

# E-UNSAT 2016

3<sup>rd</sup> European Conference on Unsaturated Soils

## Frontiers in Unsaturated Soils

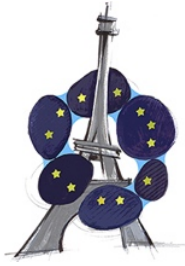
12-14 September 2016, Ecole des Ponts ParisTech, Paris

Detailed programme



P. Delage, Y.-J. Cui, S. Ghabezloo, J.-M. Pereira, A.-M. Tang





# E-UNSAT 2016

3<sup>rd</sup> European Conference on Unsaturated Soils

## Frontiers in Unsaturated Soils

12-14 September 2016, Ecole des Ponts ParisTech, Paris

Open access Proceedings available from 12 September 2016 on <http://www.e3s-conferences.org/>

### The 3<sup>rd</sup> European Conference on Unsaturated Soils

- is run under the auspices of the Technical Committee 106 on Unsaturated Soils of the International Society of Soil Mechanics and Geotechnical Engineering
- is supported by the following organisations



TC 106  
Unsaturated Soils



École nationale des ponts et chaussées

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Comité français de mécanique des sols et de géotechnique



Laboratoire d'excellence MMCD  
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### The Exhibitors



## Practical information

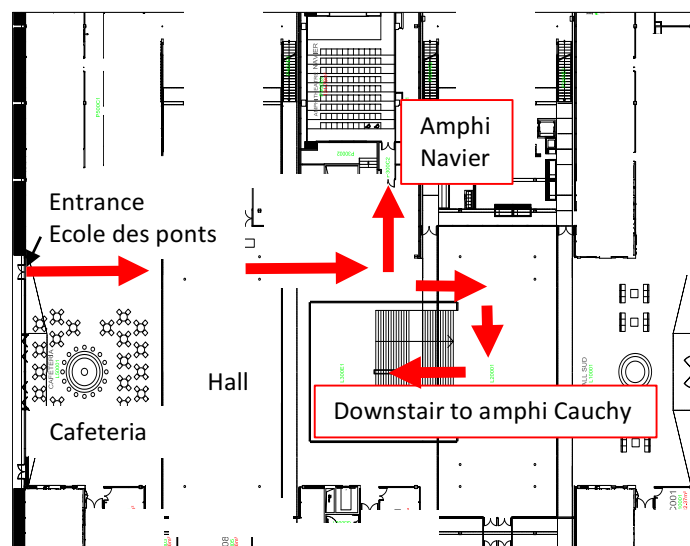
Building Bienvenüe (IFSTTAR)  
Amphi Bienvenüe, restaurant

Ecole des ponts  
Amphis Cauchy and Navier

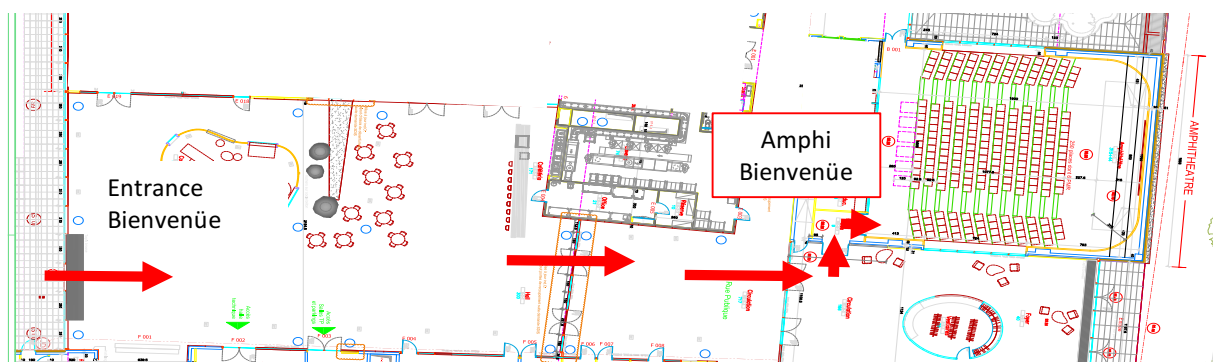


### Access

- Amphis Cauchy and Navier (Ecole des ponts)



- Amphi Bienvenüe (IFSTTAR, Building Bienvenüe)



### Wifi

- Amphis Cauchy and Navier:
  - User name: [congres.eunsat@enpc.fr](mailto:congres.eunsat@enpc.fr) - Password : E-Unsat16
  - Eduroam (under « Automatic proxy detection »)
- Amphi Bienvenüe:
  - Eduroam



## GENERAL PROGRAMME - CHAIRPERSONS

Monday, 12th September 2016

8:00 – 8:30	Registration			Cauchy
8:30 – 9:00	Opening Ceremony <i>Roger Frank</i>			Cauchy
9:00 - 10:35	Plenary Session <i>David Toll</i>			Cauchy
10:35 – 11:00	Coffee break			Hall
11:00 – 12:30	<b>Foundations</b> <i>Wojtek Solowski</i> Bienvenüe	<b>Microstructure</b> <i>Simon Salager</i> Cauchy	<b>Thermal and chemical effects</b> <i>John McCartney</i> Navier	
12:30 – 14:00	Lunch			Restaurant Bienvenüe
14:00 – 15:50	<b>Numerical modelling</b> <i>Robert Charlier</i> Bienvenüe	<b>Advances in experimental methods: Mechanical properties</b> <i>Enrique Romero</i> Cauchy	<b>Water retention properties</b> <i>Said Taïbi</i> Navier	
15:50 – 16:20	Coffee break			Hall
16:20 – 18:05	<b>Numerical modelling</b> <i>Daichao Sheng</i> Bienvenüe	<b>Advances in experimental methods: Mechanical properties</b> <i>Olivier Cuisinier</i> Cauchy	<b>Water retention properties</b> <i>Snehasis Tripathy</i> Navier	

