

# Preliminary Workshop Programme

ISSMGE  
TC-101

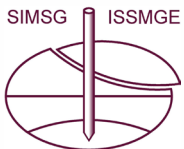
# Advances in **Multiphysical Testing** of Soils and Shales

3 - 5 September 2012

EPFL, Lausanne, Switzerland

[amtss.epfl.ch](http://amtss.epfl.ch)

SIMSG ISSMGE



Organized by Prof. Lyesse Laloui &  
Dr. Alessio Ferrari

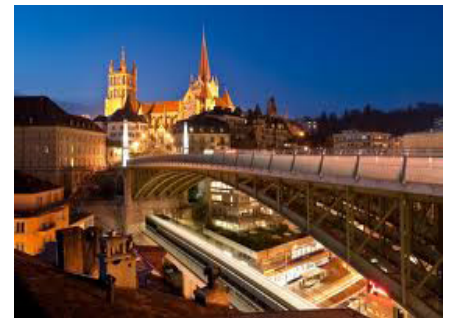
# About the Workshop

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The workshop will focus on the significant advances of knowledge regarding the experimental analysis of soils and shales that have been achieved during the last decade. Some fundamental issues have been solved, and important achievements have been made in certain areas, including the development of multiphase testing facilities for non-isothermal conditions and the characterization of the microstructural arrangement for complex geomaterials.

This outstanding progress in the field has had relevant consequences in the theoretical developments of geomechanical theories, such as the constitutive modelling of multiphysical and multiscale processes, as well as important engineering applications. The workshop is aimed at stimulating the debate on the advances in experimental geomechanics; contributions on unsaturated soil testing, non-isothermal experiments and chemo-osmotic experimental evidences are welcomed. The workshop proceedings will be published in the Springer Series in Geomechanics and Geoengineering.

The workshop will be held between 3 and 5 September 2012 at the conference facilities of the EPFL in Lausanne (Switzerland). The workshop is organized by the Laboratory for Soil Mechanics (LMS) at the EPFL.



## Sponsors

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## Contact

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Barbara Tinguely  
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# About the Venue

The inspiring and dynamic learning EPFL  
ambiance comes fully to its right at the campuses of both the Swiss Federal Institute of Technology of Lausanne (EPFL) and the University of Lausanne (located just east of EPFL). With green all around - except for the southern side, which looks out over the lake - and all necessary academic and personal facilities within hand reach, the campus of EPFL offers a perfect environment. It is not without reason that more than ten thousand students and academics find their ways here.



## Accommodation:

Special hotel prices have been negotiated with some hotels. If you wish to book your stay in one of those hotels, please announce yourself as a participant to the "AMTSS Workshop at EPFL" in order to profit of the special prices. Some of the hotels have limited availability: please take care to make your reservation as soon as possible. Most of the hotels in the Lausanne's area offer a free travel card for public transport during your stay. The list of hotels can be found on the workshop website: <http://amtss.epfl.ch/venue.html>.





