E-UNSAT 2016
3rd 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
The 3rd 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

École nationale des ponts et chaussées

Comité français de mécanique des sols et de géotechnique

Laboratoire d’excellence MMCD
Multi-Scale Modelling & Experimentation of Materials for Sustainable Construction

ÉCOLE DOCTORALE
Sciences, Ingénierie et Environnement

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Practical information

Access

- **Amphis Cauchy and Navier (Ecole des ponts)**

  - **User name:** congres.eunsat@enpc.fr - **Password:** E-Unsat16
  - **Eduroam** (under « Automatic proxy detection »)

- **Amphi Bienvenüe (IFSTTAR, Building Bienvenüe)**

Wifi

- **Amphis Cauchy and Navier:**
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  - **Eduroam** (under « Automatic proxy detection »)

- **Amphi Bienvenüe:**
  - **Eduroam**
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<td>Registration</td>
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<td>Nuclear waste disposal</td>
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Plenary session 08h00 – 10h35 – Amphi Cauchy
Chair David Toll (UK)

08:00 - 08:30  Registration

08:30 - 09:00  Opening Ceremony

European Distinguished Lecture
09:00 - 9:45  Unsaturated railway track-bed materials
Yujun Cui, Ecole des Ponts ParisTech, France

Plenary Lecture
9:45 - 10:10  Effective stress and energetics of unsaturated soils
Nasser Khalili, University of New South Wales, Sydney, Australia

Plenary Lecture
9:10 - 10:35  Transient boundary conditions in the frame of THM-processes at nuclear waste repositories
Tom Schanz, Ruhr-Universität Bochum, Germany

Coffee break (Hall) 10h35 – 11h00
Parallel session

11h00 – 12h30 – Amphi Bienvenüe

Foundations – Retaining walls
Chair Wojtek Solowski (Finland)

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 Nikoee, Shiraz University, Iran

Lunch (Restaurant) 12h30 – 14h00
Parallel session 
11h00 – 12h30 – Amphi Cauchy

Microstructure 
Chair Simon Salager (France)

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
### Parallel session
### 11h00 – 12h30 – Amphi Navier

**Thermal and chemical effects**

**Chair John McCartney (USA)**

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

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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

14:00 - 14:20
Numerical modelling

Chair: Robert Charlier (Belgium)

14:20 - 14:35
Probabilistic assessment of Precipitation-Triggered Landslides: The Role of Vegetation
Estefanía Muñoz, Universidade de Brasilia, 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)
Abdeldjalil Zadjaoui, 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

**Advances in exp. Methods: Mechanical properties**

Chair: Enrique Romero (Spain)

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

**Advances in exp. methods Mechanical properties**

Chair: Olivier Cuisinier (France)

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<td>The cone penetration test in unsaturated silty sands</td>
<td>Hongwei Yang, The University of Hong Kong, SAR China</td>
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<td>16:35 - 16:50</td>
<td>Reconciling soil-water retention properties and shear strength parameters of compacted clayey soils via suction-controlled ring shear testing</td>
<td>Laureano R. Hoyos, University of Texas at Arlington, USA</td>
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<td>16:50 - 17:05</td>
<td>Stress path during pressuremeter test and link between shear modulus and Ménard pressuremeter modulus in unsaturated fine soils</td>
<td>Vincent Savatier, EGIS Géotechnique, Seyssins, France</td>
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<td>17:05 - 17:20</td>
<td>The influence of saturation on the cracking process in compacted desiccating clays</td>
<td>Maria Noack, Bauhaus-Universität Weimar, Germany</td>
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<td>17:20 - 17:35</td>
<td>Characterization of compacted silty sand via relative humidity-controlled triaxial testing</td>
<td>Laureano R. Hoyos, University of Texas at Arlington, USA</td>
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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
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
Parallel session 11h00 – 12h30 – Amphi Bienvenue

Numerical modelling  Chair Antonio Gens (Spain)

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
### Soil-vegetation-atmosphere interactions

**Chair Bernardo Caicedo (Colombia)**

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| 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)**

*12:30 – 14:00*
Parallel session

11:00 – 12h30 – Amphi Navier

Environmental Geotechnics (with TC215)
Chair Malek Bouazza (Australia)

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 Lourencó, The University of Hong Kong, SAR China

Lunch (Restaurant)

12h30 – 14h00
Invited Lecture – Amphi Bienvenüe
14:00 - 14:20
SEALEX in-situ experiments-performance tests of repository seals: experimental observations and modelling
Nadia Mokni, Institut for Radiation Protection and Nuclear Safety, Fontenay, France

Invited Lecture – Amphi Cauchy
14:00 - 14:20
Indirect determination of soil water content
Philippe Cosenza, Université de Poitiers, France

