



***ALERT Geomaterials***

Alliance of Laboratories in Europe for Education, Research and Technology

<http://alertgeomaterials.eu>

# **30<sup>th</sup> ALERT Workshop and School**

Aussois, 30<sup>th</sup> September to 4<sup>th</sup> October 2019

**Preliminary Program**

(1<sup>st</sup> July 2019)



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## **30<sup>th</sup> ALERT Workshop Program**

**Aussois, 30<sup>th</sup> September 2019**

### **SESSION I: Upscaling in Geotechnical Engineering (70th anniversary of Roberto Nova)**

Coordinators: Claudio Di Prisco (Politecnico di Milano), Cristina Jommi (Politecnico di Milano), Claudio Tamagnini (Università di Perugia)

**8:20 – 8:30 Opening of the 30<sup>th</sup> ALERT Workshop**

Cino VIGGIANI (Université Grenoble-Alpes, France), President of ALERT

**8:30 – 8:40 Session Opening**

Claudio DI PRISCO (Politecnico di Milano), Cristina JOMMI (Politecnico di Milano), Claudio TAMAGNINI (Università di Perugia)

**8:40 – 9:10 Invited Speaker**

A challenging problem: how can discrete element simulations bring advances in constitutive modelling?

Bruno CHAREYRE (Université Grenoble-Alpes, France)

**9:10 – 9:35**

A double-scale FEMxDEM model applied to cohesive-frictional granular materials in polyaxial loading conditions.

Cyrille-B COUTURE (Université Grenoble-Alpes), Jacques DESRUES (Université Grenoble-Alpes), Vincent RICHEFEU (Université Grenoble-Alpes), Pierre BESUELLE (Université Grenoble-Alpes), Frédéric COLLIN (Université de Liège)

**9:35 – 10:00**

FFT-based Homogenization of Gas Hydrates Bearing Sediments

Axelle ALAVOINE (Ecole des Ponts ParisTech, IFSTTAR, CNRS), Patrick DANGLA (Ecole des Ponts ParisTech, IFSTTAR, CNRS), Jean-Michel PEREIRA (Ecole des Ponts ParisTech, IFSTTAR, CNRS)

**10:00 – 10:30 Invited Speaker**

Revisiting failure in granular media from discrete constitutive modellings

Luc SIBILLE (Université Grenoble-Alpes)

**10:30 – 10:55 COFFEE BREAK**

**10:55 – 11:20**

Multi-scale modeling of sand-silt mixtures with application on internal erosion

Pierre-Yves HICHER (Ecole Centrale de Nantes)



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- 11:20 – 11:45** Revisiting the Nova “Sinfonietta Classica”: application to granular soils subjected to internal erosion by suffusion  
Quentin ROUSSEAU (GeM, Ecole Centrale de Nantes), Giulio SCIARRA (GeM, Ecole Centrale de Nantes), Rachel GELET (GeM, Université de Nantes), Didier MAROT (GeM, Université de Nantes)
- 11:45 – 12:10** Constitutive laws for crushable solids accounting for grain-scale processes  
Giuseppe BUSCARNERA (Northwestern University)
- 12:10 – 12:35** Numerical simulation of saturated active clay under chemo-mechanical loading  
Farzaneh GHALAMZAN (Università di Trento), Alessandro GAJO (Università di Trento), Lucia SIMEONI (Università di Trento)
- 12:35 – 14:35** **LUNCH**
- 14:35 – 15:05** **Invited Speaker**  
Multiphase approach to modelling of fast landslides and related phenomena  
Manuel PASTOR (Universidad Politécnica de Madrid)
- 15:05 – 15:30** A granular hydrodynamic model covering solid, fluid and gaseous states and transitions in between  
Ebrahim ALAEI (The University of Sydney), Benjy MARKS (The University of Sydney), Itai EINAV (The University of Sydney)
- 15:30 – 15:55** Numerical modelling of a bentonite seal: From small scale experiments to real scale structures  
Liliana GRAMEGNA (Université de Liège) & Robert CHARLIER (Université de Liège)
- 15:55 – 16:25** **COFFEE BREAK**
- 16:25 – 16:50** Definition of macroelement models for reproducing the hydromechanical coupled response of tunnel fronts and shallow foundation  
Luca FLESSATI (Politecnico di Milano), Claudio DI PRISCO (Politecnico di Milano)
- 16:50 – 17:20** **Invited Speaker**  
Macroelement modelling in geomechanics  
Panagiotis KOTRONIS (Ecole Centrale de Nantes)
- 17:30 – 18:00** **ALERT General Assembly**
- 18:00 – 20:00** **Poster Session (intermediate level) and aperitif**
- 20:00** **DINNER**



