



MINING FOUNDATION OF THE SOUTHWEST

Thomas L. ALDRICH, Executive Director

PO Box 42317, TUCSON, AZ 85733

520-577-7519 (office),

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www.miningfoundationsw.org

admin@miningfoundationsw.org

CONCENTRATES

HOF Awards Banquet to Induct Honorees on December 4

The 39th Annual American Mining Hall of Fame Awards Presentation Banquet & Fundraiser will be held December 4 at the JW Marriott Starr Pass Resort & Spa in Tucson, Arizona beginning at 6 PM. The banquet has over 60 sponsors supporting the Mining Education Outreach Program overseen by the University of Arizona's Lowell Institute of Mineral Resources.



This year's Inductee is **Robert Friedland**, Founder and Executive Co-Chairman, Ivanhoe Mining Ltd. For more than 30 years, Friedland has been recognized by leaders of the international financial sector and mineral resource industries as an entrepreneurial explorer, technology innovator and company builder. He has a knack for hurdling seemingly insurmountable challenges to turn dreams into reality. Friedland was inducted into the Canadian Mining Hall of Fame in January 2016. Mr. Friedland holds United States and Canadian citizenships and resides in Singapore.



Medal of Merit Honoree **Sydney Hay** was inspired to become involved in public policy in the 1980's and has been a tireless fighter for the citizens of Arizona ever since. She has served for the past 27 years as President of AMIGOS (Arizona Mining and Industry Get Our Support), a trade association of small to mid-size businesses with members in over 20 states that supply Arizona's vital copper mining industry. Sydney leads the way in standing up for issues important to mining.



Medal of Merit Honoree **Sarah Strunk** is Chair of the Board of Directors of Fennemore. Strunk has represented numerous clients in the mining and natural resource industry over the past 3 decades. She practices in business and finance law, with an emphasis on mergers and acquisitions, corporate governance, international sales contracts and exploration projects. Prior to joining Fennemore, Strunk was Corporate Counsel to the copper and molybdenum division of Cyprus Amex Minerals Company.



Medal of Merit under 40 Honoree **Angela Watt** grew up on a cattle ranch in Southern Arizona and developed an early passion for rock-collecting. However, it was a visit to the university's San Xavier Mining Laboratory, a student-run underground mine, where she found her calling to underground mining. In 2018, she joined South32's Hermosa Project in Southern Arizona as Chief Mining Engineer. In May 2020 she was promoted to Manager Underground Engineering and is now responsible for the team performing Hermosa's mining study work and overseeing technical input to construction projects.



A SOUTHWEST ENERGY / Orica Joint Venture

The Industry Partnership Award goes **Southwest Energy**, established in 1973 by 2013 Inductee James Toole in Tucson, Arizona. Throughout the 80's and 90's, the company continued to expand and in 2008 formed a joint venture with Orica. Southwest Energy safely manufactures and loads hundreds of millions of pounds of blasting agents every year, working closely with their customers to optimize their explosive products.

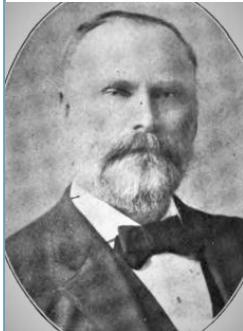


Founded 1871

A Special Citation Award is being given to the **American Institute of Mining, Metallurgical and Petroleum Engineers (AIME)** in recognition of their 150th Anniversary. Founded in 1871 by 23 mining engineers in Pennsylvania as one of the first national engineering societies established in the United States., AIME now has nearly 200,000 of the most influential and innovative figures in engineering and science

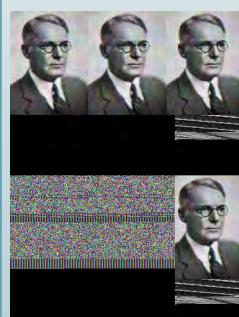
HOF Awards Banquet to Induct Honorees on December 4

This year's Inductees from Mining's Past include a prospector, a former governor, a renown mining engineer and an inventor turned philanthropist. All were alive at the turn of the twentieth century and each left their mark on the mineral resources industry.



Robert Metcalfe (1825—1905) was one of the discoverers of the Morenci copper deposits in Arizona. He was born in Kentucky and educated at West Point. At the close of the Civil War, Metcalfe found his fortune lost. He then headed west prospecting for a new future. In 1870 while scouting the area near Silver City, New Mexico, he discovered a rich copper deposit. He returned two years later with his brother Jim and located the Longfellow claim. Metcalfe was among the original group of prospectors who organized the Copper Mountain Mining District in 1872. The town of Metcalf along Chase Creek about 8 miles from present day Clifton was named after Robert Metcalfe and was eventually overtaken by the advancement of the Morenci open pit mine.