## Transport:

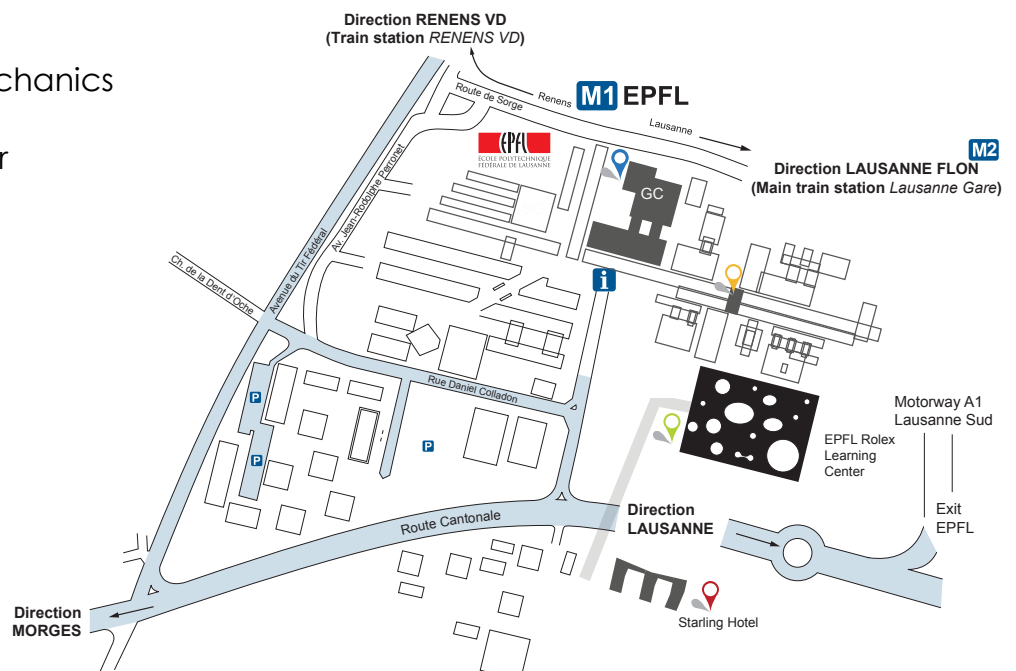
### Coming by plane and by train

Genève-Cointrin is the nearest airport (40-60 minutes). The train from Zürich Airport takes approximately 2h 30 to go to Lausanne. From these airports, you can take a train to *Lausanne Gare*, then the metro (*Lausanne Gare* - Metro M2> *Lausanne Flon* > Metro M1 - *EPFL*). Or you can take a train to *Renens VD*, then the metro (*Renens VD* - Metro M1> *EPFL*).

### Coming by car

The coordinates N46.52184, E6.56488 will take you directly to a parking lot at the campus.

-  Laboratory of Soil Mechanics
-  Rolex Learning Center
-  Salle Polyvalente
-  Starling Hotel



# Workshop Programme

## Sunday, Sep.2

18:00 - 18:30

Registration

18:30 - 19:30

Welcome cocktail

## Monday, Sep.3

08:30 - 09:30

Registration

Welcome opening

09:00 - 10:40

Theme lecture

**L. R. Hoyos:** Advances in experimental modelling of unsaturated soil behaviour over a whole range of paths and modes of deformation

10:50 - 12:30

Thematic session

Testing in variably saturated conditions

Chairman:  
A. Tarantino

Thematic session

Treated and weathered geomaterials

12:30 - 13:30

Lunch

13:30 - 15:20

Theme lecture

**F. Marinho:** Undrained shear of plastic soils under suction

Chairman: T. Schanz

Thematic session

Testing in non-isothermal conditions

15:35 - 18:00

Theme lecture

**E.C. Leong:** Triaxial testing of unsaturated soils

Chairman: X. Cheng

Thematic session

Testing in non-isothermal conditions

19:00 - 21:00

Workshop dinner

## Tuesday, Sep.4

09:00 - 10:50

Theme lecture

**A. Ferrari:** Thermo-hydro-mechanical testing of shales

10:50 - 12:30

Thematic session

Experimental analyses of shales behaviour

Chairman:  
R. Ewy

Thematic session

Compressibility, strength and time dependent investigations

12:30 - 13:30

Lunch

13:30 - 15:20

Theme lecture

**E. Romero:** Air tests on low-permeability claystone formations. Experimental results and simulations

Chairman: P. Marschall

Thematic session

Micro-scale investigations and image-analysis techniques

15:35 - 18:00

Theme lecture

**J. Kodikara:** Desiccation cracking in clayey soils: mechanisms and modelling

Chairman: F. Masroui

Thematic session

Micro-scale investigations and image-analysis techniques

18:00 - 18:30

Workshop closure

## Wednesday, Sep.5

09:00 - 12:30

Short course

Advanced Experimental Geomechanics

Visit of the EPFL Soil Mechanics Laboratory

# List of Contributions

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## 1. Theme lectures

Advances in experimental modelling of unsaturated soil behaviour over a whole range of paths and modes of deformation

**Laureano R. Hoyos**

Undrained shear of plastic soils under suction

**Fernando A. M. Marinho**

Desiccation cracking in clayey soils: mechanisms and modelling

**Jayantha Kodikara, Susanga Costa**

Triaxial testing of unsaturated soils

**E.C. Leong, T.T. Nyunt, H. Rahardjo**

Thermo-hydro-mechanical testing of shales

**Alessio Ferrari, Lyesse Laloui**

Air tests on low-permeability claystone formations. Experimental results and simulations

**Enrique Romero, Rainer Senger, Paul Marschall, Rodrigo Gómez**

## 2. Testing in variably saturated conditions

Influence of hydraulic hysteresis on the resilient behavior of a natural compacted sand

**Xuan Nam Ho, Hossein Nowamooz, Cyrille Chazallon, Bernard Migault**

Monotonic simple shear response of fine grained silts under different saturation condition

