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## EDITORIAL

Dear ALERT member,

A new year has just begun. Among the institutional commitments in our stressful daily lives as scientists, participating in ALERT activities is, I think, particularly important. Indeed, this participation gives us the opportunity to plan our scientific objectives and to reconsider our approach to what we are doing. Participation in our annual meeting is a stimulating form of soul-searching. The opportunity to compare our work with the activities of other ALERT members is often like a revitalising shower and, in my opinion, in recent years, the participation in the Aussois workshops of many external researchers has further improved this process.

As I explained on the occasion of the last General Assembly, this year is particularly important for the Association, as we are called upon to designate the new Alert Board

of Directors and the new President. As you probably know, Felix cannot be nominated again, as our Statute prohibits the election of the same President more than twice.

During the next few months, I will collect the candidatures for becoming a member of the Alert Board of Directors. Please remember that only those who stand as candidates can be elected. A new Board of Directors, a new President and a new Bureau will certainly open up new frontiers for our association. In the near future, globalisation will surely result in the growth of our community, and we must be ready to take up this challenge with bravery.

Happy new year!

Yours sincerely,

Claudio di Prisco

## Rules for the election of the new Board of Directors

The rules concerning the election of the new Board of Directors are reported in the following.

### ALERT INTERNAL RULES

#### Article 2: ELECTION OF THE BOARD OF DIRECTORS (BoD) MEMBERS

- The BoD is composed of 15 members elected by the General Assembly (GA), together with the members of the ALERT Bureau, as defined in Article 8 of the ALERT Statute.
- All permanent teachers, researchers and technicians belonging to an ALERT member institution are eligible candidates for the BoD.
- Each institution has one (1) vote. The vote is cast by the named representative of the institution (whose name is specified on the ALERT website), or by another person belonging to the same institution delegated by a written mandate by the named representative. The election takes place during the ALERT Workshop, before the meeting of the new BoD.
- Candidates for election to the BoD must send their applications by email to the ALERT director before September 30<sup>th</sup>; the list of candidates is published and advertised on the ALERT website during the first week of October.
- The ballot contains the list of declared candidates in alphabetical order, starting from a randomly chosen letter.
- Each voter must tick a maximum of 15 names. Otherwise, the ballot will be considered void.
- The 15 names which receive the largest number of votes are elected. In the case of a tie, the youngest candidate is chosen.
- The vote count is controlled by three scrutineers, chosen from among the ALERT members by the outgoing ALERT President. The names of the 15 new BoD members are announced at the end of the count, and published on the ALERT website.

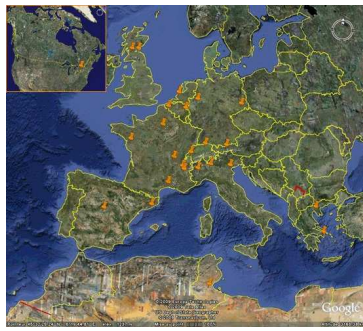


If you want to advertise open positions in your institution or forthcoming scientific events (conferences, symposia, etc.) using the ALERT mailing list, please send a leaflet to: [alertdirector@stru.polimi.it](mailto:alertdirector@stru.polimi.it). Only files in PDF format will be accepted for transmission.

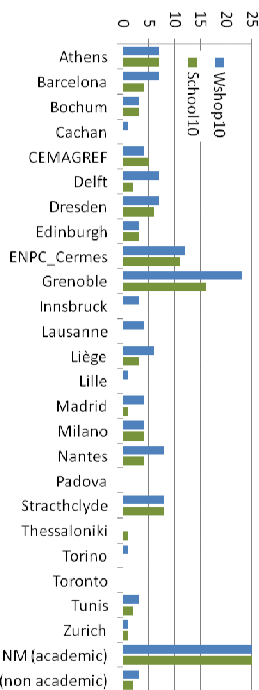
## New ALERT members

During the last Board meeting, held in Aussois on the 5<sup>th</sup> October 2010, one European university and one European research institution were accepted as new ALERT members: the University of Montpellier (France) and the Ecole Centrale de Lyon (France).  
The current number of ALERT members amounts to 25. You can find the updated list of ALERT members at <http://alert.epfl.ch>.  
The research activities of the new members are summarised below.

