COMMONGROUND

A University of Utah - Department of Mining Engineering Publication | 2024

LETTER FROM THE CHAIR

DEAR FRIENDS OF MINING ENGINEERING,

In a time when mining and critical minerals are gaining unprecedented global attention and higher education is undergoing rapid change, it's a dynamic and exciting time for the mining engineering department!

The department is well positioned to thrive and grow. We have quadrupled our annual enrollment since 2022 and continue to demonstrate high impact in Utah and beyond. Our graduates routinely secure high-placement jobs in a field recognized as a strategic priority for our state's workforce. With an excellent return on investment for their degrees, they are entering a sector critical to the nation's economic and technological future. I remain optimistic about our program's resilience and continued contributions to this vital industry.

The Department of Mining Engineering is working proactively to seize on the reality that the United States needs to mine more of its own minerals. This is not just an issue of sustainability, but a matter of national security. If the U.S. is reliant on other nations for the raw materials critical to our industries and the way we've come to operate and live, we are beholden to them. For this reason we are ensuring that our department remains at the forefront of mining education and research.

> . . . Continue to engage with us and help us tell our story to the broader community. There is much work to do, and we are ready.

History has shown that uncertainty often breeds opportunity, and I see this moment as a chance to innovate, expand, and strengthen our impact. As the new department chair, I look forward to working together with internal and external stakeholders—including our state legislators—to address the challenges ahead and take advantage of new opportunities.

In this issue, you'll find an overview of the exciting developments within our department. As previously mentioned, our undergraduate enrollment has been steadily rising, growing from just five new students in 2022 to 20 this past fall semester—a promising sign of renewed interest in mining education. The industry itself is evolving rapidly, embracing AI, automation, and other innovations that are reshaping how we think about mining. While these advancements introduce new risks and uncertainties, they also present significant opportunities for growth and development.

Our faculty and industry advisory board are actively exploring ways to integrate these tools into our

curriculum and recruitment efforts. One such innovative approach is our work on a uniquely designed version of the wildly popular online game *Minecraft*, tailored to engage and educate youth about mining.

The resilience and competence of the students we recruit make me genuinely optimistic about our future. Thank you for your past support—your financial contributions, interest, loyalty, and advocacy. I hope you will consider making a donation to the department, to continue to engage with us and help us tell our story to the broader community.

There is much work to do, and we are ready.

Sincerely,

Chair Pratt Rogers

RECOGNITION

WILLSON DISTINGUISHED ALUMNUS AWARD
JOSEPH HIRSHI

WILLSON DISTINGUISHED STUDENT AWARD
ADAM WINFREY

OUTSTANDING ACADEMIC ACHIEVEMENT
AUSTIN TAYLOR (FRESHMAN)
ELIZA WATSON (SOPHOMORE)
ISAAC PETERSON (JUNIOR)

EXTRA MILE AWARD
ELIZA WATSON

THE WATCHMAN AWARD
HUNTER NORRIS

OBLAD SILVER MEDAL OF EXCELLENCE
JOSEPH RHOADES

STEVEN KOCHEVAR MEMORIAL AWARD
ALEJANDRO CAMACHO

Cover: Road leading to a Mongolian coal mine.

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NEW FACULTY

by JULIA ST. ANDRE

THE DEPARTMENT OF MINING ENGINEERING WELCOMES A NEW FACULTY MEMBER.

YUAN 'STUART' LI

A distinguished researcher in mine waste management, Li's research focuses on advancing tailings management strategies by investigating innovative approaches to tailings treatment, deposition, and storage.

Born and raised in the Hunan province in China, Li completed both his master's and Ph.D. degrees at the University of British Columbia in Vancouver. Now, he's ventured to Utah, a hub for mining engineering, to put his expertise to work. Li's research will explore the entire spectrum of tailings management, a crucial but sometimes overlooked element of mining operations.

With his research, Li hopes to make strides in tailings dewatering procedures, which prioritize removing water from mining byproducts to ensure stable and safe storage. A central element of his research involves understanding the overall stability of tailings storage facilities (TSFs), especially in the event of seismic activity. "We need to make sure that when you store this material in the tailings facility, it's physically stable and that if there is a seismic event, it will not fail," he explains. "In order to do that, we want to dewater tailings because if we increase the solids concentration in the slurry, then we will have a material with higher strength, and then we can build a safer facility."

Li emphasizes that many people underestimate the sheer volume of tailings generated by mining operations. TSFs can be vast, and improper management can have serious consequences for the environment, local communities, and the mining industry.

