



Politecnico di Bari

Department of Civil,  
Environmental, Land, Building  
Engineering and Chemistry  
(DICATECh)



ALERT Geomaterials  
The alliance of Laboratories  
in Europe for Education,  
Research and Technology



UNIVERSITAT POLITÈCNICA  
DE CATALUNYA – BarcelonaTech  
Department of Geotechnical Engineering  
& Geosciences

# ALERT Olek Zienkiewicz Winterschool 2018

The ALERT Olek Zienkiewicz Winterschool 2018

## **Natural versus compacted clayey soils: from micro to macro behaviour and modelling**

will be held at the Politecnico di Bari (Italy) from the 5th to the 9th of November 2018.

The school is organised in collaboration by The Alliance of Laboratories in Europe for Education, Research and Technology (ALERT Geomaterials) and the geotechnical groups at Politecnico di Bari and the Universitat Politècnica de Catalunya (Spain).

The theme chosen for the Olek Zienkiewicz Winterschool 2018 has been subject of intense research aimed at yielding the impact that micro to meso-scale phenomena of different typology (i.e. mechanical, physico-chemical, thermal, electromagnetic) have on the behaviour of soils and rocks at the macro-scale.

The school will focus on clayey soils, either natural, or compacted, and provide knowledge about their genesis and consequent features at the micro to meso-scale, and about how their macro-response varies with the micro to meso-features. Particular emphasis will be given to the either experimental, or modelling research contributions that have provided new evidence and understanding of the phenomena at the micro to meso-scale, that generate observable trends in macro-response.

The lectures will concern, as first, the fundamentals about the genesis of clays of different structure, either consolidated or compacted, and about the different scales of structures in clays. Thereafter, they will deal with the analysis and modelling of the hydro-mechanical behaviour of the clayey materials characterized at the micro- to meso-scale. Hence, the course will provide an overview of the up-to-date studies that have represented major paradigms in improving both the understanding of the relationships between the macro-response of classes of clayey soils and their micro to meso-features, and the modelling of their behaviour.

Starting from the basics of mineralogy and particle interactions, up to basic hydro-mechanical response of reconstituted and natural clays, sensitive and not, the lectures will also focus on the behavior of hard soils, soft rocks and transitional soils, as well as on the effects of weathering, high organic content and fissuring.

The ALERT OZ Winterchool will be organised in 4 hours morning and afternoon sessions, that will be delivered by experienced lecturers coming from different universities: Universitat Politècnica de Catalunya, University College London, Université Grenoble Alpes, Ecole des Ponts Paris Tech., Politecnico di Bari, Politecnico di Milano, Sapienza University of Rome, Purdue University. For further information, please visit the website <http://www.poliba.it/it/content/home>.



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## Lecturers

- Eduardo Alonso - *Universitat Politecnica de Catalunya - BARCELONATECH, Spain*
- Angelo Amorosi - *Sapienza University of Rome, Italy*
- Beatrice Baudet - *University College London, United Kingdom*
- Francesco Cafaro - *Politecnico di Bari, Italy*
- Matthew Coop - *University College London, United Kingdom*
- Federica Cotecchia - *Politecnico di Bari, Italy*
- Pierre Delage - *Ecole des ponts Paris Tech, France*
- Gaetano Elia - *Politecnico di Bari, Italy*
- Antonio Gens - *Universitat Politecnica de Catalunya - BARCELONATECH, Spain*
- Cristina Jommi - *Politecnico di Milano, Italy*
- Enrique Romero - *Universitat Politecnica de Catalunya - BARCELONATECH, Spain*
- Jean Vaunat - *Universitat Politecnica de Catalunya - BARCELONATECH, Spain*
- Cino Viggiani - *Université Grenoble Alpes, Laboratoire 3SR, France*
- Claudia Vitone - *Politecnico di Bari, Italy*



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## Workload: 5 ECTS for the 5-days school

### ALERT Olek Zienkiewicz Winterschool 2018

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<b>Monday 5th November</b>		
<b>Fundamentals about the genesis of clays and different scales of structures</b>		
Morning session	9:00 - 9:30	Welcome address Eugenio Di Sciascio - Rector Politecnico di Bari Umberto Fratino - Director Department DICATECh (Politecnico di Bari) Michele Mossa – Coordinator of the Risk and environmental, territorial and building development Ph.D. Course Cino Viggiani - President ALERT Geomaterials - Université Grenoble Alpes, Laboratoire 3SR, France
	9:30 - 11:00	Composition, microstructure and state of consolidated clays Federica Cotecchia - <i>Politecnico di Bari, Italy</i>
	11:00 - 11:30	Coffee Break
	11:30 - 13:00	Microstructure and state of high sensitivity natural soft clays Pierre Delage - <i>Ecole des ponts Paris Tech, France</i>
	13:00 - 14:30	Lunch
Afternoon session	14:30 - 16:00	Microstructure, state and permeability of compacted clays Enrique Romero - <i>Universitat Politecnica de Catalunya - BARCELONATECH, Spain</i>
	16:00 - 16:30	Coffee Break
	16:30 - 18:00	Experimental characterization of localized deformation in clays and clay rocks Cino Viggiani - <i>Université Grenoble Alpes, Laboratoire 3SR, France</i>



