ALERT Geomaterials

NEWSLETTER - April 2017
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http://alertgeomaterials.eu

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Impressions of Aussois
Photographs of the photo competition 2012

EDITORIAL

Dear ALERT members,

it's a great pleasure for me to open a new "ALERT" year, rich of scientific and didactic events, always aimed at sharing the knowledge in Geomechanical fields. ALERT, over the years, becomes more and more a meeting platform for scientists, researchers and students, as it is demonstrated by the large participation to our meetings, and by the numerous people that daily visit our website (http://alertgeomaterials.eu/) in all its specific sections.

Three Workshop sessions and a Doctoral School (held as usual in Aussois, France), together with the ALERT summer school - Olek Zienkiewicz Course (this year organized in Assisi, Italy) have been organized. All the programs are very stimulating, and I thank all the organizers for their hard (and silent!) work. Detailed presentations of these events are provided hereafter.

The year 2017 represents a very important passage for our association, and I truly have confidence that all our members will assure their contribution. Following our Statute, in October, during the Aussois meeting, the election of the new ALERT Board of Directors will take place, together with the choice of the new President and the formation of the new ALERT Bureau. Board of Directors, President and Bureau, in front of the General Assembly, will share the responsibility of managing our association for the next three years (2017-2020). One section of the present issue of the Newsletter is specifically devoted to this important point, but I warmly ask right now to each responsible of each ALERT institution to promote the internal debate among the members. This is the only way to get new managing organisms that can be representative of all the different souls of our association: no one is excluded!

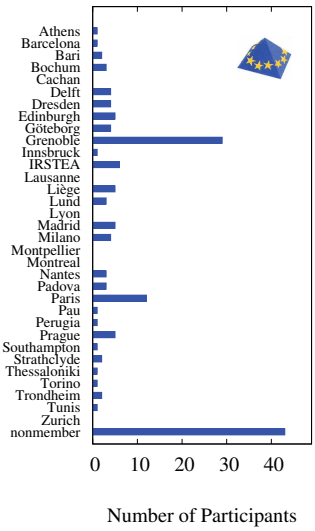
I would thank all the members of the present Board of Directors (2014-2017), for having always guaranteed a high scientific level to all our activities. Finally, I would also personally thank the colleagues of the Bureau, Prof. Manuel Pastor, Prof. Ivo Herle with Max Wiebicke and Prof. Stéphane Grange, for their effortless and always proactive contribution to the management of the current (and sometime very boring!) administrative duties the association.

Once again, I close this Editorial by inviting all of you to enrich this newsletter: all contributions for the next issues are welcome!

Happy new "ALERT" year to all of you!!

Andrea Galli
Director of ALERT Geomaterials

ALERT Workshop 2016



Participants of the ALERT Workshop 2016

In 2016 the annual ALERT Workshop was held from Monday, 3rd until Wednesday, 5th October 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, 153 participants registered for the ALERT workshop 2016.

As it was introduced in 2013, the session on Tuesday lasted only half a day allowing the Board of Directors meeting, the PhD-prize ceremony and the Special lecture to be held in the afternoon.

The three topics of the ALERT Workshop 2016 are listed below:

1 **New trends in micromechanical approaches of Particulate Materials – experiments and modelling aspects**
coord. M. Karstunen, N. Benahmed & M. Hattab

2 **Mechanics of multiphase porous media in modelling cementitious materials: from early ages to durability issues**
coord. L. Sanavia, F. Pesavento & M. Briffaut

3 **Geomechanics of faults, with applications spanning from earthquake nucleation to landslides**
coord. M. Veveakis, K. Regenauer-Lieb, I. Stefanou & J. Sulem

We thank all active participants and coordinators for their effort.

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The presentations of the speakers, that allowed us to share their contributions, can be downloaded from the ALERT website.

http://alertgeomaterials.eu/presentations-of-the-alert-workshop-2016/

ALERT PhD Prize 2016

Alessandro Tengattini (University of Sydney, Université Grenoble-Alpes)

The jury of the ALERT PhD Prize 2016 was composed of the professors Manuel Pastor (Universidad Politécnica de Madrid), Takashi Matsushima (University of Tsukuba), Gary Couples (Heriot-Watt University) and Michael Hicks (Delft University of Technology). Only PhD students from one of the institutions belonging to ALERT are eligible candidates for the prize which is dated to 1000 Euro.

