MINES MAGAZINE

COLORADO SCHOOL OF MINES ALUMNI MAGAZINE

Winter 2019 Volume 110 Number 1

INTERNATIONAL INFLUENCE

Mines alumni live and work in cities around the world, shaping the oil and gas industry's global landscape.

14

GAINING A GLOBAL PERSPECTIVE

Study abroad students bring unique international experiences back home, which prove to be advantageous in their academic and professional lives.

20

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EARTH • ENERGY • ENVIRONMENT

As part of his undergraduate education, chemical engineering student Daniel Langemann spent a semester studying in Singapore, an experience he credits with helping him become a better student and global citizen. While abroad, he traveled beyond Singapore to places like Su Pan Village in Vietnam, pictured here.

CONTENTS

Cover image: Mines has a strong international community, with people of all backgrounds contributing to the school's global influence and reputation. This issue of *Mines Magazine* has an international focus, detailing the stories of alumni living and working around the world, study abroad students, international students who come to Mines for higher education and more.
(Cover designed by Wan Jun Aida Wan Ahmad Johari)

FEATURES

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DEPARTMENTS

WEB EXTRAS | MULTIMEDIA

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Q&A WITH DAVID WRIGHT
Mines Magazine sat down with Mines' new assistant provost of international affairs, David Wright, to talk about his vision for internationalization at Mines, the importance of study abroad experiences and how to build a strong global community. Read his full interview on *Mines Magazine's* website.

ALUMNI TALES
We can't get enough of hearing stories from Mines alumni, and now all alumni have the chance to share their favorite memories, advice and points of view in "Alumni Tales" videos on the Mines alumni website. Visit **minesalumni.com/AlumniTales** to watch the videos or share a story of your own.

CELEBRATING CULTURES
Each fall, groups across campus host several multicultural events, including International Day, African Cultural Night and Diwali, to celebrate the many cultures at Mines. Check out photos from this year's events on *Mines Magazine's* website.

COMING HOME
Mines hosted Homecoming again this fall, welcoming graduates back to campus for class reunions, the annual parade, tailgate, a new 5K and more. Check out photos from the weekend's events on *Mines Magazine's* website.

WINTER 2019
VOLUME 110 NUMBER 1

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Mines Magazine is published by Colorado School of Mines and the Mines Alumni Association for alumni and friends of the school. *Mines Magazine* is a critical communication serving the Colorado School of Mines community. Its mission is to keep readers informed about the school, to further the goals of the school and the alumni association and to foster connectedness.

Comments and suggestions are welcome. Contact us via our contact form at **minesmagazine.com/contact-us** or via mail at *Mines Magazine*, 1500 Illinois St., Golden, CO 80401. To update your address, go to **minesalumni.com/update** or email **minesalumni@mines.edu**.

ALUMNI NOTE

David Wright is Mines' new assistant provost for international affairs, leading the school's internationalization efforts and global education opportunities.

Photo by Agata Bogucka

THE VALUE OF BEING GLOBAL CITIZENS

As part of the MINES@150 strategic plan, the alumni association is excited to launch the new International affinity group. The group will work directly with David Wright and the Office of International Programs to develop new programs and initiatives that connect with our alumni who are currently living and working outside the United States. Look for more details in a future issue of Mines Magazine*, and read David's note below to learn more about Mines' growing international community.*
–Brady McConaty '78, Alumni Association Board Director

When I joined Mines last July as the new assistant provost for international affairs, I was excited at the opportunities it would not only give me in my career, but also the opportunities I would be able to help provide for Mines students.

With a focus on engineering, Mines students address difficult technical problems that demand a problem-solving mindset, which is the perfect fit for an international education. Students in our study abroad programs expand their resourcefulness and strengthen their capacity to cooperate across cultures. The students I have already worked with have returned to Golden ready to talk about new ways of thinking and with new passions for finding solutions to pressing global challenges. A semester abroad also helps students engage in the ever-evolving world of cross-cultural communication, gaining a skill set that allows individuals to better arbitrate the nuances of a diverse, global workforce.

These experiences help students later become successful professionals and global citizens, like we have seen in the many Mines alumni who are living and working abroad and changing the world on a day-to-day basis. Many Mines alumni have found success overseas, like those featured in the story on page 14, and their experiences are a testament to the value of international connections.

As a member of a vibrant community of Mines alumni scattered around the globe, international experiences will always be within reach. Start by connecting with fellow Orediggers abroad through your local M Club or participating in future travel opportunities. Connect with Mines' Office of International Programs to build relationships with current students and help continue the Oredigger legacy of being industry leaders throughout the world.

Mines alumni are prime examples of success and have a wealth of knowledge to share. If you know of international opportunities for students or want to learn more about the international programs at Mines, don't hesitate to contact me at **dwright1@mines.edu**.

David Wright
Assistant Provost for International Affairs

▶ Read *Mines Magazine's* interview with David Wright online at **magazine.mines.edu**.

PRESIDENT'S CORNER

THE FUTURE IS BRIGHT FOR 2019

Last fall, Mines and Confluence Companies broke ground on a 249-bed, four-story residence hall on campus. The new building moves Mines closer to its strategic goal of housing all freshman and sophomores on campus.
Photo by Joe DelNero

2019 will be another busy and exciting year at Mines. We only have five years left to accomplish our MINES@150 strategic plan and ensure that Mines is well positioned for its next 150 years as the world's premier science and engineering school. Five years seems like a long time in some ways, but it's very short when you look more closely at what needs to be done. There is a pretty significant role in the plan for our alumni, and in fact, many are already playing key leadership roles in planning, programming and supporting the MINES@150 plan.

In the near term, some of the things I'm looking forward to in 2019 include the completion of key construction projects, the launch of new academic programs and, of course, everything uniquely Mines that happens in the course of each academic year.

In the new year, we will complete our first-ever parking garage and renovations to the Green Center. The first project is significant, not just because it adds much-needed parking to campus, but also because it will increase our classroom capacity. The parking garage design includes a 20,000-square-foot exterior "wrap" featuring modern flexible classrooms that provide opportunities for innovative instruction in our design courses. Completion of the Green Center renovation is key to our ability to hold conferences and workshops, present plays and musical performances on campus and host local community events, like Jefferson Symphony Orchestra performances.

2019 will also bring a number of new academic programs to Mines, many of which will expand what we currently offer to practicing professionals in terms of certificates, master's degrees and continuing education. We're even adding online options so our alumni and new students can enroll in courses any time and from anywhere in the world. I'm excited about the programs and courses being developed for the world's first space resources program, our expanding activity in advanced manufacturing and more professional development opportunities in the mining sector.

I'm hoping 2019 will also be a year of deeper and expanded relationships with industry and government agencies. One example is our recently signed cooperative agreement with the U.S. Geological Survey that will bring about 150 USGS scientists and their unique expertise and laboratory capabilities to the Mines campus, and we hope to pursue similar opportunities with industry. Relationships like this expand opportunities for students, research and education and enhance our reputation.

And finally, I can't wait to see what the Mines Activity Council has in store for E-Days 2019.

Go Orediggers!

Paul C. Johnson, PhD
President and Professor

REPURPOSING A MINE

STUDENTS ENVISION FUTURE OF COLORADO'S HENDERSON MINE

Mines students are working with Climax Molybdenum to find ways to repurpose the Henderson mine once its mineral resources are depleted.
Photo courtesy of Climax Molybdenum

Mines students are flexing their creative muscle on a real-life challenge by working with Climax Molybdenum, a Freeport-McMoRan company, in envisioning innovative ways to repurpose the Henderson mine following the eventual depletion of the mineral resource and the social and economic transition of the mine and surrounding communities.

The semester-long Henderson Sustainable Development and Entrepreneurship Challenge kicked off in the fall with 24 Mines student teams pitching concepts for the sustainable repurposing of the mine's surface facilities and properties. The students' initial proposals included everything from resorts, education and recreation to business development, data centers and ecological enhancement.

Located near Empire, Colorado, the Henderson mine is an economic driver for the region, paying a significant portion of property taxes collected in Clear Creek County. Student concepts were required to take that into consideration and provide a socioeconomic benefit to the surrounding communities. In addition, concepts had to be economically sustainable, socially acceptable and provide a positive and lasting legacy in the state of Colorado.

"This challenge represents a one-of-a-kind opportunity for students and faculty to apply classroom and theoretical knowledge to a real-world scenario," said Bill Cobb, Freeport-McMoRan's vice president-environmental services and sustainable development. "This will help to both create responsible future industry leaders who can execute sustainable development practices throughout the life cycle of a mining operation and bring forward fresh thinking and a diversity of solutions for industry and community that might not otherwise be explored, which is a win-win situation."

By **Emilie Rusch**

ATHLETICS

AHEAD OF THE PACK

Before this year, no institution in the 100-plus year history of the Rocky Mountain Athletic Conference had ever won four team championships in a single fall season. But Mines changed the game and did exactly that in 2018, capturing regular-season titles in football, volleyball and men's and women's soccer, as well as RMAC Tournament crowns for both soccer teams.

FOOTBALL

The Mines football team went 10-2 overall and won a share of its fourth RMAC regular-season title of the decade, qualifying for the NCAA Championship tournament in the process. This year, the Orediggers played their first on-campus postseason game in 14 years and the first ever at Marv Kay Stadium.

Photo by Tim Flynn

EARNING A TOP SPOT

A Mines alumnus has never been a full-time member of the PGA Tour. Until now.

