

Building Capacity for the U.S. Mineral Resources Workforce Workshop Agenda



JANUARY 23, 2024

8:15 am EDT Registration and light breakfast

8:45-9:15

Welcome and goals

Welcome, agenda, and parameters
Goals of workshop

Eric Riggs
Colin Williams, USGS

9:15-9:45

Opening presentations

Establishing a sustainable workforce road map Murray Hitzman, iCRAG
Designing future university programs Misael Cabrera, University of Arizona

9:45-11:15

Session 1: Growing mineral resources programs at universities

Presentations on university enrollment trends & projected needs

- Vlad Kecojevic, Society of Mining Professors
- Chris Keane, American Geosciences Institute
- *Simon Jowitt moderates

Panel discussion: How to succeed in administering and growing Earth
Resources programs

- Misael Cabrera, University of Arizona
- Heather Wilson, The University of Texas at El Paso
- Mo Dehghani, Missouri S&T
- Jeff Thompson, University of Nevada, Reno
- Walter Copan, Colorado School of Mines

*Eric Riggs moderates

11:15-11:30

BREAK

11:30-12:45

Session 2: Disciplines and skills for a future mineral resources workforce

Panel discussion: What are the disciplines and skills are you recruiting for?

- Anita Bertisen, Brooks and Nelson
- Christine Whetten, Barrick/Nevada Gold Mines
- Fio Giana, Freeport
- Mike Timmons, New Mexico Bureau of Geology & Mineral Resources
- Teresa Kirschling, USGS
- Greg Nottingham, Department of Interior

* John Metesh moderates

12:45-1:45 Lunch and continued discussion

1:45-3:00 Session 3: Supporting students and faculty through research funding and academia-agency-industry partnerships

Flash talks and audience discussion on research and partnership opportunities

- Steve Mackwell, NSF
- Jeremy Mehta, DOE
- George Luxbacher, NIOSH
- Brad Fravel, Virginia Tech

*Kwame Awuah-Offei moderates

3:00-3:15 BREAK

3:15-5:00 Breakout Sessions - How to grow interest among university and 12th grade students?

Short presentations and discussion in separate rooms

- Jacqueline Huntoon, NSF
- Franciszek Hasiuk, Sandia National Labs
- Isabel Barton, University of Arizona

* Priscilla Nelson, Simon Jowitt, and Antonio Arribas moderate

JANUARY 24, 2024

8:30-9:00 Registration and light breakfast

9:00-9:45 Welcome and report back from breakouts

* Saskia Duyvesteyn moderates

9:45-11:00 Session 4: Preparing students through internships, professional development, and mentorship

Flash talks on successful programs & panel discussion on what makes a successful experience and program

- Bill Bieber, Mining Petroleum Training Service
- Cat Joyner, Society for Mining, Metallurgy & Exploration and John T. Boyd Company
- Duncan Proctor, Society of Economic Geologists
- Dan Pearson, Coeur Mining

*Antonio Arribas moderates

11:00-11:15 BREAK

11:15-12:30 Session 5 - How to improve retention in the mineral resources workforce?

Panel discussion

- Ashley Chancellor, Women in Mining USA
- Beatrice Opoku-Asare, AngloGold Ashanti
- Irene Schlechter, BHP

* Priscilla Nelson moderates

12:30-1:30 Lunch and continuing discussion

1:30-2:00 Closing remarks & adjourn

SPEAKER BIOGRAPHIES

Isabel Barton is an Assistant Professor in the University of Arizona Department of Mining and Geological Engineering. Her background includes graduate degrees in mining engineering and economic geology, and she works with academic and industry metallurgists, geologists, mine engineers, mineralogists, and geotechnical engineers, as well as with archaeologists and geochemists. Her main focus area is geometallurgy.