George H. Dern (1872—1936) was an American politician, mining innovator, and businessman. He is remembered today as the co-inventor of the Holt-Dern ore-roasting furnace, as a former governor of Utah (1925—1933), and as a former U.S. Secretary of War (1933—1936). Dern was born in Dodge County, Nebraska, and graduated from Fremont Normal College at the age of 16. In 1894, Dern moved to Salt Lake City, Utah joining the Mercur Gold Mining and Milling Company, where his father served as president. Dern rose rapidly from bookkeeper to company treasurer and in 1901 he was promoted to general manager. During his tenure as Governor of Utah, a landmark mineral leasing act was passed that leased, rather than sold, Utah's mineral rights to private concerns.



Francis W. MacLennan (1876—1947) was an internationally renowned mining engineer and former ViP of the Miami Copper Company. He was born in Canada in 1876 and graduated from McGill University in Montreal in 1898. He worked for various mining enterprises in British Columbia, Utah, Nevada and Peru. From 1919 to 1936 he worked for the Miami Copper Company in Arizona in management and as Vice President. MacLennan devised a mining method that would drastically reduce mining costs and extend mine life. At the time, block caving used blocks 60 to 100 feet in height. MacLennan designed a system using blocks 300 feet in height by utilizing detailed design, engineering and costing. In 1931, MacLennan was awarded the William Laurence Saunders Gold Medal.



Frederick Gardner Cottrell (1877 - 1948) was born in Oakland, California. After finishing high school, he entered the University of California, Berkeley at age 16 and graduated in 3 years. He received an advanced degree from the University of Berlin in 1901 and a Ph.D. from the University of Leipzig in 1902. Returning to a professorship at the University of California in 1904. While at Berkley he embarked on his best-known work which culminated in 1908 patent for the Cottrell electrostatic precipitator for smelters, one of the first inventions designed to eliminate air pollution, and which is still widely used throughout the world today. Cottrell established the philanthropic Research Corporation in 1912 where his patents funded scientific research. Cottrell later served as director of the U.S. Bureau of Mines. He was elected to the National Academy of Sciences in 1939.

We Salute those significant contributors to the industry and profession!



**Hall of Fame Chairman, Amanda Best
Senior Environmental Consultant
Westland Resources**



Happy Holidays, Everyone! I greatly appreciate the generosity of our sponsors this year for the ongoing success of the Mining Foundation of the Southwest. As of this week of Thanksgiving, our sponsors have come through with \$122,740 in sponsorships for the 39th Annual American Hall of Fame Awards Banquet & Fundraiser. Thanks to the support of our sponsors and

others who plan to participate in the event this year, we will be able to continue to fully fund our Outreach Coordinator, Chris Earnest, at the Lowell Institute of Mineral Resources at the University of Arizona. Chris has done some wonderful work as our Outreach Coordinator, and I look forward to seeing what he will do in 2022. I want to thank all the members of the Hall of Fame Committee who worked so diligently to present an outstanding slate of Honorees and plan for this event. Special thanks also to Tom Aldrich, the Executive Director of the Mining Foundation of the Southwest. His dedication, commitment, and efforts since 2016 have greatly contributed to the Foundation's success. I'm looking forward to seeing everyone again this year and I am so very honored to be the Foundation's 2021 Vice President and Hall of Fame Committee Chair. See you all on December 4 at the JW Marriott Starr Pass, Tucson Ballroom!

THANK YOU 2021 AMERICAN HALL OF FAME SPONSORS



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Platinum: Eclipse Mining, Freeport -McMoRan, Hexagon, Komatsu, M3 Engineering, Modular and Southwest Energy;

Gold: Ames Construction, Asarco LLC, Boart Longyear, Capstone Mining Pinto Valley Mine, Doosan Bobcat, Empire Southwest, Epiroc, MMSA, Resolution Copper, Ruen Drilling, Rummel Construction, SRK Consulting, Stantec and Westland Resources;

Silver: AMIGOS, Ausenco, BGC Engineering, Boart Longyear, CAID, CalPortland, Cascade Drilling, Cementation, Civil & Environmental Consultants (CEC), Copper State Bolt & Nut Co., CTI, DMYL, Fennemore, First Majestic Silver, Florence Copper, Golder, Hudbay, John Fenn, KGHM (Carlota Copper Company), Major Drilling, Montgomery & Associates, Next Plan LLC, Origin Mining, Pioneer Equipment, Professional Minerals Development, Quarles & Brady, Skyline Assayers, South32, Sundt, T P McNulty and Associates, Inc., George Tsiolis, Valley Forge and Bolt Company, Wood and Yellow Jacket Drilling;

Others – Robin Barnes, NMHOF & Museum, Tom Scartaccini, Robert Tracy and Pam & Will Wilkinson

Thank You To Our Sponsors!





