



# ALERT Geomaterials

NEWSLETTER - April 2020  
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<http://alertgeomaterials.eu>

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## EDITORIAL

Dear ALERT members,



ALERT President  
Gioacchino (Cino)  
Viggiani

given the unprecedented situation we are all living these days with the COVID-19 epidemic, you won't be surprised to see that the editorial of our Newsletter is a bit unusual this year. By its very nature, ALERT-Geomaterials is a network of colleagues, students, and –very often– friends. Our annual meeting in Aussois is in many respects the very heart of our community. Therefore, it is with great sorrow and regret that we must inform you that, after careful consideration, the Board of Directors has decided that **we won't meet in Aussois in October 2020**. It is the first time this happens, after 26 years!

**The three-day ALERT workshop will take place in 2021** (from September 27 to September 29). The three sessions in 2021 will be those that were originally planned for this year – the organizers have already all agreed to postpone their sessions to next year. However, ALERT-Geomaterials is not only a research network: the “E” in its name stands for “European” but also for “Education”. And in fact our annual meeting in Aussois also includes, from its first edition back in 1994, a doctoral school – which is as important, if not more, as the three-day workshop. On behalf of the Board of Directors, we are happy to inform you that we have decided **to keep the doctoral school for 2020** (on October 1st and 2nd). Since we'll not be in Aussois, the school will be taught and attended remotely, though (either pre-recording them or having them online via one of the several available platforms for distance teaching) we are currently evaluating which is the best option, together with the school coordinators. We remind you that the topic of the doctoral school, organized by Manolo Pastor (Madrid) and Wei Wu (Vienna) will be: “Particle-based continuum numerical methods in Geomechanics”. We are fully aware that delivering/attending a lecture via

the internet is by no means the same as doing it in Aussois. However, we believe that it is very important for the ALERT community not to postpone the school: it is a sign of continuity! Besides, we are all – willingly or unwillingly – becoming increasingly used to distance teaching these days... We have also decided **not to postpone neither the PhD prize, nor the invited lecture for 2020** (by Chris Spiers, Utrecht University). Of course, also these two events will take place (on September 30) online. As for the next **Olek Zienkiewicz Course**, it will be entitled “Looking into the rhizosphere: the interface between plant science and soil mechanics”. This school will be organized by Alessandro Tarantino (University of Strathclyde) and Enrique Romero (UPC) and will take place in Glasgow, UK. Originally scheduled in November 2020, it **will be postponed to April 2021**.

One last word about the **election of the new Board of Directors** – for the period 2020-2023: since we will not meet in Aussois, the Board of Directors has decided to exceptionally **postpone the elections to October 2021**. Thus, the current bureau will stay in place until then. It is not ideal, but we believe this is the best option we have.

The rest of this newsletter is more standard: it provides you information about our activities in 2019, and also welcomes two new member institutions: the University of Sydney, Australia (with the group led by Itai Einav) and the Universität für Bodenkultur Wien, Austria (with the group led by Wei Wu).

Further information on the organization of our activities will be given in due time as a post in ALERT-Geomaterials website.

Keep staying safe, long life to ALERT-Geomaterials!

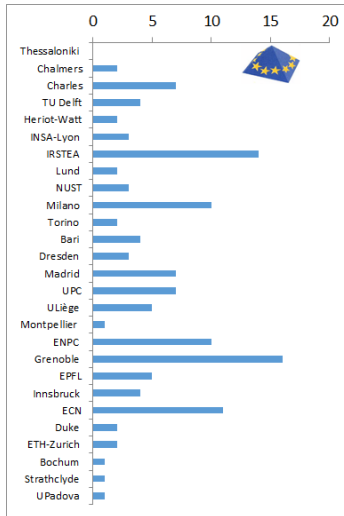
Frédéric Collin and Cino Viggiani



ALERT Director  
Frédéric Collin



## ALERT Workshop 2019



Participants of the ALERT Workshop 2019

In 2019 the annual ALERT Workshop was held from September 30th to October 2nd again in Aussois, France. The regional distribution of the participants from the institutional members of ALERT Geomaterials is shown on the left hand side. In total, 175 participants registered for the ALERT workshop 2019.

As always since 2013, the session on Tuesday lasted only half a day and was followed in the afternoon, by the Board of Directors meeting, the PhD-prize ceremony, and the Special lecture in the afternoon.