Tuesday, 13th September 2016

9:00 - 10:35	Plenary Session <i>Jean-Louis Briaud</i>			Cauchy
10:35 – 11:00	Coffee break			Hall
11:00 – 12:30	<b>Numerical modelling</b> <i>Antonio Gens</i> Bienvenüe	<b>Soil-vegetation-atmosphere interactions</b> <i>Bernardo Caicedo</i> Cauchy	<b>Environmental Geotech. (with TC215)</b> <i>Malek Bouazza</i> Navier	
12:30 – 14:00	Lunch			Restaurant Bienvenüe
14:00 – 15:50	<b>Mechanical behaviour</b> <i>Adrian Russell</i> Bienvenüe	<b>Advances in experimental methods Hydraulic properties</b> <i>Tacio de Campos</i> Cauchy	<b>Slope stability</b> <i>Jean Vaunat</i> Navier	
15:50 – 16:20	Coffee break			Hall
16:20 – 18:05	<b>Mechanical behaviour</b> <i>Claudio Mancuso</i> Bienvenüe	<b>Advances in experimental methods Hydraulic properties</b> <i>Farimah Masrouri</i> Cauchy	<b>Slope stability</b> <i>Harianto Rahardjo</i> Navier	

Wednesday, 14th September 2016

9:00 - 10:35	<b>Water transport properties</b> <i>Wiebke Baille</i> Bienvenüe	<b>Constitutive modelling</b> <i>Simon Wheeler</i> Cauchy	<b>Mechanical behaviour</b> <i>Federica Cotecchia</i> Navier	
10:35 – 11:00	Coffee break			Hall
11:00 – 12:30	<b>Water transport properties</b> <i>Domenico Gallipoli</i> Bienvenüe	<b>Constitutive modelling</b> <i>David Mašin</i> Cauchy	<b>Mechanical behaviour</b> <i>Laureano Hoyos</i> Navier	
12:30 – 14:00	Lunch			Restaurant Bienvenüe
14:00 – 15:30	<b>Nuclear waste disposal</b> <i>Maria Villar</i> Bienvenüe	<b>Dams and dykes</b> <i>Michael Bardanis</i> Cauchy	<b>Transportation infrastructure</b> <i>Rafaela Cardoso</i> Navier	
15:30 – 16:00	Coffee break			Hall
16:00 – 18:00	Plenary Session <i>Eduardo Alonso</i>  <i>Closing Ceremony</i> <i>Pierre Delage</i>			Cauchy



**Plenary session****08h00 – 10h35 – Amphi Cauchy****Chair David Toll (UK)****MONDAY 12 SEPTEMBER 2016**

08:00 - 08:30	<b>Registration</b>
08:30 - 09:00	<b>Opening Ceremony</b>
09:00 - 9:45	<b>European Distinguished Lecture</b> Unsaturated railway track-bed materials <i>Yujun Cui, Ecole des Ponts ParisTech, France</i>
9:45 - 10:10	<b>Plenary Lecture</b> Effective stress and energetics of unsaturated soils <i>Nasser Khalili, University of New South Wales, Sydney, Australia</i>
9:10 - 10:35	<b>Plenary Lecture</b> Transient boundary conditions in the frame of THM-processes at nuclear waste repositories <i>Tom Schanz, Ruhr-Universität Bochum, Germany</i>

**Coffee break (Hall)****10h35 – 11h00**

**Parallel session****11h00 – 12h30 – Amphi Bienvenue****Foundations – Retaining walls****Chair Wojtek Solowski (Finland)**

MONDAY 12 SEPTEMBER 2016

- 11:00 - 11:15 Numerical analysis of an energy pile under different boundary conditions and thermal loading cycles  
*Ali Khosravi, Sharif University of Technology, Iran*
- 11:15 - 11:30 Study on vertical permeability regularity and collapsibility of a large thickness loess foundation by in-situ testing  
*Huang Xue-feng, LEU Chongqing, China*
- 11:30 - 11:45 Experimental study on the coefficient of lateral earth pressure in unsaturated soils  
*Ali Pirjalili, Tarbiat Modares University, Iran*
- 11:45 - 12:00 Bearing capacity of strip footings on unsaturated soils by the slip line theory  
*Thanh Vo, The University of New South Wales, Sydney, Australia*
- 12:00 - 12:15 Effect of plastic soil on a retaining wall subjected to surcharge loading  
*Khawla Al-Juari, University of Mossoul, Irak*
- 12:15 - 12:30 A study on the saturation degree dependency of the seismic behaviour of retaining walls  
*Ehsan Nikooee, Shiraz University, Iran*

**Lunch (Restaurant)****12h30 – 14h00**

**Parallel session****11h00 – 12h30 – Amphi Cauchy****Microstructure****Chair Simon Salager (France)**

MONDAY 12 SEPTEMBER 2016

- 11:00 - 11:15 Macro-microscopic one-dimensional compression of wet granular soils by experimental investigation  
*Vinh Du Than, Ecole des Ponts ParisTech, France*
- 11:15 - 11:30 A microstructure insight into the water retention properties of the Callovo-Oxfordian claystone  
*Pierre Delage, Ecole des Ponts ParisTech, France*
- 11:30 - 11:45 Microstructure analysis of laboratory and in-situ compacted silts  
*Giacomo Russo, University of Cassino and Southern Lazio, Italy*
- 11:45 - 12:00 Effect of pore-size distribution on the collapse behaviour of anthropogenic sandy soil deposits  
*Alireza Jafari Jebeli, Ruhr-Universität Bochum, Germany*
- 12:00 - 12:15 Sample size choices for XRCT scanning of highly unsaturated soil mixtures  
*Charles Augarde, Durham University, UK*
- 12:15 - 12:30 Grain scale mechanisms for capillary collapse in a loose unsaturated pyroclastic soil  
*Sabatino Cuomo, University of Salerno, Italy*

