



# **ALERT GEOMATERIALS**

The Alliance of Laboratories in Europe for Education, Research and Technology  
<http://alertgeomaterials.eu/>

## **27<sup>th</sup> ALERT Workshop and School** Aussois, 3<sup>rd</sup> October to 8<sup>th</sup> October 2016

### **Final Programme** (September 21, 2016)



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

Aussois, 3<sup>rd</sup> October 2016

### **Session I: New trends in micromechanical approaches of Particulate Materials – experiments and modelling aspects**

Coordinators: Minna Karstunen (Chalmers University of Technology, Sweden), Nadia Benahmed (IRSTEA, France), Mahdia Hattab (Université de Lorraine, France)

**8:20 - 8:30 Opening of the 27<sup>th</sup> ALERT Workshop**

Manuel Pastor (Universidad Politécnica de Madrid, Spain), President of ALERT

**8:30 - 9:10 Invited Speaker**

Experimental study of the cracking mechanisms of clay during drying

Jean-Marie Fleureau<sup>1</sup>, Xin Wei<sup>1,2</sup>, Mahdia Hattab<sup>2</sup> (<sup>1</sup>CentraleSupélec Chatenay-Malabry, France ; <sup>2</sup>Université de Lorraine, France)

**9:10 - 9:35 Quantitative comparison between the crack apertures, strains and microstructure in Tournemire clay-rocks**

Anne-Laure Fauchille, Stephen Hedan, Valery Valle, Dimitri Prêt, Philippe Cosenza (University of Poitiers, France)

**9:35 - 10:00 Parametric sensitivity study of particle shape effect through 3D printing**

Seung Jae Lee<sup>1</sup>, Beena Sukumaran<sup>2</sup>, Yu-Feng Su<sup>1</sup> (<sup>1</sup>Florida International University, USA ; <sup>2</sup>Rowan University, USA)

**10:00 - 10:30 COFFEE BREAK**

**10:30 - 11:10 Invited Speaker**

Microstructural changes in the background of the one-dimensional compression behaviour of a stiff clay

Federica Cotecchia, Francesco Cafaro, Simona Guglielmi (Technical University of Bari, Italy)

- 11:10 - 11:35** On the determination and description of fabric in natural granular materials  
Max Wiebicke<sup>1,2</sup>, Edward Andò<sup>2</sup>, Gioacchino Viggiani<sup>2</sup>, Ivo Herle<sup>1</sup>  
(<sup>1</sup>Technische Universität Dresden, Germany ; <sup>2</sup>Université Grenoble-Alpes, Laboratoire 3SR )
- 11:35 - 12:00** Conceptual micromechanical model for non-active clays  
Matteo Pedrotti, Alessandro Tarantino (University of Strathclyde, UK)
- 12:00 - 12:25** Description of the mechanical response of soils subjected to suffusion based on a micro-hydromechanical model  
Rodaina Aboul Hosn<sup>1</sup>, Cong Doan Nguyen<sup>2</sup>, Luc Sibille<sup>1</sup>, Nadia Benahmed<sup>2</sup>, Bruno Chareyre<sup>1</sup> (<sup>1</sup>Laboratoire 3SR, France ; <sup>2</sup>IRSTEA, France)
- 12:30 - 14:30** **LUNCH**
- 14:30 - 15:10** **Invited Speaker**  
On the observation of trans-scale structural response of soft soils during mechanical loading  
Jelke Dijkstra<sup>1</sup>, Georgios Birmpilis<sup>1</sup>, Stephen Hall<sup>2</sup> (<sup>1</sup>Chalmers University of Technology, Sweden ; <sup>2</sup>Lund University, Sweden)
- 15:10 - 15:35** Validity of DEM in describing stresses in wet granular materials  
Jérôme Duriez, Mahdad Eghbalian, Richard Wan (University of Calgary, Canada)
- 15:35 - 16:00** Experimental analysis of interparticle force distribution in granular media  
Stephen A. Hall<sup>1</sup>, Ryan Hurley<sup>2</sup>, Jonathon Wright<sup>3</sup>, Stefanos Athanasopoulos<sup>2</sup> (<sup>1</sup>Lund University, Sweden ; <sup>2</sup>Lawrence Livermore National Laboratory, USA ; <sup>3</sup>European Synchrotron Facility, France )
- 16:00 - 16:25** Scale separation in suffusion: a micromechanical attempt  
Antoine Wautier<sup>1</sup>, Stéphane Bonelli<sup>2</sup>, François Nicot<sup>1</sup> (<sup>1</sup>Université Grenoble Alpes-Irstea UR ETGR, France ; <sup>2</sup>Irstea UR RECOVE, France)
- 16:25 - 17:30** **COFFEE BREAK**
- 17:30 - 18:00** **ALERT General Assembly**
- 18:00 - 20:00** **Poster Session (intermediate level) and aperitif**
- 20:00** **DINNER**