GREENING WASTE

In addition to improving safety, Li is exploring new avenues in mine waste management, including the potential of utilizing tailings to capture and store carbon. His research will investigate how high concentrations of CO_2 can be introduced into tailings materials, triggering chemical reactions that sequester the carbon. If successful, this approach could be integrated seamlessly into existing tailings processing methods, transforming essential waste management into a unique climate mitigation strategy.

ENTHUSIASTIC MENTOR

Along with diving into research at the U, Li is enthusiastic about connecting with his students and introducing them to the lesser-known field of tailings management. Anyone entering Li's classroom will find a dedicated and enthusiastic mentor with an interactive and approachable teaching style. "I feel like the teaching process is very rewarding, especially because at the very beginning, the students know nothing about tailings because it's not something we usually talk about, so I enjoy growing with the students throughout the course," he explains.

An avid lover of the outdoors, Li looks forward to getting settled at the U and exploring Salt Lake City's renowned outdoor recreation. Outside the lab, you'll find him snowboarding, hiking, golfing, and rewatching his favorite films. With his commitment to advancing tailings management, improving sustainability, and supporting students, Yuan "Stuart" Li is digging deeper to uncover new insights on his journey at the U. <

CARSON POLLASTRO

MINING ENGINEER POWERING UTAH'S COAL INDUSTRY

Pollastro, second from left, and team entering the Fossil Rock Mine to analyze the mine's condition.

CARSON POLLASTRO **BMG '09 IS QUICK TO DISPEL MISCONCEPTIONS ABOUT MINING ENGINEERING AS A DESK JOB.**

"Till the day I'm done here on this earth, I will say a mining engineering degree is not a white-collar job. It's a blue-collar job."

CEO of Wolverine Fuels, Pollastro comes from a rich mining heritage as a fourth-generation underground coal miner from Spring Glen, Utah. His great-grandfather emigrated from northern Italy in the early 1900s specifically for coal mining opportunities in Utah.

After graduating from Carbon High School in 2001, Pollastro followed family tradition by enrolling in the University of Utah's Mining Engineering program, graduating in 2008. He credits professors (now emeriti) like Kim McCarter, William Pariseau, Felipe Calizaya, and recently retired Mike Nelsen for their rigorous approach to education.

"They were demanding in a good way," Pollastro recalls. "They wanted you to become an engineer, not just graduate with an engineering degree."

Pollastro's career advanced rapidly after graduation. He first joined Pacific Corp at the Bridger underground mine in Wyoming, becoming chief engineer within just two years. In 2011, he moved to Southern Illinois to join Murray Energy Corporation as assistant VP of Operations. While there, he pursued an MBA at Washington University in St. Louis from 2014 to 2016.

Returning to Utah in 2019, Pollastro briefly oversaw Murray Energy's Utah assets before Wolverine Fuels recruited him as COO. Now as CEO, he manages Utah's largest coal operation, including multiple mines across Utah and Colorado.

PRAGMATIC VIEW

As the energy landscape evolves toward renewables, Pollastro offers a pragmatic view of coal's continuing role. He points out limitations with intermittent energy sources like solar and wind, noting that conventional energy sources remain essential for base load generation which refers to the amount of electricity—or electrical power—generated that is needed during the course of the day.

"The only answer right now that we have is some geothermal, mainly coal, natural gas, nuclear . . . where you can store your fuel supply. You can produce power on demand when you need it."

Despite environmental stigma affecting recruitment, Pollastro emphasizes mining's fundamental importance: "The saying is true—if you don't grow it, you mine it, and everything we use is either grown or mined. There's nothing outside of that that occurs."

For Utah's coal industry specifically, Pollastro sees sustainability: "I do believe, especially for Utah coal, where we're at, we have a low sulfur, high BTU product that is a clean-burning product, to where there's opportunities for us, I think, over the next 20-30 years to remain healthy and in good operation."

In the meantime, Carson Pollastro, perhaps because of his family legacy in mining, proudly wears the figurative "blue-collar." **<**

ENGINEERING THE VARIABILITY OF MOTHER NATURE

by **CJ SIEBERNECK**

"WE PREDICT THAT WE WILL NEED MORE COPPER IN THE NEXT TWENTY-FIVE YEARS THAN WE HAVE MINED IN THE LAST FIVE THOUSAND YEARS," SAYS RESEARCH ASSOCIATE AARON YOUNG**.**

"Mining remains global, and it's a massive industry, with the opportunity that undergraduates have to live abroad, travel abroad, and develop minds abroad."