**Lunch (Restaurant)****12h30 – 14h00**



## Thermal and chemical effects

Chair John McCartney (USA)

MONDAY 12 SEPTEMBER 2016

- 11:00 - 11:15 Study of the influence of the saline solution NaCl on the potential collapse of soil  
*Abbeche Khelifa, Université de Batna, Algeria*
- 11:15 - 11:30 Vapor intrusion in soils with multimodal pore-size distribution  
*Miguel Soto, Universidade Estadual Paulista, Brazil*
- 11:30 - 11:45 Seasonal thermal energy storage in shallow geothermal systems: thermal equilibrium stage  
*Hossein Nowamooz, INSA de Strasbourg, France*
- 11:45 - 12:00 Thermal volume change of unsaturated silt under different stress states and suction magnitudes  
*John McCartney, University of California, San Diego*
- 12:00 - 12:15 Exploring ice content on partially saturated frozen soils using dielectric permittivity and bulk electrical conductivity measurements  
*Enrique Romero, Universitat Politècnica de Catalunya, Barcelona, Spain*
- 12:15 - 12:30 Modelling the effects of pore-water chemistry on the behaviour of unsaturated clays  
*Henry Wong, Université de Lyon, France*

**Lunch (Restaurant)****12h30 – 14h00**

- 14:00 - 14:20 **Invited Lecture – Amphi Bienvenüe**  
Modelling an in-situ ventilation test in the Andra Underground Research Facilities  
*Frédéric Collin, Université de Liège, Belgium*
- 14:00 - 14:20 **Invited Lecture – Amphi Cauchy**  
Advances in the monitoring of geo-structure subjected to climate loading  
*Alessandro Tarantino, University of Strathclyde, UK*
- 14:00 - 14:20 **Invited Lecture – Amphi Navier**  
Fabric and clay activity in soil water retention behaviour  
*Cristina Jommi, Delft University of Technology, The Netherlands*



## Parallel session

14h20 – 17h50 – Amphi Bienvenue

## Numerical modelling

Chair Robert Charlier (Belgium)

- 14:20 - 14:35 Probabilistic assessment of Precipitation-Triggered Landslides: The Role of Vegetation  
*Estefanía Muñoz, Universidade de Brasília, Brazil*
- 14:35 - 14:50 Inverse analysis of cyclic constitutive models for unsaturated soil under consideration of oscillating functions  
*Muyiwa Alalade, Bauhaus University, Germany*
- 14:50 - 15:05 Numerical modeling of hydric profiles on Tlemcen limon (Algeria)  
*Abdeljalil Zadjoui, Université de Tlemcen*
- 15:05 - 15:20 Soil-atmosphere interaction in unsaturated cut slopes  
*Aikaterini Tsiampousi, Imperial College London, UK*
- 15:20 - 15:35 Some Experience in Numerical Modelling of Unsaturated Landslide Instabilities  
*Josif Josifovski, Ss. Cyril and Methodius University, Skopje, Macedonia*
- 15:35 - 15:50 Modelling desiccation cracking in a homogenous soil clay layer: comparison between different hypotheses on constitutive behaviour  
*Cristina Jommi, Delft University of Technology, The Netherlands*

## Coffee break (Hall)

15h50 – 16h20

## Numerical modelling

Chair Daichao Sheng (Australia)

- 16:20 - 16:35 Shakedown modeling of unsaturated expansive soils subjected to wetting and drying cycles  
*Hossein Nowamooz, INSA de Strasbourg, France*
- 16:35 - 16:50 Investigation into the isotropic compression of wet granular soils using discrete element method  
*Vinh Du Than, Ecole des Ponts ParisTech, France*
- 16:50 - 17:05 Numerical modelling of desiccation cracking of clayey soil  
*Thi Dong Vo, Ecole des Ponts ParisTech, France*
- 17:05 - 17:20 Propagation of cohesive crack in unsaturated porous media by use of XFEM method  
*Behrouz Gatmiri, University of Tehran, Iran*
- 17:20 - 17:35 Simple Numerical Model to Simulate Penetration Testing in Unsaturated Soils  
*Majid Ghayoomi, University of New Hampshire, UK*
- 17:35 - 17:50 Seismic response of earth dams considering dynamic properties of unsaturated zone  
*Ehsan Nikooee, Shiraz University, Iran*

## Welcome reception



## Parallel session

14h20 – 17h35 – Amphi Cauchy

## Advances in exp. Methods: Mechanical properties

Chair Enrique Romero (Spain)

- 14:20 - 14:35 Suction-controlled dynamic simple shear apparatus for measurement of dynamic properties of unsaturated soils  
*Majid Ghayoomi, University of New Hampshire, UK*
- 14:35 - 14:50 Optimisation of in-situ dry density estimation  
*Mathilde Morvan, Université Blaise Pascal, Clermont-Ferrand, France*
- 14:50 - 15:05 Effect of particle size on the measurement of the apparent contact angle in sand of varying wettability under air-dried conditions  
*Yunesh Saulick, The University of Hong Kong, SAR China*
- 15:05 - 15:20 Characterization of the secondary swelling of compacted Maryland clay  
*Shengyang Yuan, The University of Newcastle, Australia*
- 15:20 - 15:35 Interpreting measurements of small strain elastic shear modulus under unsaturated conditions  
*Simon Wheeler, University of Glasgow, UK*
- 15:35 - 15:50 Low-cost alternatives to estimate unsaturated soil shear strength parameters  
*Michael Bardanis, EDAFOS Engineering Consultants S.A., Greece*

