

*Thirty-First Annual*  
**American Mining Hall of Fame**



**Awards  
Presentation**  
BANQUET & FUNDRAISER

Saturday, December 7<sup>th</sup>, 2013  
JW Marriott Starr Pass Resort & Spa, Tucson, Arizona

# Program

6:15 p.m.            RECEPTION  
7:00 p.m.            BANQUET  
8:00 p.m.            CEREMONY

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- Welcoming Remarks: **COROLLA (CORI) HOAG**, PRESIDENT, MFSW
- Introduction of Head Table  
and Other Honored Guests: **CORI HOAG**
- Introduction of Inductees: **MARK BAKER**, VICE PRESIDENT, MFSW
- Presentation of Inductees  
From Mining's Past  
BY MARK BAKER & THEODORE EYDE: **BARTOLOMÉ DE MEDINA**  
(1497-1585)
- BEN WILLIAMS**  
(1852-1925)
- CHARLES E. MILLS**  
(1867-1929)
- JOHN SPENCE FINLAY** (1874-1935)  
**EDWIN BURTON ROYLE** (1905-1957)  
ACCEPTED BY HIS SON, JOHN K. ROYLE
- LOUIS CARYL GRATON**  
(1880-1970)
- Presentation of Medal of Merit  
BY MARK BAKER: **JOSEPH M. KEANE**
- Presentation of Medal of Merit  
Under age 40 BY MARK BAKER: **SEAN D. DESSUREAULT**
- Presentation of Industry Partnership  
BY MARK BAKER: **JOY GLOBAL SURFACE MINING**  
ACCEPTED BY JEFF SCHMALING, VP NORTH AMERICA
- Presentation of Special Recognition  
BY CORI HOAG: **ARIZONA GEOLOGICAL SURVEY**  
ACCEPTED BY LEE ALLISON, STATE GEOLOGIST & DIRECTOR
- Grand Door Prize: **CORI HOAG**  
SELECTED BY MOLLY TOOLE
- Presentation of Inductee  
BY CORI HOAG: **JAMES D. TOOLE**
- Featured Address: **JAMES D. TOOLE**
- Adjournment: **CORI HOAG**



**DIAMOND**

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Southwest Energy LLC

**PLATINUM**

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ASARCO LLC

Freeport-McMoRan Copper & Gold Inc.

Independent Mining Consultants, Inc.

Joy Global

M3 Engineering & Technology Corporation

Mintec, Inc.

Modular Mining Systems, Inc.

**GOLD**

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Ames Construction, Inc.

Apache Nitrogen Products, Inc.

Caterpillar Inc.

Keane Mineral Engineering LLC

MWH, Global

Newmont Mining Corporation

**SILVER**

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Atlas Copco Construction Mining Technique USA LLC

Boart Longyear Company

CAID Industries, Inc.

DeConcini McDonald Yetwin & Lacy, P.C.

Empire Southwest

Golder Associates

Liebherr Mining Equipment, Inc.

Lowell Copper Ltd.

Minas de Oro Nacional

Mineral Park Mine

Montgomery & Associates

Mountain States R&D International, Inc.

RDE Evaluations Ltd.

Ruen Drilling Incorporated

SGS Metcon/KD Engineering

Tetra Tech

# Mining Foundation of the Southwest

**T**he Mining Foundation of the Southwest (MFSW) was incorporated in 1993 by combining the Mining Club of the Southwest and the Mining Club of the Southwest Foundation. The purpose of the Foundation is to promote public understanding and education related to mineral resources and the mining industry. Toward this goal, the Foundation has been able to fund a number of projects each year in the southwest, including Mexico, from donations and fund-raising activities.

The MFSW raises funds to support programs focused on educating students and adults about mining and the importance of mineral resources in modern life. Pamela A. K. Wilkinson, an educator and a geologist, serves as Outreach Education Coordinator providing presentations at no charge to schools and community groups. She has made presentations to more than 34,500 students, teachers and others since March, 2009. This position is funded by the MFSW through the Lowell Institute for Mineral Resources at The University of Arizona.