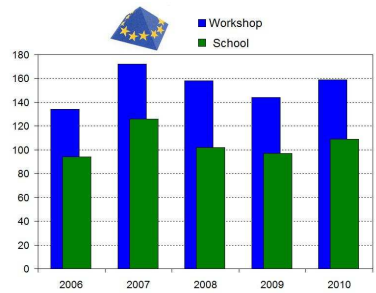
The group working at LTDS (Laboratoire de Tribologie et Dynamique des Systèmes) of the **Ecole Centrale de Lyon** (team leader: Eric Vincens) is formed of six senior researchers and three post-doc and doctoral students. The major interests of this group are focused on homogenisation and multiscale modelling of granular materials. Further research topics concern the filtration processes in geomaterials, constitutive modelling and earthquake engineering.



Map of ALERT institutions



Participants in ALERT Workshops and Schools 2010 from different institutions



Participants in ALERT Workshops and Schools in the last five years

The PMGM (Physics and Mechanics of Granular Materials) group from the **University of Montpellier** (team leader: Prof. Farhang Radjai) is composed of five senior researchers and six post-doc/doctoral students. The research activity of the group is mainly devoted to the micromechanical analysis of granular materials by means of DEM and contact dynamics numerical approaches. In particular, micromechanics is exploited to study force transmission processes and the flow of dense materials (with applications for avalanches). The topic of fluid-grain interaction is tackled as well, by extending the use of particle methods to the analysis of unsaturated materials and, in general, to the thermo-hygro-mechanical problems.



Logos of the new ALERT members

Other ALERT members



## Workshop 2010

This year, the ALERT Workshop lasted for three days, with a large number of participants: this is the best proof of the level of interest in the topics proposed by the association and tackled by the speakers. It is worth mentioning the participation of 42 non-ALERT members (from both academic and non-academic institutions). The total number of participants was 159. The numbers of participants in the ALERT Workshops from the last five years are reported on the left-hand side of this page. The three topics of the ALERT Workshop 2010 were:

- 1. Engineering geostuctures**  
coord. I. Herle and A. Gens
- 2. Mechanics of clay rocks**  
coord. P. Besuelle and R. Charlier
- 3. Chemo- and bio-mechanical couplings**  
coord. J.F. Shao and B. Garitte

As usual, the programme was very rich, collecting 13 contributions in session 1, 14 in session 2 and 14 in session 3. All of the active participants, and particularly the coordinators, are warmly acknowledged!



## Invited Lecture 2010



The ALERT lecturer 2010  
Prof. APS Selvadurai  
McGill University (Canada)



European Journal  
of Environmental  
and Civil Engineering

Revue européenne de génie civil

European Journal of Environmental and Civil Engineering

Revue européenne de génie civil - Volume 13 - No. 7-8-2009

Guest Editors:  
Ezzam Lahmi, Frédéric Collin, Vincenzo De Gennaro

R. Nies  
Failure in geomaterials  
R. Kowarski, A. Doria, L. Luzzi, F. Grassi  
Mathematical processes in geomaterials  
T. H. Wang  
Thermally and chemically induced failure in geomaterials  
R. Patai, L. Luzzi, T. H. Wang, L. H. He  
Deformation cracking of soils  
J. Sulem  
Multifield aspects of strain-softening  
V. De Gennaro  
Advanced mathematical modeling for soil cracks  
A. Giori, R. Giori, S. Ghossein, J. Sulem  
Application of multifield poroelasticity to underground nuclear waste storage  
G. Proenza-Ciani, C. La Birotte  
Mechanical damage, chemical damage and permeability in quartzite cementitious materials  
F. Grassi, S. Lavezzi, R. Giori  
Numerical post failure analysis in multifield problems



European Journal of Environmental and  
Civil Engineering: "Mathematical  
Modelling in Geomechanics"



Prof. Iannis Vardoulakis

### ALERT Phd Prize 2011

Eligible candidates for the ALERT PhD Prize 2011 are all the students coming from ALERT Institutions who defended before Decembre 31, 2010. Deadline for submission is June 30. Further details on <http://alert.epfl.ch>

It was a great pleasure for all of us to host **Prof. Patrick Selvadurai** from McGill University as a special guest lecturer during the 2010 ALERT Workshop, in recognition of his contributions to scientific research in the field of geomechanics.

In Aussois, Prof. Selvadurai presented a learned dissertation entitled **The Analytical Method and its Role in the Development of Geomechanics**.

This lecture, in video and audio formats, will be available very soon on the ALERT Geomaterials website. This will give you the opportunity to attend a very interesting lecture whilst sitting comfortably in your office.

The lecture started with a clarification of the concept of "analytical solution", meaning the "exhaustive application of pure mathematical procedures for the development of a solution to a problem in engineering".