## Coffee break (Hall)

15h50 – 16h20

## Advances in exp. methods Mechanical properties

Chair Olivier Cuisinier (France)

- 16:20 - 16:35 The cone penetration test in unsaturated silty sands  
*Hongwei Yang, The University of Hong Kong, SAR China*
- 16:35 - 16:50 Reconciling soil-water retention properties and shear strength parameters of compacted clayey soils via suction-controlled ring shear testing  
*Laureano R. Hoyos, University of Texas at Arlington, USA*
- 16:50 - 17:05 Stress path during pressuremeter test and link between shear modulus and Ménard pressuremeter modulus in unsaturated fine soils  
*Vincent Savatier, EGIS Géotechnique, Seyssins, France*
- 17:05 - 17:20 The influence of saturation on the cracking process in compacted desiccating clays  
*Maria Noack, Bauhaus-Universität Weimar, Germany*
- 17:20 - 17:35 Characterization of compacted silty sand via relative humidity-controlled triaxial test  
*Laureano R. Hoyos, University of Texas at Arlington, USA*

## Welcome reception



## Parallel session

14h20 – 18h05 – Amphi Navier

## Water retention properties

Chair Said Taïbi (France)

- 14:20 - 14:35 Water retention behaviour of compacted bentonites: experimental observations and constitutive model  
*Robert Charlier, Université de Liège, Belgium*
- 14:35 - 14:50 Network modelling of retention and transport behaviour in unsaturated soils  
*Simon J. Wheeler, University of Glasgow, UK*
- 14:50 - 15:05 Effect of in situ and laboratory compaction on the retention behaviour of a clayey soil  
*Francesca D'Onza, Italian National Agency for new technologies, Energy and sustainable economic development, Italy*
- 15:05 - 15:20 Experimental determination of the hysteretic behaviour of soil-water retention curve of silty sands  
*Ludwig Angerer, TU München, Germany*
- 15:20 - 15:35 Modelling of the water retention characteristic of deformable soils  
*Yu Wang, University of Salford, UK*
- 15:35 - 15:50 Estimation of water retention behaviour of MX-80 bentonite partially saturated with saline solution  
*Wojciech Solowski, Aalto University, Helsinki, Finland*

## Coffee break (Hall)

15h50 – 16h20

## Water retention properties

Chair Snehasis Tripathy (UK)

- 16:20 - 16:35 A theoretical retention model for unsaturated uniform and graded soils  
*Jacques Monnet, GAIATECH, Grenoble, France*
- 16:35 - 16:50 Comparison of soil water retention curves for sandy clay, obtained using different laboratory testing methods  
*Piotr Osinski, Warsaw University of Life Sciences, Poland*
- 16:50 - 17:05 Classification, soil-water characteristic curve and swelling/collapse behaviour of the Nicosia marl, Cyprus  
*Dimitrios Loukidis, University of Cyprus*
- 17:05 - 17:20 A void ratio dependent water retention curve model including hydraulic hysteresis  
*Amin Pasha, University of New South Wales, Sydney, Australia*
- 17:20 - 17:35 Water repellent soils: The case for unsaturated soil mechanics  
*Chris Beckett, The University of Western Australia, Perth*
- 17:35 - 17:50 Analytical reliability analysis of soil-water characteristic curve  
*Ali Johari, Shiraz University of Technology, Iran*
- 17:50 - 18:05 Study of the hydric behaviour of double-layered of unsaturated soils. Analysis of water and suction profiles during infiltration tests  
*Ibrahim Alimi-Ichola, INSA de Lyon, France*

## Welcome reception



*Plenary session*

*09h00 – 10h35 – Amphi Cauchy*

Chair Jean-Louis Briaud (USA)

TUESDAY 13 SEPTEMBER 2016

- 09:00 - 09:45 **Keynote Lecture**  
Investigation on chemical effects on GMZ bentonite used as buffer materials  
*Wei-Min Ye, Tongji University, Shanghai, China*
- 09:45 - 10:10 **Plenary Lecture**  
Challenges in treating earthen construction materials as unsaturated soils  
*Charles E. Augarde, Durham University, UK*
- 10:10 - 10:35 **Plenary Lecture**  
Modelling suction instabilities in soils at varying degrees of saturation  
*Giuseppe Buscarnera, Northwestern University, Evanston, USA*

*Coffee break (Hall)*

*10h35 – 11h00*



## Numerical modelling

Chair Antonio Gens (Spain)

TUESDAY 13 SEPTEMBER 2016

- 11:00 - 11:15 An XFEM Model for Hydraulic Fracturing in Partially Saturated Rocks  
*Saeed Salimzadeh, Imperial College London, UK*
- 11:15 - 11:30 Experimental and numerical approaches of the hydro-mechanical behavior of quasi-saturated compacted clayey soil  
*Zhong-Sen LI, Centrale-Supélec, France*
- 11:30 - 11:45 Elastoplastic model for unsaturated, quasi-saturated and fully saturated fine soils  
*Antonin Fabbri, Université de Lyon, France*
- 11:45 - 12:00 The determination of model dimension for an embankment to study soil atmosphere interaction with Finite Element Method  
*Ni An, Ecole des Ponts ParisTech, France*
- 12:00 - 12:15 Effect of Hydraulic Hysteresis on Dynamic Response of Unsaturated Soils  
*Babak Shahbodaghkhan, The University of New South Wales, Sydney, Australia*
- 12:15 - 12:30 Modelling large deformation problems in unsaturated soils  
*Eduardo Alonso, Universitat Politècnica de Catalunya, Barcelona, Spain*