Including the 2013 inductees, 182 mining luminaries and organizations have been inducted into the American Mining Hall of

Fame. The American Mining Hall of Fame honors past and present individuals with lasting impact on the mining industry by inducting one living honoree and no more than six deceased luminaries, selecting two outstanding individuals for a Medal of Merit award as well as honoring one or more supporting organizations. Commemorative plaques awarded through 2010 are on display in the mining exhibit area at the Arizona Historical Society Museum at 949 E. 2nd Street in Tucson. As wall space is limited, MFSW is in the process of redesigning the exhibit to incorporate interactive touch screen video displays of all past and future honorees. Hopefully, this will enhance visitors' interest and allow for additional visual and historical content.

As the public attention continues to focus on the dual objectives of mineral sufficiency and environmental protection, the MFSW is committed to support mineral and mining education for school children, college students, the general public and to honor the achievements of industry leaders through the American Mining Hall of Fame Annual Awards, the MFSW's website, and publications. *Thank you for your continued support!*



## James D. Toole



**James D. Toole**, past President and Chairman of Southwest Energy, LLC was born into a coal mining family in the anthracite region of Pennsylvania. He began his mining career working in open cut strip mines.

After graduating from King's College in Wilkes-Barre, Pennsylvania, and completing service in the U.S. Marine Corps, Toole was hired by the explosives division of Hercules Inc. in 1965. His first assignment was in the Minnesota Iron Range where he arrived with his wife Molly. Three years later, he and his family were transferred to the Panama Canal Zone where he worked on the canal widening project.

After his work in Panama, a third transfer found Toole, his wife and their three children in Tucson where copper mining was expanding. Also expanding was the Toole family with the addition of three more children in the following years.

In May 1973, Toole took an innovative approach to the application of bulk blasting agents, left Hercules and founded Southwest Energy. Four months later, Southwest Energy purchased Hercules' Arizona operations and began to broaden its business affiliations beyond Arizona. In early 1980, Southwest Energy took an equity position in Apache Powder Company, now known as Apache Nitrogen Products Inc. in Benson, Arizona.

After adding additional bulk loading capacity and blast hole drilling throughout the 1980s and 1990s, Southwest Energy formed a joint venture in 2000 with SASOL, a South African chemical and energy company. As a result of this joint venture, Southwest Energy gained access to explosives technologies, electronic detonators and a unique form of ammonium nitrate prill called EXPAN. After three years, the joint venture dissolved when SASOL exited the global explosives market, leaving Southwest Energy in a stronger market position with expanded product capabilities.

In 2008, Southwest Energy created a new joint venture with Orica, the largest explosives company in the world based in Melbourne, Australia. With the innovative explosives technologies and strong manufacturing base of Orica, Southwest Energy continues to provide even greater value to its mining customers. Today, Southwest Energy has multiple facilities, distribution sites, and blasting operations across the western United States.

During the company's 40-year history, Toole believes that the greatest assets of Southwest Energy are the exceptional employees and the willingness of the company to share its profitability with all of its people and the communities where they live and work. Southwest Energy's mission has always been and continues to be the creation of opportunity for its employees by bringing ever increasing value to its customers.

## Bartolomé de Medina (1497-1585)

### *Inventor of the Patio Process*

**Bartolomé de Medina** was a successful Spanish businessman who became fascinated with solving the challenge of decreasing silver yields and increasing production costs from silver ores mined in Spanish America. He first focused his attention on learning about new smelting methods from smelters in Spain but found that silver could be extracted from ground ores using mercury and salt water brine.

Armed with this knowledge, he left for Pachuca, New Spain (Mexico) in 1554 and established a model patio refinery to test the effectiveness of this new technology. The process involved first crushing silver ores to a fine slime, then mixed with salt, water, magistral (impure copper sulfate), and mercury and then spread in a 1- to 2-foot thick layer in a shallow-walled open enclosure patio. Horses were driven around the patio to further mix the ingredients that eventually formed an amalgam. This “dry” method eliminated the need for large quantities of wood and water which were readily available in Europe but not in the treeless, waterless highlands of Mexico and the Andes.

The introduction of amalgamation to silver refining replaced smelting as the primary method of silver extraction and inaugurated a rapid expansion of silver production in



Mexico and Peru. As a result, the Americas became the primary source, producing three-fifths of the world's silver supply until around 1900. Spanish American production fed the demand for silver, facilitating the development of extensive trade networks and this rapid expansion is often recognized as the key to early modern world trade linking Europe, Africa, Asia, and the Americas.