Jim Knous '12 earned his PGA Tour card on Sept. 23, finishing 25th on the Web.com Tour Finals money list to punch his ticket to the world's top golf tour over the next year. Knous earned the 25th and final card on a harrowing day at the Web.com Tour Championship, the final event of the four-tournament Web.com Tour Finals series that determined qualifying for the next PGA Tour season.

"It was a brutal day emotionally. I wasn't quite sure how much my performance would affect the overall outcome. It kind of just depended on what everybody else did," Knous said after his round, which saw him finish 57th.

Knous needed to finish inside the top 25 of earnings across the four Web.com Tour Finals events and ended up with $41,931—only $490 ahead of Justin Lower.

His PGA Tour card continues a professional golf dream for Knous, who was a decorated amateur golfer for Mines. Knous played in numerous small events and qualifiers all over the country before latching onto the Web.com Tour—the PGA Tour's "minor league"—full-time last year after four tries at qualifying school. Knous qualified for his first PGA Tour event in 2017 when he played in the Waste Management Phoenix Open.

"I dreamed about it, for sure," Knous said. "I didn't know if it was achievable or not, but the last few years I know I've been playing great golf and I knew I had the game—just getting it done was the hard part, and to actually do that is awesome."

Knous is the first Mines—and Rocky Mountain Athletic Conference—alumnus to earn a full-time PGA Tour card and is one of only two Orediggers to have played in a top-level event, joining Marty Jertson '02, who has three PGA Championship appearances under his belt. A standout for Mines from 2008 to 2012, Knous was an all-American in 2012, finishing tied for the lead at the NCAA Division II national championship. He was the

Photo by Michael Cohen/Getty/Web.com Tour

2012 RMAC Player of the Year, a two-time PING All-Region pick and a four-time First-Team All-RMAC selection. As a senior, Knous finished second in the GolfStat D-II rankings before earning his bachelor's degree in civil engineering in 2012.

Knous wasted no time putting his PGA Tour status to work—he finished tied for 10th in his very first event, the Safeway Open, in October. Knous' status allows him to compete in events through the end of the PGA Tour year in fall 2019.

WOMEN'S SOCCER

Mines had an outstanding season, going 19-1-2 overall to also win the RMAC double. The Orediggers were an undefeated 11-0-1 at home led by one of the nation's best defenses. The championships continued a dynasty for Mines women's soccer, which has won five of the last six regular-season titles and seven of the last eight RMAC Tournament titles as they qualified for their 11th consecutive NCAA Championship tournament.

MEN'S SOCCER

The men's soccer team went 18-2-1 to win both the RMAC regular-season and tournament titles, reaching as high as fifth in the national rankings. The regular-season title was Mines' seventh since 2000 and their RMAC Tournament trophy was the program's sixth of the decade.

Photos courtesy of Rocky Mountain Athletic Conference

VOLLEYBALL

One might think that a team regularly starting five freshmen might be looking to the future, honing their skills and teamwork to earn championships later in their college careers. But for Mines volleyball, the future is now. The team went 24-6 overall this year to win a share of the RMAC regular-season championship. Mines was 16-2 with a very tough RMAC schedule and qualified for their 10th consecutive NCAA Championship tournament, where they advanced to the second round.

Photo by Sam Boender

By **Tim Flynn**

▶ For more on Mines athletics, visit **minesathletics.com**.

BELOW THE SURFACE

EDGAR MINE TO FACILITATE UNDERGROUND ROBOTICS RESEARCH

Mines researchers will soon purchase equipment and conduct research on underground robotics applications in Edgar Mine's one-of-a-kind educational and research environment.
Photo by Joe DelNero

The Edgar Experimental Mine in Idaho Springs has long been a unique underground laboratory for future engineers, providing valuable experience to those training to find, develop and process natural resources. And now, thanks to National Science Foundation funding, it will also be home to cutting-edge research in underground robotics.

"There's lot of infrastructure being built underground and that presents new challenges," said Tom Williams, assistant professor of computer science. "If you have some sort of security threat in a subway system or some sort of disaster in the tunnels, the techniques you're going to use to deal with those types of situations are much different than what you would use on the surface—because of the networking challenges, because it is dark and smoky, because there's a lot less structure."

Researchers will deploy a team of robots in Edgar's underground environment—ground robots, amphibious robots, drones and robot arms—as well as sensors, networking equipment and augmented reality headsets to facilitate their use.

Drones and robot arms could be operated for solo underground exploration or in tandem with ground robots. Networking equipment will allow robots to communicate with each other and their human teammates, and augmented reality headsets could allow for easier human-robot communication in low-light and dusty environments.

"Being able to safely inspect underground environments and perform rescues during underground catastrophes is essential to achieve the new underground frontier," Williams said. "It's important not only to be able to have robots in those types of environments because they can get into areas that humans can't but also because they have sensor capabilities that humans don't—I don't have laser vision."

By **Emilie Rusch**

GEOSCIENCES OF THE FUTURE

NEW RESEARCH CENTER TO FOCUS ON SUBSURFACE RESOURCE MODELS

Students log exploration drill cores at the LaRonde base metal mine in Quebec. CASERM aims to optimize how real measurements can be used to increase the accuracy of model predictions.
Photo by Thomas Monecke

Mines and Virginia Tech have been awarded funding from the National Science Foundation to set up a new research center focusing on advanced subsurface earth resource modeling.

Mines is the lead institute in the new Center for Advanced Subsurface Earth Resource Models (CASERM), which will bring together more than 20 faculty members from the two schools' geology, geophysics, applied math and statistics, mining and computer science departments to develop high-impact solutions to help mining companies minimize drilling and increase the chances of exploration success.

Each institution will receive $750,000 through NSF's Industry/University Cooperative Research Centers (I/UCRC) program, which represents the National Science Foundation's primary mechanism to support industry-driven, pre-competitive applied research. The grant will pay for costs related to managing the center during its first five years of operation and will augment support the center receives for research projects from industry and agency sponsors.

"Colorado School of Mines and Virginia Tech bring together more than 250 years of experience in earth resource research and service to the global exploration and mining industry," said Ric Wendlandt, professor of geology and geological engineering at Mines and director of the new center. "It is our vision for the Center for Advanced Subsurface Earth Resource Models to transform the way geoscience data is used to locate subsurface earth resources."

Research at the center will focus on four core areas:

- Development of geophysical and geochemical instrumentation, analysis and interpretation methods for enhanced characterization of rock properties
- Integration, scaling and inversion of diverse geological, petrophysical and geophysical data types of dissimilar spatial resolution and distribution to identify and characterize earth resources
- Development of information methodologies for reducing risk associated with decision-making
- Computational imaging and development of graphical and exploratory data analysis solutions and visualization tools

"This research center is directed toward research challenges in the development of 3D subsurface models. We will advance geoscience knowledge, analytical capabilities, geostatistical methods and computational algorithms to model and visualize the subsurface of our Earth," said Thomas Monecke, associate professor of geology and geological engineering at Mines and site director of the new center. "These models integrate diverse geoscience data to inform decision-making and minimize geological risk, beginning with locating and mining subsurface earth resources and continuing through mine closure and environmental remediation."

The vision for the center has been developed over the past three years in close collaboration with a group of industry advisors. A planning meeting supported by NSF in September 2017 involved 38 exploration and mining companies and government agencies.

"The geosciences of the future are going to rely more and more heavily on creative interdisciplinary techniques," said Stefanie Tompkins, vice president of research and technology transfer at Mines and a geologist by training. "It gives us a great edge and changes how we explore and characterize the underground. The stakes are high, and you need sophisticated interdisciplinary tools."

By **Emilie Rusch**

CROSSING CULTURES

INTERNATIONAL STUDENTS TAKE ADVANTAGE OF EVERY OPPORTUNITY AT MINES

Mines has a rich community of international students who come to the school to pursue their undergraduate and graduate educations, bringing with them unique experiences and global perspectives. We talked to a few international students about their experiences coming to the United States to study at Mines and the best parts of being an Oredigger.

Interviewed by
Wan Jun Aida Wan Ahmad Johari

"My first impression of Mines was that it was very different from Québec. I remember thinking it looks very American, just like in the movies. I also like that there are fields and people hanging out outside. In Canada, people don't hang out outside because it's too cold, but here, they are outside pretty much all the time.

"I knew a couple of guys in the math department, and one day, they were playing volleyball outside. It was February, and they were playing volleyball. Outside. I just thought that was amazing that you can do that here.

"I told all my friends, and we started playing volleyball together. I would borrow a net from the Rec Center, and a group of people would come and play volleyball in the evening on Kafadar Commons.

"Every Friday for almost a year now, we play volleyball on Kafadar Commons. The goal is just to have fun at the end of the week, especially for graduate students since we are not as involved as the undergrads in on-campus activities.

"Basically, I'll send out a text message to a group of people. Every week, it's a different joke or a story relating to volleyball, reminding them that we will be playing."

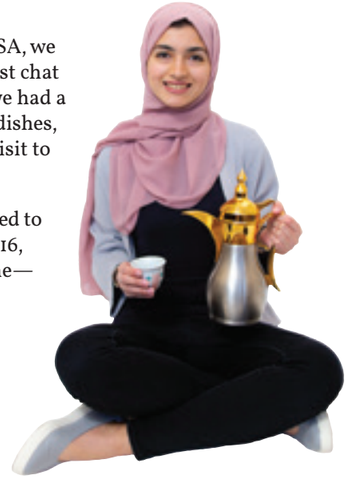
Félix Therrien
PhD student, physics
Canada

Félix is holding the Québec flag.

