Tailings Geotechnics: Recent advances and perspectives

When: Sunday, November 5th

Presenter(s): Jorge Macedo, Frederick Olmsted Early Career Professor, Georgia Tech
Christopher Bareither, Associate Professor, Colorado State University
Jonathan Bray, Professor, University of California Berkeley
Scott Olson, Professor, University of Illinois at Urbana Champaign
Georgia Lisay, Director Tailings and Water, Freeport-McMoRan
Paul Ridlen, President, Knight Piesold and Consulting

Description: This course discusses recent advances and future perspectives in tailings geotechnics, emphasizing their role in the design, construction, and operation of tailings storage facilities. Discussion topics include tailings engineering, fundamentals of static/cyclic liquefaction, characterization of mine tailings at different scales (i.e., laboratory, field), and seismic design aspects of tailings storage facilities. The course aims to present recent methodologies and how they are being implemented in the engineering of tailings storage facilities; hence, it assumes that participants have familiarity with the area of tailings geotechnics.

Content:

8.00 – 8.10 am	Welcome and Introduction	Jorge Macedo
8.10 – 9.10 am	Commingled Tailings Engineering	Christopher Bareither
9.10 – 10.10 am	Field and laboratory assessment of tailings and TSF foundations	Scott Olson
10.10 – 10.30 am	Break	
10.30 – 11.30 am	Recent advances in international technical guidelines for tailings storage facilities	Paul Ridlen
11.30 – 12.30 pm	Panel 1 – Moderator: Jonathan Bray	Panelists: Christopher Bareither, Paul Ridlen, Scott Olson
12.30 – 1.30 pm	Lunch	
1.30 – 2.30 pm	Mechanical response of mine tailings at different scales	Jorge Macedo

2.30 – 3.30 pm	Seismic Performance of Tailings Storage Facilities	Jonathan Bray
3.30 – 4.00 pm	Break	
4.00 – 4.30 pm	Tailings Geotechnics – Owner's Perspective	Georgia Lysay
4.30 – 5.30 pm	Panel 2 –Moderator: Scott Olson	Panelists: Georgia Lisay, Jonathan Bray, Jorge Macedo

SPEAKERS

Dr. Jorge Macedo, Ph.D., P.E., Frederick Olmsted Early Career Professor, Georgia Institute of Technology

Dr. Jorge Macedo, Ph.D., P.E., is the Frederick Olmsted Early Career Professor in the School of Civil and Environmental Engineering at the Georgia Institute of Technology (Georgia Tech), where he joined the faculty in 2018. He received M.S. (2014) and Ph.D. (2017) degrees from the University of California at Berkeley, all majoring in civil engineering.

Dr. Macedo practiced as a geotechnical engineer for six years (2008-2013), working on major mining, oil, and gas projects in Peru, Argentina, Chile, and Brazil from conception to detailed engineering design, and he holds P.E. licenses in California and Peru. Dr. Macedo's main research areas are mining geotechnics, geotechnical earthquake engineering, and data-driven risk engineering applied to multi-hazards. He is an associate editor of Earthquake Spectra and guest editor of the Bulletin of Earthquake Engineering.

Dr. Macedo's research aims to make geotechnical infrastructure and cities more resilient against natural (e.g., earthquakes) and man-made hazards, saving lives, and reducing economic losses. Dr. Macedo is a recipient of the 2022 States National Science Foundation CAREER award for his work at the convergence of tailings geotechnics and data science. He also received the 2022 Young Faculty Research Award (Georgia Tech), the 2022 ASCE Outstanding Reviewer award, and the 2023 ISSMGETC20 Young Researcher Award. Dr. Macedo is also the founder and chair of the TAILENG (TAilings and IndustriaL waste ENGineering) center, which works on improving the resilience of infrastructure in the mining and power industries.

Christopher Bareither, Ph.D Associate Professor, Colorado State University

Dr. Bareither is an Associate Professor of Civil and Environmental Engineering at Colorado State

University. His expertise is in Geotechnical and Geoenvironmental Engineering. His education is all within the field of Geological Engineering; he received a BS from University of Idaho (2004) and MS (2006) and PhD (2010) from University of Wisconsin-Madison.

Dr. Bareither conducts research and teaches undergradauate and graduate courses in Geotechnical and Geoenvironmental Engineering. In addition, he is faculty adviser to the CSU chapter of Engineers Without Borders that is actively engaged in engineering challenges for developing communities, and is a licensed Professional Engineer in the state of Colorado.

