



POLITECNICO  
MILANO 1863



Politecnico  
di Torino

UGA  
Université  
Grenoble Alpes



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16<sup>th</sup> International Conference of the International Association  
for Computer Methods and Advances in Geomechanics



SHORT COURSE

# MULTISCALE NUMERICAL MODELLING *of* GEOMATERIALS

Inferring macro behaviour from micromechanisms

GRENOBLE • FRANCE  
29-30 August, 2022

Save  
the  
date



## **TOPIC** *Multiscale numerical modelling of geomaterials*

The response of geomaterials at the engineering scale depends on their microstructure and the mechanisms occurring at small scale. Starting from imaging geomaterials under selected loading conditions, it is possible to study and then model the mechanisms occurring at the small scale. The results of this process can be used to inform macro scale models in a physics-based manner. This short course is meant to introduce such innovative techniques. The first half-day session will take place at the Synchrotron in Grenoble.

There will be the opportunity to visit this unique and innovative imaging facility and to learn the basic concepts of full-field measurement. The second half-day session will take place at Laboratoire 3SR on the Grenoble university campus. Lectures will introduce multiscale modelling and discuss different methods as DEM, FEMx FEM, FEMx DEM. Selected engineering and material science applications will be presented. After lunch, a bus will be organised for all participants to move to Torino for the official beginning of the IACMAG conference.

**Organizers:** Alice Di Donna, Angela Casarella and Cino Viggiani • *Laboratoire 3SR, Grenoble*

## **PROGRAMME**

### Monday • August 29, 2022 • Synchrotron Grenoble

- 14:00 - 18:00 Technical visit of the Synchrotron facilities of Grenoble.  
*Alessandro Tengattini & Bratislav Lukić*
- 19:30 Social event: dinner.

### Tuesday • August 30, 2022 • Laboratoire 3SR/Grenoble Campus

- 8:45 - 9:00 *Welcome*
- 9:00 - 9:45 From imaging to numerical modelling.  
*Emmanuel Roubin*
- 9:45 - 10:30 Granular plasticity revisited by DEM.  
*Félix Darve*
- 10:30 - 10:45 *Coffee break*
- 10:45 - 11:30 A clay-DEM involving mesoscopic-molecular interactions of flexible platelets.  
*Vincent Richefeu*
- 11:30 - 12:15 Introduction to FEMx FEM and FEMx DEM.  
*Jacques Desrues*
- 12:15 - 13:00 Considering heterogeneity of argillaceous rock microstructure in a FEMx FEM double scale model.  
*Benoît Pardoën*
- 13:00 *Lunch time*