The three topics of the ALERT Workshop 2019 are listed below:

### 1 Upscaling in Geotechnical Engineering

coord. C. di Prisco, C. Jommi & C. Tamagnini

### 2 The mechanics of root-soil systems: from microscopic to macroscopic approaches

coord. E. Kolb & L. Sibille

### 3 Computational methods in snow and avalanche release mechanics

coord. J. Gaume, P. Hagenmuller, F. Nicot & G. Chambon

We thank all active participants and coordinators for their effort.

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## ALERT PhD Prize 2019



Dorjan Dauti  
(Grenoble-Alpes University)  
Antoine Wautier (IRSTEA)

The jury of the ALERT PhD Prize 2019 was composed of the professors G. Viggiani (President of ALERT), A. Puzrin (ALERT Invited Lecturer for 2019), C. Jommi (chosen member) and L. Sanavia (chosen member). Only PhD students from one of the institutions belonging to ALERT are eligible candidates for the prize, which consists of a certificate and a reward of 1000 Euros.

The three finalists, Dorjan Dauti (Université Grenoble-Alpes), Antoine Wautier (IRSTEA) and Bratislav Lukic (Université Grenoble-Alpes) were chosen by the jury out of 13 applications.

The jury finally awarded the PhD student Antoine Wautier for his work entitled

**Micro-inertial analysis of mechanical instability in granular materials with application to internal erosion**

and the PhD student Dorjan Dauti for his work entitled

**An experimental and numerical approach to spalling of concrete due to fire**

The abstract of this PhD thesis is available on the ALERT website.

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## ALERT Doctoral School 2019

The ALERT Doctoral School 2019 lasted from Thursday, 3rd October to Friday, 4th October and was attended by 93 participants. The topic of the school was

### The Legacy of Ioannis Vardoulakis to mechanics of granular materials

This school was organized by Jean Sulem (Ecole des Ponts ParisTech) and Cino Viggiani (Université Grenoble-Alpes).

The lectures were presented by

- Edward Ando (Université Grenoble-Alpes)
- Alexander Puzrin (ETH Zurich)
- Ioannis Stefanou (Ecole Nationale des Ponts et Chaussées, IFSTTAR, CNRS)
- Euripides Papamichos (Aristotle University of Thessaloniki)
- Panos Papanastasiou (University of Cyprus)
- Itai Einav (University of Sydney)
- Holger Steeb (Universität Stuttgart)

The school focused on the granular materials and showed how theoretical concepts can impact engineering applications. The school highlighted the legacy of Professor Ioannis

Vardoulakis with three topics: the mechanics of granular materials (both experimental approach and modelling), the modelling of strain localization in geomaterials and the hydromechanical couplings. The school also covered some geotechnical applications, like the landslide mechanics and petroleum geomechanics.

In order to tackle these topics, the two days of the school were divided into :

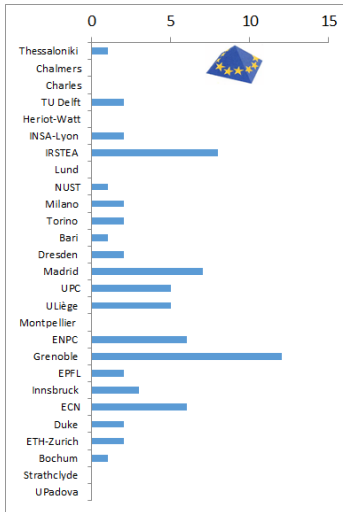
- Mechanics of granular materials I. Experimental approach
- Mechanics of granular materials II. Modelling
- Landslide mechanics and growth of slip surfaces
- Modelling of strain localization in geomaterials - Higher order continuum theories and regularization techniques
- Petroleum Geomechanics
- Hydro-mechanics of porous and granular material - Poroelasticity and beyond

On behalf all the ALERT members we want to thank the lecturers and the organizers for their commitment.

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The accompanying book, containing articles referring to the lectures, as well as some books of previously held doctoral schools can be downloaded from the ALERT website.

<http://alertgeomaterials.eu/publications/>



Participants of the ALERT Doctoral School 2019



## Special Lecture 2019: Prof. Alexander (Sasha) Puzrin

The ALERT Special lecture 2019 was delivered by Prof. Sasha Puzrin, Professor and Chair of Geotechnical Engineering at the ETH Zurich.

The title of the lecture was:

**Growth of slip surfaces (life is dangerous)**

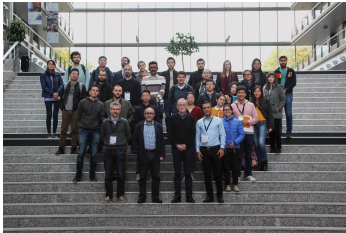
The lecture was recorded during the presentation and is available for downloading on the ALERT website.

