and respect. They know a big change is coming, so being transparent really sets the stage for how your interactions are going to go moving forward. Once you start establishing that trust, people will start buying into what you want to do. We've prioritized being transparent and giving people an opportunity to shine. Not everybody wanted to be there at first, but those who really bought in and wanted to do the great things we had planned were able to really step up and show us what they could do.

Harrison: Providing opportunities for employees to generate ideas and be empowered to drive positive change in the business has been tremendously effective. Sometimes, somebody might say, "Well, that's not for me." And that's OK. But for the people who say, "That's for me," you have a teammate who you can do great things with and enjoy success together.

MM: WHAT ARE SOME OF THE STRONGEST QUALITIES YOU'VE SEEN IN LEADERS, AND HOW DO YOU THINK THOSE QUALITIES TRANSLATE INTO SUCCESS?

Harrison: I think a great leader is someone who is genuine and will



Ty Harrison '98
President and Chief
Financial Officer,
PureWest Energy

give it to you straight but coupling that with compassion and recognizing they're dealing with real people. It's developing an environment where we're thinking about what the company is trying to accomplish but is complimentary to what's important to the employees and the ways in which they're trying to grow. When those can coexist and everybody's aligned, you can achieve great things for business and your people.

Valdez: It's absolutely that people have to trust you if you're going to get them to follow you—and that coupled with self-awareness is important. I also think something that probably doesn't get talked about enough is listening. Listen to what people have to say. It's on us to set these strategic objectives and directions for the company, but then we need to get out of the way and let our people execute that vision. That's one of the things that I've admired about the leaders throughout my career—those who allow you to have accountability and let you stumble but then help pick you up rather than hovering over every decision. That's something we try to do as much as possible.



This rendering shows the future of the Mines Park redevelopment and renovation that will see six aging buildings in the community demolished and replaced with five new apartment buildings, with a total of 658 beds in a mix of studio, 2-bedroom and 4-bedroom units. The remaining 19 smaller apartment buildings will be renovated from top to bottom, bringing the total number of beds at Mines Park to 1,058, up from 495.

Image courtesy of Capstone Development Partners

ENGINEERING CAMPUS

Mines alumni play important roles in shaping and building new campus spaces

BY EMILY HALNON

When Conor Lenon '14, MS '15 was a Mines student, he remembers that the Mines Park residence community could feel isolating, since the apartment complex is separated from the rest of campus by U.S. 6 and didn't have many places for students to convene.

"It didn't necessarily feel like the typical dorm experience," he said.

But now, Lenon is helping Mines Park transform into a vibrant community through a \$151 million redevelopment and renovation that's expanding student housing and creating more spaces for students to hang out and collaborate. Lenon is the lead structural project engineer on the Mines Park project with Fortis Structural, a group out of Denver that's spearheading the work to ensure the five new buildings at Mines Park are safe and structurally sound.

"I loved my experience at Mines, and it's really exciting to help improve campus and be involved in projects that are helping it to become an even better school," he said.

Lenon is one of several alumni who have contributed to campus development projects over the years led by companies like Fortis Structural, Kimley Horn, McKinstry, Martin/Martin and GH Phipps. And many of them say it's easy to see how their education at Mines prepared them to succeed in this field.

Renee Ereckson '04, MS '06, a project manager and structural engineer at Martin/Martin, has worked on a number of campus projects, including the construction of Spruce Hall, which was one of the first Mines buildings to earn a LEED Platinum certification. She was also involved in the GRL Annex and preliminary designs of Elm Hall and the CoorsTek Center for Applied Science and Engineering.

She said the collaborative environment and multidisciplinary nature of Mines positioned her to thrive in structural engineering, where she's constantly working with with civil engineers, mechanical engineers and architects on various projects that demand a complex, multipronged approach.

"So much of my education at Mines really mirrored what I now do in the field," she said.

She also honed critical thinking and problem-solving skills at Mines, which she leverages into her work on campus development projects since her team has to constantly find innovative approaches to issues that come up, like when they had to work through

different visions and desires for the columns in Spruce Hall to reach a consensus on the option that was most structurally sound. They also had to tackle the challenge of constructing buildings and foundations that are compatible with the campus topography, which includes many hills and drainage ditches.

Lenon can also connect his work as a structural engineer to his Mines education, in many different ways.

