



ALERT Geomaterials

Alliance of Laboratories in Europe for Education, Research and Technology

<http://alertgeomaterials.eu>

33rd ALERT Workshop and School

Aussois, 26th September to 1st October 2022

Final Program
(September 2022)



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33rd ALERT Workshop Program

Aussois, 26th September 2022

SESSION I: Mechanics of Hard Soils – Soft Rocks

Coordinators: Nadia BENAHMED (INRAE, France), Elma CHARALAMPIDOU (Heriot-Watt University, U.K.), Claudia VITONE (Politecnico di Bari, Italy)

- 8:20 – 8:30 Opening of the 33rd ALERT Workshop**
Cino VIGGIANI (Université Grenoble-Alpes, France), President of ALERT.
- 8:30 – 8:40 Session Opening**
Nadia BENAHMED (INRAE, France), Elma CHARALAMPIDOU (Heriot-Watt University, U.K.), Claudia VITONE (Politecnico di Bari, Italy).
- 8:40 – 9:25 Keynote lecture**
Hydro-mechanical behaviour of argillaceous hard soils and soft rocks
Antonio GENS
Universitat Politècnica de Catalunya, Barcelona, Spain.
- 9:25 – 9:45 Analysis of the evolution of clay microstructure upon compression and shearing**
Simona GUGLIELMI¹, Federica COTECCHIA², Francesco CAFARO², Antonio GENS³
¹Scuola Superiore Meridionale, Italy; ²Politecnico di Bari, Italy; ³UPC, Barcelona, Spain.
- 9:45 – 10:05 On the rate-dependent behaviour of clays at high pressures under monotonic and cyclic triaxial loadings**
Andrea CIANCIMINO¹, Monica BARBERO¹, Renato Maria COSENTINI¹, Sebastiano FOTI¹, Alessandro MESSORI², Guido MUSSO¹, Giorgio VOLONTÉ²
¹Politecnico di Torino, Italy; ²Eni SpA, Milan, Italy.
- 10:05 – 10:25 Triaxial shale testing: Insights from Opalinus Clay and Callovo-Oxfordian claystone**
Pierre DELAGE¹, Malik BELMOKHTAR²
¹Ecole des Ponts ParisTech, France; ²ATLAS Géotechnique.
- 10:25 – 11:00 COFFEE BREAK**



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- 11:00 – 11:20** Understanding the influence of triaxial deformation and heterogeneity on the hydraulic behaviour of porous sandstones from in-situ testing with x-ray and neutron tomography
Fernando Antonio LEITE VIEIRA LIMA¹, Stephen HALL¹, Erika TUDISCO¹, Jonas ENGQVIST¹, Robin WORACEK², Alessandro TENGATTINI³, Cyrille COUTURE⁴
¹Lund University, Sweden; ²European Spallation Source, Sweden; ³Institute Laue-Langevin (ILL), France; ⁴Université Grenoble Alpes, France.
- 11:20 – 11:40** Field observations of heaving in stiff clay due to unloading
Wills SANIN JAIME, Jamie STANDING
Imperial College London, UK.
- 11:40 – 12:00** Geotechnical characterisation of tectonised flysch formations
Gianfranco URCIUOLI¹, Luciano PICARELLI², Anna D'ONOFRIO¹
¹Università degli Studi di Napoli Federico II, ²CMCC, Italy.
- 12:00 – 12:20** Three weak rocks from Malta - one dimensional compression and shear of reconstituted and intact specimens
Adrian MIFSUD¹, Federica COTECCHIA², Francesco CAFARO², Francesca SANTALOIA³
¹University of Malta; ²Politecnico di Bari, Italy; ³CNR-IRPI.
- 12:20 – 12:50** **Discussion on experimental evidence of the physical characteristics and geomechanical effects of stress-history, bond- and suction-induced soil structures of HSSR.**
- 12:50 – 14:20** **LUNCH**
- 14:20 – 14:40** Stiffness of Lightweight Cemented Soils: homogenisation schemes vs experimental data
Laura PERROTTA¹, Enza VITALE², Giacomo RUSSO²
¹Scuola Superiore Meridionale; ²Università degli Studi di Napoli Federico II, Italy.
- 14:40 – 15:00** Experimental investigation of mechanical and hydro-mechanical behaviour of artificial cemented granular soils
Abbas FARHAT¹, Pierre PHILIPPE¹, Li HUA LUU¹, Pablo CUÉLLAR², Nadia BENAHMED¹, Torsten WICHTMANN³
¹INRAE Aix-Marseille University, France; ²BAM, Federal Institute for Materials Research and Testing, Berlin, Germany; ³RUB Ruhr-Universität Bochum, Germany.
- 15:00 – 15:20** Analysis of a landslide in brittle soils
Luigi PUGLIESE, Antonello TRONCONE, Andrea PARISE, Enrico CONTE
University of Calabria, Italy.