Invited Lecture – Amphi Navier
14:00 - 14:20
Infiltration-induced Slope Instability: a multi-scale approach
Francesca Casini, Università di Roma Tor Vergata, Italy
Parallel session 14h20 – 17h50 – Amphi Bienvenüe

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  
João 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 suction 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 Sr  
Mathilde Morvan, Université Blaise Pascal, Clermont-Ferrand, France

Gala dinner at “Le Train Bleu”, Gare de Lyon (upon registration)  20h00
Rainfall-induced landslides in quaternary soils in Norway
Håkon Heyerdahl, Norwegian Geotechnical Institute, Oslo, Norway

Effects of soil-vegetation-atmosphere interaction on the stability of a clay slope: a case study
Giuseppe Pedone, Geotechnical Consulting Group, London, UK

Numerical simulation of rainfall tests on small-scale slope model
Fakher Hamrouni, Ecole Nationale d’Ingénieurs de Tunis, Tunisia

Effects of rainfall characteristics on the stability of tropical residual soil slope
Harianto Rahardjo, Nanyang Technological University, Singapore

Field instrumentation for performance assessment of geobarrier System
Harianto Rahardjo, Nanyang Technological University, Singapore

Degree of saturation effect on the grout-soil interface shear strength of soil nailing
Qiong Wang, The University of Newcastle, Australia

Governing failure mode of unsaturated soil slopes under rainwater infiltration
Wengui Huang, Nanyang Technological University, Singapore

Analysis of rainfall triggered landslides at Rest and be Thankful in Scotland
Brunella Balzano, University of Strathclyde, UK

Numerical analysis of the stability of inhomogeneous slopes considering partially saturated conditions
Patrick Pichler, Graz University of Technology, Austria

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

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)
Invited Lecture – Amphi Bienvenüe
09:00 - 09:20
Challenges in monitoring and managing engineered slopes in a changing climate
Paul N. Hughes, Durham University, UK

Invited Lecture – Amphi Cauchy
09:00 - 09:20
Two-phase flow effects on the CO2 injection pressure evolution and implications for the caprock geomechanical stability
Víctor Vilarrasa, École Polytechnique Fédérale de Lausanne, Switzerland

Invited Lecture – Amphi Navier
09:00 - 09:20
Chemo-physical evolution and microstructure features of lime treated soils
Giacomo Russo, University of Cassino and Southern Lazio, Italy
Water transport properties

Chair Wiebke Baille (Germany)

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
**Constitutive modelling**

**Chair Simon Wheeler (UK)**

**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)**

**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)**

**12:30 - 14:00**
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
Parallel session 14h00 – 15h30 – Amphi Bienvenüe

Nuclear waste disposal  Chair María Villar (Spain)

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)

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>14:00 - 14:15</td>
<td>Investigation of the influence of animal burrowing on the failure of the levee of San Matteo along the Secchia river</td>
<td>Maria Luisa Taccari, Deltares, Delft University of Technology, The Netherlands</td>
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<td>14:15 - 14:30</td>
<td>On the role of partially saturated soil strength in the stability analysis of a river embankment under steady-state and transient seepage conditions</td>
<td>Guido Gottardi, University of Bologna, Italy</td>
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<td>14:30 - 14:45</td>
<td>Conceptual considerations on evaluation of internal erosion phenomenon via no-erosion filter test and continuing erosion filter test</td>
<td>Johnatan Ramos Rivera, National University of Colombia</td>
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<td>14:45 - 15:00</td>
<td>Distribution of pore water pressure in an earthen dam considering unsaturated-saturated seepage analysis</td>
<td>Kumar Venkatesh, Motilal Nehru National Institute of Technology, Allahabad, India</td>
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<td>15:00 - 15:15</td>
<td>Reliability analysis of flood embankments taking into account a stochastic distribution of hydraulic loading</td>
<td>Alessia Amabile, University of Strathclyde, UK</td>
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<td>15:15 - 15:30</td>
<td>Swelling and collapse of compacted soils to be used as earth dam cores</td>
<td>Michael Bardanis, EDAFOS Engineering Consultants S.A., Greece</td>
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**Coffee break (Hall)**  
15h30 – 16h00
Parallel session 14h00 – 15h30 – Amphi Navier

Transportation infrastructures

Chair Rafaela Cardoso (Portugal)

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
WeiJiao 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
Plenary Lecture
16:00 - 16:25 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

Plenary Lecture
16:25 - 16:50 Cracking in desiccating soils
Alberto Ledesma, Universitat Politècnica de Catalunya, Barcelona, Spain

Keynote Lecture
16:50 - 17:35 Determination of the relationship among capillary pressure, saturation and interfacial area: a pore unit assembly approach
Majid Hassanizadeh, Utrecht University, The Netherlands

Closing Ceremony
17:35 - 18:00