**Lunch (Restaurant)****12h30 – 14h00**

## Parallel session

11h00 – 12h30 – Amphi Cauchy

## Soil-vegetation-atmosphere interactions

Chair Bernardo Caicedo (Colombia)

TUESDAY 13 SEPTEMBER 2016

- 11:00 - 11:15 Correlating hydro-mechanical properties of vegetated soil with leaf functional traits  
*David Boldrin, University of Dundee, UK*
- 11:15 - 11:30 Implications of the atmosphere-soil interaction for the design of earth retaining structures  
*Juan Carlos Ruge, Universidad Nacional de Colombia, Bogota*
- 11:30 - 11:45 Effect of wetting-drying cycles on soil desiccation cracking behaviour  
*Chao-Sheng Tang, Nanjing University, China*
- 11:45 - 12:00 Evaluation of the effect of Land Vegetation Cover on water and energy balance of an unsaturated pyroclastic cover  
*Alfredo Reder, Università di Napoli Federico II, Italy*
- 12:00 - 12:15 Description of a field test involving cracking in a drying soil  
*Alberto Ledesma, Universitat Politècnica de Catalunya, Barcelona, Spain*
- 12:15 - 12:30 On the mechanisms and kinetics of evaporation of a compacted silt  
*Régis Mpawenayo, Université libre de Bruxelles, Belgium*

Lunch (Restaurant)

12h30 – 14h00





*Parallel session**11h00 – 12h30 – Amphi Navier***Environmental Geotechnics (with TC215)****Chair Malek Bouazza (Australia)**

TUESDAY 13 SEPTEMBER 2016

- 11:00 - 11:15 Influence of atmospheric conditions on the strength of unstabilized earthen constructions  
*Pierre Gérard, Université libre de Bruxelles, Belgium*
- 11:15 - 11:30 Improved climatic chamber for desiccation simulation  
*Catalina Lozada, Universidad de los Andes, Bogota, Colombia*
- 11:30 - 11:45 Aging effect on swell, shrinkage and flexural strength of sand and waste marble powder stabilized expansive soil  
*Serife Oncu, Eastern Mediterranean University, North Cyprus*
- 11:45 - 12:00 Feasibility study of a new unsaturated three-layer landfill cover system  
*Jason Coo, Hong Kong University of Science and Technology, SAR China*
- 12:00 - 12:15 Experimental study of gas breakthrough and emission in an unsaturated clay landfill cover  
*Zhongkui Chen, Hong Kong University of Science and Technology, SAR China*
- 12:15 - 12:30 Testing surfactants as additives for clay improvement: compaction and suction effects  
*Sergio Lourenco, The University of Hong Kong, SAR China*

*Lunch (Restaurant)**12h30 – 14h00*

- 14:00 - 14:20 **Invited Lecture – Amphi Bienvenüe**  
SEALEX in-situ experiments-performance tests of repository seals: experimental observations and modelling  
*Nadia Mokni, Institut for Radiation Protection and Nuclear Safety, Fontenay, France*
- 14:00 - 14:20 **Invited Lecture – Amphi Cauchy**  
Indirect determination of soil water content  
*Philippe Cosenza, Université de Poitiers, France*
- 14:00 - 14:20 **Invited Lecture – Amphi Navier**  
Infiltration-induced Slope Instability: a multi-scale approach  
*Francesca Casini, Università di Roma Tor Vergata, Italy*



## Parallel session

14h20 – 17h50 – Amphi Bienvenue

## Mechanical properties

Chair Adrian Russell (Australia)

- 14:20 - 14:35 Hydro-mechanical paths within unsaturated compacted soil framed through water retention surfaces  
*Simon Salager, Université Joseph Fourier, Grenoble, France*
- 14:35 - 14:50 Influence of saturation degree and role of suction on unsaturated soils behavior : Application to liquefaction  
*Mathilde Vernay, Université Blaise Pascal, Clermont-Ferrand, France*
- 14:50 - 15:05 Hydromechanical behavior of a quasi-saturated compacted soils on drying-wetting paths - experimental and numerical approaches  
*Soanarivo Rinah Andrianatrehina, Université du Havre, France*
- 15:05 - 15:20 Effect of very high compaction pressures on the physical and mechanical properties of earthen materials  
*Agostino W. Bruno, Université de Pau et des Pays de l'Adour, Anglet, France*
- 15:20 - 15:35 Study of the microstructure of a collapsible soil flooded with NaCl saline  
*Bahloul Ouassila, Université de Batna, Algeria*
- 15:35 - 15:50 Unconfined strength of an unsaturated residual soil struck by replicated lightning  
*Thiago Carnavale, Pontifical Catholic University of Rio de Janeiro, Brazil*

## Coffee break (Hall)

15h50 – 16h20

## Mechanical properties

Chair Claudio Mancuso (Italia)

- 16:20 - 16:35 Experimental study of the hydro-mechanical behavior of unsaturated argillaceous rock  
*Jairo Martín Espitia López, Universidad de los Andes, Bogota, Colombia*
- 16:35 - 16:50 Rheology of wet granular materials in slow shear : experiments and discrete numerical simulations  
*Michel Badetti, Université Paris-Est, Laboratoire Navier, Marne la Vallée, France*
- 16:50 - 17:05 Settlements in unsaturated granular soil induced by changes in saturation and suction  
*Marius Milatz, Hamburg University of Technology, Germany*
- 17:05 - 17:20 Relating shear strength of unsaturated soils with capillary water retention curve  
*Daichao Sheng, The University of Newcastle, Australia*
- 17:20 - 17:35 Evaluation of swell behavior of expansive clays from specific moisture capacity  
*Laureano Hoyos, The University of Texas at Arlington, USA*
- 17:35 - 17:50 Stabilization of an expansive soil from Sergipe - Brazil  
*Erinaldo Cavalcante, Universidade Federal de Sergipe, Brazil*