On the Mines Park project, he is working with cross-laminated timber, which is an emerging product that's known for being a sustainable, aesthetic and cost-effective building material. Lenon wrote his senior thesis on cross-laminated timber after working with Mines professor Shiling Pei, who researched the durability of the panels during earthquakes. But this is the first time he's actually worked with the material in his professional career, and he loves the opportunity to apply his knowledge from Mines to a project that will improve campus and benefit students.

"The new project will have a ton of community space, and the cross-laminated timber will make the buildings look beautiful," Lenon said. "I think students are going to love spending time there."

Emmy Tran '19, MS '20 worked with Lenon on the Mines Park project as a design engineer for Fortis Structural. When she was a Mines student, she took a special topics course on post-tension concrete, a

type of concrete slab in which the concrete is reinforced by steel cables, or tendons, that increase its durability and stability. She was able to apply that knowledge to the Mines Park project when her team utilized a post-tension concrete slab for one of the buildings.

"It definitely felt full circle to work on post-tension concrete through the Mines Park project," she said. "I use things I learned from my professors at Mines in my work almost every day."

Tran also worked on designing gravity systems, which include structural components like floor slabs, decking, columns and beams, and lateral systems, including shear walls and frames. Lateral systems play a vital role in ensuring a building can withstand the force of elements like wind, which Tran said is critical to consider when designing buildings on the Mines campus.

"The wind loads are crazy on campus," she explained. "The designs needed much more intense lateral systems to accommodate the high wind loads you see in Golden."

The design team accounted for this challenge by using more durable shear walls, designing longer and narrower buildings, and reinforcing the walls with a stronger rod system.

All of the alumni are thrilled to see campus growing in a way that directly benefits students beyond the expanding geographical footprint.

Ereckson pointed to the increasing number of community spaces across campus as a major way she's watched Mines change since she was a student. In recent years, Mines has added facilities like the Beck Venture Center, which aims to boost entrepreneurial possibilities through coworking stations and collaborative spaces, and the new Labriola Innovation District, which fosters teamwork and innovation through makerspaces, group project meeting spaces and an innovation hub.

"Apart from the Student Center, we just had the coffee cart in the library when I was at Mines," Ereckson said. Now she sees opportunities for academic collaboration and social gatherings all over campus.

"I love working on campus and making it a great place for the next generation."



Norma Mozeé '83, Jackie Haney '01, Kaitlin Soehner '11 and Melanie Westergaard '87 participated in a panel discussion during the third annual Forces of Mines: Elevating Women Summit at Mines on March 9, 2024. The summit provided opportunities for Mines students, alumni and community members to network and build on personal and professional development, centering around this year's theme of "Making the Career Leap."

1990s

Meredyth Crichton '98 was named director of systems engineering at renewable energy development and repowering company PivotGen in February 2024.

2000s

Hamid Nazeri PhD '01 was presented with the Richard S. Ladd D18 Standards Development Award on Jan. 22, 2024, in Louisville, Kentucky, by the ASTM D18 Committee on Soil and Rock. He is currently a rock mechanics division manager at Advanced Terra Testing in Lakewood, Colo.

Henrik Lundin '05 was appointed to the board of directors of United Lithium in February 2024.

2010s

Amanda Johnson '10 and Turner Sanders celebrated their wedding in La Fortuna, Costa Rica, on Dec. 2, 2023. They were excited to celebrate their decade-long relationship with their closest friends and family, including nine Mines alumni.

Jim Knous '12 ended his full-time professional golf career in February 2024 and started working at PING, where he is a club fitter and education engineer.

Franz Martinez MS '16 and **Teresa Ramos MS '17**, both graduates of Mines' mineral and energy economics master's program, welcomed their second child, Matthew Alexander Martinez, on Dec. 14, 2023.

Olivia West '19 and **Keith-Clinton "K.C." Fox '19, MS '20** were married at Arrowhead Golf Course on Sept. 16, 2023. They met as Mines students and began their relationship there. Family, friends and other Mines alumni helped to celebrate this special day. Olivia currently works at Lockheed Martin and K.C. works for United Launch Alliance.

2020s

Victoria Waters '20, MS '21 and **Paul Hentges '20** were married on Aug. 28, 2022, in Estes Park, Colo. Twenty Mines alumni, including the entirety of the wedding party, celebrated in the Rocky Mountains. Paul and Victoria met as first-year students at Mines and now live an adventure-filled life in Anchorage, Alaska.