Anita Bertisen is the Director of Recruitment at Brooks and Nelson. Born and raised in the Netherlands, Anita's passion for mining started at an early age and was guided by her appetite for adventure, exploring new territories, and meeting people from all walks of life. She earned her masters' degree in applied earth sciences at the University of Technology in Delft, The Netherlands and after a few trips around the world, moved to Colorado to pursue a master's degree in mining engineering from the Colorado School of Mines. After 20 years of operational and corporate experience working for major gold mining companies, as well as for consulting and contract mining firms, Anita now works for Brooks & Nelson as the Director of Recruiting, where she can leverage her strength and number one passion for building diverse, cross-functional, high-performing teams. In Anita's spare time, she supports Women in Mining (WIM) USA, where she served as president from 2019 to 2022, and WIM Denver. Here, she pours her energy and passion into changing public perception surrounding the mining industry, driving inclusion and diversity, and expanding mining careers for women.

Bill Bieber is the Executive Director of the Mining Petroleum Training Service. The University of Alaska established the Mining and Petroleum Training Service in 1979 to deliver training, development and consulting services to the resource industries of Alaska. Since that time MAPTS has trained over 100,000+ individuals and has offices in Soldotna and Anchorage which serve the entire state. Bieber brings four decades of mining training experience, having trained workers in a variety of countries, including South Africa, Papua New Guinea, Dominican Republic, Canada, Greenland and soon the Republic of Namibia. He has been working in mining in Alaska since 1996.

Misael Cabrera is the inaugural Director of the School of Mining and Mineral Resources at the University of Arizona. With a background in multinational engineering firms, he made a notable shift to public service in 2011, becoming the first Latino and longest-serving Director of the Arizona Department of Environmental Quality (ADEQ). Under his leadership, ADEQ was recognized 28 times for excellence. Successes included the redevelopment and reclamation of several mine sites, the closure of the first six state superfund sites in department history, and the tripling of employee engagement. A first-generation college graduate, he holds an engineering degree from the University of Arizona and now proudly serves as a professor of practice and Director at his alma mater.

Ashley Chancellor is the current President of Women in Mining USA and the Environmental Affairs Manager for Sibanye-Stillwater's US East Boulder Mine. After graduating from Colorado School of Mines with her B.S. in Chemical Engineering, she landed her first job as a project engineer at a gold mine in Nevada, where she developed a deep appreciation for the industry, especially its people. Now 15 years later, Ashley is an experienced environmental and process engineering professional with a demonstrated history of working across multiple mining

& mineral extraction operations in the western United States. Ashley has been an active member of Women in Mining (WIM) since 2015 and co-founded WIM Montana in 2021. In 2022, she was elected President of WIM USA after serving as both Treasurer and National Representative. Now in her second term as President, Ashley has a passion for promoting STEM Education, the importance of Diversity, Equity and Inclusion, and communicating issues that are of strategic importance to women within the mining industry. Her goal is to help mining become a more sustainable industry where everyone can thrive.

Walter Copan is the Vice President for Research and Technology Transfer at Colorado School of Mines. A physical chemist by training, Copan began his career in R&D, business leadership and biotech ventures at The Lubrizol Corporation. Over the years, he has held a variety of roles in the private and public sectors, including the U.S. Department of Energy National Renewable Energy Laboratory (NREL) in Golden, where he served from 2003 to 2005 as principal licensing executive for technology transfer, focused on increasing NREL's effectiveness in developing and commercializing clean energy technologies. Copan then served as executive vice president and chief technology officer at Clean Diesel Technologies, Inc., helping to lead the company's transformation from research focus to a successful commercial enterprise. He returned to the public sector in 2010, when he was named managing director for technology commercialization and partnerships at the DOE's Brookhaven National Laboratory.

Mo Dehghani is the Chancellor of Missouri University of Science and Technology. A mechanical engineer, Dehghani is a nationally prominent research and academic leader who has experience leading complex organizations and building collaborative teams. Dehghani joined S&T from Stevens Institute of Technology in Hoboken, New Jersey, where he served as vice provost for research, innovation and entrepreneurship since 2013. Before joining Stevens, Dehghani was a professor of mechanical engineering and founding director of the Johns Hopkins University Systems Institute. Prior to joining Hopkins in 2008, Dehghani led the New Technologies Division at the Lawrence Livermore National Laboratory. Dehghani holds a Ph.D. in mechanical engineering from Louisiana State University, where he also earned his master of science and bachelor's degrees in mechanical engineering. He also completed a postdoctoral NSF internship at Massachusetts Institute of Technology.