## Ben Williams (1852-1925)



### *Mine Superintendent and General Mine Manager*

**Ben Williams**, born in February 1852, was the son of a prominent family of Welsh metallurgists from Swansea. The family emigrated to the United States in 1855 settling in Connecticut, the American center of brass and copper refining. The family then moved on to copper refining works near Houghton, Michigan, and subsequently to San Francisco in 1874 where William's father and brother-in-law, DeWitt Bisbee, founded the mining firm of Bisbee, Williams & Company.

Williams' first job in the Arizona Territory was as Superintendent of the San Xavier Mine near Tucson. In 1879, he relocated to Charleston, Arizona, a smelter town along the San Pedro River, and prospected in the Huachuca Mountains. The following year, the nearby Copper Queen claims, situated adjacent to Mule Gulch, were purchased by a group of mining investors and Bisbee, Williams & Company was hired to manage the mine. Bisbee, Williams and Company recognized the mine's potential and placed Ben Williams and his brother Lewis in charge of general operations

and of smelting respectively. Together the brothers dedicated their technical expertise and procedural skills necessary to develop the mine and built a small smelter to extract the copper from the raw ore. By the end of 1880, the mine had produced more than 700 tons of copper representing about 70% of all the copper produced from Arizona mines during that year!

Dr. James Douglas, a metallurgical engineer from Phelps Dodge & Co. was dispatched in 1882 to examine the area and his company purchased the adjoining Atlanta Claim. Two years later, when the Atlanta ore deposit bordering both mines was simultaneously discovered, the two mines merged to avoid costly litigation and formed the Copper Queen Consolidated Mining Company with Douglas as President and Williams as General Manager.

In 1897, on learning that the free masons were holding the Masonic Grand Lodge of Arizona Meeting at the Caverns situated 350' below the surface of the Copper Queen Mine, Williams ordered the interior to be lit by electricity. He realized that the grandeur of the Caverns would attract visitors worldwide. As trade and commerce increased, Mule Gulch's population grew sufficiently to warrant a post office and the town was renamed after Bisbee for his absolute devotion and financial support in ore prospecting.

By Williams' retirement in 1899, Bisbee had emerged as a vibrant copper mining town and was known as the "Queen of the Copper Camps" in no small part due to William's exemplary and capable leadership. Williams passed away on September 1, 1925 and many members of the Copper Queen management attended the funeral. Williams will always be remembered as an important Arizona pioneer and father of the Copper Queen Mine.

## Charles E. Mills (1867-1929)



*Mining Manager, Founder and President, Apache Powder Company and The Valley National Bank*

**Charles E. Mills** left major footprints in both the mining and the banking industries. Following graduation from the University of Iowa, School of Engineering, he joined the Copper Queen Mine at Bisbee, Arizona in 1888. Shortly thereafter, he left for Harvard University and returned after two years to become the general manager of the Detroit Copper Mining Company at Morenci but resigned to become a private in the Rough Riders during the Spanish American War. Mills resumed his managerial duty at Morenci after the war but left in 1912 to become dual general manager of the Inspiration Consolidated Copper Company and the International Smelting Company at Miami.

While there, he directed the development of the Inspiration Mine – adopting flotation as the method of concentration, supervised the construction of the mill and buildings, and built the International Smelter.

When this nation entered World War I, Mills volunteered as a “dollar a year” man in the aircraft production division. On his return after the war, Mills recognized the need for a regional source of explosives and formed the Apache Powder Company providing explosives for the southwestern mines and successfully eliminating freight expenses. In 1990, the company formally changed its name to Apache Nitrogen Products, Inc.

In 1899, Mills broadened his interests towards the finance industry and embarked on his other notable career beginning with the Gila Valley Bank and Trust Company. Under his direction, the bank became the largest branch banking institution in Arizona. After steadily acquiring the major financial interest in the bank, Mills became President in 1908. In 1914, Mills was appointed to reorganize The Gila Valley Bank and The Valley Bank and merged the two banking institutions in 1922 to form The Valley National Bank. Mills remained the guiding source of The Valley National Bank and the Apache Powder Company and served as President of both until his death in 1929.