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

Aussois, 4<sup>th</sup> October 2016

### **Session II: Mechanics of multiphase porous media in modelling cementitious materials: from early ages to durability issues**

Coordinators: Lorenzo Sanavia, Francesco Pesavento (Università degli Studi di Padova, Italy), Matthieu Briffaut (Laboratoire 3SR, France)

**8:30 - 8:40 Session Opening**

Francesco Pesavento<sup>1</sup>, Matthieu Briffaut<sup>2</sup>, Lorenzo Sanavia<sup>1</sup> (<sup>1</sup>Università degli Studi di Padova, Italy ; <sup>2</sup>Laboratoire 3SR, France)

**8:40 - 9:05** Intrinsic, apparent and relative permeability estimation of cementitious materials based on pore size distributions

Lionel Ecay, David Grégoire, Fadi Khaddour, Gilles Pijaudier-Cabot (Université de Pau et des Pays de l'Adour, France)

**9:05 - 9:30** Numerical coupling between mechanical state and permeability for concrete applied on a 3D splitting test

M. Ezzedine El Dandachy, Matthieu Briffaut, Frédéric Dufour, Stefano Dal Pont (Laboratoire 3SR, France)

**9:30 - 9:55** Water flow in cracking concrete : experimental study and numerical modeling based on a probabilistic cracking approach

Giuseppe Rastiello<sup>1</sup>, Claude Boulay<sup>2</sup>, Stefano Dal Pont<sup>3</sup>, Jean-Louis Tailhan<sup>2</sup>, Pierre Rossi<sup>2</sup> (<sup>1</sup>École Centrale de Nantes, France ; <sup>2</sup>Université Paris-Est, France ; <sup>3</sup>Laboratoire 3SR, France )

**9:55 - 10:25 COFFEE BREAK**

**10:25 - 10:50** Nano-granular texture of cement hydrates

Katerina Ioannidou<sup>1</sup>, Franz-Josef Ulm<sup>1</sup>, Pierre Levitz<sup>2</sup>, Roland J.-M. Pellenq<sup>1</sup>, Emanuela Del Gado<sup>3</sup> (<sup>1</sup>Massachusetts Institute of Technology, Cambridge, USA ; <sup>2</sup>University Pierre et Marie Curie, France; <sup>3</sup>Georgetown University, Washington, USA )

- 10:50 - 11:15** Constitutive modelling of hydrating cement paste : application to oil-well cement sheath integrity  
Siavash Ghabezloo<sup>1</sup>, Jean Sulem<sup>1</sup>, Nicolaine Agofack<sup>1,2</sup>, Marcos Samudio<sup>1</sup>, Sara Bahafid<sup>1</sup> ( <sup>1</sup>École des Ponts ParisTech, France ; <sup>2</sup>SINTEF, Norway)
- 11:15 - 11:40** Modelling Coupled Chemo-Hygro-Thermo-Mechanical Phenomena in Cementitious Materials  
Francesco Pesavento<sup>1</sup>, Dariusz Gawin<sup>2</sup> ( <sup>1</sup>Università degli Studi di Padova, Italy ; <sup>2</sup>Lodz University of Technology, Poland )
- 12:30 - 14:30** **LUNCH**
- 15:00 - 17:00** **ALERT Board of Directors**
- 17:30 - 18:30** **ALERT PhD Prize 2016**
- 18:30 - 19:30** **ALERT Special Lecture 2016**  
Planetary geomechanics  
Prof. Takashi Matsushima (University of Tsukuba, Japan)
- 20:00** **DINNER**



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

Aussois, 5<sup>th</sup> October 2016

### **Session III: Geomechanics of faults, with applications spanning from earthquake nucleation to landslides**

Coordinators: Manolis Veveakis, Klaus Regenauer-Lieb (University of New South Wales, Australia), Ioannis Stefanou, Jean Sulem (École des Ponts ParisTech, France)