Last year, mining engineering students traveled to Oyu Tolgoi mine, located in the Umnugovi province of Mongolia. This excursion was important for undergraduate students not just as an experience-building trip, but in order to see one of the largest copper deposits in the world, since mining is an international effort.

"If you think about labor back in the pre-Industrial Revolution time, a lot of the workforce was involved in labor like mining," Young states. "Today, only approximately one percent of the population is involved in mining … and so networking is key."

Both the Kennecott mine here in Utah and the Oyu Tolgoi mine are owned by Rio Tinto. Kennecott is an open pit mine but has started the process of transitioning into underground mining. Oyu Tolgoi is already mining underground, and in Mongolia, many of the mining employees have learned the skills and techniques that can be deployed in Utah. Seniors who traveled to Mongolia have seen in person the methodologies that can be used in the Kennecott mine.

"The training of the people, the understanding of the engineering, the methodologies are being cross pollinated," says Young. "It's helpful to have two operations that are kind of similar."

Similar operations are rare, according to Young. "Every deposit is going to be shaped differently. It's going to have different mineralogies. It's going to have different strengths and weaknesses, right? It's not like, hey, we opened an ice cream factory here, and in Mongolia, they happen to like the same flavor of ice cream, and that's the reason we're on the same page. It's rare for mines to be so big in scale and have that commonality. That's part of the reason we have this relationship with Mongolia."

The Department of Mining Engineering has a long history at the U. The extraction industry has always been an important industry in Utah, and the U has been training mining engineers since nearly 1896 when the territory was granted statehood.

"So historically speaking, and as it applies to the University, every other engineering department has come out of the College of Mines and Earth Sciences," Young says. "There was no need for electrical engineers until we had electricity. The first need we had for engineers was to pump water out of the mines."

Today, the focus is shifting away from surface mining due to the depletion of surface materials. The shift now is

Underground at the Rio Tinto's Oyu Tolgoi mine in Mongolia. Credit: Pratt Rogers

towards underground mining, with mines going deeper and deeper in order to find essential minerals. Research is dedicated to figuring out how to mine at deeper depths, or how to refine materials out of already mined materials such as tailings and rock piles, which is what Young's research focuses on.

"We have better processing power than we used to," says Young. "Rock piles are formed from the dumping of a haul truck. If you have a good understanding of that basic process, then you are able to get more value out of it."

The Oyu Tolgoi mine in Mongolia is one of the most modern mines in the world and a leader in technology and methodologies for deep underground mining. Senior undergraduates in mining engineering are able to see first-hand and in real time, familiarizing themselves with the environment of their future careers.

Along with a partnership with the Oyu Tolgoi mine, the U has a partnership with the Mongolian University of Science and Technology (MUST) and has accepted their students into the U's mining program.

"Not only were they getting degrees in mining here," Young states, "but they were also doing summer internships, getting practical experience in mining." Moving forward, the U and MUST will maintain their unique, mutually beneficial relationship,

Mongolian U alumni with our students at the Rio Tinto offices in Ulaanbaatar. Credit: Pratt Rogers

Part of the reason why Young participated in the field trip to the Oyu Tolgoi mine was that he was classmates with several of the Mongolian students, who now work at Oyu Tolgoi.

"We will not only collaborate on the technicalities of underground mining," says Young, "but I think we will also collaborate when it comes to that additional use of what has already been mined."

> Today, the focus is shifting away from surface mining due to the depletion of surface materials. The shift now is towards underground mining.

The value of experiencing those technicalities in the Mongolian mine were not lost on Trey Robison, a participating undergraduate student on the field trip. "Naturally, we would have a huge interest in this opportunity to go visit a mine," says Robison. "While over there, we got to tour this mine for a day and see all of their processes. Additionally, we met with the Minister of Mining in the Mongolian government."

Potentially, the department would like to make the Mongolian trip a yearly endeavor, again visiting Oyu Tolgoi but other mines as well. The ambition is an extension of other outings: in 2023, U mining students and faculty visited Greenland, an excursion that was the result of a partnership between the U and the University of Alaska-Fairbanks.

SMELL THE SULFUR

"A big part of what we try to do in the mining department is to get our students into the mines," states Young. "We have a course called Mine Visits that we do every spring. It gives you that exposure and helps you understand. Because everybody's got all these different concepts of what mining is going be like, you've got to get in there and smell the sulfur."

Mining engineering is not only an industry essential to society, it's a field rich in research opportunities, traveling experiences, and creativity.