## Edwin Burton Royle (1905-1957) • John Spence Finlay (1874-1935)

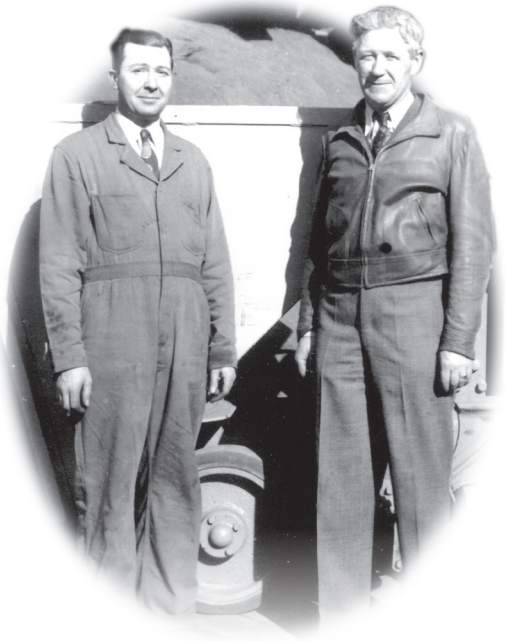
### *Inventors of the mucking machine*

Anyone who has worked underground owes a debt of gratitude to **Burt Royle**, the principal inventor of the mucking machine, which greatly eased the job of removing the broken muck by hand shoveling to operating a powered machine, doing the job in less time and with much less exertion and back strain. Many unsuccessful attempts had been made to improve the mucking cycle, but the revolutionary design conceived by Burt Royle, with improvements by John Spence Finlay made possible the removal of muck faster and easier than ever thought possible.

Royle was reputedly the best hoist engineer with an active and analytical mind at the North Lily Mine in Eureka, Utah. His idea for the mucking machine came partly from observing the arc motion of the shovel while mucking out a round. His design permitted a small cross-section drift to be driven, similar to the drifts driven where hand mucking was used, and significantly smaller than those employing the mechanical devices then available.

**John Spence (Jack) Finlay** was born in Canada and emigrated in 1890. He worked for Anaconda in Butte and was sent down to Eureka, UT to manage its North Lily mine. The depression was starting and Anaconda wanted a likely gold deposit explored. Funds to accomplish this were meager, so when Burt Royle approached him with plans for the overshot mucker, Finlay encouraged him, as he realized that the savings this machine could make in labor, time and powder could make possible exploration of the target.

In the old days, the Mine Superintendent welded a lot of power. Finlay authorized the building of Royle's machine in the mine's shop. Since it was built largely out of parts from the



mine's "bone yard" (scrap pile- supposedly including parts from a wrecked Model T Ford), costs were minimal. The machine was successful: the October 15, 1931 issue of the *Eureka Reporter* stated that the mechanical mucker had been in use for ten days without any breakdowns at the Big Hill Mine in Eureka, and could fill an "ordinary" mine car in one minute and twenty seconds.

An agreement was reached with Eastern Iron & Metals Co. (EIMCO), a small Salt Lake foundry, for the manufacture of the machine. This invention was largely responsible for EIMCO's growth and success. Finlay retired and Royle became a full time consultant for EIMCO. In the course of his life, Royle received seventeen patents, eight of which were for mining applications. Two of these patents were shared with Finlay.

## Louis Caryl Gratton (1880-1970)



*Economic Geologist and Professor Emeritus,  
Harvard University*

**Louis Caryl Gratton** was born in Parma, New York on June 10, 1880. He entered Cornell University in 1896 at the age of 16 and received his BS degree in 1900. He continued his studies in geology at McGill University while working in exploration around the mining districts of Ontario, Canada. Returning to Cornell in 1902, he completed his Ph.D. course requirements by 1903, but his Ph.D. degree was not conferred until completion of his 1930 thesis, "Hydrothermal Origin of the Rand Gold Deposits."

In 1903, Gratton joined the U.S. Geological Survey where he assisted Waldemar Lindgren in a restudy of the Cripple Creek District in Colorado, beginning a lifelong professional association and friendship with Lindgren. In 1909, he was appointed Director of the newly formed Copper Producers' Association in New York City, but left soon after when he was invited to join the faculty at Harvard University as a mining geology instructor. He advanced to full professorship in 1912 and remained on the Harvard faculty for the ensuing 37 years. The main theme of many of his lectures was the importance of

hydrothermal magmatic waters as a source of ore deposits.

