VIRTUAL TECHNICAL COURSES PRIOR TAILINGS 2026

Time Zone Santiago, Chile. GMT -3 | Free Access for Participants

Wednesday, September 23

14:00–17:00

ENG

"Practical Calibration of Geotechnical Models for Tailings Dams and Mining Structures"
Guilherme Gomes, Federal University of Ouro Preto, Brazil; and **Alexandre Vilaça**, WSP, Brazil

Thursday, September 24

11:00–14:00

ENG

"From Chemistry to Stability: Geochemical Influences on Physical Changes and Geotechnical Performance"

Joe Scalia, Colorado, State University, USA; **Heath Orcutt**, SRK Consulting, USA; **Sarah Doyle**, WSP, USA; and **Linda Figueroa**, Colorado School of Mines, USA

15:00–18:00

ENG

"Tailings Characterization and Potential Applications"

Álvaro Videla, **Felipe Vargas** and **Iván Navarrete**, Pontificia Universidad Católica de Chile

COURSE 1: Practical Calibration of Geotechnical Models for Tailings Dams and Mining Structures

Instructors: **Guilherme Gomes**, Federal University of Ouro Preto, Brazil; and **Alexandre Vilaça**, WSP, Brazil

WHEN	LANGUAGE	LENGTH
Wednesday, September 23	**English**	**3 hours (14:00 – 17:00)**

DESCRIPTION

This course introduces the model–data paradigm, covering model inputs and outputs, parameterization, calibration, and validation. It addresses local and global optimization techniques and Bayesian inference, with applications to geotechnical problems involving tailings dams and filtered tailings. Emphasis is placed on uncertainty quantification and propagation in the NorSand model using automated workflows in Plaxis.

GENERAL OBJETIVES

1. *Understand the model–data paradigm and apply calibration and optimization techniques to the NorSand model.*
2. *Apply Bayesian inference to quantify parameter uncertainty in geotechnical problems involving tailings dams and unsaturated flow in filtered tailings.*
3. *Evaluate and propagate predictive uncertainty in the NorSand model using automated workflows in Plaxis*.

CONTENT AND PROGRAME

14:00 - 14:40	**Introduction to the model–data paradigm; the Critical State Line in the NorSand model; manual calibration; local and global optimization**	Guilherme J. C. Gomes
14:40 - 14:50	Questions and discussion Module 1	
14:50 - 15:00	Break 1	
15:00 - 15:40	**Bayesian Inference and case studies involving tailings dams and filtered tailings stacks**	Guilherme J. C. Gomes

15:40 - 15:50	Questions and discussion Module 2	
15:50 - 16:00	Break 2	
16:00 - 16:40	**Propagation of predictive uncertainty in the NorSand model using automated workflows in Plaxis**	Alexandre C. Vilaça
16:40 - 16:50	Questions and discussion Module 3	
16:50 - 17:00	**Conclusions and Closure of the Course**	Guilherme J. C. Gomes

LECTURERS BIO

Guilherme Gomes is an Associate Professor of Geotechnical Engineering at the Federal University of Ouro Preto (UFOP), with a PhD from Pontifical Catholic University of Rio de Janeiro (PUC-Rio) and research experience at the University of California, Irvine. His work focuses on computational geotechnics, including model calibration, Bayesian inference, uncertainty quantification, and the development of interpretable machine learning tools for geotechnical applications. He has authored numerous international journal papers and developed advanced numerical and AI-based frameworks applied to problems such as tailings dams, unsaturated flow, and slope stability.

Alexandre Vilaça is a Civil Engineer and PhD student in Geotechnical Engineering at the Federal University of Ouro Preto (UFOP), where he also obtained his master's degree. His work focuses on numerical modeling and liquefaction assessment for tailings storage facilities, with experience in the design, inspection, and monitoring of geotechnical structures. At WSP Brazil, he is part of the Geotechnical Engineering, Numerical Modeling, and Engineer of Record (EOR) technical teams, where he contributes to applied projects involving dam safety, mining infrastructure, and advanced geotechnical analyses, integrating academic research with engineering practice.

COURSE 2: From Chemistry to Stability: Geochemical Influences on Physical Changes and Geotechnical Performance

Instructors: **Joe Scalia**, Colorado, State University, USA; **Heath Orcutt**, SRK Consulting, USA; **Sarah Doyle**, WSP, USA; and **Linda Figueroa**, Colorado School of Mines, USA

WHEN	LANGUAGE	LENGTH
Thursday, September 24	**English**	**3 hours (11:00 – 14:00)**

DESCRIPTION

This course introduces the chemo-mechanical behavior of geomaterials, covering how geochemical processes drive physical alterations and affect geotechnical performance. It addresses mineralogical changes, fluid-solid interactions, and weathering, with applications to tailings and foundation soils. Emphasis is placed on quantifying chemical impacts on volume change, shear strength, and long-term structural stability.