Outreach Corner by Chris Earnest

Funded by the Mining Foundation of the Southwest through the Lowell Institute for Mineral Resources at the University of Arizona



MFSW Outreach Coordinator Activities: Mid-September- Mid-November 2021

Hello from Chris Earnest. The yellowed leaves on the cottonwood trees tell us that fall has finally descended upon southern Arizona. The cooler weather makes travel pleasant and the last two months has brought the outreach program to Superior, Wilcox, Tucson, Phoenix, and Sierra Vista to present about the importance of mining and mineral resources.

Forging connections



Our friendly "spooky scientists" prepare to astound and amaze.

Over the last two months the outreach program has had several chances to deepen connections with educators, the mining industry, and the public. At the Arizona SCITech Conference and the Arizona Science Teachers Association (ASTA) fall meeting the outreach program had the pleasure of meeting face to face with teachers from all over Arizona. Old friends were greeted heartily, and many new faces were introduced to the outreach program. In mid-October the Lowell Institute for Mineral Resources sent Chris Earnest,



A young "Elsa" and her magic wielding older sister watch with awe as a solid appears out of a blue liquid.

the outreach education coordinator, and Mario Muñoz, the recruitment coordinator, to the annual Women In Mining Conference in Salt Lake City. At the conference, Chris was able to introduce the outreach program to some of the attendees while receiving valuable feedback for improving the broad appeal of outreach program materials. Right after returning from the conference, Chris and John Gengler, the education outreach intern, headed up to Superior to run a table at the Superior Mining Days by invitation of the Chamber of Commerce. Chris and John spent a beautiful day introducing residents of Superior and tourists from The Valley to how society benefits from the minerals mined in the Copper Triangle. At the very end of October, Chris and John put on their spooky googles and lab coats to help teach trick-or-treaters about mining at Flandrau Planetarium's Science Spooktacular. Little ghouls and ghosts cackled gleefully when eerie green and blue minerals transmogrified into copper through the power of science.

Outreach Corner by Chris Earnest (cont.)

Out and About



Wilcox Highschool science students or future exploration geologists?

After a surprise request for a virtual presentation from a High School in New Jersey brought Chris into the Mines Building at five in the morning to introduce mining to the students back east over Zoom, the outreach program put away the costumes and spooky decorations and hit the road. In-person presentations were given to schools in Phoenix, Sierra Vista, Tucson, and Wilcox. Buena High school in Sierra Vista took full advantage of both virtual and in person offerings. Over Zoom, Mario introduced careers in mining and the education pathways needed to enter the industry. Then, he and Chris guided the students through a Google Sheets based mine design activity. The next week Chris went to Sierra Vista in person to have the students try their hands at being metallurgists

through the newly put together Electrowinning kits mentioned in the previous newsletter. Through a contact made at the RAIN conference, also mentioned in the previous newsletter, Mario and Chris spent three days in Wilcox talking to every High School and Middle school science class. Chris introduced the 5th, 6th, 7th, and 8th grade students to materials mined near Wilcox and around Arizona, what we use those minerals for, and the people that work at the mines and processing facilities. The students enjoyed having guests come in to talk to them with one student commenting, when asked why they would recommend the presentation, "because it's really interesting and you get to know more about mining."

Field Trip Time

After a presentation from Chris on mine design to a Computer Technology and Engineering (CTE) class at Sunnyside High School, the teacher and students wanted a chance to visit a mine in person. Fortunately, the University of Arizona's San Xavier Underground Mining Laboratory (affectionately known by students and staff as the "SX Mine") has re-opened for tours. Assistant Director James Werner has been graciously assisting the outreach program by allowing interested classes to tour the mine as well as leading the tours himself when his busy schedule allows. When the Sunnyside students arrived, Mario introduced them to all the different people it takes to make a mine and gave them some ideas about how they could enter the industry.



Dr. Lutz helps Sunnyside Highschool students understand the importance of ground support in the "New Decline."

Outreach Corner by Chris Earnest (cont.)



Students noticing that not all the rock in the mine contains copper minerals.

December the education outreach program looks forward to bringing middle school 7th and 8th graders out to see the mine as a capstone to a three class-period mining “mini-unit.”