Gratton's knowledge and interest in copper deposits were instrumental in his assignment as Director of the Secondary Enrichment Investigation in 1913, sponsored by the Geo-physical Laboratory of the Carnegie Institution and several American copper companies. This investigation studied all of the major copper districts in the world in collaboration with many renowned scientists. When the United States entered World War I, Gratton obtained leave from Harvard University to serve as secretary of the Copper Producers' Committee for War Service until April 1919. During this time, at the request of the Internal Revenue Service, he participated in the development of acceptable methods of valuation to be used as a basis for taxing the extractive industries, resulting in the adoption of the depletion allowance concept.

While Gratton was a consultant to many mining companies, his 30-year association with Cerro de Pasco Corporation was most noteworthy. During his many visits to Cerro's mining properties in Peru, he became convinced that a tunnel situated 1,000 feet below the lowest mine level would best address the ventilation and haulage issues that challenged the mine. This bold venture, known as the Gratton Tunnel, is still one of the longest mine tunnels in the world.

Gratton devoted his life to the study of ore deposits, believing that the answers to ore genesis were to be found in field relations. The door to his home was always open to students, helping them with personal and financial problems and finding them jobs through his many contacts in the mining industry. He was President of the Society of Economic Geologists in 1931 and was awarded the SEG Penrose Gold Medal in 1950.

## Joseph M. Keane

*Metallurgical Consultant-SGS*

*Owner-Keane Mineral Engineering LLC*

**Joseph Keane** earned his B.S. and M.S. degrees in Metallurgical Engineering and in Mineral Dressing Engineering respectively both from Montana Tech. He is the co-inventor of a novel copper hydrometallurgical patent and was the recipient of the 1989 Montana Tech Distinguished Alumni Award.

Keane is a registered Professional Engineer in Arizona and Nevada as well as being a member of the Instituto de Ingenieros de Minas de Chile. He held numerous technical and managerial positions in the mineral industry worldwide between 1962 and 1975 including positions with Chile Exploration Company in Chile, Molycorp in New Mexico, Colorado and in Mexico, and also with EIMCO as a mineral processing equipment sales engineer in Colorado prior to permanently relocating to Tucson, Arizona.

In 1975, Keane joined Mountain States Mineral Enterprises as Vice President and Senior Process Engineer and later joined Pincock, Allen & Holt, Inc. as Vice President, Project Engineer of the Process and Geotechnical Engineering Department overseeing the development of metallurgical feasibility studies and consulting activities. Under his management, Pincock, Allen & Holt greatly expanded their engineering design and construction management capabilities. Projects completed included the first semi-autogenous copper sulfide flotation mill in the Philippines and doubling the production capacity of the largest gold mine in that country.

From 1982 to 2005, Keane was President and Principal Metallurgical Engineer with KD Engineering Co., Inc. specializing in process design development, equipment selection and pollution abatement for global clients. Concurrent with his duties at KD Engineering, Keane also held the position of President of METCON Research from 1985 to 2005 and supervised numerous mineral beneficiation



test programs and pilot plant studies. During this period he was a consultant to the Mining & Petroleum Division of International Finance Corporation, a unit of the World Bank. Both companies expanded under Keane's practical guidance and depth of metallurgical project experience and in 2005 the two companies were sold to E&S Engineering Services.

In January 2013, SGS Minerals Services acquired the parent company of both METCON Research and KD Engineering and the two groups consolidated to form SGS Metcon/KD Engineering. Keane continues his metallurgical consulting with SGS and as the owner of Keane Mineral Engineering LLC of Sahuarita, Arizona. He has served on the Boards of Directors of Golden Cycle Gold Corporation, Rochester Resources, Mercator Minerals and Stingray Copper Corporation.

## Sean D. Dessureault

### *University Professor and Entrepreneur*

A graduate of McGill University, **Sean D. Dessureault** earned his Master's and Ph.D. from the University of British Columbia with a focus on advanced mine technology and management while working in various roles throughout surface and underground Canadian mines. Dessureault was working at INCO-West Mines Complex in Ontario, Canada when he received an unexpected offer from the University of Arizona. Aside from his wife's desire to enjoy the warmer climate, Dessureault was attracted to Arizona for its rich mining history and resources as well as the University recruiters' encouragement to continue his entrepreneurial pursuit.