Sydney Marchando '21 and **Jacob Feldman '19, MS '20** were married on October 7, 2023, in Larkspur, Colo. More than 20 percent of the attendees were Mines alumni, including bridesmaids Megan Dickson '21 and Stefanie Brunello '21 and groomsmen Trevor Kehe '19, MS '20. The couple met as peer mentors at Mines and were both student-athletes on the softball and wrestling teams.

Olivia West '19 and Keith-Clinton "K.C." Fox '19, MS '20



We're proud of Mines alumni. We want to cheer you on and celebrate your accomplishments. Tell us about your recent wedding, a new baby or your new job. Share a personal or professional accomplishment, volunteer activity or your favorite Mines memories. Stay connected to the Oredigger family.

➔ Submit a class note at minesmagazine.com/classnote.



Sydney Marchando '21 and
Jacob Feldman '19, MS '20



Amanda Johnson '10
and Turner Sanders



Matthew Alexander Martinez



Victoria Waters '20, MS '21
and Paul Hentges '20



Partnering throughout the years to reach your financial goals.

Cooper Swenson, AAMS™
Financial Advisor
14142 Denver West Parkway
Bldg 51 Ste 170
Lakewood, CO 80401
303-278-0733

MKT-5894K-A-A1 AECSPAD

Be a member of the Guild

TIMBER FRAMERS GUILD www.tfguild.org | 833-862-7376

Join us in **Keystone, CO**, November 10-12 for the Guild's 2023 annual Conference!

Patents - Trademarks - Copyrights
Edwin H. Crabtree
Patent Attorney & Professional Engineer
501 S Cherry St, Suite 1100
Denver, CO 80246
303-322-7460
edcrabtreepatentlaw@gmail.com
crabtreepatentlaw.com

KiwiEnergy
Mark Gregg
CEO
KiwiEnergy, Ltd.
5847 San Felipe
Suite 2900
Houston, TX 77057
713-266-3820
Cell 713-304-9791
markg@kiwienergy.com
www.kiwienergy.com

Decision Precision®
Training and assistance in risk and economic decision analysis and project risk management
John Schuyler
CSM '77 '73, DJ '77
(303) 493-0017
CISA, CCP, CMC
DRMP, PE (CO), PMP
Aurora, Colorado
john@maxvalue.com
www.maxvalue.com
Decision Analysis applied to capital investment decisions, project estimates, risk management
435 p., \$39.95 softcover
\$29.95 Kindle (large format)
available from Amazon.com

MIKE GATHERS LPC
Career | Relationship | Lifestyle Coach
SPECIALIZING IN
Entrepreneurial Coaching for the Engineer at Heart
BS CEPR '94, MS ETM '03, MA Naropa TCP '10
mikegathers.com
p: 303.956.7574 e: mike.gathers@outlook.com



IN MEMORIAM

Remembering Orediggers who have passed away but will always remain part of the Mines community

Ian Berke '64 died Feb. 18, 2024. Born in 1940, Ian joined the U.S. Army after graduating from Mines, serving in Vietnam as a First Lieutenant in the 46th Engineering Battalion. He later worked for Bechtel Corporation before becoming a real estate broker, specializing in architecturally significant homes.

James B. Copeland '57 died Oct. 14, 2023. Born in 1934, James began his career working at mines in Idaho before working in mine development, design and construction for Dravo Corporation. He then became a chief engineer and superintendent for Colorado Fuel and Iron Company. His career spanned 44 years in the mining field.

David H. Fruhling '61 died Jan. 1, 2024. David was born in 1938 and was a member of the ROTC at Mines. He served as a captain in the U.S. Army Corps of Engineers and was trained as a paratrooper and airborne ranger. After leaving the Army, David spent his career in the oil and gas industry as a geophysicist for Chevron.

Stephen J. "Steve" Navin IV '67 died Oct. 12, 2023. Born in 1938, Steve began his career working in mines across the United States for Patrick Harrison Construction.

He later joined Parsons Corporation's mining division and went on to become the lead construction manager for the Parsons-Dillingham joint venture on several segments of Los Angeles Metro Redline. He later became the technical director for underground construction for Parsons, leading many significant projects.