"In mining engineering," Aaron Young concludes, "we are engineering the Earth. We are engineering the variability of Mother Nature." **<**

'SMALL' BUT MIGHTY

"WHEN PEOPLE ASK US WHAT IT'S LIKE TO BE A MINING ENGINEERING STUDENT AT THE UNIVERSITY OF UTAH, WE TELL THEM THAT IT'S LIKE BEING PART OF A FAMILY," WROTE FOUR U UNDERGRADUATE MINING ENGINEERING MAJORS IN THE *SALT LAKE TRIBUNE* IN MAY.

"We may be a small department, but that's part of what makes it so special. We know each other. We support each other. And because of that, we thrive—both as students and as future professionals."

The opinion piece penned by **Trey Robison**, **Michael Gough**, **Eliza Watson**, and **Travis Bach** was in response to a recent U and Utah System of Higher Education discussion about cutting smaller academic programs. "Unfortunately," wrote the students, "our department—mining engineering—was mentioned by name as an example of a discipline that could be subject to review under proposed enrollment thresholds."

The concerned students took the news as an opportunity "to tell our story and to highlight what it really means to be a mining engineering student," intoning that more than a major, the degree program was a "mission."

Mining engineering majors at the U are immediately thrust into inter-disciplinary study that includes geology, engineering design, environmental stewardship, safety systems, and more. Unlike perhaps other majors in the College of Science/College of Mines and Earth Sciences, mining majors experience hands-on training at mine locations where they are likely to land full-time positions at before graduation.

Some of these sites include aggregate pits like Kennecott Utah Copper along the Wasatch Front, coalfields in central Utah, goldfields in Nevada, trona mines in western Wyoming, and "even remote mining camps in Australia."

Mining majors at the U, which have quadrupled in annual enrollment since 2022, are the only thing you might consider "small." Everything about mining is out-sized—not just the gigantic, complex operations in open-air pits and underground, but in the vaulting demand for materials to build a sustainable and secure future in the US and beyond.

The students reminded us that mining is also an essential aspect of a green economy: without lithium and other critical and rare earth minerals, our lives and lifestyle would come to a screeching halt. Any elements found in the periodic table which are used widely needs to be mined.

On more of a personal note, the students who authored the *Tribune* piece were keen to paint a picture of how being at the U in a small cohort of undergraduates quickens their group cohesion, a cohesion that immediately has global implications. "Recently, we launched a student mine rescue team—a multidisciplinary effort that brings students from across campus together to learn about emergency response in industrial settings."

"Think of where the materials came from to construct the device on which you may be reading this," concluded the mission-driven students. "[T]he foundation of the building in which you sit, the fertilizer that was used to grow the food you eat, your favored mode of transportation … the list goes on and on." <

DIGGING THEIR OWN FUTURE

THE NEXT GENERATION OF MINERS

UNDERGRADUATES HAVE ALWAYS BEEN THE LIFEBLOOD OF THE DEPARTMENT OF MINING ENGINEERING.

After a dip in enrollment for several years, complicated by the pandemic, enrollment is now up, from just five new students in 2022 to 20 this past fall semester. Current and incoming students are welcomed with open arms. Interest in mining is steadily climbing, especially as it relates to the new "green economy," an important identifier among, especially, the younger generation. Generous scholarships, housing aid for out-of-town / rural students, guaranteed internships and the promise of a high-paying job upon graduation all coalesce in the Department for student success par none.

Four current students, featured below, epitomize the breadth of our student body, intersecting diverse identities and backgrounds. The department is ready . . . and continually readying for the next class of budding mining professionals.

HUNTER NORRIS

A GENERATIONAL TRADITION

Descended from four generations of miners on his father's side and three on his mother's, Norris was destined to follow in his forebears' footsteps. Inspired by his parents and the interconnected mining community, he's pursuing a career in mining health and safety. "The saying 'Everyone goes safely home' always rang true to me," Norris shares, "and it is a goal I will strive for in my career."

And strive he has, serving as the president of the U's Mine Rescue Team and advocate councilor for the mining engineering program. He has expertly balanced this alongside his undergraduate degree and already lined up a job as a mining engineer for TATA Chemicals after graduation. Just as mining is only possible with strong supporting pillars protecting the workers, Norris has personal support and interests. He makes sure to devote time to hunting, fishing, and the great outdoors outside of his pursuit of an ME degree.

"It's something I learned from my parents," Norris explains. "My father showed me the importance of working hard, being successful in a career and striving to be an excellent caregiver. My mother taught me the importance of family and how to enjoy life outside of work."