In 2002, Dessureault joined the University of Arizona and is now a tenured Associate Professor in the Mining and Geological Engineering Department. Since arriving at Arizona, Dessureault has simultaneously followed his passion in research and commercial enterprises. Recruited to modernize the mining engineering curriculum, Dessureault has successfully developed projects resulting in over \$4.5 million in rewarded research funds; created an integrated remote operations center lab that monitors mines throughout the United States; introduced the first engineering sustainable development course in the curriculum; modernized undergraduate and graduate studies to include the latest technology; and established the UA Engineers Without Borders (EWB) student chapter. The establishment of the EWB chapter enables impoverished communities without resources to receive engineering services such as water projects in Africa.

Dessureault's success in the lab also translates to his enterprising spirit since almost all the research he oversees begins as a business



activity. He currently is active with several mining related businesses and is the Founder and CEO of Mining Information Systems and Operations Management Consulting Services Inc. (MISOM), leading a team of experienced IT and mining engineers in designing, deploying and supporting Data Warehousing and Business/Operational Intelligence Systems worldwide, including tablet apps that replace paper or act as a light fleet management system. In addition to MISOM, in 2011, Dessureault spearheaded Stakeholder Listening & Analysis providing listening analysis and engagement solutions for mineral and other development projects focused on the permitting processes.

Dessureault is a sought-after speaker, columnist, and panelist on the topics of technology and automation. Further, he has also authored and co-authored 25 journal publications to date and was the recipient of many awards including the SAP Canadian Information Productivity Award; the Best Graduate Dissertation Research Project in 2001; and the Faculty Award in 2006 for significant research and innovations.

## Joy Global - It Starts with a Singular Focus on Mining

**H**eadquartered in Milwaukee, Wisconsin, USA, Joy Global brings advanced equipment, systems and direct services to the global mining industry. With its focus solely on mining, Joy Global designs, manufactures, distributes and services extensive product lines of highly reliable P&H surface mining equipment and Joy underground mining machinery used to cut, crush, load and convey coal and industrial minerals worldwide.

From its origins in the design and production of mechanized mining machinery, Joy Global has grown to become one of the world's largest, most recognizable and highly respected providers of underground and surface mining solutions. The company's equipment, mining know-how, and employees are at the forefront of providing raw materials and coal to people all over the world. Joy Global's products and related services are used for the mining of coal, copper, iron ore, oil sands, gold and other mineral resources.

Its reach is truly global, with facilities and service centers that span six continents and more than 20 countries. But its focus remains local, with people and services close to the mines to facilitate better decisions and provide better solutions. Around the world, Joy Global employs more than 14,000 people in over 120 facilities. Through its worldwide service centers and highly trained field technicians, Joy Global provides year round, 24-hour support and service to literally thousands of customers.

Joy Global is at the vanguard of new developments in underground and surface mining processes and mining equipment, constantly introducing ever more powerful, technologically advanced and consistently reliable equipment and controls. Throughout its history, Joy Global has compiled a succession of industry firsts and literally has revolutionized the mining industry, taking it from its pick and shovel origins to the fully mechanized, highly complex and automated mining processes of today.

Joy Global is continuously working to make mining operations safer and more productive. With its innovative equipment and life-cycle services, mine operators are able to consistently achieve the lowest cost per unit of production over the life of the equipment.

Above ground and below, Joy Global strives to create a more seamless experience that raises the bar for the entire mining industry.

# JOYGLOBAL



# Arizona Geological Survey - Celebrating 125 Years from 1888-2013

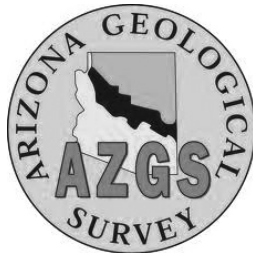
**T**he Arizona Geological Survey (AZGS) celebrates its 125th Anniversary this year. In 1888, the U.S. Congress first created the post of Territorial Geologist of Arizona – the AZGS traces its roots back to this appointment! This unpaid position of Territorial Geologist went to John F. Blandy who served until the mid-1890s. From this audacious start came the present-day Arizona Geological Survey and its predecessor agencies listed here in chronological order from youngest to oldest:

- Arizona Geological Survey 1988 – Present
- Arizona Bureau of Geology and Mineral Technology 1977 – 1988
- Arizona Bureau of Mines 1915 – 1977
- The University of Arizona Bureau of Mines 1893 – 1915
- Office of the Territorial Geologist 1888 – 1890

In 1915, the Arizona Bureau of Mines was established at the University of Arizona with Charles Willis as its first director. The focus then was on characterizing Arizona's economic minerals and rocks: asbestos, building stone, copper, molybdenum, lead, zinc, silver, gold, and more. The first Geologic Map of Arizona was published in 1924 in cooperation with the U. S. Geological Survey.