- 8:30 - 8:35** Opening  
Manolis Veveakis<sup>1</sup>, Klaus Regenauer-Lieb<sup>1</sup>, Ioannis Stefanou<sup>2</sup>, Jean Sulem<sup>2</sup> (<sup>1</sup>University of New South Wales, Australia ; <sup>2</sup>École des Ponts ParisTech, France )
- 8:35 - 8:55** Faulting: Do we know what we are talking about?  
Gary Couples (Heriot-Watt University, Edinburgh, UK)
- 8:55 - 9:15** Experimental Investigation of the Shear Strength of Rock Mass with Intermittent Joints  
Eleni Gerolymatou, Theodoros Triantafyllidis (Karlsruhe Institute of Technology, Germany)
- 9:15 - 9:35** Fault orientation: how it affects the stick-slip behaviour of saturated sandstones at the laboratory scale  
Elli-Maria Charalampidou<sup>1</sup>, Georg Dresen<sup>2</sup> (<sup>1</sup>Heriot Watt University, Edinburgh, UK ; <sup>2</sup>GFZ German Research Centre for Geosciences, Germany)
- 9:35 - 10:10** **Keynote lecture**  
Effect of Brittle off-fault Damage on Earthquake Rupture Dynamics  
Harsha Bhat (École Normale Supérieure, France)
- 10:10 - 10:40** **COFFEE BREAK**
- 10:40 - 11:00** Geomechanical Simulation of Structural Geology: More than just a boundary value problem?  
Helen Lewis (Heriot-Watt University, Edinburgh, UK)
- 11:00 - 11:20** Borehole stability and flow-through drying in gas flow  
Euripides Papamichos (Aristotle University of Thessaloniki, Greece)

- 11:20 - 11:40** Collapse of granular media subjected to wetting  
Zahra El Korchi, Maroc Frédéric, Moulay Saïd El Youssefi (University Of Montpellier, Montpellier, France)
- 11:40 - 12:00** Fracture networks in carbonate laminites  
Stephanie Zihms<sup>1</sup>, Helen Lewis<sup>1</sup>, Gary Couples<sup>1</sup>, Steven Hall<sup>2</sup>, Jim Somerville<sup>1</sup> (<sup>1</sup>Heriot-Watt University, Edinburgh, UK ; <sup>2</sup>Lund University, Sweden )
- 12:00 - 12:20** Couplings involved in the weakening of faults: comparison of linear stability and finite element analysis with field observations  
Hadrien Rattiez<sup>1</sup>, Ioannis Stefanou<sup>1</sup>, Manolis Veveakis<sup>2</sup>, Thomas Poulet<sup>2</sup>, Jean Sulem<sup>1</sup> (<sup>1</sup>École des Ponts ParisTech, France ; <sup>2</sup>University of New South Wales, Australia )
- 12:30 - 14:30** **LUNCH**
- 14:30 - 15:05** **Keynote Lecture**  
Microseismicity and deep fluid injections  
François Cornet (EOST-Université de Strasbourg, France)
- 15:05 - 15:25** Earthquake nucleation and observations of mechanical-hydraulic-geochemical interactions due to drainage of a surface water reservoir in Switzerland  
R.J. Lunn, M. Kinali, R. Lord, S. Pytharouli, Z.K. Shipton, M. Stillings (University of Strathclyde, UK)
- 15:25 - 15:45** Analysis of dynamics in multiphysics modelling of active faults  
Sotiris Alevizos, Thomas Poulet, Manolis Veveakis, Klaus Regenauer-Lieb (University of New South Wales, Australia)
- 15:45 - 16:15** **COFFEE BREAK**
- 16:15 - 16:35** Thermo-poro-mechanical modelling of the creeping and failure phases of catastrophic landslides  
Francesca Brambilla<sup>1</sup>, Antonis Zervos<sup>2</sup>, Claudio Di Prisco<sup>1</sup> (<sup>1</sup>Politecnico di Milano, Italy ; <sup>2</sup>University of Southampton, UK )
- 16:35 - 16:55** Modelling multiphase geomaterials at high temperature with application to strain localization and rapid catastrophic landslides  
Lorenzo Sanavia<sup>1</sup>, Toan Duc Cao<sup>2</sup> (<sup>1</sup>Università degli Studi di Padova, Italy ; <sup>2</sup>Texas Tech University, USA )
- 16:55 - 17:30** **Keynote Lecture**  
Modelling faults from engineering (landslides) to geodynamic (subduction initiation) scales  
Klaus Regenauer-Lieb (University of New South Wales, Australia)
- 20:00** **DINNER**



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

**Aussois, 6<sup>th</sup> October 2016**

## **Modelling of instabilities and bifurcation in Geomechanics**

*Coordinators:*

*Jean Sulem (École des Ponts ParisTech, France)*

*Ioannis Stefanou (École des Ponts ParisTech, France)*

*Euripides Papamichos (Aristotle University of Thessaloniki, Greece)*

*Manolis Veveakis (University of New South Wales, Australia)*

**8:30 - 09:00 Introduction to the Course**

Jean Sulem<sup>1</sup>, Ioannis Stefanou<sup>1</sup>, Euripides Papamichos<sup>2</sup>, Manolis Veveakis<sup>3</sup> (<sup>1</sup>École des Ponts ParisTech, France ; <sup>2</sup>Aristotle University of Thessaloniki, Greece ; <sup>3</sup>University of New South Wales, Australia)