"When I first came to Mines, I felt very scared. But people here are very friendly, and that helped a lot. We immediately met the other international students through the International Student Council, and we also made new friends with the Americans.

"I am involved in the Saudi Student Association (SSA) and the Photography Club. In SSA, we just started a new activity called 'Diwanya,' where we gather all the Saudi students to just chat and eat together at every end of the month. One of my favorite Diwanyas was when we had a cooking competition. Not only Saudis, but a lot of the Arab people came and brought dishes, and we bought gifts and voted for the winners. We also organized other events, like a visit to the senior living community, and volunteered at Children's Hospital.

"Another memory I made here was getting my driver's license. Women were not allowed to drive in Saudi Arabia, but I really wanted to. I took the driving test in the summer of 2016, and now I have a Colorado driver's license. Saudi legalized women drivers this past June—I am very happy that I can now drive in my home country."



Etaf Alghunaim
Class of 2019, petroleum engineering
Saudi Arabia

Etaf is holding a dallah, a traditional Arabic coffee pot.

"When I started my freshman year at Mines, my life was crazy because I wanted to try everything. I joined Astronomy Club and Kayaking Club. I even went for soccer tryouts, although that just lasted for a day.

"Being the president of the Mines African Student Union (MASU) is a big thing for me. I started in MASU as a recruiting officer, and the president at the time got us started with a lot of things. First, we made sure people knew we existed on campus, because even African students didn't know we existed. But now the organization is increasingly known on campus, and being a part of it is amazing.

"I joined the Society for Mining, Metallurgy and Exploration (SME) this semester. I organized the barbecue, and it was an interesting experience. As an international student not speaking English as a native language, there are some things we can learn only by communicating and being involved with clubs on campus.

"I currently love what I am involved in on campus, because it's both who I am and who I am becoming. Contributing to MASU and SME builds my character as an African and a future mining engineer."

Stela Cayatte
Class of 2019, mining engineering
Angola

Stela is holding the Angolan and U.S. flags.

"When I decided to go to graduate school, I searched for the best petroleum engineering graduate school in the U.S. Mines popped up as the fourth or fifth when I searched. I decided on this school since it was one of the top schools, but when I came here, the core structure and the Petroleum Engineering Department here felt like the best I could ever find. All the petroleum engineering professors here are considered legends in the industry, and they are here at Mines, which is just amazing.

"I am the president of the Petroleum Engineering Graduate Students, an officer for the American Association of Drilling Engineers (AADE) and the Society of Petroleum Engineers (SPE). Getting involved in clubs definitely keeps you occupied at Mines, but the main things I've learned are 'people skills' and bringing people together as a team. You can't just be technically sound because employers are looking for leadership skills.

"In regards to the international students, I would say the culture here is super rich. I have a crazy habit of collecting currencies. It's only been a year, and I have already collected dollar notes and coins from 45 different countries. I even learned a new language just by making friends with other international students.

"I can get a degree anywhere in India, but here, we are lucky to be exposed to so many people from different places, and it's impossible to visit all of these places in the world, as much as I want to. I can't even generalize India, because every state has its different cultures—how can I generalize the whole world?"

Sathianandan Dharmaselvan
Master's student, petroleum engineering
India

Sathianandan is holding peacock feathers to represent India's national bird.

Photos by **Agata Bogucka**

INTERNATIONAL INFLUENCE

Mines alumni pursue careers all over the world, shaping the oil and gas industry's global landscape

By **Teresa Meek**

Mines is known around the world for producing leaders in the oil and gas industry, and a degree from the school can be a ticket to living in an interesting location.

A significant portion of Mines' alumni community lives and works abroad, expanding the school's international influence and making valuable global connections. But the experience is not without its challenges.

Alumni abroad say the strong work ethic and out-of-the-box thinking Mines instills has helped them overcome difficulties they would never have faced in the U.S. But these international experiences also gain alumni career-boosting skills and confidence and demonstrate Mines' reputation for producing graduates with not only outstanding technical expertise, but real-world problem-solving ability and grit.

Here are the stories of five alumni who embraced the challenges of working abroad, built successful careers and made lifelong friendships in the process.

Originally from Trinidad, Roxanne Skeene ’83 worked in the United States for several years before returning home to work for the state oil company. She eventually ended up in the U.K. working for BP for three years and made valuable career connections and friendships.
Photo courtesy of Roxanne Skeene

UK AND TRINIDAD: MAKING CAREER CONNECTIONS

Roxanne Skeene ’83 is very familiar with international experiences. Originally from Trinidad, she came to the United States for her undergraduate education and worked in Houston for seven years. She eventually decided to return home to work for Trinidad’s state oil company and later went to work for BP.

Though she enjoyed being home, when BP offered to send her to the U.K. for three years, Skeene jumped at the chance. “Trinidad is a very small island, and we don’t get the visibility we need at BP unless we leave,” she said.

In the U.K., Skeene learned about managing operations while partnering with other oil companies, something that wasn’t done in Trinidad. “It was eye-opening. It broadened my perspective,” she said.

But the most important advantage she gained from her U.K. experience was the contacts she made through networking. One woman, who is now a vice president at BP, became her mentor. “I call her when I have a career challenge, and we chat,” Skeene said. “I would never be able to do that if I had stayed in Trinidad.”

Several other people she met in the U.K. have moved into positions of influence at BP. One is responsible for approving expenses for her group’s projects in Trinidad. She believes that knowing him personally helped when she presented a new plan for developing a well location the company had already rejected twice.

Her petition was successful. “Had it been someone else, I might have had a harder time,” she said. “It’s easier when you can put a face to a person and you have a bit of background.”

NEW ZEALAND: ACCEPTING CHALLENGING ASSIGNMENTS

As a freshman at Mines, Ashley Lantz ’05 decided to major in petroleum engineering after hearing a professor say that graduates in the field could work anywhere in the world. “That pretty much sold me,” she said.

After obtaining her bachelor’s degree and working in the U.S. for eight years, Lantz was offered an opportunity in New Zealand, where she now works as a completions engineering manager for Todd Energy.

She found the opening through a former colleague and fellow Mines graduate. “Mines has a really strong international network,” Lantz said. “Lots of Mines expats are working all over the world, and we’re highly regarded and well known in the Southern Hemisphere.”

Living in New Zealand has given Lantz the opportunity to see the country and travel in Southeast Asia and Australia as well. But she didn’t go for the scenery.

“The geology is very complex in New Zealand. It’s a big technical challenge, and I came for the opportunity to learn and grow in engineering,” she said.

According to Lantz, Mines did a great job of preparing her for international work. The school encouraged her to seek out career-building challenges, and its large international population taught her to work with a diverse range of people. “Exposure to different cultures sets you up for success internationally,” she said.

Lantz has been in New Zealand for five years and plans to stay until she’s ready for a new challenge. “You know you’re learning when you’re a little bit uncomfortable,” she said. “You always have to challenge yourself and push the boundaries.”

Ashley Lantz ’05 jumped at the chance to work in New Zealand due to the unique challenges and learning opportunities she would encounter in an unfamiliar place.
Photo courtesy of Ashley Lantz

IRAQ: LIVING IN A CONFLICT ZONE

The Iraq War officially ended in December 2011, the same month that Sean Zeeck ’10 arrived in the country to work for the oilfield services company Schlumberger. But there were still isolated attacks, and security was tight.

Zeeck lived on a former military base near the Rumaila oil field in southern Iraq. Armed guards accompanied workers to the site, where they toiled in 120-degree heat restoring wells that had been shut down during the war. They worked 100-hour weeks for two months, then were sent home to the U.S. to recuperate for three weeks before returning for another two-month stint. Zeeck kept up this routine for two and a half years.

“It was pretty stressful,” Zeeck said, but he acknowledged the tough conditions also promoted teamwork. “When you’re forced into that situation, everyone tends to band together pretty well. You don’t think about the negatives because you have to work together so much.”

He was one of only five Americans on the former base, and he developed close friendships with Iraqis. One day while he was enjoying some rare free time in his “room”—a metal container on the base—he suddenly heard rocks hitting the outside of the container and angry voices outside. An Iraqi friend texted him, telling him to lock his door and turn out the lights.

Someone at an adjacent base had ripped up an Iraqi religious flag, causing an angry mob to form in retaliation. That base went into lockdown, but the mob soon turned its attention to Zeeck’s base next door, and a sympathetic security guard let them in.

Zeeck’s friend continued to communicate with him for hours to make sure he stayed safe. When soldiers arrived to secure the base, Zeeck’s Iraqi friends came to accompany him out of his room.

No one was killed in the incident, but all expats were sent home while the charged political atmosphere cooled. Several of Zeeck’s Iraqi friends offered to let him stay in their homes instead, but because of company protocol, he politely declined.

Zeeck could have ended his work agreement with Schlumberger after that, but he returned for a final stint to complete the work he had started.

Zeeck said the self-discipline he learned at Mines pulled him through the tough times in Iraq. “Mines not only prepares you for all things engineering—it forces you to train yourself to work hard,” he said. And when describing his Iraq experience in job interviews, he explains, “No one has any doubt what my work ethic is.”