The Arizona Geological Survey was established as an independent state agency on July 1, 1988 and still maintains strong collegial ties with the faculty and staff at the University of Arizona. In 1991, the AZGS became the institutional home of Arizona Oil & Gas Conservation Commission – a five member commission charged with supporting and monitoring oil and gas exploration in the state. In 2011, the Arizona Department of Mines & Mineral Resources (ADMMR) merged with the AZGS. As an outgrowth of the merger, AZGS is engaged in a multiyear effort to digitize and post on line ADMMR's extensive collections of mining and mineral resource files, maps and photographs.

Over the past 125 years, AZGS has grown and evolved but its core mission of serving as a primary source of geological information to enhance public understanding of the State's geologic character, geologic hazards and mineral resources remains unchanged. The AZGS continues to advise and assist the public and private industry as well as local, state and federal government in matters of geological processes that impact the State and continue to provide technical advice and assistance in the wise development and prudent use of Arizona's mineral and land resources.



# American Mining Hall of Fame

## *Inductees (1983-2012)*

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1983	George E. Atwood	1998	Charles G. Preble
1984	Charles F. Barber	1999	Irl F. Engelhardt
1985	George B. Munroe	2000	Ronald C. Cambre
1986	John C. Duncan	2001	A. Dan Rovig
1987	Plato Malozemoff	2002	J. David Lowell
1988	Simon D. Strauss	2003	Thomas J. O'Neil
1989	G. Robert Durham	2004	J. Steven Whisler
1990	Harry M. Conger	2005	Pierre Lassonde
1991	Kenneth J. Barr	2006	Jack E. Thompson, Jr.
1992	T.S. Ary	2007	Dennis R. Washington
1993	Milton H. Ward	2008	Timothy R. Snider
1994	J. Burgess Winter	2009	Tom Albanese
1995	Douglas C. Yearley	2010	Richard C. Adkerson
1996	Richard de J. Osborne	2011	Laurence Golborne Riveros
1997	James R. Moffett	2012	Gregory H. Boyce



## *Industry Partnership Awards (1995-2012)*

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1995	Caterpillar, Inc. - Glen A. Barton
1996	AMIGOS (Arizona Mining & Industry Gets Our Support)
1997	Colorado School of Mines
1998	Stephen D. Bechtel, Jr. and Bechtel Corporation
1999	Mineral Information Institute
2000	Modular Mining Systems, Inc.
2001	Mintec, Inc.
2002	Senator Larry Craig
2003	Aker Kvaerner
2004	Mining and Metallurgical Society of America
2005	Northwest Mining Association
2006	Mountain States Legal Foundation
2007	M3 Engineering & Technology Corporation
2008	Atlas Copco Construction Mining Technique USA LLC
2009	Boart Longyear Company
2010	Prospectors and Developers Assoc. of Canada
2011	Chilean Government/Industry Partnership
2012	Komatsu America Corp.