Gala dinner at “Le Train Bleu”, Gare de Lyon (upon registration)

20h00



## Advances in exp. methods: Hydraulic properties

Chair: Tacio De Campos (Brasil)

- 14:20 - 14:35 Building the UPPA high capacity tensiometer  
*Joao Mendes, Université de Pau et des Pays de l'Adour, Anglet, France*
- 14:35 - 14:50 Correspondence between the electrical resistivity and total suction in compacted kaolin considering the presence of salt  
*Rafaela Cardoso, Instituto Superior Técnico, University of Lisbon, Portugal*
- 14:50 - 15:05 Soil water retention behaviour for an instrumented embankment  
*David Toll, Durham University, UK*
- 15:05 - 15:20 Validation of a new sensor to measure the concentration of polyethylene glycol for unsaturated soil testing  
*Shengyang Yuan, The University of Newcastle, Australia*
- 15:20 - 15:35 Time response of two types of porous blocks for suction measurement  
*Michael Bardanis, EDAFOS Engineering Consultants S.A., Greece*
- 15:35 - 15:50 Effects of testing techniques on the SWRC of a partially saturated soil  
*Michael Gunn, London South Bank University, UK*

## Coffee break (Hall)

15h50 – 16h20

## Advances in exp. methods: Hydraulic properties

Chair Farimah Masrouri (France)

- 16:20 - 16:35 Investigating soil water retention characteristics at high suctions using relative humidity control  
*Vasileios Mantikos, Imperial College London, UK*
- 16:35 - 16:50 Application of fitting parameters in best fit equation  
*Qian Zhai, Nanyang Technological University, Singapore*
- 16:50 - 17:05 Estimation of hydraulic conductivity function in unsaturated pyroclastic soils  
*Marianna Pirone, Università di Napoli Federico II, Italy*
- 17:05 - 17:20 Response of different osmotic membranes and calibration of a coupled model capturing the temperature effect for the osmotic method  
*Shengyang Yuan, The University of Newcastle, Australia*
- 17:20 - 17:35 Erodibility of soil above the groundwater level: some test results  
*Anna Shidlovskaya, National Mineral Resources University, St Petersburg, Russia*
- 17:35 - 17:50 Measurement of soil suction using moist filter paper  
*Richard Kizza, Nanyang Technological University, Singapore*
- 17:50 - 18:05 Study of the variation of  $B$  with  $S_r$   
*Mathilde Morvan, Université Blaise Pascal, Clermont-Ferrand, France*

## Gala dinner at "Le Train Bleu", Gare de Lyon (upon registration)

20h00



## Parallel session

14h20 – 17h50 – Amphi Navier

TUESDAY 13 SEPTEMBER 2016

- 14:20 - 14:35 Rainfall-induced landslides in quaternary soils in Norway  
*Håkon Heyerdahl, Norwegian Geotechnical Institute, Oslo, Norway*
- 14:35 - 14:50 Effects of soil-vegetation-atmosphere interaction on the stability of a clay slope: a case study  
*Giuseppe Pedone, Geotechnical Consulting Group, London, UK*
- 14:50 - 15:05 Numerical simulation of rainfall tests on small-scale slope model  
*Fakher Hamrouni, Ecole Nationale d'Ingénieurs de Tunis, Tunisia*
- 15:05 - 15:20 Effects of rainfall characteristics on the stability of tropical residual soil slope  
*Harianto Rahardjo, Nanyang Technological University, Singapore*
- 15:20 - 15:35 Field instrumentation for performance assessment of geobarrier System  
*Harianto Rahardjo, Nanyang Technological University, Singapore*
- 15:35 - 15:50 Field instrumentation for performance assessment of geobarrier System  
*Harianto Rahardjo, Nanyang Technological University, Singapore*

## Coffee break (Hall)

15h50 – 16h20

## Slope Stability

## Chair Harianto Rahardjo (Singapore)

- 16:20 - 16:35 Degree of saturation effect on the grout-soil interface shear strength of soil nailing  
*Qiong Wang, The University of Newcastle, Australia*
- 16:35 - 16:50 Governing failure mode of unsaturated soil slopes under rainwater infiltration  
*Wengui Huang, Nanyang Technological University, Singapore*
- 16:50 - 17:05 Analysis of rainfall triggered landslides at Rest and be Thankful in Scotland  
*Brunella Balzano, University of Strathclyde, UK*
- 17:05 - 17:20 Numerical analysis of the stability of inhomogeneous slopes considering partially saturated conditions  
*Patrick Pichler, Graz University of Technology, Austria*
- 17:20 - 17:35 Characteristics of failure mass and safety factor during rainfall of an unsaturated slope  
*- Domenico Gallipoli, Université de Pau et des Pays de l'Adour, Anglet, France*
- 17:35 - 17:50 Rainfall Seasonality Influence on Landslide Probability: A Modelling Approach  
*Estefanía Muñoz, Universidad Nacional de Colombia, Medellin*

## Gala dinner at "Le Train Bleu", Gare de Lyon (upon registration)

20h00



- 09:00 - 09:20 **Invited Lecture – Amphi Bienvenüe**  
Challenges in monitoring and managing engineered slopes in a changing climate  
*Paul N. Hughes, Durham University, UK*
- 09:00 - 09:20 **Invited Lecture – Amphi Cauchy**  
Two-phase flow effects on the CO<sub>2</sub> injection pressure evolution and implications for the caprock geomechanical stability  
*Víctor Vilarrasa, École Polytechnique Fédérale de Lausanne, Switzerland*
- 09:00 - 09:20 **Invited Lecture – Amphi Navier**  
Chemo-physical evolution and microstructure features of lime treated soils  
*Giacomo Russo, University of Cassino and Southern Lazio, Italy*