With these values close to heart, Norris hopes to support and invest in the community he's grown to love all his life. He plans to use his knowledge to ensure that the current generation of miners can live healthily, successfully, and inspire a new generation in turn.

~Michael Jacobsen

TREY ROBISON:

SUSTAINABLY MOVING FORWARD

When picturing the mining industry it's easy to get lost in a vision of coal dust and construction vehicles, of runoff and rust. For many, the industry has a reputation of being anti-environment, but this isn't necessarily the case. Mining is a vital part of our society; we can't exist without it, so a brighter environmental future needs to work together with this industry, not against. As a student pursuing a sustainable development emphasis, Robison is well aware of this fact and is already making great strides in achieving his goals.

"I really want to help educate people on this topic," Robison explains. "Perception of mining is wildly outdated in so many ways; we're all still stuck picturing pickaxes and canaries despite technological advances. But mining advances evolve like any other profession, and it's particularly vital to do so with the environment."

Fueling this drive are a multitude of inspirations and experiences. Robison's grandfather worked with coal mines for 37 years, helping develop safer and more efficient equipment, and serving as a valuable inspiration for Robison himself. He's worked at the Skyline Mine for the last two summers as a propman, is an active member of the U's Mine Rescue Team, attended MINExpo last fall, and joined a group of U students visiting Oyu Tolgoi in Mongolia last spring. He even went so far as meeting with the Mongolian Minister of Mining.

Collaboration and cooperation are paramount for success when mining, and Robison has clearly learned this in spades.

Moving forward, Robison will be switching gears to interning at the Nevada Gold Mine in the upcoming semester. Recognizing the value of industry experience, he hopes to pursue more for a while, but thinking toward the future, Robison is heavily considering a role in state government like Utah Division of Oil, Gas and Mining. He believes the future of mining walks hand-in-hand with the environment and hopes that through his work he can help see that belief to fruition. *~Michael Jacobsen*

ELIZA WATSON

CARING DEEPLY ABOUT THE ENVIRONMENT

"Our modern society is highly dependent on mining," Watson, a sophomore studying mining engineering, states. "Without it, we would not be able to enjoy any of the conveniences we have at our fingertips."

Watson became interested in mining when she attended Engineering Day, an event hosted by the U.

"I've always been fascinated by geology," says Watson, who is minoring in geology. "I felt that mining combined this interest with my goal to have a career in engineering."

Watson was a part of the U's 2023 cohort of ACCESS Scholars, a first-year community, research, and scholarship program for students in STEM disciplines. As part of the program, she had the opportunity to participate in sresearch that monitored seismic activity in Arizona and the effects on ancient structures. She then presented her findings at the ACCESS Research Symposium.

After graduating, Watson's goal is to work at a mine site, overseeing elements such as landslide control and slope stability. Her summer internship is with Rio Tinto at the Kennecott Copper Mine, on the geotechnical engineering team with whom she will be learning these skills.

"Mining is an incredibly underappreciated industry," explains Watson. "All other industries are reliant on mining in some way, but many overlook its importance."

She also hopes to work on a reclamation project as well, which focuses on returning retired mines back to the ecosystem.

"Mining engineers are working to make mining a more environmentally sustainable venture," Watson says. "The industry requires people who care deeply about the environment and who will ensure that mining practices only improve in regard to the health of the planet and its people."

Outside of school, Watson enjoys hiking, country swing dancing, and spending time with her friends and family. *~CJ Siebeneck*

JAKE WHITE

UNLOCKING THE FUTURE

"The future is unlocked through mining," White says. "Mining has been a leader in sustainability and has set the standard for similar industries."

White is the freshman representative for the Society of Mining, Metallurgy

and Exploration, or SME, and participates in the Mine Rescue program with SME.

White's personal hero is Aaron Witt. A kind of "dirt" influencer, Witt has worked to change how the public views earth-moving industries such as construction and mining.

"This goal resonates with me because, before I started at the U, I was oblivious to how these industries operated," states White. "Like Aaron Witt, I would love to change how mining is perceived. Public perception depicts mining as harmful and wasteful, a danger to the environment. Mining is getting more sustainable, which is a major selling point, but seems to get neglected."

This summer, White is interning for Wolverine Fuels which operates, among others, the Skyline coal mine. He will be working on running longwall and continuous-miner operations, two types of mining that heavily involve machinery.

"I started my path in mining engineering early," White says. "The U did an engineering showcase at my high school where I met the mining academic advisor, Pam Holman. She introduced me to some mining basics."