The numerous applications of analytical

methods in geomechanics were overviewed, pointing out the relationship between the recent contributions of the lecturer and those of a number of other renowned scientists.

The presentation addressed several topics, ranging from the applications of the theory of elasticity in geomechanics (including Kelvin's and Boussinesq's problems and extensions for inhomogeneous media) to coupled poro-elastic problems. Special emphasis was devoted to flow and transport phenomena in porous media, by considering the notable application to CO<sub>2</sub> sequestration problems.

The examples discussed in the lecture covered a large spectrum of areas, in order to signify the contributions of analytical methods to the development of geomechanics, both from practical and pedagogic standpoints.

## ALERT Doctoral School 2010

The ALERT Doctoral School 2010, organised by Prof. J. Sulem (École Nationale des Ponts et Chaussées, Paris) and Prof. E. Papamichos (Aristotle University of Thessaloniki), was dedicated to the memory of Prof. Ioannis Vardoulakis. The content of the course was inspired by the numerous contributions of Prof. Vardoulakis in the field of geomechanics. A summary of his outstanding research activities was presented by those who had been his students and/or close collaborators, as well as by the Invited ALERT Lecturer for 2010, Prof. Selvadurai.

On behalf of the ALERT Association, it is our pleasure to thank the organisers and teachers (G. Exadaktylos, F. Froiio, I.O.S. Georgopoulos, E. Papamichos, P. Papanastasiou, S. Papanicopoulos, A.P.S. Selvadurai, M. Stavropoulou, J. Sulem, I. Stefanou, E. Vairaktaris, E. Veveakis and A. Zervos) for their devoted efforts and for the quality of their contributions.

There were 81 participants from ALERT member institutions and 28 participants from non-ALERT institutions. The total number of participants was 109! (See the graph on the previous page.)

After the introduction by the organisers, the

first day was first dedicated to emphasising the role of analytical methods in geomechanics, with special reference to transport phenomena in porous materials. The basic concepts of strain localisation analysis were then presented, along with the enhanced continuum theories suitable for overcoming the limitations of standard approaches (e.g. Cosserat and second gradient theories).

During the second day, the main computational issues related to the simulation of localisation were tackled: in particular, the application of Cosserat's and gradient theories in FEM failure analyses was discussed. Experimental topics were also addressed, as well as the problems of fluidisation and liquefaction of granular materials.

The last session of the School concerned several applications of the aforementioned theoretical/numerical concepts to the study of, for instance: (i) inverse problems in geomechanics; (ii) erosion processes; (iii) triggering and propagation of creeping landslides; and (iv) the mechanical behaviour of discontinuous block structures.

## ALERT Phd Prize 2010

The Jury of the ALERT PhD Prize 2010 was composed of P.Y. HICHER (Ecole Centrale de Nantes), D. MUIR WOOD (Dundee University), Félix DARVE (Institut National Polytechnique de Grenoble) and A.P.S. SELVADURAI (McGill University).

The prize was awarded ex aequo to Dr. Chloe Arson, from École Nationale des Ponts et

Chaussées (ENPC) for her PhD thesis entitled *Etude théorique et numérique de l'endommagement thermo-hydro-mécanique des milieux poreux non saturés*, and Dr. Mathieu Nuth from EPF Lausanne for his PhD thesis entitled *Constitutive Modelling of Unsaturated Soils with Hydro-Geomechanical Couplings*.



The thesis developed by Dr. Arson involved the development of a damage model for studying the excavation damaged zone (EDZ) around nuclear waste repositories. It is well known that radioactive packages behave as heat sources which have to be stored in unsaturated porous media. The novelty of the research work developed by Dr. Arson lies in the combination of continuum damage mechanics and poro-mechanics. The proposed damage model has been formulated using independent stress state variables. The origin of damage can be mechanical, capillary or thermal. Moreover, the model accounts for the intensification and orientation of flows due to cracking.

The thesis developed by Dr. Nuth addressed

a variety of classical topics of unsaturated soil mechanics: (i) a review of the possible effective stresses for unsaturated soils; (ii) the development of a new constitutive model (ACMEG-s) for the stress-strain behaviour of unsaturated soils; (iii) the formulation and validation of a model for water retention behaviour and finally (iv) the integration of the coupled model into a finite element code. In order to apply the coupled model to the broadest panel of civil engineering cases (e.g. landslides and earthdams), two case studies are presented: the earth dam of Mirgenbach and the shallow landslide experiment from Rüdlingen.