The three finalists Alessandro Tengattini (Université Grenoble-Alpes and University of Sydney), Alessandro Leonardi (Swiss Federal Institute of Technology, Zurich) and Benoît Pardoen (Université de Liège) were chosen by the jury out of 9 applications.

The jury awarded the PhD student Alessandro Tengattini for his work entitled

A micro-mechanical study of cemented granular materials

With his thesis Dr. Tengattini contributed to the development of a methodological framework for cemented granular materials. This is accomplished by relating the behaviour of individual grains to their collective response observed at engineering scale by developing a combination of analytical, experimental and numerical approaches.

The acknowledgement of grain-scale behaviour within this methodological framework allows for a realistic validation of the constitutive models not only at the scale of the specimen response and its localisation features, but also at the scale of individual grains. This is pivotal in a number of open engineering problems where the localised evolution of the micro-structure dictates the observed response (e.g. the compartmentalisation of hydrocarbon reservoirs due to localised permeability reduction).

The abstract of the PhD thesis of Dr. Alessandro Tengattini is available on the ALERT website.

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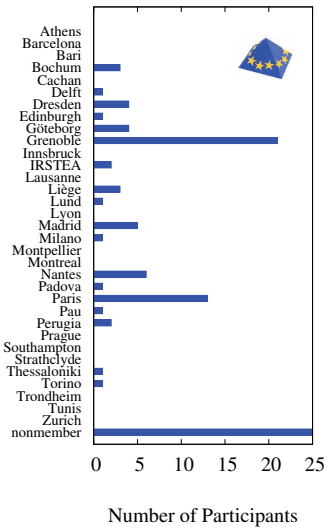
ALERT Doctoral School 2016



Participants of the ALERT Doctoral School 2016

The ALERT Doctoral School 2016 lasted from Thursday, 6th October to Saturday, 8th October and was attended by 96 participants. The school was dedicated to

Modelling of instabilities and bifurcation in Geomechanics

The organization was carried out by Jean Sulem, Ioannis Stefanou (both from École des Ponts ParisTech, France), Euripides Papamichos (Aristotle University of Thessaloniki, Greece) and Manolis Veveakis (University of New South Wales, Australia). The accompanying book, containing articles referring to the lectures, can be downloaded from the ALERT website.

The lectures were presented by

- Jean Sulem (École des Ponts ParisTech)
- Tomasz Hueckel (Duke University, USA)
- Ioannis Stefanou (École des Ponts ParisTech)
- Pierre Bésuelle (Laboratoire 3SR)
- Antonis Zervos (University of Southampton)
- Panos Papanastasiou (University of Cyprus)
- Euripides Papamichos (Aristotle University of Thessaloniki)
- Manolis Veveakis (University of New South Wales)
- Frédéric Collin (Université de Liège)
- Thomas Poulet (University of New South Wales)

In order to tackle this topic, the school was divided into two main parts:

- lectures that explained the theoretical background to experimental evidence and finally the numerical modelling of such problems
- an extensive practical session on Saturday. The organisers supplied a virtual box with all the software already installed to the participants and thus, lead smoothly through different numerical aspects of bifurcation analysis.

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/

The ALERT Special Lecturer 2016 Prof. Takashi Matsushima

Special Lecture 2016: Prof. Takashi Matsushima

The ALERT Special lecture 2016 was delivered by Prof. Takashi Matsushima from the University of Tsukuba in Japan

The title of the lecture was:

Planetary Geomechanics

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

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ALERT Olek Zienkiewicz Course 2016

UNIVERSITÀ DEGLI STUDI DI SALERNO

POLITECNICO MILANO 1863

Organising Institutions of the ALERT OZ Course 2016

Impressions of the ALERT Olek Zienkiewicz Course 2016

The 8th ALERT Olek Zienkiewicz Course was held for five days in September 2016 at the University of Salerno, Italy.

Within the framework of an institutional agreement, the 8th ALERT OZ Course was held jointly with the first week of the LARAM School (International School on LAndslide Risk Assessment and Mitigation) and it was organized by L. Cascini (University of Salerno, Italy) and C. di Prisco (Politecnico di Milano, Italy).

The topic of the Course was

Geomechanics of Landslides

which represents a traditional yet challenging field of investigation discussed in three Rankine Lectures: 4th Rankine Lecture "Long-term stability of clay slopes", (A.W. Skempton, 1964), 39th Rankine Lecture "Natural slopes and cuts: mevement and failure mechanisms", (S. Leroueil, 1999), and 57th Rankine Lecture "Triggering and Motion of Landslides" (E. Alonso, 2017).