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ARISTOTLE  
UNIVERSITY OF  
THESSALONIKI

Organising Institutions of the  
ALERT OZ Course 2019



Participants to the ALERT OZ  
Course 2019

## ALERT Olek Zienkiewicz Course 2019

The 11th ALERT Olek Zienkiewicz Course was held for four days in November 2019 in Paris, France.

The school was coordinated by Siavash Ghabezloo (Ecole des Ponts ParisTech, France), and Euripides Papamichos (Aristotle University of Thessaloniki, Greece).

The topic of the Course was

### Petroleum Geomechanics

The objectives of the course were to make PhD students and researchers familiar with the main problems of oil and gas exploration and production, related to geomechanics and to show various analysis and design method.

Lectures and tutorials were held by:

- Erling Faer and Arne Raaen (SINTEF, Norway)
- Vincenzo di Gennaro (Schlumberger, France)
- Siavash Ghabezloo (Ecole des Ponts ParisTech, France)
- Rune Holt (NTNU, Norway)
- Yves Leroy (TOTAL, France)
- Euripides Papamichos (Aristotle University of Thessaloniki, Greece)
- Panos Papanastasiou (University of Cyprus, Cyprus)

- Patrick Rasolofosaon (IFP, France)

They covered several issues:

- Industry challenges and perspectives
- In-situ stresses and their determination
- Mechanical behaviour of porous rocks
- Exploitation of hydrocarbon reservoirs, drilling mechanics and completion technology
- Analytical solutions for poro-elastic reservoirs
- Hydraulic fracturing and exploitation of unconventional reservoirs
- Elastic wave propagation in rocks for log and seismic interpretation
- Borehole stresses and wellbore stability analysis
- Sand/solids production
- Seismic monitoring of reservoir exploitation-Physical basis and Case studies

The 11th ALERT Olek Zienkiewicz Course was attended by 30 PhD students. On behalf all the ALERT members, we want to thank the lecturers and the organizers for their commitment. For more information, please visit the post-school notes and info on the ALERT website.

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UNIVERSITÀ DEGLI STUDI  
DI SALERNO



UNIVERSITAT POLITÈCNICA  
DE CATALUNYA  
BARCELONATECH



POLITECNICO  
MILANO 1863



Organising Institutions of the  
ALERT Workshop 2020

## ALERT Workshop 2020 POSTPONED TO 2021

The ALERT Workshop will not be organized in 2020 but will be postponed in 2021, from Monday, 27th September to Wednesday, 29th September. Given the current knowledge on COVID-19 in Europe, we expect that the workshop will again take place at the Centre Paul Langevin in Aussois, France.

The focus of the three workshop sessions and the responsible coordinators are listed below:

### 1 Forecasting landslide displacements

coord. S. Cuomo, J. Vaunat & N.M. Pinyol  
[scuomo@unisa.it](mailto:scuomo@unisa.it)

### 2 Machine Learning and Geomechanics

coord. I. Stefanou & F. Darve

The session will consist of invited talks only.

### 3 Bridging the gap between experiments and modelling: from laboratory testing to prediction

coord. B. Baudet, C. Jommi, & F. Cotecchia

[b.baudet@ucl.ac.uk](mailto:b.baudet@ucl.ac.uk)  
[cristina.jommi@polimi.it](mailto:cristina.jommi@polimi.it)  
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The Monday and Wednesday sessions include invited speakers as well as contributions from the abstract submission process.

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## ALERT Doctoral E-School 2020



UNIVERSIDAD  
POLITÉCNICA  
DE MADRID

POLITÉCNICA



Organising Institutions of the  
ALERT School 2020

Exceptionally this year, ALERT Doctoral School will be taught and attended remotely, from Thursday, 1st October to Friday, 2nd October also in Aussois.

The topic of the ALERT School will be dedicated to

Particle based continuum methods in  
geomechanics

and will be organized by Manuel Pastor (Universidad Politécnica de Madrid) and Wei Wu (BOKU).

Lectures will be held on two days and will include the following topics:

- Introduction to SPH in geomechanics
- Constitutive modelling for fast granular

flow

- Applications of SPH models in geomechanics
- Depth integrated models for fast landslides and related phenomena
- MPM and its application to snow
- PFEM and its application to technical engineering
- LBM-DEM for porous media

The Lectures will be held by Ha Bui, Johan Gaume, Antonia Larese, Manolo Pastor, Steve Sun and Wei Wu.