Brad Fravel is the Executive Director of LINK the Center for Advancing Partnerships at Virginia Tech. As a seasoned professional with two decades of experience in science and business, Brad is responsible for identifying and creating strategic, long-term collaborations with the private sector to advance innovation, improve communities, and strengthen tomorrow's workforce. Brad brings to Virginia Tech a wide range of experiences within corporate and university settings. He is a lover of technology and the potential it brings to solve some of the world's trickiest problems, and he prides himself on knowing just about everything "technology" going on at Virginia Tech. Brad earned a Ph.D. in physical organic chemistry from Indiana University. He also holds a bachelor's degree from Southern Methodist University and an M.B.A. from the Butler University Lacy School of Business.

Fio Giana is the General Manager – Mining at Freeport-McMoRan. She is an experienced Leader with a demonstrated history of working in the mining & metals industry and skilled in hard rock surface mining, copper, management, and Continuous Improvement. Fio received a

Building Capacity for the U.S. Mineral Resources Workforce

B.S. in Mining Engineering from University of Missouri-Rolla and a Professional Masters degree in Mine Management and Engineering from Colorado School of Mines.

Franciszek Hasiuk is a Scientific Researcher at Sandia National Labs. Previously, he was an Associate Scientist at the Kansas Geological Survey. He has a Ph.D. in Geology from University of Michigan, Ann Arbor.

Murray Hitzman is Director of iCRAG and a Science Foundation Ireland Research Professor. Murray has B.A. degrees in geology and anthropology from Dartmouth College (1976), an M.S. in geology from University of Washington (1978), and a Ph.D. in geology from Stanford University (1983). He worked in the petroleum and minerals industries from 1976 to 1993 primarily doing mineral exploration worldwide and was largely responsible for Chevron Corporation's Lisheen Zn- Pb-Ag deposit discovery in Ireland (1990). Dr. Hitzman served in Washington, D.C. as a policy analyst in both the U.S. Senate for Senator Joseph Lieberman (1993-94) and the White House Office of Science and Technology Policy (1994-96). In 1996 he was named the Fogarty Professor in Economic Geology at the Colorado School of Mines (CSM) and served as head of the Department of Geology and Geological Engineering from 2002-07.

Jacqueline Huntoon is the Director of the Division of Graduate Education, Directorate for STEM Education at the National Science Foundation. Previously she was provost and senior vice president for academic affairs (2015-2022) and dean of the Graduate School (2005-2015) at Michigan Technological University. She also served as program director for diversity and education at the National Science Foundation's Directorate for Geosciences (2003-2005). Huntoon earned her PhD in Geology at The Pennsylvania State University. Huntoon has been recognized nationally for her leadership in higher education and in her field of geology. She is a member of the American Society for Engineering Education and a Fellow of the Geological Society of America. In 2019, she received the Mallinson Award for Lifetime Achievement from the Michigan Science Teachers Association in recognition of her contributions in the area of pre-college STEM education.

Cat Joyner is currently serving on the Board of Directors for the Society of Mining, Metallurgy & Exploration (SME). Over the past 3 years she has served as both the Chair of, and the Board Liaison to, the SME Industry Workforce Strategic Committee. She has worked extensively with this committee to address current and future mineral industry workforce challenges by promoting mining and underground construction as multidisciplinary careers that are essential and rewarding. As a mining professional, Cat has over 25 years of diverse mining engineering experience acquired in industry, government, and as a consultant. She has worked internationally as a senior mine engineering consultant and is currently working as a Senior Consultant with John T. Boyd Company. She is also the owner of Scratchgravel Mining Services in Helena, Montana. Cat graduated from Montana Tech in 1998 with two M.S. degrees in Mining Engineering and Environmental Engineering, and has a B.S. in physics from the University of California, Davis, 1992.