The objectives of the course were to provide PhD students and researchers with an overview of the current knowledge in geomechanics of materials involved in landslides as well as insights into modelling and geomechanics-based susceptibility analysis of landslides.

Lectures and tutorials covered several issues:

- Soil characterization for landslide analysis
- Constitutive modeling for rainfall-induced and earthquake-induced landslides
- Diagnosis of landslide processing in clayey soils
- Modeling of rock slides, rock falls and landslides in coarse-grained soils
- Landslide susceptibility deterministic (and statistical) analysis

Lectures and tutorials were delivered by: E. Alonso, M. Calvello, L. Cascini, F. Cotecchia, S. Cuomo, C. di Prisco, S. Ferlisi, F. Nadim, M. Pastor, C. Scavia.

The 8th ALERT Olek Zienkiewicz Course was attended by 54 PhD students and 2 Young Doctors from 21 Countries (including the students of the LARAM School). Besides the lectures, the ALERT students had the opportunity to share scientific and technical knowledge with the colleagues of the LARAM School.

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Election of a new Board of Directors

In October, during our annual meeting in Aussois, the Board of Directors, the President of ALERT and the Bureau will be renewed. Following the ALERT Statute, this procedure takes place each three years and it is composed by three different phases:

1. Election of the new members of the Board of Directors
2. Election of the new ALERT President by the Board of Directors
3. Appointment of the new members of the Bureau by the ALERT President

The Board of Directors is composed by 15 members, elected during General Assembly, together with the members of the Bureau (President, Director, Vice Director for Administration, Vice Director for Economy). A specific Jury composed by three scrutineers will be appointed by the outgoing ALERT President to manage the election procedure.

All permanent professors, researchers and technicians belonging to an ALERT member Institution are eligible candidates for the Board of Directors. Candidatures must be sent by email to director@alertgeomaterials.eu before September 15th. The list of candidates will be then advertised on the ALERT website.

Each Institution belonging to ALERT has one vote, cast by the named representative. The ballot will contain the list of candidates in alphabetical order. Each voter must thick no more than fifteen candidates, and the 15 names which receive the largest number of votes are elected. In case of a tie, the youngest candidate is chosen.

The list of ALERT members is available on

http://alertgeomaterials.eu/alert-geomaterials/members/

During its first meeting, the new Board Directors elects the new ALERT President, who finally choose the new members of the Bureau.

For any further detail, the complete rules for the election are available on the ALERT website.

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ALERT Workshop 2017

The ALERT Workshop in 2017 will be organized from Monday, 2nd October to Wednesday, 4th October. The workshop will again take place in the Centre Paul Langevin in Aussois, France.

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

1 **Porous Media Mechanics from geomaterials to non-geological media**
coord. W. G. Gray, B. Schrefler & C. Tamagnini
graywg@gmail.com
bernhard.schrefler@dicea.unipd.it
claudio.tamagnini@unipg.it

2 **Must Critical State Theory for Granular Mechanics be Revisited?**
coord. Y. F. Dafalias & G. Viggiani
jfdafalias@ucdavis.edu
cino.viggiani@3sr-grenoble.fr

3 **Advanced numerical modelling of geomaterials with emphasis on large deformation and flow problems**
coord. M. A. Hicks, P. Mira & L. Sanavia
M.A.Hicks@tudelft.nl
pmira62@gmail.com
lorenzo.sanavia@unipd.it

Abstracts can only be submitted to the first and third session (Monday and Wednesday, respectively), because the second half-day session on Tuesday will be held by invited speakers only. The deadline for the submission of abstracts is 31st May 2017.

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Organising Institutions of the ALERT Workshop & School 2017

Please do not forget to submit your abstract by email directly to the coordinators using the abstract form which can be downloaded at the ALERT site:

http://alertgeomaterials.eu/2017/03/alert-workshop-2017-call-for-abstracts/

The online registration for the ALERT Workshop & School is open. http://alertgeomaterials.eu/2017/05/registration-for-the-alert-workshop-school-2017-is-open/

ALERT Doctoral School 2017

The workshop is followed by the ALERT Doctoral School which will be hosted from Thursday, 5th October to Saturday, 7th October also in Aussois. The topic of the ALERT School will be dedicated to

Discrete Element Modeling

and will be organized by Gaël Combe (Laboratoire 3SR Grenoble) and Stefan Luding (University Twente).