White has received the William Browning scholarship, a mining engineering scholarship for students with a GPA above a 3.0. Most students graduate with little-to-no student debt and with a high employment rate.

"Mining requires public support," says White. "People don't understand how far ahead the mining industry is." <

~CJ Siebeneck

HENRY EYRING
FROM MINER TO ACADEMIC

HENRY EYRING **(1901 – 1981) WAS A MEXICO-BORN UNITED STATES THEORETICAL CHEMIST WHOSE PRIMARY CONTRIBUTION WAS IN THE STUDY OF CHEMICAL REACTION RATES AND INTERMEDIATES.**

Eyring developed the Absolute-Rate Theory or Transition-State Theory of chemical reactions, connecting the fields of chemistry and physics through atomic theory, quantum theory, and statistical mechanics.

But before the celebrated scientist / instructor was recruited from Princeton to be dean of the graduate school at the University of Utah (with professorships in chemistry and metallurgy), Eyring had earned his bachelor's degree from the University of Arizona by working in a copper mine. He later earned his M.Sc. there in metallurgy.

The safety standards at the mines and smelters, at that time, were nowhere near our current standards, and he chose to leave industry and pursue his Ph.D. in chemistry at University of California, Berkeley.

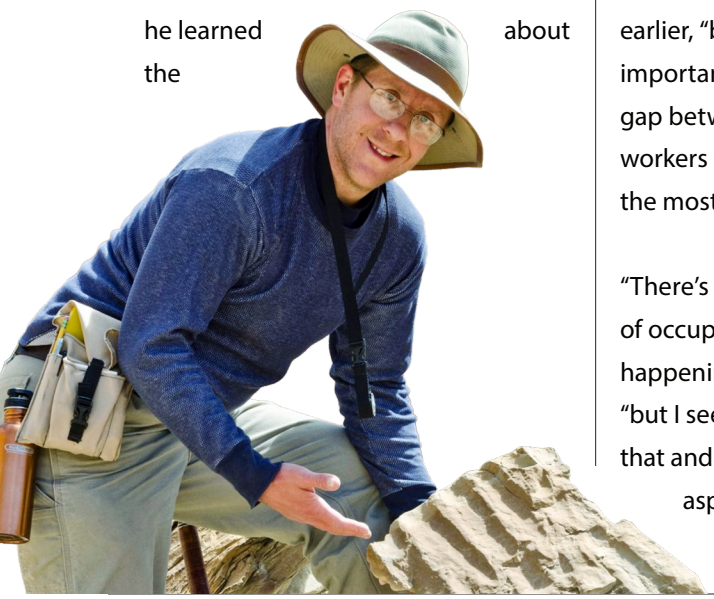
The chemistry building on the U campus is now named in his honor, and in March of this year a larger-than-life bronze statue of the miner-turned-academic was installed in the rotunda lobby of the building. <

GETTING MINERS HOME SAFE AT NIGHT

AT 43, GEOFFREY KING **IS NOT YOUR TYPICAL GRADUATE STUDENT.**

He's worked in oil fields and mines, taught high school science, flipped houses, run a rental business, and even planned a year-long move to Spain. Now, he's a student in the first-ever cohort of a master's program at the University of Utah focused on mining safety. The interdisciplinary program is a collaboration between the U's Department of Mining Engineering and the Rocky Mountain Center for Occupational and Environmental Health.

King's path to mining safety was a circuitous one. After earning a geology degree from Weber State, he jumped into the industry, including at Kennecott Copper Mine. After that, a pivot to teaching high school earth sciences. Then came Spain. Or at least, the idea of it before he learned about the opportunity to return to school.



"I got lucky," he admits. "Normally, I would've missed the application deadline by months. But this program had just launched. I interviewed, got accepted, and they offered to pay for the whole thing. At that point, I had to really consider it."

Now, King is deep into coursework that surprised him with its emphasis on health science. "I thought I'd be learning mostly about safety—hard hats, harnesses, protocols," he says. "Turns out, I'm taking classes with medical residents and postdocs, studying how toxic exposures affect the body."

His studies will take him to South America this summer, where he'll do an internship in Colombia. "I've got some Spanish," he says, remembering his ambition to move to Spain earlier, "but I want a lot more." More importantly, he wants to bridge the gap between academia and the workers who need this knowledge the most.

"There's this massive machine of occupational safety research happening in universities," he says, "but I see a disconnect between that and the guy working next to an asphalt paver on the freeway. That's who I want to help."