**9:00 - 10:00 Overview of instability phenomena in Geomechanics**

Tomasz Hueckel (Duke University, USA)

**10:00 - 10:30 COFFEE BREAK**

**10:30 - 12:30 Fundamentals of bifurcation and stability analysis**

Ioannis Stefanou (École des Ponts ParisTech, France)

**12:30 - 14:00 LUNCH**

**14:00 - 16:00 Material instability and strain localization analysis**

Jean Sulem (École des Ponts ParisTech, France)

**16:00 - 16:30 COFFEE BREAK**

**16:30 - 18:00 Experimental investigation of strain localization**

Pierre Bésuelle (Laboratoire 3SR, France)

**20:00 DINNER**





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

**Aussois, 7<sup>th</sup> October 2016**

## **Modelling of instabilities and bifurcation in Geomechanics**

*Coordinators:*

*Jean Sulem (École des Ponts ParisTech, France)*

*Ioannis Stefanou (École des Ponts ParisTech, France)*

*Euripides Papamichos (Aristotle University of Thessaloniki, Greece)*

*Manolis Veveakis (University of New South Wales, Australia)*

**9:00 - 10:30 Numerical modelling of strain localization**

Antonis Zervos<sup>1</sup>, Panos Papanastasiou<sup>2</sup> (<sup>1</sup>University of Southampton, England; <sup>2</sup>University of Cyprus, Cyprus)

**10:30 - 11:00 COFFEE BREAK**

**11:00 - 12:30 Applications**

Euripides Papamichos (Aristotle University of Thessaloniki, Greece)

**12:30 - 14:00 LUNCH**

**14:00 - 15:00 Multiphysics couplings and instabilities I**

Jean Sulem (École des Ponts ParisTech, France)

**15:00 - 16:30 Multiphysics couplings and instabilities II**

Manolis Veveakis (University of New South Wales, Australia)

**16:30 - 17:00 COFFEE BREAK**

**17:00 - 18:30 Numerical modelling of multiphysics couplings and strain localization**

Frédéric Collin (Université de Liège, Belgium)

**20:00 DINNER**



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

**Aussois, 8<sup>th</sup> October 2016**

## **Modelling of instabilities and bifurcation in Geomechanics**

*Coordinators:*

*Jean Sulem (École des Ponts ParisTech, France)*

*Ioannis Stefanou (École des Ponts ParisTech, France)*

*Euripides Papamichos (Aristotle University of Thessaloniki, Greece)*

*Manolis Veveakis (University of New South Wales, Australia)*

**9:00 - 10:30 From theory to practice: supervised group exercises (I)**

Thomas Poulet<sup>1</sup>, Ioannis Stefanou<sup>2</sup>, Manolis Veveakis<sup>1</sup>, Hadrien Rattetz<sup>2</sup>  
(<sup>1</sup>University of New South Wales, Australia ; <sup>2</sup>École des Ponts ParisTech, France )

**10:30 - 11:00 COFFEE BREAK**

**11:00 - 12:30 From theory to practice: supervised group exercises (II)**

Thomas Poulet<sup>1</sup>, Ioannis Stefanou<sup>2</sup>, Manolis Veveakis<sup>1</sup>, Hadrien Rattetz<sup>2</sup>  
(<sup>1</sup>University of New South Wales, Australia ; <sup>2</sup>École des Ponts ParisTech, France )

**12:30 - 14:00 LUNCH**

**14:00 - 16:00 From theory to practice: supervised group exercises (III)**

Thomas Poulet<sup>1</sup>, Ioannis Stefanou<sup>2</sup>, Manolis Veveakis<sup>1</sup>, Hadrien Rattetz<sup>2</sup>  
(<sup>1</sup>University of New South Wales, Australia ; <sup>2</sup>École des Ponts ParisTech, France )

**16:00 - 16:15 Closure**

Jean Sulem<sup>1</sup>, Ioannis Stefanou<sup>1</sup>, Euripides Papamichos<sup>2</sup>, Manolis Veveakis<sup>3</sup> (<sup>1</sup>École des Ponts ParisTech, France ; <sup>2</sup>Aristotle University of Thessaloniki, Greece ; <sup>3</sup>University of New South Wales, Australia)