## Parallel session

09h20 – 12h15 – Amphi Bienvenue

## Water transport properties

Chair Wiebke Baille (Germany)

WEDNESDAY 14 SEPTEMBER 2016

- 09:20 - 09:35 Numerical study on the influence of entrapped air bubbles on the time-dependent pore pressure distribution in soils due to external changes in water level  
*Georg Ausweger, Graz University of Technology, Austria*
- 09:35 - 09:50 On the hydrological properties of mountain soils, from measurement to the geotechnical implications  
*Baldassare Bacchi, Università degli Studi di Brescia, Italy*
- 09:50 - 10:05 Modelling of coupled heat and moisture flows around a buried electrical cable  
*Olivier Cuisinier, Université de Lorraine, Nancy, France*
- 10:05 - 10:20 Volumetric water content measurement probes in earth-dam construction  
*Michael Bardanis, EDAFOS Engineering Consultants S.A., Greece*
- 10:20 - 10:35 Evaluation of empirical methods for estimating potential evaporation values in northeast France  
*Yu Jun Cui, Ecole des ponts ParisTech*

## Coffee break (Hall)

10h35 – 11h00

## Water transport properties

Chair Domenico Gallipoli (France)

- 11:00 - 11:15 Formulation of phase-field model for multiphase flow in deformable porous media  
*Giulio Sciarra, Università di Roma La Sapienza, Italy*
- 11:15 - 11:30 Estimation of the empirical model parameters of unsaturated soils.  
*Salima Bouchemella, Université de Souk Ahras, Algeria*
- 11:30 - 11:45 A new mechanism of canopy effect in unsaturated freezing soils  
*Jidong Teng, Central South University, Changsa, China*
- 11:45 - 12:00 Modeling of imbibition process in an embankment scale model  
*Giada Maria Rotisciani, Università di Roma La Sapienza, Italy*
- 12:00 - 12:15 Simulation of water movement and its distribution in a soil column under a water source using pore - scale network modeling  
*Saeed Samadianfard, University of Tabriz, Iran*

## Lunch (Restaurant)

12h30 – 14h00



## Parallel session

09h20 – 12h30 – Amphi Cauchy

## Constitutive modelling

Chair Simon Wheeler (UK)

WEDNESDAY 14 SEPTEMBER 2016

- 09:20 - 09:35 A finite strain elastoplastic constitutive model for unsaturated soils incorporating mechanisms of compaction and hydraulic collapse  
*Keita Nakamura, Yokohama National University, Japan*
- 09:35 - 09:50 Development of a coupled thermo-hydro-mechanical double structure model for expansive soils  
*David Mašín, Charles University in Prague, Czech Republic*
- 09:50 - 10:05 Incorporating anisotropy in the Barcelona basic model  
*Domenico Gallipoli, Université de Pau et des Pays de l'Adour, Anglet, France*
- 10:05 - 10:20 Identification of potential strain heterogeneities during wetting-induced compaction  
*Giuseppe Buscarnera, Northwestern University, Evanston, USA*
- 10:20 - 10:35 Plasto-damage modelling for semi-brittle geomaterials  
*Gatmiri Behrouz, University of Tehran, Iran*

## Coffee break (Hall)

10h35 – 11h00

## Constitutive modelling

Chair David Mašín (Czech Republic)

- 11:00 - 11:15 Prediction of wetting – induced volume change behaviour of compacted unsaturated soils in the context of the MPK framework  
*Arunodi Abeyrathne, Monash University, Melbourne, Australia*
- 11:15 - 11:30 Modelling of wetting tests for a natural pyroclastic soil  
*Sabatino Cuomo, University of Salerno, Italy*
- 11:30 - 11:45 Fully undrained cyclic loading simulation on unsaturated soils using an elastoplastic model for unsaturated soils  
*Veerayut Komolvilas, Yokohama National University, Japan*
- 11:45 - 12:00 Essential features of compacted silty sand behavior via suction-controlled triaxial testing  
*Laureano R. Hoyos, The University of Texas at Arlington, USA*
- 12:00 - 12:15 A constitutive model for unsaturated soils based on a compressibility framework dependent on suction and degree of saturation  
*Panagiotis Sitarenios, National Technical University of Athens, Greece*
- 12:15 - 12:30 An effective stress approach for hydro-mechanical coupling of unsaturated soils  
*Hiram Arroyo, Universidad Autónoma de Querétaro, Mexico*

## Lunch (Restaurant)

12h30 – 14h00





## Parallel session

09h20 – 12h30 – Amphi Navier

## Mechanical behaviour

Chair Federica Cotecchia (Italia)

- 09:20 - 09:35 Hydro-mechanical behaviour of sandy silt under generalised stress conditions  
*Enrique Romero, Universitat Politècnica de Catalunya, Barcelona, Spain*
- 09:35 - 09:50 An experimental investigation of the independent effect of suction and degree of saturation on very small-strain stiffness of unsaturated soils  
*Arianna Pagano, University of Strathclyde, UK*
- 09:50 - 10:05 Influence of effective stress on swelling pressure of expansive soils  
*Wiebke Baille, Ruhr-Universität Bochum, Germany*
- 10:05 - 10:20 The influence of wetting and drying paths on the shear strength of a silty clayey compacted soil  
*Rodrigo Weber, Universitat Politècnica de Catalunya, Barcelona, Spain*
- 10:20 - 10:35 Characterizing the behavior of small strain shear modulus for silt and sand during hydraulic hysteresis  
*Ali Khosravi, Sharif University of Technology, Iran*

## Coffee break (Hall)

10h35 – 11h00

## Mechanical behaviour

Chair Laureano Hoyos (USA)