Edmond S. "Stu" Nelan '69 died Feb. 14, 2024. Stu was born in 1947 and spent his career in geophysical programming. He started out at Geophysical Services, Inc., a subsidiary of Texas Instruments. After GSI, Stu worked for many years at ARCO Oil and Gas. After ARCO was acquired by BP, he continued his career at Geotrace Technologies, Weinman Geosciences and Global Geophysical Services. He retired in 2016.

Gaby Neunzert '61, MS '70 died March 3, 2024. Born in 1934 in Switzerland, Gaby came to the United States in 1953 to become a petroleum engineer. He joined the U.S. Army, where he was able

to obtain U.S. citizenship during his three-year service. After graduating from Mines, Gaby worked for Martin Marietta designing missiles before returning to Mines to teach while completing his master's degree. He went on to start the surveying program at the Community College of Denver but eventually returned to Mines, where he stayed until his retirement in 2000.

Jon D. Schieltz '61 died Jan. 10, 2021. Jon was born in 1938 and served two years in the U.S. Army as a First Lieutenant. He later worked for Tektronix and Maxim Engineering until his retirement in 2005.

➔ To submit an obituary for publication in *Mines Magazine*, visit minesmagazine.com/obituary.

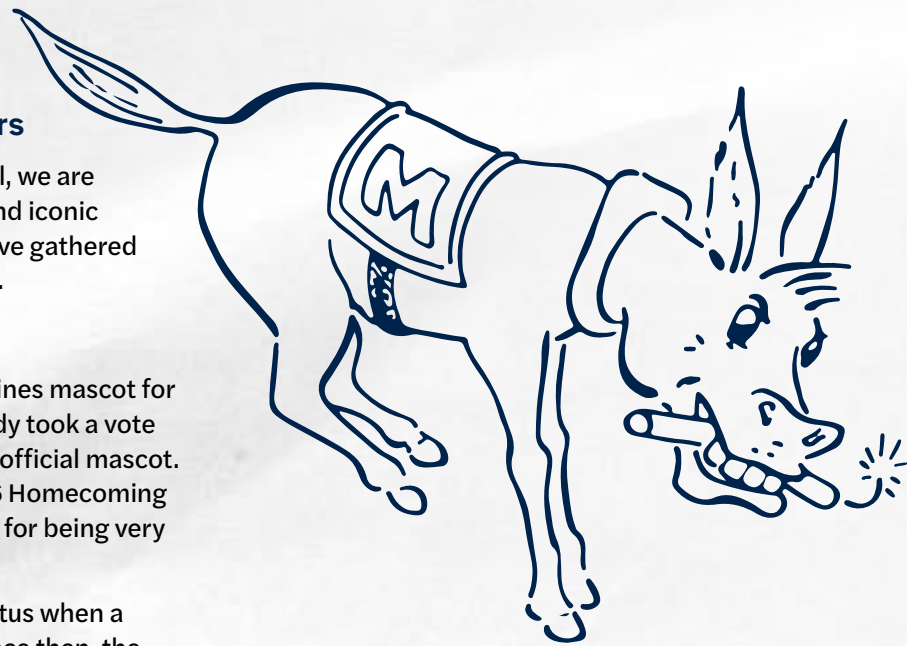
➔ Memorial gifts to the Colorado School of Mines Foundation are a meaningful way to honor the legacy of friends and colleagues while communicating your support to survivors. For more information, call **303-273-3275** or visit weare.mines.edu/givingguide.



OUR PROUD PAST

Highlights from Mines history in celebration of the last 150 years

To commemorate Mines' sesquicentennial, we are reflecting on some of the school's icons and iconic moments throughout history. Here, we have gathered just a few highlights from Mines' rich past.



BLAST(ER) FROM THE PAST

Did you know that a burro has been the Mines mascot for nearly 100 years? In 1936, the student body took a vote and chose a burro named Zenith as the unofficial mascot. Zenith made his mascot debut at the 1936 Homecoming festivities and quickly gained a reputation for being very smart—and a little rowdy.

By 1951, a few burros had held mascot status when a professor suggested the name Blaster. Since then, the burros have changed but the name remains.