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<b>Tuesday 6th November</b>		
<b>Consolidated, intact and fissured clays: fundamentals to advanced analysis of the mechanical behaviour</b>		
Morning session	9:30 - 10:30	Fundamentals of modeling clay macro-behaviour Gaetano Elia - <i>Politecnico di Bari, Italy</i>
	10:30 - 11:00	Coffee Break
	11:00 - 12:30	Advanced constitutive modelling of clays Angelo Amorosi - <i>Sapienza University of Rome, Italy</i>
	12:30 - 13:30	Insight into the macro-behaviour of soft clays Pierre Delage - <i>Ecole des ponts Paris Tech, France</i>
	13:30 - 14:30	Lunch
Afternoon session	14:30 - 16:00	Modelling the behaviour of soft clays Beatrice Baudet - <i>University College London, United Kingdom</i>
	16:00 - 16:30	Coffee Break
	16:30 - 17:30	Insight into the microstructural processes in the background of clay macrobehaviour Federica Cotecchia - <i>Politecnico di Bari, Italy</i>
	17:30 - 19:00	Microstructural features implemented in the modelling of clay macrobehaviour Jean Vaunat - <i>Universitat Politecnica de Catalunya - BARCELONATECH, Spain</i>

<b>Wednesday 7th November</b>		
<b>Consolidated, intact and fissured clays: fundamentals to advanced analysis of the mechanical behaviour</b>		
Morning session	9:30 - 11:00	Mechanical behaviour of fissured clays Claudia Vitone - <i>Politecnico di Bari, Italy</i>
	11:00 - 11:30	Coffee Break
	11:30-12:30	Visit to the Geotechnical Laboratory of the Politecnico di Bari Osvaldo Bottiglieri - <i>Politecnico di Bari, Italy</i>
	12:30 - 14:00	Lunch
<b>Compacted clays: fundamentals to advanced analysis of the mechanical behaviour</b>		
Afternoon session	14:00 - 16:00	Hydro-mechanical behaviour of compacted clays Enrique Romero - <i>Universitat Politecnica de Catalunya - BARCELONATECH, Spain</i>
	16:00 - 16:30	Coffee Break
	16:30 - 18:00	Porosimetry and hydro-mechanical modelling of compacted clays Cristina Jommi - <i>Politecnico di Milano, Italy</i>
<i>Typical Apulian Dinner</i>		



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<b>Thursday 8th November</b>		
<b>Compacted clays: fundamentals to advanced analysis of the mechanical behaviour</b>		
Morning session	9:30 - 11:00	Behaviour and constitutive modelling of compacted soils Eduardo Alonso - <i>Universitat Politecnica de Catalunya - BARCELONATECH, Spain</i>
	11:00 - 11:30	Coffee Break
	11:30 - 13:00	Behaviour and constitutive modelling of compacted expansive clays Antonio Gens - <i>Universitat Politecnica de Catalunya - BARCELONATECH, Spain</i>
	13:00 - 14:30	Lunch
<b>Hard clays/weak claystones: analysis and modelling of the hydro-mechanical behaviour</b>		
Afternoon session	14:30 - 16:00	Hydro-mechanical behaviour of natural argillaceous hard soils and weak rocks Antonio Gens - <i>Universitat Politecnica de Catalunya - BARCELONATECH, Spain</i>
	16:00 - 16:30	Coffee Break
	16:30 - 18:00	On the modelling of shear failure, creep and localized deformations in saturated hard clays Antonio Gens - <i>Universitat Politecnica de Catalunya - BARCELONATECH, Spain</i>
<b>Friday 9th November</b>		
<b>Transitional soils and weathered clays: analysis of the mechanical behaviour</b>		
Morning session	9:30 - 11:30	Mechanical behaviour of transitional soils Matthew Coop - <i>University College London, United Kingdom</i>
	11:30 - 12:00	Coffee Break
	12:00 - 13:00	The effects of weathering on clay mechanics Francesco Cafaro - <i>Politecnico di Bari, Italy</i>
	13:00 - 14:30	Lunch
Afternoon session	14:30 - 16:00	PhD session
	16:00 - 16:30	Coffee Break
	16:30 - 17:00	Summary, discussion and perspectives Cino Viggiani - <i>Université Grenoble Alpes, Laboratoire 3SR, France</i>
	17:00 - 18:00	Round Table
	18:00	Closure of the ALERT OZ Winterschool