Dr. Jonathan Bray, Ph.D., P.E., N.A.E., Faculty Chair in Earthquake Engineering Excellence, University of California, Berkeley

Jonathan Bray is the Faculty Chair in Earthquake Engineering Excellence at the University of California, Berkeley. He earned engineering degrees from West Point, Stanford, and Berkeley. Dr. Bray is a registered professional civil engineer and has served as a consultant on several important engineering projects and peer review panels. He has authored more than 350 research publications.

Jonathan's expertise includes the seismic performance of earth structures, seismic site response, liquefaction and ground failure and its effects on structures, earthquake fault rupture propagation, and post-event reconnaissance.

Dr. Bray was elected into the US National Academy of Engineering and is a Fellow in ASCE. He has received several other honors, including the Terzaghi Award, Ishihara Lecture, Peck Award, Joyner Lecture, Prakash Award, Huber Research Prize, Packard Foundation Fellowship, and NSF Presidential Young Investigator Award.

Scott M. Olson, Ph.D., P.E., Professor and Faculty Excellence Scholar, University of Illinois

Scott M. Olson, Ph.D., P.E. is a Professor and Faculty Excellence Scholar in the Civil & Environmental Engineering Department at the University of Illinois, where he joined the faculty in 2004. Prior to joining the University of Illinois, Scott worked in practice for nearly 8 years for Woodward-Clyde Consultants and URS Corporation on infrastructure, energy, and mining projects worldwide.

Prof. Olson has researched static and seismic liquefaction for over 25 years, and has been involved in dozens of research and consulting projects involving geotechnical earthquake engineering; tailings dam engineering; in situ, laboratory, and centrifuge testing, soil-foundation-structure interaction; and paleoliquefaction and geohazards analysis. From these activities, Scott has published over 150 journal papers, conference articles, and reports and has received numerous awards, including the ASCE Walter L. Huber Civil Engineering Research Prize and the Canadian Geotechnical Society R.M. Quigley

Award.

Prof. Olson serves in various capacities for the Geo-Institute, USUCGER, EERI, the Transportation Research Board (TRB), and the Geotechnical Extreme Event Reconnaissance (GEER) Association. Most recently, he became a founding member of the U.S.-based Tailings and Industrial Waste Engineering (TAILENG) Center.

Georgia Lysay, M.S., P.E., Director Tailings & Water at Freeport-McMoRan

Georgia Lysay, has been an active tailings professional for more than 20 years and has held a variety of roles including engineering consultant, site tailings dam engineer, environmental manager and progressive positions in corporate tailings and water management. Over the course of her career, Georgia has been engaged in the design, construction, operation, reclamation and closure of numerous tailings facilities in North and South America and Asia. She received her Bachelor's degree in Civil Engineering from the University of Saskatchewan and her Master's degree in Civil Engineering from the University of British Columbia and is currently Director – Tailings, Crushed Leach and Water with Freeport-McMoRan. In this role, she leads a skilled team of engineers, scientists, and analysts who are responsible for planning, design, operational support, surveillance, review and governance of Freeport tailings facilities.

Paul W. Ridlen, President at Knight Piesold USA

Paul Ridlen is President of US Operations and a member of the Board of Directors of the Knight Piésold global group of companies, with responsibility for Knight Piésold's operations in the US, Mexico and Brazil. He has more than 30 years of engineering experience in mining, water resources, energy, and public infrastructure projects, with a specialty in the design of tailings dams. He holds a B.S. in Civil Engineering and a M.S. in Geotechnical Engineering from the Missouri University of Science & Technology.

He began his career at Woodward-Clyde Consultants in 1991 and has since worked for such firms as Stone & Webster, URS Corporation, and Tetra Tech prior to joining Knight Piésold in 2013.

Mr. Ridlen has had an active role in promoting excellence in the engineering profession. He is currently the US representative for tailings dams to the International Commission on Large Dams (ICOLD) and was a co-author of ICOLD Bulletin 194 on Tailings Dam Safety. He is a principal author of a new tailings dam safety guideline for tailings dams in the United States for the Federal Emergency Management Agency and also co-authored the Proposed Best Practices for the Engineer of Record for Tailings Dams, published by the Geoprofessional Business Association in 2018. He is an active member of the U.S. Society of Dams, the American Society of Civil Engineers, the Society for Mining, Metallurgy and Exploration and several other professional organizations. He is an industry sponsor of the TAILENG program, a joint effort by Georgia Tech, University of California Berkeley, University of Illinois, and

Colorado State University to improve the state of knowledge and practice in the design of tailings storage facilities.

Mr. Ridlen is married to Dr. Lucia Ridlen-Gonzalez and is the proud father of four children: Christina, Hannah, Sarah, and Isaac.