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- 15:20 – 15:40** Anisotropic thermal compaction of claystone: Constitutive modelling and simulation from sample to structure scale
Philipp BRAUN¹, Siavash GHABEZLOO¹, Patrick DANGLA¹, Minh-Ngoc VU², Gilles ARMAND², Carlos PLUA²
¹Laboratoire Navier, France; ²ANDRA, France.
- 15:40 – 16:00** Performance of large diameter sealing structures in deep argillaceous nuclear waste repository – Analysis considering true 3D configurations
Matías ALONSO¹, Jean VAUNAT¹, Minh-Ngoc VU², Jean TALANDIER²
¹Universitat Politècnica de Catalunya, Barcelona, Spain; ²ANDRA, France.
- 16:00 – 16:30** **COFFEE BREAK**
- 16:30 – 17:00** **Discussion on modelling strategies, which are physics-inspired and experimentally-driven and emblematic cases of successful and unsuccessful predictions of their behaviour.**
- 17:00 – 17:10** **Perspectives and Closure**
- 17:30 – 18:00** **ALERT General Assembly**
- 18:00 – 20:00** **Poster Session (intermediate level) and aperitif**
- 20:00** **DINNER**



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33rd ALERT Workshop Program

Aussois, 27th September 2022

SESSION II: Special Session on Robot-Ground Interaction

Coordinators: Raul FUENTES (RWTH Aachen University) & Itai EINAV (University of Sydney)

- 8:30 – 8:35 Session Opening**
Raul FUENTES (RWTH Aachen University) & Itai EINAV (University of Sydney)
- 8:35 – 8:55 Robot-Ground Interaction - topic introduction**
Raul FUENTES (RWTH Aachen, Germany).
- 8:55 – 9:40 Keynote lecture**
Modelling robot-ground interaction systems
Ken KAMRIN (MIT, USA).
- 9:40 – 10:00 Plant roots as a model in geotechnique**
Barbara MAZZOLAI, Emanuela DEL DOTTORE (Istituto Italiano di Tecnologia, Italy).
- 10:00 – 10:20 Resistance to Motion for Small Wheeled Robots from Soil Strength Failure Envelopes**
Kaustubh JALUNDHWALA, David WHITE, Klaus-Peter ZAUNER, Danesh TARAPORE (University of Southampton, UK).
- 10:20 – 10:50 COFFEE BREAK**
- 10:50 – 11:10 Orthogonal cutting of sands – experiments and simulations**
Tejas MURTHY (Indian Institute of Science, India).
- 11:10 – 11:30 Artificial Intelligence toolbox for subsurface exploration by self-excavating robots**
Chloe ARSON, Duen HORNG, Fernando PATINO-RAMIREZ, Zijie WANG, Sanshrit SINGHAI, Xiangyu WANG (Georgia Tech, USA).



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- 11:30 – 11:50** Introduction of closed-loop control to the Smooth Particle Hydrodynamics framework. Case study: closed-loop control for overturning prevention of mobile drilling rigs
Rahul SOMASUNDARAM, Francisco Williams RIQUER, Jurgen GRABE (Hamburg University of Technology, Germany).
- 11:50 – 12:10** Micro-mechanics of terradynamics: understanding the mechanisms behind granular lift in horizontal penetration
Fernando PATINO-RAMIREZ, Catherine O’SULLIVAN (Imperial College London, UK).
- 12:10 – 14:30** **LUNCH**
- 15:00 – 17:00** **ALERT Board of Directors**
- 17:30 – 18:30** **ALERT PhD Prize 2022**
- 18:30 – 19:30** **ALERT Special Lecture 2022**
The Force is strong with this one
Professor José ANDRADE (CALTECH, USA).
- 20:00** **BANQUET**



33rd ALERT Workshop Program

Aussois, 28th September 2022

SESSION III: Multi-field approach of gravity-driven disasters in a global climate change context

Organizers: François NICOT (EDYTEM / USMB), Florence MAGNIN (EDYTEM / CNRS-USMB), Stéphane LAMBERT (UGA - INRAE), Francesco CALVETTI (Politecnico Milano)

8:20 – 8:30 Opening Session

François NICOT (EDYTEM / USMB), Florence MAGNIN (EDYTEM / CNRS-USMB), Stéphane LAMBERT (UGA - INRAE), Francesco CALVETTI (Politecnico Milano).

Part 1 – Rockfall and permafrost modeling

8:30 – 9:10 Keynote lecture

Modelling rockwall destabilization from a geomechanical perspective
Anna-Maria FERRERO (Università di Torino, Italy) and Maria Rita MIGLIAZZA (Politecnico di Torino, Italy).

9:10 – 9:35

15 years of rockfall and permafrost observation in the Mont-Blanc massif to better appreciate their relationship
Ludovic RAVANEL (EDYTEM, CNRS-Université Savoie Mont Blanc, France).

9:35 – 10:00

Micromechanical modelling of ice and frozen soils
Francesco CALVETTI and Guodong WANG (Politecnico Milano, Italy).

10:00 – 10:25

Factors conditioning high-elevation slope instability in a changing climate: insights from the Italian Alps and beyond
Marta CHIARLE (Italian National Research Council, Institute of Research for Geo-hydrological Protection, Italy).