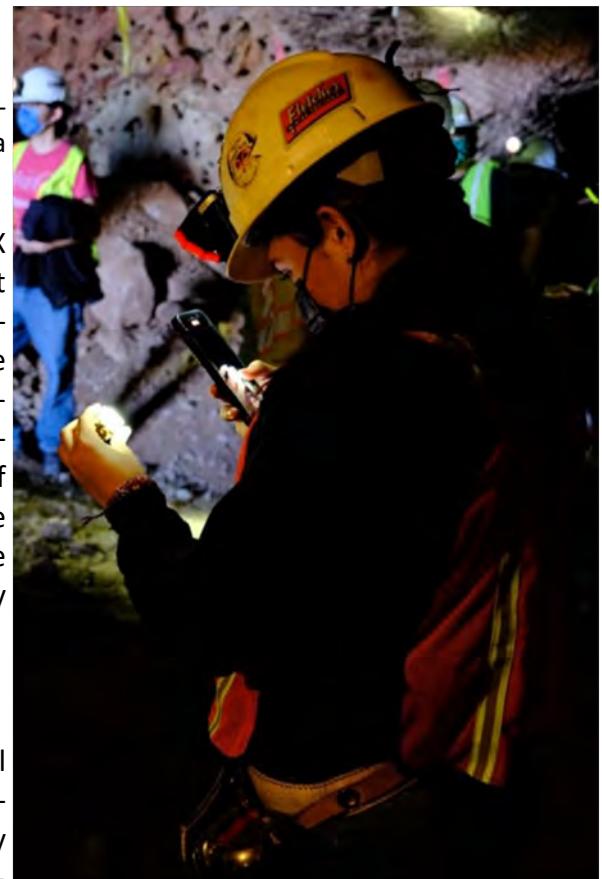
While not a viable option for every school group, the SX Mine provides a unique opportunity for students to connect what they learn during outreach presentations with a real-life example. Pictures say a thousand words but being there in person leads to quick understanding. The education outreach program would like to thank the Assistant Mining Laboratory Director James Werner, Dr. Eric Lutz, the faculty of the Mining and Geological Engineering Department, and the graduate and undergraduate University Students who have donated time and energy to make this field trip opportunity available to the outreach program.

Wrapping Up The Year

The few weeks left in December before the winter break will see the outreach program travel to schools in Tucson, Phoenix, Sahuarita, and hopefully a few more. As the university students look forward to their winter break, Chris looks forward to seeing the members of the Mining Foundation at the Hall of Fame Banquet. Happy Holidays!

The excitement was palpable as the students put on their PPE and Dr. Eric Lutz, Associate Professor in the College of Public Health and the Department of Mining and Geological Engineering, led them through the historic workings and the new decline. Walking into the mine allowed students to connect what they learned in the mine design exercise, how to plan so that you don't mine excess material, with the reality of how much work moving all that rock requires.

Sunnyside high school is not the only school to request a tour of the SX Mine. Pusch Ridge Academy visited in November and the recruitment outreach program has brought several community college groups through as well. In



An 11th grade student hoping to find some of the malachite she saw in class.

What We're all about...Lowell Institute for Mineral Resources

A common refrain by miners is “*if it can’t be grown, it must be mined.*” We depend on mineral resources for nearly all aspects of our daily lives and as our societies become more technologically developed, we become increasingly dependent on nonrenewable mineral resources. We encourage the next generation of scientists and engineers to become informed about this topic—**who knows, one of your students might discover the next big breakthrough in advancing sustainable and responsible mining.**

With funding from the [Mining Foundation of the Southwest](#), the Lowell Institute provides educational programming geared towards middle school, high school and college-level audiences. Head to [Minerals.Arizona.edu](#) for more details.

MEMBERSHIP

Annual membership renewal will soon be here in January 2022. Please consider asking your associates to join the Mining Foundation of the Southwest. The key to any organization is membership, especially new members.

[Become a Member \(miningfoundationsw.org\)](#)

Thank you all for your support of the MFSW. Help us get bigger and stronger and healthier. The Outreach Program needs your support!



HALL OF FAME COMMITTEE MEETING

Date: Wednesday, January 10, 2021

Time: 3:30 p.m. — 4:30 p.m.

Place: ZOOM & M3 Engineering, 2051 W. Sunset Rd., Tucson, AZ 85704

RSVP: admin@miningfoundationsw.org OR 520-577-7519

Happy Thanksgiving



*"Appreciation is a wonderful thing.
It makes what is excellent in others belong to us as well." — Voltaire*