## 30<sup>th</sup> ALERT Workshop Program

**Aussois, 1<sup>st</sup> October 2019**

### **SESSION II: The mechanics of root-soil systems: from microscopic to macroscopic approaches**

Coordinators: Evelyne Kolb (Sorbonne Université) & Luc Sibille (UGA)

**8:20 – 8:30 Session Opening**

Evelyne KOLB (Sorbonne Université), Luc SIBILLE (Université Grenoble-Alpes)

**8:30 – 9:00 Invited Speaker**

Quantification of mechanical and hydrological root-reinforcement  
Gerrit MEIJER (University of Dundee)

**9:00 – 9:30 Invited Speaker**

Root anchorage of trees under wind load  
Pauline DEFOSSEZ (ISPA, INRA, Bordeaux Science Agro)

**9:30 – 10:00 Invited Speaker**

Scaling behavior of root growth in granular materials  
Farhang RADJAI (LMGC, Université de Montpellier, CNRS)

**10:00 – 10:30 Flash-talks (6 min/talk) :**

Kinetics of growth responses of a root encountering an obstacle  
Marie-Béatrice BOGEAT-TRIBOULOT (Université de Lorraine, INRA, AgroPariTech, UMR Silva)

Plant root growing against or around mechanical obstacles  
Evelyne KOLB (Sorbonne Université)

The cap size and shape of *Arabidopsis thaliana* primary roots impact the root responses to an increase in medium strength  
Valérie LEGUE (Université Clermont Auvergne, INRA, PIAF)

**Questions on flash-talks (10 min)**

**10:30 – 11:00 COFFEE BREAK**



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### **11:00 – 11:30 Invited Speaker**

Experimental and numerical investigations of soil-root interactions for analysing the impact of forest vegetation on shallow landslides

Guillaume VEYLON, Franck BOURRIER (IRSTEA Aix-en-Provence / Grenoble)

### **11:30 – 12:00 Invited Speaker**

Physics and hydrology of mucilage-soil interactions

Andrea CARMINATI (Chair of Soil Physics, University of Bayreuth)

### **12:00 – 12:30 Flash-talks (6 min/talk) :**

Microscale variations in particle forces and root responses to soil mechanical stress

Lionel DUPUY (James Hutton Institute)

Digital image analysis of the root-soil interaction

Floriana ANSELMUCCI (Université Grenoble-Alpes, Grenoble INP, CNRS, 3SR)

Multi-scale observations on a root-permeated compacted soil at different hydraulic states

Alessandro FRACCICA (Universitat Politècnica de Catalunya, AMAP, CIRAD, CNRS, IRD, Univ. Montpellier)

### **Questions on flash-talks (10 min)**

### **12:30 – 14:30 LUNCH**

### **15:00 – 17:00 ALERT Board of Directors**

### **17:30 – 18:30 ALERT PhD Prize 2019**

### **18:30 – 19:30 ALERT Special Lecture 2019**

Growth of slip surfaces (life is dangerous)

Professor Alexander M. Puzrin, ETH Zurich, Switzerland

### **20:00 BANQUET**



## 30<sup>th</sup> ALERT Workshop Program

Aussois, 2<sup>nd</sup> October 2018

### **SESSION III: Computational methods in snow and avalanche release mechanics**

Organizers: Johan Gaume (EPFL), Pascal Hagenmuller (CNRM - CEN, Grenoble), François Nicot (Univ. Grenoble-Alpes, IRSTEA), Guillaume Chambon (Univ. Grenoble-Alpes, IRSTEA)

**8:20 – 8:30 Opening Session**

Johan GAUME (EPFL), Pascal HAGENMULLER (CNRM - CEN), François NICOT (IRSTEA), Guillaume CHAMBON (IRSTEA)

**8:30 – 9:10 Invited Speaker: General challenges on snow and avalanche mechanics**

Snow avalanches – from snow failure to slab release.

Juerg SCHWEIZER (SLF), Bastian Bergfeld, Grégoire Bobillier, Achille Capelli, Johan Gaume, Benjamin Reuter, Alec van Herwijnen

**9:10 – 9:40 Towards field measurements of crack propagation in weak snowpack layers at the slope scale**

Alec VAN HERWIJNEN (SLF), Bastian BERGFELD

**9:40 – 10:10 Acoustic emissions from progressive failure of snow**

Achille CAPELLI (SLF), Ingrid REIWEGER, Juerg SCHWEIZER

**10:10 – 10:40 COFFEE BREAK**

**10:40 – 11:20 Invited Speaker: Micromechanical modelling of snow mechanics**

Internal time scales and spatio-temporal deformation instabilities in snow mechanics

Michael ZAISER (Univ Erlangen), Stefan LIEBENSTEIN (Univ Erlangen, Univ. Edinburgh), Tom BARRACLOUGH (Univ. Edinburgh), Jane BLACKFORD (Univ. Edinburgh), Henning LOEWE (WSL-SLF)