Early in his career, Sean Zeeck ’10 worked on the Rumaila oil field in southern Iraq. One day, another group working at the site made a mistake and flung crude oil at least 50 feet from the main spot, spraying Zeeck in the face.
Photo by Harith Hayder

GABON AND ROMANIA:
NAVIGATING CULTURAL DIFFERENCES

Gehrig Schultz '89, the founder and current CEO of Surus Geophysical in the Netherlands, has spent his entire career working internationally. One of his postings was Gabon, where he hired members from local tribes to work on an oil production crew for Western Geophysical. But production on one crew quickly went downhill and fell to zero.

Schultz learned that workers came from rival tribes, separated by religion, custom and longstanding ill will. Some didn't even speak the others' languages. They insisted on living in separate quarters, and one group refused to take others to the job site, resulting in a shortage of people to run the equipment. "We made a mess you could not imagine, mixing lifelong enemies," Schultz said.

To get the groups working efficiently with each other, Schultz helped create a rewards system in which workers who were the most productive and upheld safety standards wore clothing in colors identifying them as the best team. It worked. "The people in reward colors were respected by everybody, no matter which tribe they were from," Schultz said.

Schultz attributes his management skills in part to Mines' EPICS program, which teaches students to work in teams. The McBride Honors program was equally important, helping him obtain work lobbying and working for state legislatures. "I learned the social and diplomatic skills that were key to my future success," he explained.

Schultz exercised his diplomacy skills again in Romania, where he led a geophysical company struggling to emerge from an anachronistic state-run culture, and whose five-year plans ignored serious cash flow problems. Staffers hand-wrote financial statements on legal pads, and the average age of workers was 58, in a country with a retirement age of 62.

Over eight years, Schultz managed to turn the company around, making the culture more dynamic without alienating people, while modernizing operations, expanding to 11 countries and growing revenue from $28 million to $130 million.

He helped his own workers learn new methods and become more efficient, but he wanted to do more. To inspire a new generation of mining engineers, Schultz created a summer camp for Romanian college students based on the geophysical camps he remembered attending at Mines. The camps give young people hands-on experience in geology and have expanded to include students from Serbia, Poland and Ukraine. Schultz is working to add U.K. students to the mix.

Achieving success abroad entails understanding the perspectives of the people around you and adapting your ideas to their environment, Schultz said. "It's about understanding the culture and organizing things in a way that makes sense for the people you're working with."

Gehrig Schultz '89 has spent his whole career working abroad, including leading a geophysical company in Romania. He is pictured here with a few of the people he worked with in Bucharest in 2013.
Photo courtesy of Gehrig Schultz

RUSSIA:
PLAYING POLITICAL FOOTBALL

Corwin "Corky" Rose '70 expected to face many challenges when Chevron sent him to Moscow to be the engineering manager for the Caspian Pipeline Consortium. He had worked on the pipeline in Kazakhstan and London and knew it required coordinating a variety of stakeholders, including the governments of Russia, Kazakhstan and other countries, as well as private oil companies.

What he didn't anticipate was the extent of political maneuvering that would accompany every step of the process. The Russian government disliked foreigners making decisions about a pipeline on its soil and blocked many measures the other partners believed were in the pipeline's best interest, Rose said. "Every major decision became a political football," he added.

When problems appeared intractable, Rose applied the creative thinking he learned at Mines. "Mines trains people to think outside the box and come up with unique solutions to problems," he said. Eventually, Chevron and the other partners found ways to gain cooperation, often by making strategic concessions, such as hiring Russian contractors to do pipeline work.

Another challenge Rose experienced was getting the 22 Russians who worked for him to make decisions on their own. "They were all very capable and knowledgeable, but in the Russian culture, the manager makes all the decisions," Rose said. Previously, a worker's wrong decision could result in severe punishment.

"It took us five years to get them comfortable about making decisions," Rose said. "They had to understand we had their backs, and if something went wrong, they were not going to be punished."

Watching his workers develop confidence in their decisions was one of the highlights of Rose's Moscow experience. Another was the pipeline itself. Despite all the challenges, the consortium managed to keep it running at 98 percent efficiency, a world standard. "We got our maintenance done, there were no ruptures and we moved as much oil as we could move," he said.

Corwin Rose '70 worked in Russia for several years, working as the engineering manager for the Caspian Pipeline Consortium. Here, Rose is pictured in front of St. Basil's Cathedral in Moscow's Red Square.
Photo courtesy of Corwin Rose

LOOK BEFORE YOU LEAP

Working abroad in the oil and gas industry may not be for everyone, but for those willing to embrace the challenges, the rewards are rich.

Schultz suggests that graduates considering international work try short-term assignments first. "It's one thing to work with people from other countries and another to live in their country," he said.

Skeene agrees and says that's especially true for those considering developing countries, where dealing with crime, corruption and poverty requires a high level of patience and maturity.

Above all, to gain from an experience abroad, you need to put down your phone, get outside your comfort zone and talk to people, Schultz said. "Understand their history, eat what they eat, dance what they dance, celebrate what they celebrate," he explained. "It helps you grow in ways you can't foresee."

GAINING A GLOBAL PERSPECTIVE

Study abroad students bring worldly experiences home to the classroom and forward into industry

By **Amanda Schuster**

As the world becomes increasingly connected via technology and travel, experience with other cultures is a valuable academic, personal and professional asset. With employers looking for new hires with a wide range of experiences, more students are turning to study abroad programs and other international education opportunities to put them ahead of their peers and enter the workforce prepared for multicultural interactions.

A 2016 study by NAFSA: Association of International Educators showed that more than 300,000 college students in the U.S.—about 10 percent of graduates—study abroad per year. Still, that isn't nearly enough to fill the growing demand from employers. "Almost 40 percent of companies surveyed missed international business opportunities because of a lack of internationally competent personnel," NAFSA said.

But Mines is rising to the occasion. Currently partnering with more than 45 universities and higher education programs, Mines connects more than 200 students per year with short-term programs, international conferences and study group participation and, of course, study abroad opportunities. Students can choose from a variety of locations in the Middle East, Oceania, Latin America, Europe and Asia and from programs ranging from short research projects and internships to a full year of courses toward their degree.

Through these international opportunities, Mines provides students with a rich academic experience and helps them prepare for success in their future careers.

Daniel Langemann, pictured here in downtown Singapore, credits studying abroad with helping prepare him for his career after graduation and giving him an advantage when talking with potential employers.

Photo by Beng Jui

Although she studied abroad in Spain, Skye Kim was able to travel to Rome during her semester abroad, where she had to stop for a photo on the Spanish Steps. Photo by Sara Guzman

MULTICULTURAL MOTIVATIONS

> Mines students choose to study or intern abroad for a variety of reasons: the desire to travel, to learn or become fluent in a language, to challenge themselves. "I really wanted to get a different experience and put myself out of my shell," said Skye Kim, a chemical and biochemical engineering student who participated in research at Comillas Pontifical University in Madrid last summer. She chose the university, she said, because they were already partnered with Mines, and because of the specific research she was interested in.

Others are curious about life in another culture. "I was really eager to learn how people lived in other parts of the world—not just the parts you see when you travel and spend your time in a hotel and go on little excursions," explained Megan Graf, a chemical engineering student graduating in May. "I was very curious about how it actually was day to day."

Like Kim, Graf also chose to study in Spain, where she completed a year at the University of Oviedo, citing the language as the deciding factor. "I've always wanted to get to that level of being fluent, of thinking, dreaming, speaking in Spanish as well as in English," she said.

Daniel Langemann, a chemical engineering student who transferred to Mines in his junior year, already had a penchant for travel when he learned that study abroad was an option. After exploring several possibilities, he was able to find a university—Nanyang Technological University in Singapore—that offered an exchange with Mines and offered all of the courses he would need to take in his heavy-hitting junior year. Langemann also used the opportunity to practice speaking Chinese and has continued to study the language since returning to Mines.

Students also cite an expanded worldview as a top motivator for studying abroad. While Samuel Fiorica, a student in mechanical engineering, had originally planned to go to Spain, he decided he wanted to do something more unique with his study abroad experience. As a longtime student of taekwondo, he considered South Korea, and when he found out that Mines had recently reached an agreement with Pohang University of Science and Technology, he jumped at the opportunity.

PERSONAL GAINS

> To students studying abroad, the most obvious benefits are the ones they can integrate not only into their studies, but also into other areas of their lives. Kim said that, alone in Spain, it was much easier to drop the distractions of day-to-day life and focus instead on herself and her research. "It taught me to go back to square one, really, to manage my time and to see what my time could be used to do," she said. Kim completed 200 hours of research in five weeks on the mechanization of the epoxy Sikadur 30, essentially working full time.

Other students said studying or working abroad taught them to be more open to different ways of solving problems. Langemann noted that the general attitude in Southeast Asia was markedly more relaxed than in the U.S., "to the point where the bus driver will just stop and go in and have a coffee with his friends for 20 minutes and then get back on the bus and take off," he said. What might be direct or prompt communication to someone in the United States "might be perceived as rude and rushed in a place where time is perceived differently," Langemann explained.

The students agree that studying abroad showed them that they are capable of more than they had previously thought. Graf, who had expected to take only one class in Spanish, arrived to find out that she was signed up for three. It was challenging at first, she said, but she rose to the occasion and successfully completed a full year at the University of Oviedo. "I've already done the impossible," she said. "I'm now more confident with my classes. I'm willing to take on bigger challenges because I've already done this incredibly hard thing. There's not much I can't do at this point."

