Advances in Experimental Rock Mechanics:
Techniques, Technologies, and Applications

Sunday, June 14th, 2026 | 13.00 to 17:15 pm |

Chair: Prof Abbas Taheri (Queen's University, Canada)

Description:

As geomechanical challenges grow in key engineering fields such as deep mining, energy extraction, tunnelling, and geological storage, experimental methods need to adapt to accurately reflect the behaviour of geomaterials across various scales and under extreme conditions. This focused workshop offers a platform to examine recent, vital advancements in both laboratory and in-situ rock testing. Regarding field work, the programme will highlight the most advanced in-situ rock testing techniques designed to reveal true mass rock behaviour, including in-situ triaxial compression testing, direct shear testing, and the plate loading test. Additionally, the workshop features innovative laboratory methods, such as optical fibre sensing, to improve data quality in laboratory rock mechanics significantly.

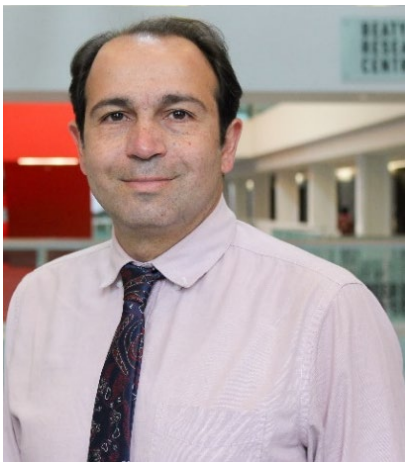
The workshop also examines the most important applications of rock mechanics, focusing on the long-term stability and design of geological storage facilities. A key session is dedicated to evaluating the geomechanical and hydrogeological performance of sedimentary and crystalline rocks in repository design, including lessons learned from major projects and studies conducted in Canada and Finland. In addition, the workshop presents recent advances in ultrasonic and acoustic emission monitoring and new instrumentation and testing methods for investigating rock mass anisotropy, providing attendees with practical and regional insights essential for modern, high-reliability infrastructure planning and rock engineering projects.

.Agenda:

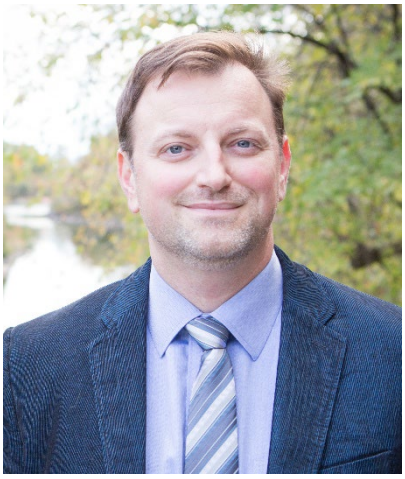
Timeline	Activity	Presenter
1:00 – 1:05 pm	Opening and Introduction	Chair
1:05 – 1:50 pm	Determining Mechanical Properties of Rock Mass Using In-situ Test Methods	Abbas Taheri
1:50 – 2:35 pm	Enhancing Data Quality in Laboratory Rock Mechanics with Advanced Monitoring and Instrumentation	Nicholas Vlachopoulos
2:35 – 3:05 pm	Coffee Break	

3:05 – 3:45 pm	Geomechanical and Hydrogeological Performance of Sedimentary and Crystalline Rocks in Repository Design	Farzine Nasseri
3:44 – 4:25 pm	Rock Damage Investigation with Ultrasonic and Acoustic Emission Monitoring	Mehdi Serati
4:25 – 5:00 pm	Innovative Approaches to Studying the Deformability of Anisotropic Unsaturated Sedimentary Rocks	Yota Togashi
5:00 – 5:15 pm	Closing and Discussion	All

Speakers Biography:

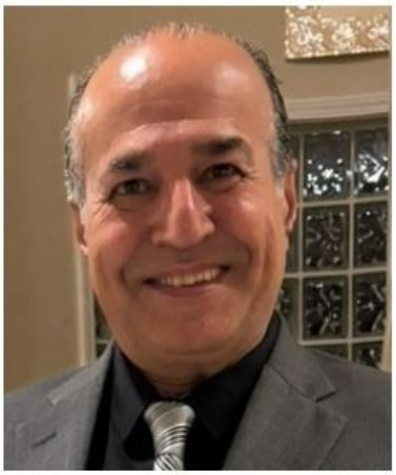


Dr Abbas TAHERI is a Tenured Associate Professor at the Robert M. Buchan Department of Mining at Queen's University in Kingston, Canada, where he holds the Chair in Mine Design. He has over 24 years of experience in industry, research, and teaching in the Middle East, Japan, Australia, and Canada, spanning mining, rock mechanics, and geotechnical engineering. He serves as the editor, associate editor, and a member of the editorial board of several international journals and has produced more than 230 refereed publications. Dr Taheri is an Associate Editor and member of the Editorial Board of several scientific journals. He is the chair of the ISRM Commission on Deep Mining and has developed and taught several courses in geotechnical engineering and mining operations.



Dr. Nicholas Vlachopoulos is a Professor of Civil Engineering at the Royal Military College of Canada, Cross-Appointed Professor at Queen's University, and Principal at Geologos Inc. He has over 30 years of experience in geomechanics and underground infrastructure. His research focuses on tunnel deformation prediction, smart and optimized ground support systems, and the application of fiber optic sensing. He has contributed to more than 170 projects in Canada and internationally, supervised and trained hundreds of highly qualified personnel, and actively bridges experimental research with engineering practice. He currently serves as Engineering Geology Chair for the Canadian Geotechnical Society and Canada Representative to the International Association for Engineering Geology.

Dr. Farzine Nasseri is a rock mechanics specialist with over 30 years of experience in experimental geomechanics, project management, and applied research. His expertise spans fracture mechanics, THM testing, and acoustic/seismic monitoring, with applications in nuclear waste repositories, mining, and petroleum engineering. Widely recognized for bridging advanced laboratory research with practical engineering solutions, he is a collaborative leader committed to safe and sustainable subsurface technologies. He has published more than sixty papers in peer-reviewed international journals and conferences. He has taught and designed new courses at the University of Toronto for 28 years.



Dr Mehdi Serati is a Senior Lecturer at the University of Queensland (UQ). He has completed his PhD at The Commonwealth Scientific and Industrial Research Organization (CSIRO) through UQ in Brisbane, Australia, in Geotechnical Engineering. His core research expertise is in designing and setting up advanced equipment and experiments to test rocks and brittle composites. His area of work is analytical and experimental methods of geotechnical problems, materials testing, rock mechanics, and rock fracture mechanics. He is also the Deputy Manager of the internationally recognized Large Open Pit Project, a collaboration funded by mining companies worldwide aimed at addressing critical gaps in the current understanding of rock slope failures and landslides in large open pit mines.

Dr Yota Togashi is an Associate Professor at the Rock Mechanics Laboratory of Saitama University, Japan. He earned his PhD degree at Yokohama National University in 2014. After that, from 2014 to 2018, he worked as a researcher at the Railway Technical Research Institute, Japan. He moved to Saitama University in 2018 and remains there to this day. His main research theme is the development and application of methods for determining rock deformation anisotropy. For this research, he received the ISRM Young Rock Engineer Award 2022 and the Walter Wittke Prize 2023 (Germany). In addition, he has worked on practical tunnel engineering challenges, including the deformation characteristics of yielding support and tunnel face stability. He is working with 1 technical staff member and 12 students, including 4 international students, in his lab.