Dr Chloe Arson (ENPC) and  
Dr Mathieu Nuth (EPFL)

## ALERT Olek Zienkiewicz Course: 3<sup>rd</sup> edition

After the successful editions held in Madrid and Lausanne, the ALERT Geomaterials Association is very pleased to announce:

### 3<sup>rd</sup> ALERT Olek Zienkiewicz Course on "Discrete Mechanics of Geomaterials"

The third edition, organised by Prof. Bruno Chareyre and Prof. Cino Viggiani, will be hosted by the University of Grenoble (France) from June 27<sup>th</sup> to July 1<sup>st</sup> 2011 and will address the discrete mechanics of geomaterials.

The understanding of the behaviour of geomaterials begins by recognising their particulate nature and its immediate implications: the interplay between particle characteristics; inter-particle arrangement and interconnected porosity; inherently non-linear inelastic contact phenomena and particle

forces.

The course will consist of both lectures and practical sessions. The participants will be provided with an overview of the state-of-the-art research on this subject, including theoretical aspects, numerical methods and advanced experimental techniques.

#### Practical details

Max. number of participants: 40

Registration fee: free for Alert members, €500 for non-members

Online registration begins: Feb 28<sup>th</sup>

Deadline for online registrations: May 30<sup>th</sup>

Notification of accepted registrations: June 6<sup>th</sup>

The organisers will provide advice on student accommodation in Grenoble. Further information will soon be available on the ALERT website.

### ALERT Olek Zienkiewicz Course "Discrete Mechanics of Geomaterials"

#### Lecturers

Bruno Chareyre  
(Univ. Grenoble)  
Virginie Marry  
(UPMC Paris 6)  
François Nicot  
(Cemagref Grenoble)  
Farhang Radjaï  
(Univ. Montpellier)  
Vincent Richefeu  
(Univ. Grenoble)  
Jean-Noël Roux  
(Institut Navier, Paris)  
Carlos Santamarina  
(Georgia Tech, Atlanta)  
Luc Sibille  
(Univ. Nantes)  
Cino Viggiani  
(Univ. Grenoble)

#### Practical Lecture Instructors

Edward Andò  
(Univ. Grenoble)  
Pierre Bésuelle  
(Univ. Grenoble)  
Emanuele Catalano  
(Univ. Grenoble)  
Gaël Combe  
(Univ. Grenoble)  
Jacques Desrues  
(Univ. Grenoble)  
Nejib Hadda  
(Cemagref Grenoble)  
Stephen A. Hall  
(Univ. Lund)  
Jack Lanier  
(Univ. Grenoble)  
Václav Šmilauer  
(CVUT Prague)

## ALERT Workshop & School 2011

The **ALERT Workshop 2011** will be held in Aussois from 3<sup>rd</sup> to 5<sup>th</sup> October 2011. The titles of the sessions chosen by the ALERT Board of Directors and the relative coordinators are listed below.

### 1. Multiscale geomechanics: from fabric to material properties

coord. G. Couples & B. Chareyre  
gary.couples@pet.hw.ac.uk  
bruno.chareyre@hmg.inpg.

### 2. Geomechanical issues in CO<sub>2</sub> storage

coord. G. Pijaudier-Cabot & J.M. Pereira  
Gilles.Pijaudier-Cabot@univ-pau.fr  
jeanmichel.pereira@enpc.fr

### 3. Localised versus diffuse failure in geomaterials

coord. M. Hicks & G. Viggiani  
M.A.Hicks@tudelft.nl  
cino.viggiani@hmg.inpg.fr

Please do not forget to submit your abstracts by email directly to the coordinators using the abstract form that can be downloaded from the ALERT website (<http://alert.epfl.ch>).

**The deadline for the submission of abstracts is 30<sup>th</sup> April 2011.**

The **ALERT Doctoral School 2011** will be entitled "Prevention and protection against hazards" and will be organised by Prof. C. di Prisco (Politecnico di Milano) and Prof. Y. Malécot (Université Joseph Fourier, France). As usual, the programme will cover three days, from 6<sup>th</sup> to 8<sup>th</sup> October.

Online registration for the Workshop and the School will open in May 2011 on the ALERT website and a notice will be posted in the next issue of the newsletter and through the ALERT mailing list. Please do not forget to fill in your online registration form with all of the requested data (date and time of arrival and departure, email address, postal address and affiliations, etc.), in order to help us to meet your needs!