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

- Simulations (Molecular Dynamics, Event Driven, DEM basics)
- Advanced contact laws for DEM applications
- Contact Dynamics
- Good practice and sample preparation
- DEM applied to Soils Mechanics
- DEM applied to Rock Mechanics
- Granular rheology, granular matter, dense flows and micro-macro transition
- LBM method for Fluid/Grain coupling

On Saturday, these lectures will be followed up by 2 parallel sessions of practical computer exercises: for beginners and for experts. The Lectures will be held by Gaël COMBE, Stefan LUDING, Jean-Yves DELENNE, Frédéric Victor DONZÉ, Vanessa MAGNANIMO, Christophe MARTIN, Farhang RADJAÏ, Vincent RICHEFEU and Anthony THORNTON.

The online registration for the ALERT Workshop & School will open in June 2017 on the ALERT website and will be announced in advance again.

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Organising Institutions of the ALERT School 2017

ALERT Olek Zienkiewicz Course 2017

Assisi, Italy

Università degli Studi di Perugia

TU Delft

Organising Institutions of the ALERT Olek Zienkiewicz Course 2017

The 10th edition of the ALERT Olek Zienkiewicz Course will be held from Monday, 26th June to Friday, 30th June 2017 in Assisi, Italy. The topic of the school is

Geotechnics of soft and organic soils

The school is organised by Cristina Jommi (Delft University of Technology, the Netherlands) and Claudio Tamagnini (University of Perugia, Italy).

Abstract: All over the world, habitable space in deltas and river areas is under increasing pressure from economic expansion, growing population, subsidence and the impact of climate change. In such environments, the typical geological profile consists of soft to very soft soils, including soft clays, organic clays and peats, which are particularly challenging both from the theoretical and the engineering viewpoint. High compressibility together with relatively high shear strength, anisotropy, time-dependent behaviour, biodegradation of the organic matter are some of the key issues which typically characterise these soils. Geotechnical engineering in these contexts is extremely challenging and requires advanced material behaviour models and analysis tools, to reduce the risk for damage and casualties and improve design and assessment methodologies. The main goal of the course is to provide PhD students and researchers with a comprehensive overview on soft soils mechanics and engineering, as well as an insight into current issues and advanced topics. Both fundamental and applied topics are tackled, during 4.5 days organised with lectures and practical sessions.

Lectures covering the following topics as well as practical sessions on some of them will be delivered:

- Fundamental Behaviour
- Constitutive Modelling
- Modelling and Numerical Implementation
- Engineering of Soft Soils

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For more details as well as the online registration form please visit the ALERT website:

http://alertgeomaterials.eu/category/oz-course

New Institutional Member of ALERT

INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

New institutional Member of ALERT

During its meeting in Aussois, held in October 2016, the ALERT Board of Directors approved the application for the membership in ALERT Geomaterials of

INSA Lyon
represented by Ali Daouadji

With these decisions, the present number of members of ALERT Geomaterials is 34!

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Special Lecture 2017: Prof. William G. Gray

The ALERT Special Lecturer 2017
Prof. William G. Gray

The Special lecture during the coming ALERT Workshop 2017 will be presented by Prof. William G. Gray from University of North Carolina, Chapel Hill and University of Vermont, Burlington. He will talk about

Systematic Description of Multiphase Flow in Porous Media

The mathematical description of the behavior of the fluid and solid phases in porous media systems has evolved over the last 150 years primarily in concert with, and as limited by, experimental capabilities to measure physical system features. More recent theoretical approaches have advocated derivation of governing equations based on conservation and thermodynamic relations and rigorous mathematical tools. The resulting governing equations confirm that standard models are significant simplifications of more general equations. A more complete and consistent set of model equations includes dependence on parameters and quantities that are inaccessible using older experimental approaches. The extended theories, which include quantities such as interfacial areas per volume and which recognize the formation of disconnected phases, make demands on experimentalists to develop methods for accessing time-dependent deformation and distribution of phases in a system. The needed expertise is not to mine data in an effort to come up with correlations that describe the system behavior but to use the data to determine coefficient and function values in derived equations. Concurrently, access to advanced supercomputers provides the ability to simulate multiphase flows within porous systems at an intrapore scale. Knowledge gained from highly resolved studies sets the stage for supporting larger scale models of real systems. The recognition of the importance of phase distributions within a system provides a challenge both in simulating these distributions at a manageable scale and in parameterizing the models of the transient distributions. Here, we will highlight some of the challenges and opportunities for advancing physically-based, systematic theoretical descriptions of multiphase flow in porous media for practical usage.

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