A HEAD START IN INDUSTRY

> Not only does studying abroad allow students at Mines to challenge themselves both personally and academically, but it also gives them a leg up when entering the workforce. Learning to live and work with other cultures "is part of our education in an increasingly globalized world," said Langemann. "It's a necessary part of engineering. Even at a midsize company, there are always going to be foreign nationals, and even contract work can be overseas. It's very likely the experience will be useful in a full-time job."

Mary Cook, associate director and manager of student mobility at Mines, agrees. "I've seen employers looking for students with the skill set you gain from studying abroad," she said. "They're looking for someone with the soft skills of demonstrating initiative or drive or the ability to be adaptable and flexible." Most importantly, she said, they're looking for "someone with intercultural skills that allow them to work with intercultural and international teams on really diverse projects."

"I've taken the initiative to learn how to interact in people's cultures," said Langemann. "Since so many engineering firms are multicultural, having candidates who are comfortable going abroad and who have some of that experience is a big selling point."

Langemann is now preparing to use his experiences in his career after graduation. "It continues to be a selling point as I've negotiated job positions and start dates and even the types of locations that I want to work in," he said.

Graf highlighted the importance of a global perspective even for students who haven't studied or worked abroad. "On the engineering side of things, if you're designing products for people all over the world, but you design it only from an American perspective, those products aren't going to be as successful," she said.

No matter what kind of international experience students have, they all agree that it was an unforgettable and invaluable opportunity. "I've spoken a lot with students who have graduated without studying abroad and they almost universally say that's the one thing they regret," Cook said. "And those who did study abroad say it was their best experience during their time in higher education and that they have no regrets."

Cook said she wants students to be able to leave Mines having had a full, rich educational journey, something that studying abroad only enhances. According to Fiorica, "it's definitely a transformative experience."

Samuel Fiorica spent a semester studying at Pohang University of Science and Technology in South Korea. Here, he is pictured with some other international students during a team-building retreat.
Photo courtesy of Samuel Fiorica

Megan Graf studied abroad for a year in Oviedo, Spain, and while much of her time was dedicated to her studies, she was also able to explore the country, including the Lakes of Covadonga, the original center of the Picos de Europa National Park.
Photo courtesy of Megan Graf

WORLDLY LEGACIES

A FEW OF THE INTERNATIONAL ALUMNI WHO HAVE LEFT A LASTING IMPRESSION ON MINES

SAO KYA SENG '53

Photo from 1953 Prospector

When Sao Kya Seng '53 was a student at Mines, only one person—Mines President John Vanderwilt—knew his secret. As the then-ruling prince of the Shan state of Hsipaw, Burma—now known as Myanmar—Seng wanted to have a normal college experience and see the American political system first-hand, then bring what he learned back to the Shan people. He graduated from Mines in 1953 with a professional degree in mining engineering.

Seng married his wife, Inge, in Denver in 1953, and returned to Burma, where Seng started a mining company and a salt mine, all while ruling the country. Seng founded the Tai Mining Company and planned to develop lead and silver mining deposits in the Kalagwe area of the state, as well as other natural resources, including salt, antimony, zinc and gold deposits. He believed these activities would help improve the economy and the livelihoods of the people of the primarily agrarian state.

However, his rule and professional ambitions were cut short by a political shift that ushered in nearly five decades of military rule. The Burmese army staged a coup in 1962, and Seng renounced his position as prince. He was arrested, imprisoned and believed to have been murdered.

Inge and the couple's two daughters, Mayari and Kennari, fled the country with only a handful of possessions, including Seng's silver diploma, which Inge still has today. In 1994, Inge wrote her biography, *Twilight Over Burma: My Life as a Shan Princess*, detailing her experiences, and the book was adapted into a film in 2015.

Seng was posthumously awarded Mines' Distinguished Achievement Medal in 2015, an honor bestowed on alumni with significant career achievements that enhance Mines' reputation and mission.

AHMED D. KAFADAR '42, MS '43

Photo from 1942 Prospector

Students cross Kafadar Commons every day as they hurry to class, but it's doubtful that many consider the person behind the name. But Ahmed D. Kafadar '42, MS '43 had a long history with Mines.

Born in 1915 in Gaziantep, Turkey, Kafadar first came to the United States during World War II on a diplomatic passport as a student representative of the Turkish government. He was one of 50 of Turkey's most promising university students sent to the U.S. for safety and advanced education, an opportunity Kafadar took full advantage of. He earned a professional degree in mining engineering in 1942 and a master's degree in mining engineering the following year. Kafadar became a U.S. citizen in 1946.

In his professional life, Kafadar started Ordnance Engineering Associates—now known as OEA, Inc.—which designs, develops, tests and produces propellant and explosive-actuated devices for aircraft personal escape systems, space vehicles and missile applications, as well as automotive air bags. Kafadar was awarded Mines' Distinguished Achievement Medal in 1986, recognizing his career achievements that helped enhance the university's reputation and mission.

After his wife, Maryanna, died in 1986, Kafadar established the Maryanna Bell Kafadar Humanities Award in 1987 in her honor. The award is granted each semester to a graduating senior who has excelled in humanities and has contributed to cultural life at Mines.

Kafadar was also responsible for starting the Kafadar Humanities Library Endowment, which provides funds for the ongoing acquisition of books and other materials in the humanities and other fields.

To acknowledge his distinguished contributions to Mines, Kafadar was awarded an honorary doctorate of engineering from Mines in 1987. The commons on campus was renamed in 1993 to reflect Kafadar's influence on the institution.

ERMÍRIO DE MORAES FAMILY

José Ermírio de Moraes '48

Antônio Ermírio de Moraes '49

Photos from 1948 Prospector

As one of the most influential families in Brazil, the Ermírio de Moraes name is familiar across the country, but the family also has strong ties to Mines. Seven members of the Ermírio de Moraes family attended Mines, starting with José Ermírio de Moraes, who earned a professional degree in mining engineering in 1921.

José's sons, José and Antônio, followed in their father's footsteps, both earning professional degrees from Mines in metallurgical and materials engineering in 1948 and 1949, respectively. The brothers supported Mines throughout their lives, contributing to the Mines Fund, the George S. Ansell Distinguished Chair in Metallurgical Engineering and the De Moraes Library Fund.

Back in Brazil, José was a chairman of the family-owned Grupo Votorantim, one of the largest industrial conglomerates in Latin America, operating in various sectors such as finance, energy, ferrous metallurgy and steel, among others. José received the Person of the Year award from the Brazilian-American Chamber of Commerce in 1995, commending him for being instrumental in forging closer ties between the two countries. He was also active with FIFA, the international soccer association, and served as a member of the 1994 World Cup Soccer Committee, the Brazilian Olympic Committee and the Brazilian Football Confederation.

Antônio also served as a chairman of Grupo Votorantim in his professional life, and was one of the original billionaires to appear on Forbes' first-ever world wealth rankings in 1987. He remained a staple on the list before largely disappearing from the public eye in 2001 after he was diagnosed with Alzheimer's disease. Antônio was president of the Beneficência Portuguesa de São Paulo hospital, which provides 60 percent of its services to citizens below the poverty line. He was awarded the Bandeirantes Medal in 2012, the highest honor awarded by the state of São Paulo to its citizens.

José and Antônio were both awarded Mines' Distinguished Achievement Medal in 1974 to recognize their career accomplishments that enhanced the university's reputation and mission. In addition, both brothers received an honorary doctorate of engineering from Mines in 1989 in recognition of their support of and interest in the school.

Four of Antônio's nine children earned bachelor's degrees from Mines: Carlos Ermírio de Moraes '79 (metallurgical and materials engineering); Antônio Ermírio de Moraes '81 (metallurgical and materials engineering); Luís Ermírio de Moraes '82 (chemistry and geochemistry); and Mário Ermírio de Moraes '86 (metallurgical and materials engineering).

By **Ashley Spurgeon**

RUNNING BACK TO MINES

ALUMNI RETURN TO CAMPUS FOR HOMECOMING 2018 CELEBRATIONS, INCLUDING A NEW 5K

Homecoming 2018 welcomed alumni back to campus to celebrate the Oredigger spirit with students, faculty and staff on Sept. 27-29. Alumni had the chance to reconnect with former classmates and get an insider's peek into what is happening on campus directly from President Paul C. Johnson, who shared details of the MINES@150 strategic plan as we get closer to celebrating the university's sesquicentennial.

Alumni reminisced on what Mines was like when they were students, noting the grit, rigor and teamwork necessary to earn their degrees are all strengths of past Orediggers that remain aspects of today's student experience and will help carry the institution into the future.

"When I was here, the professors said, 'Look to your left, look to your right—only one of you will make it.' Now, we should be saying, 'Look to your left, look to your right—those are the people who will help you get through,'" said George Puls '75.

This year, the class of 1968 celebrated its 50th class reunion and fondly remembered the fraternities they were part of, Mines traditions and the many shenanigans they got away with as students. Many shared their story in the Oredigger Story Booth, now featured as videos on the Alumni Tales page at **minesalumni.com**.

A local bluegrass band serenaded alumni as they celebrated late into the night at the Boots & Barrels event, the alumni-exclusive party and awards ceremony. Exemplary members of the Mines community highlighted that evening included:

- Mitch Kruse '85 – Outstanding Alumnus Award
- Harold Korell '68 – Melville F. Coolbaugh Award
- Tim Saenger '95 – Alumnus of the Year
- Ethan Faber MS '16 – Young Alumnus of the Year
- Harry Briscoe '71, MS '72 – Alumni Academic Involvement Award
- Sevy Swift, class of 2019 – Alumnus of the Future
- George Puls '75 – M Club Leader of the Year

The most notable event this year was the newest addition to the weekend activities: the inaugural Homecoming 5K. A total of 220 alumni, faculty, staff and students joined President Johnson for a 3.1-mile run (or walk) past the scenic views along Clear Creek, the Clear Creek Athletic Complex and many new buildings on campus.