Vlad Kecojevic is the Secretary-General of the Society of Mining Professors and a Professor of Mining Engineering at West Virginia University (WVU). He served as the Robert E. Murray Chair of the Department of Mining Engineering from 2017 through 2023 and the Interim-Chair

of Wadsworth Department of Civil and Environmental Engineering from 2022 through 2023. He joined WVU's Department of Mining Engineering in 2010. Kecojevic started his academic career with The Pennsylvania State University (PSU) as an Assistant Professor in 2001. He earned tenure and he was promoted to the rank of Associate Professor in 2007. Kecojevic held the Centennial Career Development Professorship in Mining Engineering at PSU from 2005 through 2009, and the Massey Foundation Professorship at WVU from 2012 through 2018. Prior to joining PSU, he was employed with Krupp Canada (ThyssenKrupp) from 2000 to 2001 and he was responsible for the design of mining equipment. He was also involved in planning and design of coal, bauxite and limestone mines in Serbia and Montenegro from 1992 through 2000. He earned his B.S., M.S. and Ph.D. degrees in mining engineering from the University of Belgrade in 1991, 1996, and 2000, respectively.

Chris Keane is Director of Geoscience Profession and Higher Education at American Geosciences Institute. Previously, he was a Physical Scientist at the U.S. Bureau of Mines. He has a Ph.D. in Marine, Estuarine, and Environmental Sciences and a B.S. in Geology/Earth Sciences from University of Maryland.

Teresa Kirschling is the Deputy Associate Director for Energy and Mineral Resources at the U.S. Geological Survey. In her role at the USGS she oversees the science directions and planning of the Energy Resources Program and Mineral Resources Program. This portfolio covers the full suite of geologic resources and includes science and mapping of domestic and global energy and mineral resources, and the collection of the Nation's official statistics on supply, demand, and trade of mineral commodities. She has a Ph.D. in Chemical Engineering from Carnegie Mellon University. Prior to joining the USGS Teresa was a National Research Council fellow at NIST and was on the engineering faculty at the South Dakota School of Mines and Technology.

George Luxbacher is the Deputy Associate Director for Mining for the National Institute for Occupational Safety and Health (NIOSH), part of the Centers for Disease Control and Prevention (CDC). He earned a B.S. degree in mining engineering from the Pennsylvania State University and began his career with Pittsburgh Coal Company, a subsidiary of Consolidation Coal Company. Returning to Penn State, he then completed his M.S. and Ph.D. degrees, also in mining engineering and is a Centennial Fellow of the Penn State's College of Earth and Mineral Sciences. After graduation he worked for various subsidiaries of Occidental Petroleum Corporation for 35 years, Occidental Research Corporation, Island Creek Coal, and Glenn Springs Holdings, before retiring as senior vice president of operations at Glenn Springs to start his consulting firm, MELM Consulting. In 2016 he returned to his research roots and started consulting for NIOSH, joining NIOSH as a Senior Service Fellow in 2017. He manages the NIOSH mining program's extramural research contracts, including the capacity build component designed to support graduate research and faculty development in mining engineering.

Steve Mackwell is the Section Head for Disciplinary Programs with the Division of Earth Sciences at the National Science Foundation. He has a broad scientific background with extensive experience in Earth and Planetary Sciences. Prior to joining NSF, he served as Deputy Executive Officer at the American Institute of Physics and the Corporate Director of Science Programs at the Universities Space Research Association (USRA) Headquarters in Columbia, Maryland. He also served as the USRA's Director of the Lunar and Planetary Institute in

Houston, Texas. He has had academic appointments at the Bayerisches Geoinstitut in Germany and Pennsylvania State University. While at Penn State, he served as an IPA in the Division of Earth Sciences at NSF. Dr. Mackwell is a Fellow of the American Geophysical Union, the American Association for the Advancement of Science, and the Mineralogical Society of America