10:25 – 10:50 COFFEE BREAK

10:50 – 11:15

Analysis of temperature and slope microseismic activity: the Matterhorn peak case study (North-Western Alps)
Marina PIRULLI (Politecnico Torino, Italy), Claudio SCAVIA (Politecnico Torino, Italy) and Cristina OCCHIENA (Kwantis, Italy).



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- 11:15 – 11:40** Coupled thermal and hydrological models in rockwalls
Josué BOCK (EDYTEM, CNRS-Université Savoie Mont Blanc, France).
- 11:40 – 12:05** Micromechanics of unsaturated frozen soils
Mehdi POURAGHA (Carleton University, Canada).
- 12:05 – 12:30** Modelling thawing-triggered landslides using a multi-physics SPH framework
Ha H. BUI (Monash University, Australia).
- 12:30 – 14:00** **LUNCH**
- Part 2 – Rock glaciers and geophysics applied to permafrost**
- 14:00 – 14:40** **Keynote lecture**
Rock glacier modeling
Alessandro CICOIRA (University of Zurich, Switzerland).
- 14:40 – 15:05** A petrophysical model to assess water content in permafrost and rock glaciers
André REVIL (EDYTEM, CNRS-Université Savoie Mont Blanc, France).
- 15:05 – 15:30** Monitoring of rock glacier movements and their evolution in relation to climate change
Diego CUSICANQUI (UGA, France).
- 15:30 – 15:55** Mechanical characterization and evolution of rocky glaciers: insights from ambient seismic noise monitoring
Eric LAROSE (ISTerre, UGA, France).
- 15:55 – 16:25** **COFFEE BREAK**
- 16:25 – 16:50** Glaciers and climate change: implications in term of hazards
Olivier GAGLIARDINI (IGE, France).
- 16:50 – 17:15** Glacier hazards in relation to climate change: subglacial water pockets and ice avalanches
Emmanuel THIBERT (INRAE, UGA, France).
- 20:00** **DINNER**



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33rd ALERT Doctoral School

Aussois, 29th September 2022

Advanced Experimental Geomechanics

Coordinators:

Prof. Edward Andò, EPFL Center for Imaging

Prof. Benjy Marks, The University of Sydney

Prof. Ryan Hurley, Johns Hopkins University

Prof. Joshua A. Dijksman, Wageningen University

DAY 1: What is Advanced Experimental Geomechanics?

9:00 – 11:00 Introduction to the course

Edward ANDÒ (EPFL Center for Imaging), Benjy MARKS (The University of Sydney), Ryan HURLEY (Johns Hopkins University) and Joshua DIJKSMAN (Wageningen University).

11:00 – 11:30 **COFFEE BREAK**

11:30 – 12:30 Introduction to imaging geomaterials – Theory

Edward ANDÒ (EPFL Center for Imaging) and Benjy MARKS (The University of Sydney).

12:30 – 14:00 **LUNCH**

14:00 – 15:00 Imaging geomaterials – Practical

Benjy MARKS (The University of Sydney).

15:00 – 15:30 **COFFEE BREAK**

15:30 – 17:30 Measuring forces with photoelasticity – Practical

Ryan HURLEY (Johns Hopkins University).

20:00 **DINNER**



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33rd ALERT Doctoral School

Aussois, 30th September 2022

Advanced Experimental Geomechanics

Coordinators:

Prof. Edward Andò, EPFL Center for Imaging

Prof. Benjy Marks, The University of Sydney

Prof. Ryan Hurley, Johns Hopkins University

Prof. Joshua A. Dijksman, Wageningen University

DAY 2: SPECIFIC PROBLEMS

9:00 – 11:00 Introduction to 3D imaging with RIMS – Practical
Joshua A. DIJKSMAN (Wageningen University).

11:00 – 11:30 **COFFEE BREAK**

11:30 – 12:30 X-Ray CT – Theory
Edward ANDÒ (EPFL Center for Imaging).

12:30 – 14:00 **LUNCH**

14:00 – 16:00 Deeper into 3D with X-Ray CT – Practical
Edward ANDÒ (EPFL Center for Imaging).

16:00 – 16:30 **COFFEE BREAK**

16:30 – 18:00 Measuring Forces and Stresses in 3D – Theory
Ryan HURLEY (Johns Hopkins University).

20:00 **DINNER**



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33rd ALERT Doctoral School

Aussois, 1st October 2022

Advanced Experimental Geomechanics

Coordinators:

Prof. Edward Andò, EPFL Center for Imaging

Prof. Benjy Marks, The University of Sydney

Prof. Ryan Hurley, Johns Hopkins University

Prof. Joshua A. Dijksman, Wageningen University

DAY 3: TOWARDS 4D APPLICATIONS

9:00 – 10:30 Publishing your code and data - Practical
Benjy MARKS (The University of Sydney).

10:30 – 11:00 **COFFEE BREAK**

11:00 – 12:30 Open Imaging Bar (bring your own problems) - Practical
Edward Andò (EPFL Centre for Imaging).

12:30 – 14:00 **LUNCH**