"We had the great fortune to meet some fellow alumni so we jogged/walked the entire course together, reliving our days at Mines and advancing to our careers and current lives. We all had the best of memories of our times at Mines," said Vince DeBonis '78. "The course was awesome, with the path along Clear Creek and around the campus. I am so proud of our 'new' campus. When I started in 1974, we only had about 1,200 undergrads, so the expansion, plus larger student body, has made for an impressive and modern campus."

Medals cast at the Mines foundry and a pancake breakfast awaited racers at the finish line, and they got prime seating for the Homecoming parade, which featured the Mines marching band, floats made by student organizations and, of course, an appearance by Blaster.

A raucous tailgate led into the football game, where the Orediggers beat Colorado Mesa University, 72-31, bringing the Nyikos Cup—an annual trophy named after Michael Nyikos, a longtime supporter of both schools—back to Golden for the first time since 2014.

What a weekend!

By **Anica Wong**

ALUMNA PROFILE

FINDING THE SWEET SPOT OUTSIDE OF THE COMFORT ZONE

Sarah Hanes Lokman Hakim '17 returned to her home country, Malaysia, after graduating from Mines, putting the skills she learned in college to use tackling challenges in her professional life to set herself up for a successful career.
Photo by Faris Izzat

> One need only talk to Sarah Hanes Lokman Hakim '17 for a minute or two to realize she loves a challenge. A proud graduate of Mines' chemical engineering program, she confessed that she applied to the school sight unseen. In fact, the then-teenager had never even been to the United States. "When I began looking at colleges, my father suggested I investigate Mines," Sarah recalled. "In Malaysia, where I'm from, everyone knows the school. We have many major oil companies here and lots of the engineers who work in them are Mines graduates, so the university is highly regarded."

Sarah applied, was granted admission and made her way to Golden on her own to begin classes in fall 2013. Once on campus, she threw herself into the college experience. "My sophomore year, I joined a sorority, Sigma Kappa, and got heavily involved in campus activities," she said. "I enjoyed every minute of my four years."

After graduating, Sarah returned to Malaysia to pursue employment. For the first two months, she worked as a program host for the online sports program Dunia Sukan Online, but then the oilfield services giant Schlumberger came calling and recruited Sarah as a production engineer. Now she uses her chemical engineering degree to full advantage, analyzing client data to determine the future availability of oil supplies.

Sarah enjoys the work but is constantly seeking new challenges, something she encourages other international students at Mines to do as well. "My main advice to current students is, 'Get out of your comfort zone. Don't forget your roots, but don't be afraid to explore. Join organizations on campus, mix with the locals, try new things,'" she said.

For example, Sarah said joining a sorority was a scary endeavor, but it was the right thing to do. "I was nervous about rushing a sorority, but joining Sigma Kappa was the best decision I made while at Mines," she said. "My involvement with the organization gave me the confidence to step outside my comfort zone, meet new people and interact with Americans that I didn't know. The experiences I had as a student have enabled me to realize success as a professional."

Getting her degree from Mines was tough, Sarah admitted, but she is grateful for the work ethic the university imparted. "Mines taught me to work hard," she said. "I learned that I have to put 150 percent effort into everything I do, and after four years of classes, I understood that hard work will never fail you. I've carried that lesson into my professional life."

When asked about her future plans, Sarah confessed she's not altogether sure, but she knows it will be something new. "To be honest, I don't know what's going to happen tomorrow," she said with a laugh. "My work is currently office-based, but I'd prefer to be out in the field. I'd like to work on an offshore oil platform or perhaps in another country. My parents don't like the idea of me being so far away," she conceded, "but they're very proud of me."

By **Lori Ferguson**

WINTER 2019 ON OUR WALL

What do you miss about living in Golden since you graduated from Mines?

Tacoritos at Holly West for a 10 p.m. study break.
Mark Cutright '80

Access to 14ers, riding my bike to Buffalo Bill's grave and the smell of malt in the air.
Wayne Belcher MS '88, PhD '98

Mannie and Bo's Pizzeria, Kenrow's all-you-can-eat pancakes and $20 lift tickets to Copper Mountain.
Brad Flavin '96

I miss the fall colors and slacklining during the summer.
Abhi Parmar MS '14

Foss General Store (gone), walking from married student housing on the hill (also gone) to Safeway for groceries, seeing deer outside our window and pizza at Woody's.
Shannon Canfield '01

I miss the time sitting with my wife on a bench next to Clear Creek while reading books from the Golden Library.
Husni Mubarak MS '15, PhD '15

Nothing beats the view, no matter the time of year. I loved waking up and having the mountains right outside of my window—it was so beautiful.
Maria Smith '15

ALUMNI NETWORK

ALUMNI 'ROUND THE WORLD

INTERNATIONAL M CLUBS HELP OREDIGGERS STAY CONNECTED

No matter where you are in the world, there's a good chance you can find an Orediger in every major city across the globe. Mines' M Clubs keep alumni connected to their alma mater, providing a network of Orediggers who gather to socialize, reminisce and remain an active part of the Mines community. While there are M Clubs in cities throughout the United States, there are also several international clubs, bringing Orediggers together no matter where they may be.

All alumni are welcome to join their local M Club, which provides programs, networking opportunities and support from fellow alumni. The most popular gathering is E-Days 'Round the World, held every spring for alumni to celebrate being Orediggers, even when they aren't near Golden to attend E-Days events on the Mines campus.

No matter where your adventure takes you, the M will always stand for home.

M CLUB

▶ Interested in taking an active role with alumni in your community? Visit **minesalumni.com/MClubs** to connect with an M Club near you.

Map illustrated by **Trevor Bachand**

6%
OF MINES ALUMNI LIVE INTERNATIONALLY

TOP 5
NON-U.S. COUNTRIES WHERE ALUMNI ARE BASED

#1 MALAYSIA

#2 CANADA

#3 SAUDI ARABIA

#4 INDONESIA

#5 THAILAND

ALUMNI BY REGION

616 ASIA

267 MIDDLE EAST AND NORTHERN AFRICA

222 SOUTH AMERICA

212 NORTH AMERICA (EXCLUDING THE U.S.)

184 CONTINENTAL EUROPE

85 OCEANIA

67 UNITED KINGDOM AND IRELAND

52 AFRICA

13 CENTRAL AMERICA AND THE CARIBBEAN

OREDIGGERS GIVE BACK

PAYING IT FORWARD TO SUPPORT INTERNATIONAL STUDENTS

Spending an extended amount of time in a foreign country will most likely change how someone looks at the world and interacts with the people in it. That was definitely the case for Terry Laverty '70, who lived in Colombia for more than six years while working for ExxonMobil to develop the open-pit coal mine El Cerrejón, at the northern point of South America.

"There were three Colombian Colorado School of Mines graduates on that project, and I got a chance to work with a lot of Colombians," Laverty remembered. "We made a lot of business and personal friends and had the opportunity to travel in the country and learn more about Colombia and South America."

While living there, Laverty's young children went to a bilingual school and learned about the customs and traditions of their host country. Laverty himself was able to brush up on his Spanish and got a different perspective of the United States.

After that lengthy stay in Colombia and taking many other business trips to Chile, Brazil, Bolivia, Panama, Mexico, Russia, Kazakhstan, Slovakia, Ukraine and England, Laverty was interested in helping international students who wanted to attend Mines. In 2014, he teamed up with two fellow Mines alumni, Dan Evans '69 and John McDonough '69, to create the Emerging Countries Undergraduate Scholarship, which is awarded to Mines students from emerging countries and regions around the globe.

"A lot of foreign students—undergraduate students—may get support from a company within their country for tuition and fees, but they don't have money for food, housing, computers," Laverty explained. Thanks to Laverty's generosity and that of 12 other Mines alumni, scholarship recipients are given a one-time award of $5,000 to use at their discretion as a supplement.

"We've seen some of the positive aspects of technical people in these countries," Laverty said. "Our hope is that the students return home and apply those technical skills they've learned at Mines to improve their own country."

By **Anica Wong**

EMERGING COUNTRIES SCHOLARSHIP IMPACT

16 SCHOLARSHIPS AWARDED

$97,184 TOTAL CONTRIBUTIONS
since inception of the current use fund (as of 7/1/18)

$276,590 TOTAL ENDOWMENT
(as of 7/1/18)

COUNTRIES REPRESENTED AMONG RECIPIENTS

Bolivia, China, DR Congo, Indonesia, Jamaica, Malaysia, Mexico, Mongolia, Philippines, Portugal

Photo courtesy of Terry Laverty

"It has been two years since I started working back in my home country of Malaysia. However, never will I forget the honor of receiving the Emerging Countries Scholarship during my senior year at Mines, knowing that there are people out there who really care about my education and my career path. The scholarship had really motivated me to finish my senior year well."

Catherine Tang '16
Production technologist at PETRONAS Carigali Sdn Bhd

ALUMNUS PROFILE

A MULTIDISCIPLINARY PROBLEM SOLVER WITH REAL-WORLD IMPACT

José L. Moreno '96 doesn't have your average day job. As a regional engineering security officer with the U.S. Department of State, he has spent more than a decade crisscrossing the globe, providing technical solutions and leading teams to counter cyber and technical surveillance attacks on U.S. embassies and consulates.