# American Mining Hall of Fame

## *Medal of Merit Recipients (1989-2012)*

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1989	Ralph J. Roberts	2002	Richard D. Call
1989	Victor H. Verity	2002	Kenneth L. Zonge
1990	John S. Livermore	2003	Stanley H. Dempsey
		2003	James William White
1991	George O. Argall, Jr.	2004	Edward S. Frohling
1992	Arthur A. Brandt	2004	Joaquin Ruiz
1992	William C. Epler	2005	Larry McBiles
1993	Walter E. Heinrichs, Jr.	2005	Wayne C. Hazen
1993	Willard C. Lacy	2006	Leonard R. Judd
1994	Donnell W. Agers	2006	Roshan B. Bhappu
1994	J. David Lowell	2007	William G. Davenport
1994	Ronald R. Swanson	2007	Harry Parker
1995	Warren Kay Pincock	2008	Barbara A. Filas
1996	Richard W. Hutchinson	2008	Paul Arthur Hodges
1996	Charles L. Pillar	2009	Mary M. Poulton
1997	Hugo T. Dummett	2009	Jean Michel Rendu
1997	Spencer Rowe Titley	2010	Terence P. McNulty
1998	David N. Skillings, Jr.	2010	Nyal Niemuth
1998	José Rubén Velasco Rodríguez	2011	Marco T. Einaudi
1999	Paul S. Allen	2011	Ralph B. Sievwright
1999	William C. Peters	2012	David C. Lincoln
2000	Leonard Harris	2012	Matthew D. Lengerich
2000	Pedro Sánchez-Mejorada		
2001	William H. Dresher		
2001	Warren E. Fenzi		



# American Mining Hall of Fame

## *Inductees from Mining's Past (1983-2012)*

Maxie L. Anderson	1934-1983	Thomas S. Lovering	1896-1991
Frank William Archibald	1920-1987	John William Mackay	1831-1901
William Phipps Blake	1826-1910	Hugh Exton McKinstry	1896-1961
Allan B. Bowman	1911-1982	Donald H. McLaughlin	1891-1959
James Boyd	1904-1987	Frank Wood McQuiston	1904-1987
Bert S. Butler	1877-1960	Charles Meyer	1915-1987
Nellie Cashman	1849-1925	Seeley W. Mudd	1861-1926
Louis S. Cates	1881-1959	Samuel Newhouse	1853-1930
J. Parke Channing	1863-1930	Georges Ordoñez	1907-1982
Thomas Garfield Chapman	1886-1965	Jorge Larrea Ortega	1912-1999
William Andrews Clark	1839-1925	William Smith Otis	1813-1839
James Colquhoun	1857-1954	Charles F. Park, Jr.	1903-1990
James Harold Courtright	1908-1986	Richard Alexander Penrose, Jr.	1863-1931
Arthur C. Daman	1889-1968	Charles Debrille Poston	1825-1902
John Van Nostrand Dorr	1872-1962	Kenneth L. Power	1924-1978
James Douglas	1837-1918	Frederick Leslie Ransome	1868-1935
James Stewart Douglas	1868-1949	Rossiter W. Raymond	1840-1918
Herman Ehrenberg	1818-1866	Kenyon E. Richard	1915-1993
Charles F. Fogerty	1921-1981	Robert H. Richards	1844-1945
Antoine M. Gaudin	1896-1974	Thomas A. Rickard	1864-1953
Wesley P. Goss	1899-1985	Louis D. Ricketts	1859-1940
William C. Greene	1853-1913	Bernhardt Rohe	1909-1992
John C. Greenway	1872-1926	Reno H. Sales	1876-1969
Meyer Guggenheim	1825-1905	Harrison Ashley Schmitt	1896-1966
Hal W. Hardinge	1855-1943	Fred Searls, Jr.	1888-1968
George Hearst	1820-1891	Antonio Siraumea	1710-1760
Samuel Peter Heintzelman	1805-1880	John Murchison Sully	1868-1933
Earl C. Herkenhoff	1915-2002	Arthur F. Taggart	1884-1959
Joseph Austin Holmes	1859-1915	William Boyce Thompson	1869-1930
Herbert C. Hoover	1874-1964	Howard Allen Twitty	1909-1989
Daniel C. Jackling	1869-1956	Stewart R. Wallace	1919-2009
H. Myles Jacob	1913-1997	Thomas F. Walsh	1850-1910
Ira B. Joralemon	1884-1975	Norman L. Weiss	1902-1986
Henry Krumb	1875-1958	Arthur Redman Wilfley	1860-1927
Thomas H. Leggett	1859-1935	Forbes Kingsbury Wilson	1910-1990
John Cromwell Lincoln	1866-1959	Edward H. Wisser	1895-1970
Waldemar Lindgren	1860-1939	Pope Yeatman	1861-1953
Curtis H. Lindley	1850-1920		

# Mining Foundation of the Southwest

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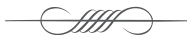
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PAMELA A.K. WILKINSON  
Lowell Institute for Mineral Resources  
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