



MINING FOUNDATION OF THE SOUTHWEST

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# CONCENTRATES



## 2014 Medal of Merit Recipients

Corale L. & James A. Brierley  
Brierley Consultancy LLC

The Brierleys met at Montana State University in Bozeman and subsequently married in 1963. Corale, the daughter of ranchers, grew up in southwestern Montana and sometimes rode Betty, her horse, to her one-room country school house. Jim, the only child of an immigrant single mother, developed his lifelong fascination with thermal springs when he accidentally stepped into one on his first trip to Yellowstone National Park at age 9.

While working on his post-graduate studies, Jim's extensive research led to the discovery of the first high temperature (thermophilic) acid loving microorganism - *Acidianus brierleyi* – named by German scientists in honor of Jim. After earning his PH.D., Jim joined the faculty of New Mexico Institute of Mining and Technology (NMT) in Socorro and Corale often enrolled in his courses!

In 1982, Corale was approached to form a company to develop biotechnology for mining and founded Advanced Minerals Technology and Jim served as its Research Director. The company with some 23 scientists and engineers developed and patented technologies for bioleaching and metal removal but was forced to dissolve when the stock market crashed in 1987. Jim then joined Newmont Mining Corporation as Chief Research Scientist and Corale soon followed as Chief of Environmental Process Development.

Laid off by Newmont, Corale began accepting consultant work in bioleaching and with increased requests for her service, founded Brierley Consultancy LLC in 1991 providing technical and business consultation to the mining and chemical industries as well as government agencies. Jim's confidentiality agreement with Newmont prohibited the Brierleys for the first time since 1963 to confer on technical matters but happily they were able to resume their collaboration when Jim retired from Newmont and became Principal of Brierley Consultancy in 2001.

Jim and Corale share many parallel career paths. Both earned Ph.Ds. in science, both received "Distinguished Achievement Award" from their respective universities, both are recipients of SME's (Society of Mining Metallurgy & Exploration) Milton E. Wadsworth Award, and both are inducted members of the U.S. National Academy of Engineering (NAE) for their demonstrated accomplishments in the pioneering of new technology. The first Brierley and Brierley technical paper was published in 1973 and many of their technical papers over the decades became the basis for the bioleaching technologies applied commercially today for copper and gold recovery – theirs is a true scientific partnership.



## Medal of Merit Recipients, cont.

David E. Nicholas  
Call and Nicholas, Inc.

David E. Nicholas, past president and co-founder of Call & Nicholas, Inc., had no knowledge of mining or geological engineering until his University of Arizona dorm mate introduced Nicholas to his father, William C. Peters, head of UA's Mining and Geological Engineering department. Inspired, Nicholas changed his major from astronomy to geological engineering. He found his vocation.

After two summer jobs with Hanna Mining and earning a B.S. in Geological Engineering in 1970, Nicholas signed on fulltime exploring in Montana and Idaho for copper deposits. A transfer to Hanna's Pilot Knob underground iron mine in Missouri allowed Nicholas to focus on his major area of interest: underground rock mechanics. In 1972 Nicholas returned to UA for a Master's Degree in Rock Mechanics, studying under Drs. John Abel and Richard Call.

Under Call, Nicholas studied pit slope stability; under Abel, he studied underground rock mechanics receiving an M.S. degree in 1976 for his work at the Oracle Ridge underground mine. For inclusion in CANMET's 1977 pit slope manual, Call subcontracted Nicholas to develop a program to model the distribution of potential step paths.

After receiving his M.S., Nicholas worked for the consulting firm Pincock, Allen, and Holt, with Call and worked on slope design and underground mining projects worldwide: North America, Chile, Sweden, Botswana, Liberia, and China.

In 1979, Nicholas and Call formed a business partnership as independent consultants and, in 1980, established Call & Nicholas, Inc. (CNI). Call and Nicholas grew the company and created a culture of collaboration and team effort. Through his work at CNI, Nicholas has been instrumental in many large underground and open pit mine projects, including the Grasberg open pit mine and block cave mines at P.T. Freeport Indonesia. In 1982, Nicholas received the Robert Peele Memorial Award for his paper, *Method Selection, A Numerical Approach*.

With Nicholas's guidance, CNI has evolved into a world renowned consulting firm and currently has over fifty employees at its consulting, slope monitoring instrumentation, and laboratory testing operation in Tucson, AZ. Today, Nicholas consults for longtime clients and enjoys mentoring young engineers and geologists.

## OUTREACH CORNER by Pam Wilkinson

June is summer camp month at the University of Arizona College Of Engineering. The first three weeks are introduction to engineering camps, one week for middle school students and two weeks for high school students. The students are exposed to all the engineering disciplines offered at the university. They attend a two hour session with the mining engineering department. During this time they create an underground tunnel through sliced bread, use the shovel simulator in the control room and learn how we determine the strength of rocks in the rock mechanics lab. This two hour session continues to be one of the top rated events of the week for these students. The fourth week of June was the mining engineering specific camp for rising junior and senior high students. Sixteen students attended the three day camp this year, the other two days they learned about materials science engineering. Day one of mining was spent out at the San Xavier mining laboratory, where they learned about PPE and had a relay race to see which group could put on all the equipment and take it off the fastest. They went on a tour underground and learned about the variety of rocks and minerals mined in Arizona. They leached copper out of copper oxide ore and plated it out onto nails.