Jeremy Mehta works as a Technology Manager for The Advanced Materials and Manufacturing Technologies Office. In this role, Jeremy is responsible for the Critical Minerals and Materials portfolio, including the Critical Materials Institute, lithium extraction and separation activities, electronics stewardship, education and workforce development, and energy and environmental justice. Prior to this, Jeremy worked on strategic development as a AAAS Science and Technology Policy Fellow including the 2021 DOE Critical Materials Strategy and the 2022 National Strategy for Advanced Manufacturing. His expertise includes semiconductors and critical minerals with a focus on material security and sustainability. Before joining AMMTO, Jeremy worked as a researcher for the Center for Advanced Microelectronics Manufacturing and Physics Department at Binghamton University in Upstate New York. There, he examined structure function relationships of active materials in solar cells, batteries, interconnects, and chemical sensors. He also managed the Research Experiences for Undergraduates program in Renewable Energy Generation and Storage. Jeremy graduated with a BS in Physics from SUNY Brockport in 2013 and earned a Master's degree in Teaching and a PhD in Physics from Binghamton University in 2018 and 2019 respectively.

Greg Nottingham is the Environmental Compliance and Cleanup Division Chief in the Office of Environmental Policy and Compliance at the U.S. Department of the Interior. He is an experienced environmental professional with a diverse background in environmental policy and international development and has strong technical skills in solid and hazardous waste management and contaminated site remediation, particularly on federally managed lands. Greg has a proven track record in leading large, complex, multi-disciplinary projects and programs at the local, state, federal, and international levels. He has a Bachelors in biology from Wabash College and two Masters degrees from Indiana University: a Master of Science in Environmental Science (MSES) and a Master of Public Affairs (MPA).

Beatrice Opoku-Asare is currently the Global Vice President of Culture and Capability at AngloGold Ashanti. Prior to this she was the Senior Director, Global Talent Management, Inclusion and Diversity at Newmont Corp. She is a charismatic change maker and her role involves partnering with the Board of Directors, executives and each operating region globally to build an inclusive workplace where everyone can thrive. Beatrice has been recognized as one of the Top 25 Most Powerful Women in Business by the Colorado Women's Chamber of Commerce and as one of the Elite100 black women in Corporate America by Diversity Woman Magazine. She is a board member of the Colorado Diversity Council and non-exec Board member of the International Women in Mining. Beatrice is an environmental scientist by training, Senior Professional in HR (SPHR) certified by the Human Resources Institute and a graduate of Yale School of Management's Women's Leadership Program.

Duncan Proctor is an exploration geologist and CSM alumni who has over 14-years experience in professional industry. He originally cut his teeth on Carlin-type gold deposits, working with

Building Capacity for the U.S. Mineral Resources Workforce

Teck and Queenstake Resources in northern Nevada, before joining New Horizon Uranium and working to advance exploration projects in the Western United States. In 2008 he joined Ivanhoe Mines and became part of the Kamoa/Kakula Copper deposit discovery team in southern DR Congo. He spent over half a decade with Ivanhoe focused on sediment-hosted copper exploration and managing projects in the Central African Copperbelt, including the Makoko copper discovery in the western Foreland. Duncan is currently the Strategist for Education & Training at the Society of Economic Geologists and has been a strong advocate for the increased participation of students and young professionals within both the Society and minerals industry.

Dan Pearson is currently the Director of Talent Acquisition and Development for Coeur Mining and has been with the company for 7.5 years. Dan partners closely with the mine site operations to specifically provide leadership support around recruitment, early careers programs, workforce and succession planning, training, and development. Dan has worked for the majority of his 15-year career in mining with HR experience at Barrick Gold and Agnico Eagle Mines. Dan started his career working in mining executive search for a boutique recruitment agency.

Irene Schlechter is the Regional Principal for Inclusion and Diversity at BHP for Minerals Americas. In this role, she aligns the BHP global I&D strategy with the efforts made in the Americas region for Female Representation, Female Leadership, Indigenous Representation, People with disabilities and LGBTQ+ community. Currently, BHP in Minerals Americas has 40% of female representation (including Canada, US, Chile and Brazil) and 38% of female leadership representation, above the average of the industry globally (In Chile female rep in mining is 12.6%). A seasoned executive with a passion for entrepreneurship, she has more than 15 years of international experience as Inclusion and Diversity Expert (Deloitte, Codelco, BHP), HR Director (Roche, AstraZeneca and adidas) and as entrepreneur (as digital startups founder). Irene has a B.S in Psychology and a Master in Organizational Psychology from Universidad Adolfo Ibañez Chile.