King's passion for connecting people to knowledge isn't new. He credits his own education to his mother, who, despite severe financial struggles and mental health challenges, made sure he had exposure to science. "We were poor," he says, "but she always brought us to the Utah Museum of Natural History [NHMU] on free Mondays. That's what set me on this path."

This excursion into graduate school at the U is not his first rodeo—or perhaps more appropriately, not his first hard rock lesson. In addition to his youthful visits to the NHMU in what is now the Crocker Science Center, he "went to preschool right here on 2nd South. Kindergarten just down the road. Our neighbor had alligators in their backyard," he adds with a laugh. "I've known where Presidents Circle is for a long time."

As for what's next, King—who when he's not "digging" into his pastimes of coaching basketball to youth, hiking, and traveling—keeps his options and one more circuitous route open. "I might go into consulting, or mining safety, or construction. Maybe I'll start my own business." Whatever he chooses, Geoffrey King knows one thing: he wants to make a real impact. "In this field, you can be the person making sure workers get home safe at night. That's powerful." **<**

MINING A SAFER FUTURE

AT THE U'S DEPARTMENT OF MINING ENGINEERING, THE CENTER FOR MINING SAFETY AND HEALTH EXCELLENCE IS TRANSFORMING UNDER PATRICK JAMES'S **GUIDANCE, BECOMING A VITAL CONNECTION POINT BETWEEN INDUSTRY AND ENGINEERING STUDENTS.**

"Mine rescue could really be a strong magnet for the school to further engage with industry, and also an opportunity for the students to learn," James explains. His strategy has already shown results—after 40 years of focusing on general industry, the Rocky Mountain Center for Occupational and Environment Health and Safety recently included a mining segment in its annual conference.

"I was initially worried about how many people would attend," James recalls. "We filled the room." This success reminded him of the famous line from the film *Field of Dreams*: "Build it, and they will come."

The strategy extends beyond conferences. James is currently working with National Institute for Occupational Safety and Health research groups to plan a workshop expected to draw significant industry participation to campus.

A VALUES-DRIVEN APPROACH

James makes a critical distinction that reveals his philosophy: "A lot of people express the opinion that safety is a priority. But my belief is that safety has always been a *value*. Priorities change on a daily basis. Values do not change."

"My belief is that safety has always been a *value*. Priorities change on a daily basis. Values do not change."

James's leadership style centers on student empowerment. "I don't want this to be about me. This is about what we're trying to accomplish here in the long term at the Center," he emphasizes, citing a proverb: "The best leader remains obscure, leading, but drawing no personal attention. Credit is not to be taken."

This philosophy manifests itself in his support for the student-led mine rescue team which sometimes participates in mine rescue contests with other mining schools. The competition with other universities, which simulates rescues in a mining environment, is not a top-down directive at the U. Instead, James works quietly to secure support and equipment from industry partners to support the right conditions for success.

Perhaps most revealing is James's view of continuous, incremental learning. "We should all strive to learn something new each day," he says, emphasizing "that learning is essential to be prepared for any new opportunity."

BREAKING DOWN BARRIERS

In an era when trust in science and higher education remains critical, James sees the Center's work as crucial to building strong partnerships. By facilitating engagement between industry and academia, the Center creates valuable opportunities for students and industry.

As it continues to grow, the Center for Mining Safety and Health Excellence represents more than just an academic program—it's becoming a bridge between university and industry, united by the shared value of safety and powered by student innovation. **<**

THE SILENCE OF SAFETY

THE U'S MINE RESCUE TEAM SHOWS THE VALUE OF SAFETY

by **MICHAEL JACOBSEN**

THE IMPORTANCE OF SAFETY IS DIFFICULT TO STATE WHEN THINGS ARE GOING WELL.

You're never going to read a news story about the life that wasn't lost in an accident, or read a statistic about all the disasters that were passively averted. When things are going well, safety measures feel downright mundane, but that's exactly why they are so important to highlight and celebrate. It means they are working, that tragic stories are being averted, and lives are being preserved.

In the realm of mining here at the University of Utah this takes the form of the **Mine Rescue Team**, a student-led organization that trains and competes with other teams across the country. In this field that's especially valuable, as Travis Brammer explains, "Most mines, especially underground mines, have rescue teams. There are important procedures. It's a dangerous environment, so specialists are trained to enter the mine, rescue people and bring them out to first responders." Mining incidents happen quickly and require immediate attention, and these specialists fill that need to ensure that everyone gets to go home.