The online registration for the ALERT School will open in July and will be announced on the website.

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## ALERT Olek Zienkiewicz Course 2021

The 12th edition of the ALERT Olek Zienkiewicz Course will not be held in 2020 but is postponed in April 2021, in Glasgow, UK. The topic of the school is

**Looking into the rhizosphere: the interface between plant science and soil mechanics**

soil mechanical resistance to root penetration) and plant adaptation mechanisms to environmental stresses (e.g. water content redistribution within the soil). Plant scientists are therefore faced with the challenge of understanding unsaturated soil behaviour and its hydro-mechanical interaction with the plant to identify conditions favourable to shoot development and therefore, crop yields in agriculture.

The school is organised by Alessandro Tarantino (University of Strathclyde, UK) and Enrique Romero (UPC, Spain).

**Abstract:** Man-made earth structures such as flood embankments, railway and roadway embankments, dams, cut slopes, are very often covered by vegetation. The same applies to natural ground forming slopes, supporting above-ground structures, and generating thrust against retaining structures.

Vegetation affects significantly the hydro-mechanical response of the ground. Plant roots act as a natural anchor system similar to geotextiles and nails, plants affect the process of atmosphere-driven water uptake via transpiration, and plants modify the soil microstructure via bio-chemical processes that affect the hydraulic response of the ground in the rooting zone (rhizosphere). Geotechnical engineers are therefore faced with the challenge of understanding plant behaviour and its hydro-mechanical interaction with the soil to design their geotechnical structures.

At the same time, plant scientists recognise more and more the importance of mechanics and hydraulics of (unsaturated) soils to understand and model plant root growth (e.g.

This Olek Zienkiewicz Course is aimed at stimulating synergies between these two disciplines, soil mechanics and plant science. It is mainly designed for researchers having a soil mechanics background. Its main goal is to introduce the fundamentals of plant morphology, anatomy and physiology and the different hydraulic, hydrological, and mechanical interactions of plants with the ground. It is also aimed at demonstrating the role of continuum and discrete soil mechanics in understanding and modelling plant behaviour with a focus on real applications involving ground-vegetation interactions.

However, the course is also open to researchers having plant science background and a short pre-course will be offered to introduce the fundamentals of soil mechanics and hydraulics and enable plant science researchers to attend fruitfully the course.

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**More details and registration:**

<http://alertgeomaterials.eu/category/olek-zienkiewicz-course>



Organising Institutions of the  
ALERT Olek Zienkiewicz Course  
2021

THE UNIVERSITY OF  
SYDNEY

## New Institutional Members of ALERT

During its meeting in Aussois, held in October 2019, there were two applications for the membership in ALERT Geomaterials and they have been accepted by the board of Directors.

University of Sydney  
represented by prof. Itai Einav  
BOKU  
represented by prof. Wei Wu

With these decisions, the present number of members of ALERT Geomaterials is 36!

It has been pointed out that, according to our status, these non-European institutions have the same rights as the others except for Election.

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New institutional Member of  
ALERT

## Special Lecture 2020: Prof. Chris Spiers



The ALERT Special Lecturer 2020  
Prof. Chris Spiers

The ALERT Special lecture 2020 will be presented by Prof. Christopher (Chris) Spiers, Professor of Earth Materials and Head of the High Pressure and Temperature Laboratory at Utrecht University. He specializes in research on the mechanical behavior of rocks and faults under the pressure, temperature and chemical conditions that pertain in the Earth's crust, and on the controlling microscale processes.

He will talk about

Induced seismicity in the giant  
Groningen gas field, Netherlands:  
Understanding the underlying rock  
and fault mechanical controls

The Groningen Gas Field is the 7th largest onshore gas fields ever discovered on Earth. It has shaped the energy landscape and econ-

omy of the Netherlands, and provided a key energy source for surrounding countries. Gas production started in the 1960's, with little surface impact. In recent decades, however, subsidence has become significant, and since the first detectable events, in 1991, induced seismic events have increased in frequency and magnitude (up to M3.6), causing building damage and much public concern. This has created an urgent need to understand how the reservoir system and the seismogenic process work. Since 2015, the HPT Laboratory at Utrecht University (UU) has been involved in a unique programme of basic research into the physical and chemical processes that control the response of the Groningen reservoir (Slochteren) sandstone, and cross-cutting faults, to gas extraction. [Back to Contents](#)

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