- 11:00 - 11:15 Study on the stress path dependency of collapse behavior of Gorgan loess implementing unsaturated oedometer devices  
*S. Mohsen Haeri, Sharif University of Technology, Iran*
- 11:15 - 11:30 Application of a multi-scale form of Terzaghi's effective stress principle for unsaturated expansive clays to simulate hydro-mechanical behavior during hydration  
*Julia Mainka, Université de Lorraine, Nancy, France*
- 11:30 - 11:45 Anisotropic behaviour of compacted clayey silt subjected to hydro-mechanical paths  
*Enrique Romero, Universitat Politècnica de Catalunya, Barcelona, Spain*
- 11:45 - 12:00 Creep response in shear of clayey geo-materials under saturated and unsaturated conditions  
*Nor Shahidah Mohd Nazer, University of Strathclyde, UK*
- 12:00 - 12:15 Predicting the volumetric variation due to changes in suction, applied stress and swelling pressure  
*Roberto Galaviz-González, Universidad Autónoma de Querétaro, Mexico*

## Lunch (Restaurant)

12h30 – 14h00



## Nuclear waste disposal

Chair Maria Villar (Spain)

WEDNESDAY 14 SEPTEMBER 2016

- 14:00 - 14:15 Hydro-mechanical modelling of MX-80 bentonite: one dimensional study  
*Ayman Abed, Aalto University, Helsinki, Finland*
- 14:15 - 14:30 Investigation of creep behavior of a compacted bentonite using suction control technique  
*Tomoyoshi Nishimura, Ashikaga Institute of Technology, Japan*
- 14:30 - 14:45 Achievements of investigation on hydraulic properties of compacted GMZ bentonite using as buffer/backfill material  
*Weimin Ye, Tongji University, Shanghai, China*
- 14:45 - 15:00 Stress release and suction generation in the Callovo-Oxfordian claystone  
*Pierre Delage, Ecole des Ponts ParisTech, France*
- 15:00 - 15:15 Changes on the microstructure of compacted bentonite caused by heating and hydration  
*María Villar, Centro de Investigaciones Energéticas Medioambientales y Tecnológicas, Madrid*
- 15:15 - 15:30 Study on GMZ bentonite-sand mixture by undrained triaxial tests  
*Wenjing Sun, Shanghai University, China*

Coffee break (Hall)

15h30 – 16h00



**Parallel session****14h00 – 15h30 – Amphi Cauchy****Dams and dykes****Chair Michael Bardanis (Greece)**

WEDNESDAY 14 SEPTEMBER 2016

- 14:00 - 14:15 Investigation of the influence of animal burrowing on the failure of the levee of San Matteo along the Secchia river  
*Maria Luisa Taccari, Deltares, Delft University of Technology, The Netherlands*
- 14:15 - 14:30 On the role of partially saturated soil strength in the stability analysis of a river embankment under steady-state and transient seepage conditions  
*Guido Gottardi, University of Bologna, Italy*
- 14:30 - 14:45 Conceptual considerations on evaluation of internal erosion phenomenon via no-erosion filter test and continuing erosion filter test  
*Johnatan Ramos Rivera, National University of Colombia*
- 14:45 - 15:00 Distribution of pore water pressure in an earthen dam considering unsaturated-saturated seepage analysis  
*Kumar Venkatesh, Motilal Nehru National Institute of Technology, Allahabad, India*
- 15:00 - 15:15 Reliability analysis of flood embankments taking into account a stochastic distribution of hydraulic loading  
*Alessia Amabile, University of Strathclyde, UK*
- 15:15 - 15:30 Swelling and collapse of compacted soils to be used as earth dam cores  
*Michael Bardanis, EDAFOS Engineering Consultants S.A., Greece*

**Coffee break (Hall)****15h30 – 16h00**

**Parallel session****14h00 – 15h30 – Amphi Navier****Transportation infrastructures****Chair Rafaela Cardoso (Portugal)****WEDNESDAY 14 SEPTEMBER 2016**

- 14:00 - 14:15 Water balance of an earth fill built of organic clay  
*Emanuel Birle, TU München, Germany*
- 14:15 - 14:30 Behavior of railroads on shrink-swell soils  
*Jean-Louis Briaud, Texas A&M University, College station, USA*
- 14:30 - 14:45 Experiences from in-situ monitoring of pavement under weather conditions change  
*Barbara Likar, Zavod za gradbeništvo Slovenije, Ljubljana, Slovenia*
- 14:45 - 15:00 IPI laboratory tests - experimental and numerical approach  
*Dino Mahmutovic, EGIS Géotechnique, Seyssins, France*
- 15:00 - 15:15 Aggregate size effect on the water retention properties of a lime-treated compacted silt during curing  
*Wejiao Wang, Ecole des Ponts ParisTech, France*
- 15:15 - 15:30 Study of chemical-mineralogical properties of modified soils with polymers addition  
*Jonny Patricio, Universidade Federal de Campina Grande, Brazil*

**Coffee break (Hall)****15h30 – 16h00**

- 16:00 - 16:25 **Plenary Lecture**  
Inputs from in situ experiments to the understanding of the unsaturated behaviour of Callovo-Oxfordian claystone  
*Gilles Armand, Agence Nationale pour la Gestion des Déchets Radioactifs, Bure, France*
- 16:25 - 16:50 **Plenary Lecture**  
Cracking in desiccating soils  
*Alberto Ledesma, Universitat Politècnica de Catalunya, Barcelona, Spain*
- 16:50 - 17:35 **Keynote Lecture**  
Determination of the relationship among capillary pressure, saturation and interfacial area: a pore unit assembly approach  
*Majid Hassanizadeh, Utrecht University, The Netherlands*
- 17:35 - 18:00 **Closing Ceremony**