**11:20 – 11:50 Micromechanical modeling of snow failure and dynamic fracture**

Grégoire BOBILLIER (SLF), Alec van HERWIJNEN, Bastian BERGFELD, Johan GAUME, Jürg SCHWEIZER



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- 11:50 – 12:20** Modeling mixed-mode weak layer anticrack collapse – insights into the interaction of stress and energy  
Philipp ROSENDAHL (2phi.de), Philipp WEISSGRAEBER
- 12:20 – 14:00** **LUNCH**
- 14:00 – 14:40** **Invited Speaker: Numerical homogenization and constitutive modelling**  
Multiscale modeling of dry snow physics and mechanics: some recent advances and current challenges  
Christian GEINDREAU (Univ Grenoble Alpes, 3SR, Grenoble, France), Frédéric FLIN, N. CALONNE, Antoine WAUTIER, R. GRANGER
- 14:40 – 15:10** From X-ray tomography images to a numerical homogenized formulation of snow viscoplasticity  
Antoine WAUTIER (IRSTEA), Frédéric FLIN, Christian GEINDREAU
- 15:10 – 15:40** Micro-mechanically-based modelling of snow failure and post-failure behavior  
Guillaume CHAMBON (UGA-IRSTEA), Tijan MEDE, Pascal HAGENMULLER, François NICOT
- 15:40 – 16:10** Microstructural investigation of the cone penetration test in snow  
Pascal HAGENMULLER (CNRM-CEN), Isabel PEINKE, Guillaume CHAMBON
- 16:10 – 16:30** **COFFEE BREAK**
- 16:30 – 17:10** **Invited Speaker: Slope-scale modelling**  
Title to be announced  
Wei WU (BOKU, Vienna, Austria)
- 17:10 – 17:40** A continuum damage material point method for snow and avalanche mechanics  
Johan GAUME (EPFL), Alec VAN HERWIJNEN, Ted GAST, Joseph TERAN, Chenfanfu JIANG
- 17:40 – 18:10** Modelling dense flow regimes in snow avalanches using DEM  
Camille LIGNEAU (SLF), Betty SOVILLA, Johan GAUME
- 20:00** **DINNER**





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**30<sup>th</sup> ALERT Doctoral School**

**Aussois, 3<sup>rd</sup> October 2019**

## **The legacy of Ioannis Vardoulakis to Geomechanics**

**Coordinators:**

**Jean Sulem, Ecole des Ponts ParisTech**

**Cino Viggiani, Université Grenoble-Alpes**

**9:00 – 9:30 Introduction to the course**

Jean Sulem, Ecole des Ponts ParisTech and Cino Viggiani, Université Grenoble-Alpes

**9:30 – 11 :00** Mechanics of granular materials: I. Experimental approach  
Edward Andò (Université Grenoble Alpes)

**11:00 – 11:30 COFFEE BREAK**

**11:30 – 13:00** Mechanics of granular materials I. Experimental approach  
Edward Andò (Université Grenoble Alpes)

**13:00 – 14:30 LUNCH**

**14:30 – 16:30** Landslide mechanics and growth of slip surfaces  
Sasha Puzrin (ETH Zurich)

**16:30 – 17:00 COFFEE BREAK**

**17:00 – 19:00** Modelling of strain localization in geomaterials - Higher order continuum theories and regularization techniques  
Ioannis Stefanou (Ecole des Ponts ParisTech)

**20:00 DINNER**



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**30<sup>th</sup> ALERT Doctoral School**

**Aussois, 4<sup>th</sup> October 2019**

## **The legacy of Ioannis Vardoulakis to Geomechanics**

**Coordinators:**

**Jean Sulem, Ecole des Ponts ParisTech**

**Cino Viggiani, Université Grenoble-Alpes**

**8:30 – 10:00** Petroleum Geomechanics (borehole stability, sand production, hydraulic fracturing)  
Euripides Papamichos (Aristotle University of Thessaloniki) & Panos Papanastasiou (University of Cyprus)

**10:00 – 10:30 COFFEE BREAK**

**10:30 – 12:00** Petroleum Geomechanics (borehole stability, sand production, hydraulic fracturing)  
Euripides Papamichos (Aristotle University of Thessaloniki) & Panos Papanastasiou (University of Cyprus)

**12:00 – 13:30 LUNCH**

**13:30 – 15:30** Mechanics of granular materials: II. Modelling  
Itai Einav, University of Sydney

**15:30 – 16:00 COFFEE BREAK**

**16:00 – 18:00** Hydro-mechanics of porous and granular material - Poroelasticity and beyond  
Holger Steeb, Universität Stuttgart

**18:00 – 18:15 Closure of the school**

Jean Sulem, Ecole des Ponts ParisTech and Cino Viggiani, Université Grenoble-Alpes

**20:00 DINNER**