Jeff Thompson serves as the Executive Vice President and Provost at the University of Nevada, Reno. Dr. Thompson's appointment as Executive Vice President and Provost came after more than a decade of service as Dean of the College of Science. Dr. Thompson grew up in Tennessee and attended the University of California, Los Angeles where he received a Bachelor of Science degree in physics. He received his Ph.D. in physics from the University of Tennessee and completed a postdoctoral fellowship at the Joint Institute for Laboratory Astrophysics at the University of Colorado. In 1991, he joined the faculty in the Physics Department at the University of Nevada, Reno, at which time he started a research laboratory in experimental atomic and molecular physics. A dedicated mentor, many of his students went on to illustrious careers in research and academia and have maintained deep connections to the University. He served as Physics Department Chair and Associate Dean of the College of Science before becoming Dean of the College of Science in 2008.

Mike Timmons is the Director and State Geologist at New Mexico Bureau of Geology & Mineral Resources and New Mexico Institute of Mining & Technology. During his undergraduate studies at the University of Nebraska at Omaha, Mike first came to New Mexico in 1994 to map east of Albuquerque in the Sandia Park quadrangle. After finishing his

undergraduate studies in 1995, Mike moved to Albuquerque for graduate work at the University of New Mexico. At UNM, Mike worked on the Late Neoproterozoic sedimentary rocks of the Chuar Group in Grand Canyon during his masters thesis studies. Later during his dissertation studies, he worked on the Late Mesoproterozoic Unkar Group of the Grand Canyon and received a Ph.D. in geology in May, 2004. Mike and his wife (Stacy Timmons) live in Socorro.

Christine Whetten is a Senior HR Leader with over 18 years of mining experience combining exemplary work ethic, strong business acumen, and maximization of human capital to deliver superior results. Known for her refreshing authenticity and long-term partnerships building, she is a dynamic, second-generation miner who understands what drives success at every level and relates to every employee from new hires to executives. From starting her career in Montana mining, engaging in employee relations in Arizona, driving HR strategy in Alaska, or supporting the largest gold mining complex in the world, there is no other industry that Christine would rather be in. Christine leads the execution of the Talent Acquisition and Talent Management strategies for Nevada Gold Mines operated by Barrick and Barrick North America.

Colin Williams is the USGS Mineral Resources Program Coordinator. The USGS Mineral Resources Program (MRP) provides objective, credible, and reliable scientific information on the origin, distribution, quantity, and quality of mineral resources, assesses mineral potential, informs the Nation on global mineral supply-demand and materials flows, and characterizes the environmental impact of development. Prior to joining MRP in 2022, Colin was Director of the USGS Geology, Minerals, Energy, and Geophysics Science Center. He previously led the USGS Geothermal Resource Studies Project, which assessed the geothermal resources of the US and conducted research on geothermal systems. Colin's primary research interest is in measuring and modeling the flow of heat and fluids through the Earth's crust and using those measurements to understand hydrothermal processes, earthquakes, and groundwater flow. He joined the USGS after earning a PhD and MPhil in Geological Sciences from Columbia University, an MS in Mechanical Engineering from UC Berkeley, and a BS in Engineering from Harvey Mudd College.

Heather Wilson became the 11th President of The University of Texas at El Paso in 2019 after serving as Secretary of the United States Air Force. She is the former president of the South Dakota School of Mines & Technology, and she represented New Mexico in the United States Congress for 10 years. In the private sector, she has served as a senior adviser to defense and scientific industry. Active in community and national affairs, she is a member of the National Science Board, which oversees the National Science Foundation. Recently, she was elected inaugural Chair of the Alliance of Hispanic Serving Research Universities. Dr. Wilson is the granddaughter of immigrants and was the first person in her family to go to college. She graduated from the U.S. Air Force Academy in the third class to admit women and earned her master's and doctoral degrees from Oxford University in England as a Rhodes Scholar.