Today, Moreno is stationed in Lagos, Nigeria, and oversees embassies and consulates in a West African region the size of the United States. Since assuming the post in September 2017, he has also traveled to London and Brussels to commission a new embassy and NATO headquarters.

Moreno landed at the State Department after serving in the U.S. Army and working for a few years as a systems engineer at Lucent Technologies and General Dynamics. "I loved the overseas experiences I had while in the Army," he said. "I frequently experienced living history, rather than just reading about it in a book, which I appreciated. My wife had also lived abroad and loved it, and we wanted to give our two boys the same experience. So, when the opportunity with the State Department came around, I grabbed it."

Since joining the agency in 2004, Moreno has steadily climbed up the organizational ladder. He earned promotions at a faster pace than many of his peers and asserted that his success is in no small part a result of the multidisciplinary education and problem-solving skills he obtained at Mines. "My degree is in electrical engineering, but I can manage multidisciplinary problems," he said. "For example, when I'm on site, I'm equally comfortable talking to public utilities workers, civil engineers, network engineers or ambassadors."

This broad-based expertise has come in particularly handy during several of Moreno's assignments. In 2014, he was posted in Islamabad, Pakistan, where, in addition to having regional responsibilities for consulates in Karachi, Lahore and Peshawar, he was responsible for commissioning one of the U.S.' largest and most expensive embassies, a $1.2 billion complex. "That was a rewarding and, as you can imagine, very challenging assignment," he said.

After completing his tour in Pakistan, Moreno immediately drew on his education and experience again when he assumed the role of senior technical advisor and site construction security engineer for the new $1.4 billion NATO headquarters in Brussels, Belgium. "There were 300 companies contracted to complete the building, and I had a staff of approximately 140 members from the then-28 NATO countries—it was a lot of moving parts," he said.

José L. Moreno '96 currently works as a regional engineering security officer with the U.S. Department of State in Lagos, Nigeria.
Photo by Tracy S. Moreno

"As a Mines student, I learned to take a bird's-eye view of a problem and then break it down into pieces that can be solved strategically. It's a skillset that has served me well."

"As a Mines student, I learned to take a bird's-eye view of a problem and then break it down into pieces that can be solved strategically," Moreno concluded. "It's a skill set that has served me well and that I have passed on to my sons, one of them (Daniel Moreno) being a new Mines student."

By **Lori Ferguson**

WEDDINGS

BREWING LOVE

Amanda Spencer '13 and Raymond Oberbroeckling '13 tied the knot on Aug. 11, 2018, at a brewery in Denver, Colorado. Several Mines alumni celebrated with the couple, including bridesmaids Melissa Cook '14, Anastasia Shpurik '14 and Lindsey (Murphy) Ball '14, and groomsmen Patrick Whitney '13 and Jonathan Ball '13. Ray proposed to Amanda on the Mines campus when they returned to Golden to celebrate their seven-year anniversary in 2017.

To submit a wedding, birth or award announcement for publication in the magazine, visit **minesmagazine.com/submit-an-announcement**.

BABIES

OREDIGGER IN THE MAKING

Michael Brehm '09 and Joelle (DiBenedetto) Brehm '10 are thrilled to announce the birth of their son, Christopher Anthony Brehm, born on March 25, 2018.

WELCOMING A BABY BROTHER

Emilyanne (Dalton) Hardy '10, Cole Hardy and big sister Evelyn Rose welcomed a sweet boy, Oliver Dalton Hardy, to the family on June 9, 2018.

IN OTHER NEWS

FOREVER FAMOUS

Longtime Mines coach, administrator and alumnus Marv Kay '63 was announced as a member of the Colorado Sports Hall of Fame's Class of 2019. Marv will be joined in this year's class by Olympic gold medalist swimmer Missy Franklin, Nordic combined silver medalist Todd Lodwick, former NFL standout Daniel Graham, longtime Wray High School wrestling coach Bob Smith and track standout and Special Olympics and Paralympics contributor Tom Southall. They will be inducted April 3, 2019, during a banquet at the Hilton Denver City Center.

RACING INTO HER FUTURE

On Sept. 18, 2018, Sabré Cook '17 was announced as the Infiniti Engineering Academy 2018 USA winner at the Circuit of the Americas. Her prize is a six-month work placement at the Renault F1 Team in Enstone, England, and a further six months at Infiniti's Technical Centre Europe in Cranfield, England. She was one of seven winners of the prize and the only winner from the United States.

EXCEPTIONAL YOUNG WOMAN

Nima Sherpa '13 was recognized at the Rio Tinto 2018 Women in Resources Awards with the Exceptional Young Woman in Australian Resources award on Sept. 13, 2018. The event was held at Parliament House in Canberra, and the awards are a partnership between the Minerals Council of Australia, Chamber of Minerals and Energy in Western Australia, NSW Minerals Council, South Australian Chamber of Mines and Energy, Tasmanian Minerals and Energy Council and Queensland Resources Council.
On the same day as the awards ceremony, Nima flew to Adelaide to attend her MBA graduation ceremony.

JOIN US IN 2019 AT AN ALUMNI GOLF TOURNAMENT!

19th Annual Endowed Scholarship Golf Tournament – Houston
Friday, April 26, 2019 | Gleannloch Pines

5th Annual Dallas Alumni Golf Tournament
Friday May 17, 2019 | Bear Creek Golf Club

35th Annual Endowed Scholarship Golf Tournament - Colorado
Friday, June 7, 2019 | Red Hawk Ridge

10th Annual Endowed Scholarship Golf Tournament – Oklahoma
Date & location TBD

For tournament and sponsorship info, please visit minesalumni.com/events

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THANK YOU TO OUR 2018 ALUMNI GOLF SPONSORS!

18th Annual Endowed Scholarship Golf Tournament – Houston

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Chesebro' family – Steve '64, Scott '92, Michelle '94

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George Puls '75

Lunch Sponsor
John H. Gray '64

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EACIIT
Rob Love '97
Nabors International
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Pat Hogelin '95
Paul C. Johnson
Lew Mologne '83
Ken Spalding '60
Michael Van Horn MS '79

2018 Scholarship Recipients

Ryan Buck
Senior, Computer Science, Houston

Anneliese Denny
Freshman, Mechanical Engineering, Houston

Delaney Duis
Junior, Environmental Engineering, Trophy Club

Warren Marshall
Junior, Economics, Houston

Number of scholarships granted to date: 42

Endowment funds raised to date: $604,757

4th Annual Dallas Alumni Golf Tournament

Corporate Silver Sponsors
MS Directional
Sooner Pipe and Supply
Rene St. Pierre '76
Total E&P

Corporate Blue Sponsors
Will Culp '99
Dynamic Drilling Fluids
Jeff Frayser '83
Patterson-UTI Drilling
Tim Saenger '95
Ulterra

Hole Sponsors
BJ Services
George Puls '75
The Turbulator Company

2018 Scholarship Recipients

Logan Braden
Junior, Mechanical Engineering, Keller

Jacob Tarpley
Senior, Geotechnics, Houston

Number of scholarships granted to date: 6

Endowment funds raised to date: $31,000

34th Annual Golden Golf Tournament

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Michael '83 & Patty '83 Starzer

Hole Sponsors
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Camino Natural Resources
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Cureton Midstream
DCP Midstream
Edward Jones
FirstBank
Franzen Pittman
Kimberly Alanis
Maxson Engineering
Mines Dining by Sodexo
PDC Energy
Sheridan Ross

2018 Scholarship Recipients

Chloe Archuleta
Senior, Chemical & Biochemical Engineering, Arvada

Hanna Bailey
Senior, Chemical & Biochemical Engineering, Evergreen

Number of scholarships granted to date: 6

Endowment funds raised to date: $44,521

9th Annual Endowed Scholarship Golf Tournament – Oklahoma

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Montclair Energy
Erdol Inc.

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Capital Distributing

Hole Sponsors
Aerion
BC Clark Jewelers
Dynamic Drilling Fluids
Intrepid
Knight Oil Tools
Smith Bits – a Schlumberger Company

2018 Scholarship Recipients

Joseph Kusbel
Junior, Mechanical Engineering, Edmond

Cameron Mayberry
Senior, Metallurgical & Materials Engineering, Stillwater

Number of scholarships granted to date: 11

Endowment funds raised to date: $186,968

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A DEDICATED LIFE

REMEMBERING NORMAN R. ZEHR (1930-2018)

Many people have a strong affinity for their alma mater, but there are few who dedicate their time and service to the extent that Norman "Norm" Zehr '52, MS '56 did to Mines.