LECTURERS BIO

Joe Scalia (Colorado State University). An Associate Professor of Civil and Environmental Engineering at CSU, specializing in geoenvironmental engineering and the containment of mine waste. His research focuses on bentonite barrier performance, tailings dewatering, and sustainable geotechnical solutions.

Heath Orcutt (SRK Consulting). A Principal GeoEnvironmental Consultant and Practice Leader at SRK, with extensive industry experience in mine waste management. He specializes in the design, operation, and closure of tailings storage facilities, bridging the gap between geochemistry and geotechnical performance.

Sarah Doyle (WSP). A Senior Geochemist and Project Manager at WSP, focusing on environmental geochemistry and acid rock drainage prediction. She brings strong consulting experience in characterizing mine materials and evaluating geochemical impacts on long-term structural stability.

Linda Figueroa (Colorado School of Mines). A Professor of Civil and Environmental Engineering and Director of the Tailings Center at CSM. She is a leading expert in biochemical mine water treatment, the geo-chemical stabilization of tailings, and sustainable mining workflows.

COURSE 3: Tailings Characterization and Potential Applications

Instructors: **Álvaro Videla, Felipe Vargas** and **Iván Navarrete**, Pontificia Universidad Católica de Chile

WHEN

Thursday, September 24

LANGUAGE

Spanish

LENGTH

3 hours (15:00 – 18:00)

DESCRIPTION

This course introduces the foundational principles of copper tailings characterization, treatment, and their innovative repurposing in sustainable construction materials. It covers the lifecycle of tailings production and the chemical and physical properties essential for stabilization and reuse. Through specialized modules, the course addresses advanced recycling techniques, including the development of artificial aggregates and the integration of tailings into cement-based materials.

CONTENT AND PROGRAME

15:00 - 15:45	**Copper Tailings Production, Characterization and Treatment**	Álvaro Videla
15:45 - 15:55	Questions and discussion Module 1	
15:55 - 16:00	Break 1	
16:00 - 16:45	**Artificial Aggregates from Copper Mine Tailings**	Felipe Vargas
16:45 - 16:55	Questions and discussion Module 2	
16:55 - 17:00	Break 2	
17:00 - 17:45	**Tailings For Cement-Based Materials**	Iván Navarrete

17:45 - 17:55	Questions and discussion Module 3
17:55 - 18:00	**Conclusions and Closure of the Course**

LECTURERS BIO

Álvaro Videla, PhD in Metallurgical Engineering; Associate Research Professor of the Department of Mining Engineering at PUC; Director of the PUC Mining Engineering Department; Board Director of the National Center for Pilot Test of Mining Technologies; Author of more than 20 papers in the subject of copper and Lithium processing technologies, two patents and advisor of more than 20 postgraduate students. His research focus on Metals Purification, Sustainable Process Extraction Methods, Mineral Processing, Energy Efficiency, and Production Technologies.

Felipe Vargas, Assistant Professor at the Instituto de Obras Civiles, at the Universidad Austral de Chile, Valdivia. He holds a Ph.D. from the Department of Civil and Environmental Engineering at the Politecnico di Milano and a Ph.D. in Engineering Sciences from the Department of Construction Engineering and Management, School of Engineering, at the Pontificia Universidad Católica de Chile. His research focuses on the use of waste materials in cementitious mixtures, the characterization of supplementary cementitious materials, and the utilization of mining waste in construction materials, particularly artificial aggregates produced from mine tailings.

Iván Navarrete is a Civil Engineer and holds both an M.Sc. and a Ph.D. in Engineering Sciences from the Pontifical Catholic University of Chile (PUC), completing his doctoral studies in 2021 through a joint program with the University of Notre Dame. He is currently an Assistant Professor in the Department of Construction Engineering and Management at PUC and serves as Director of the Concrete Innovation Hub UC. His research focuses on concrete technology, rheology and fresh-state behavior of cementitious materials, 3D concrete printing, the incorporation of industrial by-products and mine tailings into construction materials, and the development of sustainable construction solutions. He has participated in several nationally funded research projects and collaborates extensively with international research groups in advanced cement-based materials. Dr. Navarrete is an active member of various RILEM technical committees and is committed to strengthening collaboration among academia, industry, and government to foster innovation and sustainability in the construction sector.