Despite being on the younger side of mine rescue teams, the U's already has incredibly strong performances under its belt, having won the overall competition at the 2020 Society of Mining, Metallurgy and Exploration Engineers' annual conference in February. The competitions range from testing first aid skills in mass casualty simulations to scrutinizing equipment checks, to navigating underground scavenger hunts deep within mines. It's an extremely broad competition, but as Joe Rhoades describes, such breadth is well earned.

"There's collapsing walls, there's toxic gas, malfunctioning equipment, every kind of health emergency," to name a few. It's an ever-changing environment where everyone has to stay on their toes, and competitions like these are the perfect way to hone those skills.

But the Mine Rescue Team isn't just for mining and engineering students. The disaster relief focus has drawn members from across the health sciences, and a geologist, who has a career searching for future mines, joined the ranks to get some proper mineral exploration experience. Geology & Geophysics major Constance Suave explains that mining engineers and geologists work "hand in glove" constantly.

"I'd decided I wanted to know more about what comes after the process of my future career," she says, further lauding that "I didn't know what to expect at first, but I've really come to appreciate the industry and the culture around safety. It's not just mine rescue—staying mindful and staying safe is important for everyone."

It may be a relatively silent importance, but thanks to teams like this the message is still carried to the right people. As Mine Rescue Team president Hunter Norris puts it, "The saying that 'everyone goes home' has always rang true to me, and it is a goal I will strive for in my career."

Current students participating in rescue teams like this one at the U ensure that the future mining leaders they'll become will be informed and motivated by those values of safety during their career environments. <

SINCE ITS FULL RELEASE IN 2011, THE ONLINE "SANDBOX" GAME *MINECRAFT* HAS INSPIRED PLAYERS TO EXPLORE A PROCEDURALLY GENERATED, THREE-DIMENSIONAL WORLD WITH VIRTUALLY INFINITE TERRAIN MADE UP OF VOXELS, THREE-DIMENSIONAL COUNTERPARTS TO A PIXEL.

The nature of the game, a movie version of which was released by Warner Brothers in April, allows players to discover and extract raw materials, craft tools and items, and build structure, earthworks, and machines. Depending on their chosen game mode, players can fight hostile mobs, as well as cooperate or compete with other players. This emergent gameplay model eventually led graduating senior **Dan Christensen**, with direction and support from his professor, Jessica Wempen, to create a University of Utah *Minecraft* server as part of his final design project.

"With a fully developed mine plan and layout, Christensen wanted to see what the mine would be like if it was translated into real life," says graduating senior Joe Rhoades. "Since then, the Department of Mining Engineering has taken over the project, adding interactive modules within the open pit design to inform and demonstrate real-life mining practices in the easy-to-follow format of the game, drawing in talent from current and prospective students to the [mining engineering] degree."

Currently, the project has more than a dozen interactive modules to explain the complex processes involved in mining. Visitors will be able to see the life-sized open pit and walk up to realistic-sized mining equipment. Additionally, they will get to learn about the safety culture associated with mining when they stop by the personal protection equipment station, concern for the environment in the reclamation station, and optimization of pit design by trying to maximize their gold-to-waste ratio in the float cone station.

"With a mix of games and educational modules," says Rhoades, "the world offers a peek into the world of modern mining through the lens of the popular video game."

As the game changes, says Rhoades, so does the world. With new materials released in each update, the *Minecraft* world expands its options for better representation of real-world mining. Currently, designs are in the works for modules explaining the diverse topics of rock mechanics, mineral processing, and an entire underground stope process. **<**

Learn more about the world of Minecraft *franchise through the trailer to the movie, featuring a ragtag group of misfits, a mysterious blocky world, angry hordes of "piglins," and "Steve," the first and the original default "skin" available for players of contemporary versions of* Minecraft. *Scan to see the trailer.*

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Thank you to all of our alumni and friends who contribute to the Department of Mining Engineering. Your support enables us to provide exceptional education, conduct groundbreaking (literally) research, and prepare the next generation of leaders in our discipline.

If you'd like to support our efforts, please consider contributing to the **WALLIE RASMUSSEN STUDENT EXPERIENCE FUND**, which provides hands-on, real-world industry experiences for students.

Donations were previously used to support trainings and mine visits in Greenland and Mongolia. In the future, this fund will be used for additional experiences to prepare mining engineering students for impactful careers.

We are grateful for your investment in our students, faculty, and staff. We'd love to hear from you or have you stop by campus for a visit. You are always welcome here at the University of Utah!

For more information about giving to Mining Engineering, contact:

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