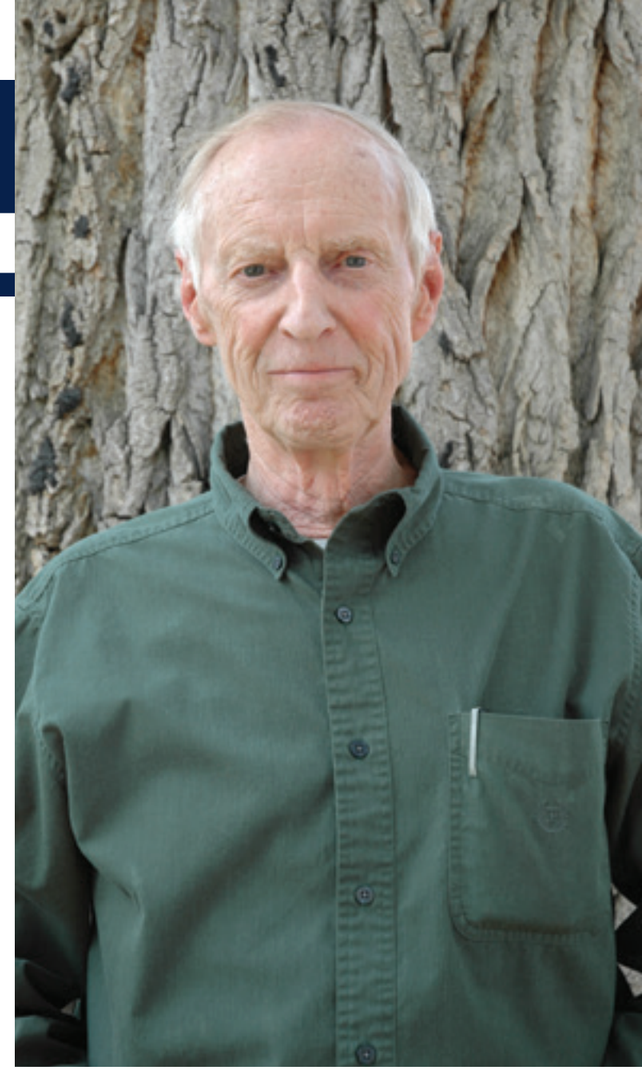
Norm's love for Mines first developed as an undergraduate as he pursued a professional degree in mining engineering nearly 70 years ago. He was an involved member of campus, becoming a member of the Sigma Nu fraternity as well as the National Society of Scabbard and Blade and the National Society of Pershing Rifles, honor societies for ROTC candidates.

Norm graduated as a distinguished military graduate in 1952. He was commissioned as a second lieutenant in the United States Army Corps of Engineers and became an Army aviator in 1954. Showing the same dedication he did at Mines, Norm excelled in the military, serving in the 40th Infantry Division and the Korean Military Advisory Group in the Korean War. He was recognized for his military achievements with numerous honors, including the Army Commendation Medal, the National Defense Service Medal and a United Nations Service Medal.

Norm obtained his commercial pilot license after leaving the military but couldn't be kept from Mines for long. He returned to campus to earn a master's degree in mining engineering in 1956.

In the following 28 years, Norm worked for Ingersoll Rand, first as a sales engineer, before being promoted to several executive positions, including vice president of Ingersoll Rand Company and president of Ingersoll Rand International. In his professional life, Norm was recognized with many accolades, including Mines' Distinguished Service Medal in 1977 and the Legion of Honor award from the Society for Mining, Metallurgy and Exploration in 2001, both honors recognizing his career achievements.

When Norm left Ingersoll Rand in 1983, Mines called him home. He returned to his alma mater in 1984 as the executive director of the alumni association. Norm held the position for 11 years, encouraging alumni to maintain their affinity for the university and ensuring the institution's success. During his tenure, he was an instrumental part of the editorial committee that produced *Rocky Mountains to the World*, a book published in 2004 by Wilton Eckley that details the university's rich history, a subject Norm felt passionate about. He was also an honorary member of Blue Key and was made an honorary Mines ROTC colonel in 1987 before being inducted into Mines' ROTC Hall of Fame in 2017.



Norm Zehr '52, MS '56 held a strong affinity for Mines and served as executive director of the alumni association for 11 years.
Photo courtesy of Mines alumni office

Norm retired from the alumni association in 1995, but continued to support Mines and its alumni. He was a founder and regular attendee of the alumni association's Lunch Bunch group where alumni in the Golden area gather on the second Thursday every month to catch up and enjoy the company of fellow Orediggers—a gathering that continues to this day.

Norm is survived by his wife, Jan; daughters, Jeannette (husband Philip) and Leslie; grandchildren, Austin, Lina and Abdallah; great-grandchildren, Acia and Mourad; and brother, Dick.

By **Ashley Spurgeon**

IN MEMORIAM

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

-Kahlil Gibran

ARTHUR RONALD "RON" BRIGGS '57 died Aug. 5, 2018. Ron was born in 1934 and earned a professional degree in petroleum engineering in 1957. He briefly worked in the oil fields in Russell, Kansas, before moving back to Denver, where Ron earned his MBA from the University of Denver. He then moved to Omaha and various cities in Texas and eventually opened his own petroleum consulting firm specializing in property evaluation, A.R. Briggs and Associates. Ron was a licensed engineer in several states, including Texas and Colorado.

RICHARD E. "RICK" ELLWANGER MS '70 died Oct. 11, 2018. Born in 1944, Richard earned a master's degree in metallurgy from Mines in 1970 and later earned a PhD in inorganic chemistry from the University of Wyoming. Rick worked in the mining industry for many years and later became a research scientist in plasma and nanotechnology at Sigma Technologies in Tucson, Arizona. An avid road and mountain biker, Rick was a state and national champion and a member of Aggress, a regional cycling team in Tucson.

NICHOLAS G. GARANIS '53 died April 24, 2017. Born in Greece in 1929, Nicholas earned a professional degree in mining engineering from Mines in 1953. As a student, he was on the soccer team and practiced violin. Nicholas started his career working for Mycobar Mining Co. and joined Cosmogas Hellas in 1957 as a general manager. From 1975 to 1981, he led General Ceramic Co., a porcelain and tiles manufacturer. Nicholas eventually started his own distribution company, which he ran until his retirement. Nicholas served as an honorary consul of Denmark in Greece and vice president of the Association of Hellenic Importers and chaired the Hellenic Association of Spirit Importers.

FRANK A. HADSELL PHD '61 died Oct. 6, 2018. Born in 1929, Frank graduated from the University of Wyoming with a bachelor's degree in general engineering in 1951 and then served in the U.S. Air Force for two years. After completing his military service, Frank returned to Wyoming, earning a master's degree in physics from UW in 1956. Frank then moved to Golden, Colorado, where he earned a PhD in geophysics from Mines is 1961 and taught geophysics at the school until his retirement.

WARREN B. HAMILTON died Oct. 26, 2018. Born in 1925, Warren served in the U.S. Navy from 1943 to 1946 and was a commissioned officer on the USS Tarawa. He earned his bachelor's degree from the University of California, Los Angeles in 1945, a master's degree in geology from the University of Southern California and a PhD in geology from UCLA. Warren worked as a research scientist with the U.S. Geological Survey and was known for integrating observed geology and geophysics into planetary-scale syntheses describing the evolution of Earth's crust and mantle. After retiring from the USGS in 1995, Warren became a distinguished senior scientist in the Mines Geophysics Department, teaching classes until fall 2017. Warren was a member of the National Academy of Sciences and was awarded the Geological Society of America's Penrose Medal.

ALSO REMEMBERED

Daniel R. Hart '73 ..... August 30, 2018
Patrick A. Ley '74 ..... November 30, 2017

JOSEPH L. HARBISON '55 died Feb. 25, 2018. He was born in 1933 and graduated from Mines in 1955 with a professional degree in petroleum refining. Joe spent his career working for Marathon Oil Company until his retirement in 1992, working in Nebraska, Wyoming, Texas, Louisiana, New Mexico, Alaska, Ohio, Canada, Great Britain, Ireland and Indonesia.

LEONARD E. OLDS '49, MS '51 died Sept. 21, 2018. Leonard was born in 1925 and served as a first lieutenant in the U.S. Army Air Corps stationed in Guam during World War II before attending Mines to earn a professional degree and master's degree in metallurgical and materials engineering in 1949 and 1951, respectively. He was a skilled research electric furnace metallurgist, held many patents and wrote several technical papers. Leonard became a high priest in the Church of Jesus Christ of Latter-day Saints and served as a senior missionary in London's Whitechapel Ward.

▶ To submit an obituary for publication in the magazine, visit **minesmagazine.com/submit-an-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 **giving.mines.edu/givingguide**.

Compiled and written by **Ashley Spurgeon**

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MINER'S PIC

CALL OF THE WILD

Wildlife photography has long been a consuming hobby of Gary Harris '84. He first got started by experimenting with underwater photography, specifically when he borrowed a 35mm underwater camera for a dive trip in April 1992. "I shot five rolls of film from which I only had about three really nice pictures," he said. "A normal person would have thrown up their hands and said, 'This is too hard.' I, however, really liked those three pictures, and I was hooked."

Since then, Harris has traveled all over the world on photo trips, giving him opportunities to view wildlife up close and personal and capture the best shots of exotic creatures. His foreign work assignments gave him access to some remote locations. "Working in the oil industry my whole career has afforded ample opportunity for me to pursue my passion," he said.

Harris has visited almost every continent, seeking out some of the most elusive of wildlife, such as bald eagles in Alaska, Japanese cranes in Japan, penguins in Antarctica and jaguars in Brazil. On a 2002 photo safari trip to Botswana's Savuti Safari Camp, Harris managed to capture the perfect shot of a lioness lounging in the setting sun. "On these trips, one may do photography for 12 to 16 hours per day. This was one of the last shots of the day due to the failing light," Harris explained. "The sun highlighting the lion's face and the deep, rich, horizontal shadows made a very attractive setting."

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EMBRACING A GLOBAL COMMUNITY

Each year, Orediggers come together for International Day to celebrate culture and diversity with performances and global cuisine to represent students' home countries and backgrounds. The annual celebration is the largest cultural event on campus.

Photos by Vicknesh Balabaskaran