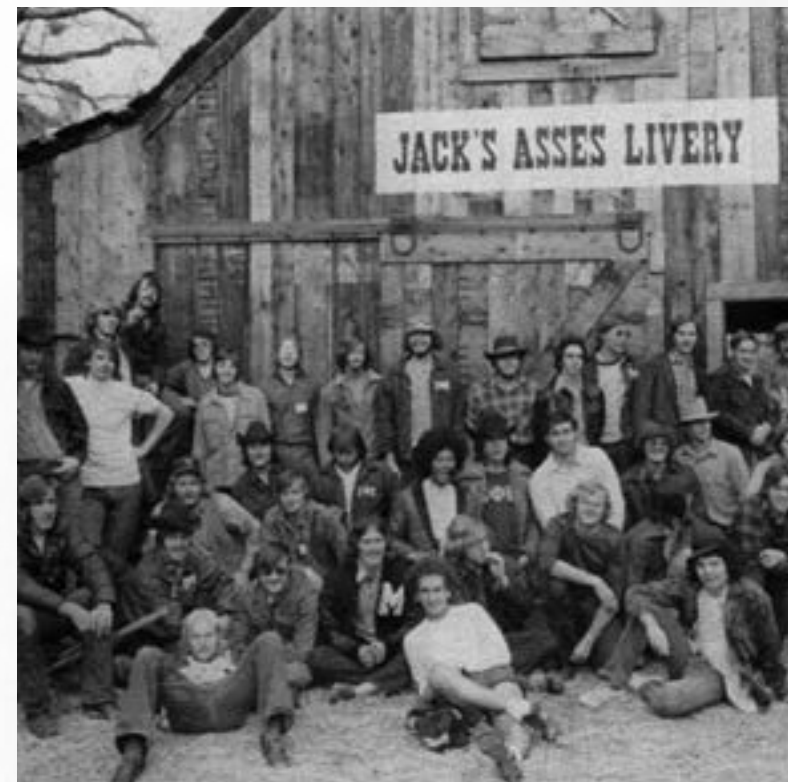
THE FIRST WOMAN TO EARN A MINES DEGREE

Over a century ago, in 1898, Florence Caldwell made history as the first woman to graduate from Mines, one of four to graduate in the first 75 years of the school's existence.

She received a civil engineering degree, to accompany her Bachelor of Science degree from Ohio Wesleyan University.

"Her personal characteristics were admirable: loyalty to friends, kindness and sympathy to anyone in distress of mind or body, and unwavering courage. She kept me encouraged through many rough places," said her husband, Frank Jones, whom she met at Mines and graduated with her in 1898.

Both the first women's residence hall and the Florence Caldwell Centennial celebration were named in her honor.



Sigma Phi Epsilon fraternity gathered in front of the livery stable, which was awarded first place in a competition for the aspect of Mineral City that best represented the 1874 time period.

A UNIQUE 100TH ANNIVERSARY CELEBRATION

Take a journey back to 1974 when our students celebrated Mines' 100th anniversary in a uniquely Mines fashion—by building their own Mineral City.

Located along the north side of what is now Kafadar Commons (but was previously known as Stratton Commons), Mineral City was a replica of an 1874 mining town. The town boasted horse-mounted police, laundry, café, saloon and hitching posts. A jail and gallows served as a harrowing warning for those who disobeyed the city's laws. Even Mines President McBride was not safe from the reach of the law. He was "wanted" for \$500 on charges of poaching jackalopes and selling horse troughs without a license.

In Mineral City, "miners" left their claims (classrooms) and came to town to wash off, fill their grub sack and belly up to the bar to discuss their next great strike. The boardwalks and clapboard structures were built through a common effort by the Mines community. A trophy was awarded to the group who most originally and authentically represented the 1874 times.

→ Follow Mines on Instagram and Facebook or go to weare.mines.edu/150-history to see more Mines history stories throughout the year.



COLORADO SCHOOL OF
MINES
@ 150 | 1874-2024

1500 ILLINOIS ST.
GOLDEN, CO 80401-1887

minesmagazine.com

The Mines campus has grown significantly over the past 150 years. And that was only more apparent in 2024 when Mines opened two new buildings—the Labriola Innovation Hub and the Beck Venture Center—making a major investment in fostering entrepreneurship and driving innovation on campus. In this issue, read more about these spaces and how they enhance the Mines experience and support the Oredigger community.

➔ Visit 150.mines.edu to learn more about Mines' enduring legacy and where the university is headed next.