PPE Relay



Underground at the San Xavier Mine

Day two was spent on campus with the shovel simulator and the rock mechanics lab. Then the intern I hired with funding from the Tucson Section of SME, Adrian Patterson, led them through Lerchs-Grossman exercise to help them understand how mining engineers use excel to create block models. He also created a simplified exercise using MineSight so they could design an open pit mine. He took their designs and converted the files and printed them out on the 3D printer over in the college of architecture. At the end of camp they all went home with a print out of their mine!



Computer lab



3D Mine Models

Day three was filled with mine tours first at FMI's Sierrita Mine where they visited the truck shop, stood on the edge of the mine, and drove through the mill. Then we had lunch on the grounds at the ASARCO Mineral Discovery Center and then did the public tour there. In this case they could see the floatation cells and connect the mills to this part of the mineral processing. At Sierrita the students learned that the mining engineers there use MineSight, the program they had just used the day before. It was interesting to see how impressed they were with having had that experience.

## OUTREACH CORNER cont.



Sierrita Mine Tour



In the bucket, very small shovel



ASARCO Tour

The camp this year was a definite success in large part because of the creative abilities of Adrian and his ability to suggest activities that high school students could do and that directly relate to the mining education he is receiving. Now he is working on a 'To Go' kit for the SME student members to use when they go into schools to talk about their career choice and the mining industry.

In addition to summer camp I was invited to participate in a teacher workshop at Biosphere2. The "Why Learn/Teach about Mining" power point presentation was followed by 'Mining Engineering: Chocolate Nuggets' activity. The teachers learned things they didn't know about mining and indicated they will use the activities in their classrooms. I had them take my 8 question test and although 68% of them answered all of the questions correctly, 32% did not, and now they have learned that mining is the source of all things they use in their lives: housing, transportation, communication, lighting, clothing, food, health and safety.



Additional events scheduled for July are a training session for the ENG 102 high school teachers. I will present to them information about the mining and geological engineering program at the U of A and provide them with hands on mining activities they can do with their students.

## NEW MEMBERS

### **DAVID TRAVIS — Vice President of Mine Planning, Freeport-McMoRan Copper & Gold Inc.**

Travis is a graduate of the University of Arizona and worked at various mine sites before joining Phelps Dodge in 1987. Since January of 2009 he has been overseeing the Centralized Mine Planning Group between the Phoenix Corporate office and the Oro Valley Office to provide mine engineering support and production optimization.

### **JERRY HARRIS—Executive Vice President, Southwest Energy LLC**

Harris earned his B.S. in Civil Engineering from Rose-Hulman Institute of Technology in Terre Haute, Indiana. A licensed Professional Engineer in Mining Engineering, he has spent over 23 years working in all aspects of drilling and blasting including operations, maintenance, explosive manufacturing, explosive chemistry, technical services and management. He worked for AMAX Coal Company prior to joining Southwest Energy.

### **JO ELLEN ERREBO — Global Account Manager, Mining Services, Orica**

Errebo received her MBA from the University of Colorado with an emphasis in Finance. She has worked at Orica, a global manufacturer and supplier of commercial explosives, for thirteen years in a variety of roles. Her career started in finance and most recently assumed the position as the Orica Global Account Manager for multiple customers in the gold and copper markets.

### **SCOTT SPICER — Draftsman/Designer, Southwest Energy LLC**

Spicer has worked in heavy equipment for the past 19 years holding various positions from fabricator to plant mechanic to heavy equipment and crane operator. He has been with Southwest Energy for almost 5 years and currently works in the Engineering Department while simultaneously pursuing a bachelor's degree in Mechanical Engineering. Spicer and his wife are presently preparing for the arrival of their fraternal twins!

**2014 MFSW MEMBERSHIP IS NOW PAST DUE.  
RENEWAL FORM IS ATTACHED .**

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## RECOGNITIONS

### **Pamela A. K. Wilkinson—2014 Prazen Award Winner**

MFSW is most proud to announce that the Board of Directors of the National Mining Hall of Fame and Museum recently announced the selection of Pamela A.K. Wilkinson as the recipient of the 2014 Prazen Living Legend of Mining Award. As you are all aware, Wilkinson is the Education Outreach Coordinator of the University of Arizona's Lowell Institute for Mineral Resources, a position funded solely by MFSW through membership donation and proceeds from its annual awards banquet. Wilkinson is lauded for developing programs to ensure accurate delivery on the importance of mining to our daily lives and her unmatched enthusiasm in bringing the message to students and adults.

### **AVA Digital Awards Competition**

MFSW's 2013 video, highlighting James D. Toole's achievements featured during the annual banquet last December, was submitted by Steve Pender for the AVA Digital Awards Competition and won a Gold Award. The AVA Competition is sponsored by the Association of Marketing & Communication Professionals. Steve Pender, President of Family Legacy Video Inc. and Cori Hoag have been collaborating on contents for all video production for the annual MFSW banquet for the past few years. The link below is provided for those who wish to revisit that video.

[2013, James D. Toole, Inductee, American Mining Hall of Fame](#)



## CALENDAR

### **National Mining Hall of Fame 27th Annual Induction Ceremony & Banquet 9/13/2014**

**Westin Hotel**

**Denver, CO**

The Hall of Fame Induction Banquet is a marquee event for the National Mining Hall of Fame and Museum. Harry M. Conger III, Gunther Franz Joklik, Ellen Swallow Richards and Alfred Weiss will be formally inducted into the National Mining Hall of Fame that evening. For banquet information, contact the NMHF&M office at 719-486-1229.

**HALL OF FAME 2014**

**MARK YOUR CALENDAR**

**32nd American Mining Hall of Fame Awards Banquet & Fundraiser**

**DECEMBER 6, 2014**