**F. Daliri, D. H. Basu**

Effect of loading and suction history on time dependent deformation of crushed granular aggregates

**Enrique Romero, Clara Alvarado, Eduardo E. Alonso**

Ultrasonic testing of unsaturated soils

**Z.Y. Cheng, E.C. Leong**

Factors influencing water retention characteristics of granular materials

**Gilbert J. Kasangaki, Gabriela M. Medero, Jin Y. Ooi**

Evaluation of collapse potential investigated from different collapsible soils

**Qasim A.J. Al-Obaidi, Saad F.Ibrahim, Tom Schanz**

## 3. Testing in non-isothermal conditions

Thermo-hydro mechanical column experiment to study expansive soil behaviour

**Tom Schanz, Long Nguyen-Tuan, Maria Datcheva**

Shear strength of clay during thaw

**Anders Beijer Lundberg**

Tests in thermo-hydraulic cells to simulate the behaviour of engineered barriers

**M.V. Villar, R. Gómez-Espina, P.L. Martín, J.M. Barcala**

Influence of freeze-thaw action on hydro-mechanical behavior of unsaturated crushable volcanic soils

**Tatsuya Ishikawa, Tetsuya Tokoro**

Plane-symmetrical simulation of flow and heat transport in fractured geological media: a discrete fracture model with Comsol

**Biguang Chen, Erxiang Song, Xiaohui Cheng**

Formulation of Tsinghua-Thermosoil Model: a fully coupled THM model based on non-equilibrium thermodynamic approach

**Zhichao Zhang, Xiaohui Cheng**

An innovative double triaxial cell for thermo-hydro-mechanical investigation in unsaturated geomechanics

**A. Seiphoori, A. Ferrari, L. Laloui**

Thermo-hydraulic behaviour of Boom clay using a heating cell: an experimental study

**Lima A., Romero E., Gens A., Li X.L & Vaunat J.**

## 4. Micro-scale investigations and image analysis techniques

Pore size distribution and soil water suction curve from micro-tomography measurements and real 3-D digital microstructure of a compacted granular media by using direct numerical simulation technique

**Felix H. Kim, Dayakar Penumadu, Volker P. Schulz and Andreas Wiegmann**

Porosity and pore-size distribution of geomaterials from X-ray CT scans

**H.S. Shin, K.Y. Kim & G.N. Pande**

Volumetric strain mechanisms and induced anisotropy analyses in clayey materials

**Mahdia Hattab, Jean-Marie Fleureau**

Application of x-ray tomography to the characterisation of grain-scale mechanisms in sand

**G. Kaddhour, E. Ando, S. Salager, P. Bésuelle, C. Viggiani, S. Hall, J. Desrues**

Observation of shear banding characteristics on sand in torsional shear test using image analysis technique

**Seto Wahyudi, Yukika Miyashita, Junichi Koseki**

Experimental and quantitative study on micro-structure of soft soil in Suzhou

**Xiaozhao Li, Liang Cao, Zhiyong Xiong, Rong Yang, Juan Ma**

Development of a new experimental device in order to improve swelling-shrinkage analysis of clayey soils

**Tatiana Maison**

Localisation processes and size effects for fissured clay specimens

**Claudia Vitone, Federica Cotecchia, Cino Viggiani**

Experimental study of the deformation pattern around a penetrating coned tip

**P. Paniagua, A.S. Gylland, S. Nordal**

Micro-scale testing of capillary bridge evolution due to evaporation

**Boleslaw Mielniczuk, Tomasz Hueckel, Moulay Said El Youssofi**

Anisotropy of mica probed by nanoindentation

**Rohit Pant, Liming Hu, Guoping Zhang**

## 5. Compressibility, strength and time-dependent investigations

Meso-scale oedometer test system for volume change determination in problematic soils

**Shahid Azam, Peter Gutw, Mavinakere E. Raghunandan**

Long term compression behaviour of soft organic sediments

**Marta Boso, Jürgen Grabe**

On creep laboratory tests in soil mechanics

**Arman Khoshghalb**

One dimensional consolidation under time dependent loading

**D. Manca, A. Ferrari, L. Laloui**

Variation of cohesive sediment strength with stress level

**Brendan Casey, John T. Germaine**

Consolidation of soft clays through radial flow using hydraulically pressurized oedometer

**M.V. Shah, A.V. Shroff**

## 6. Experimental analyses of shales behaviour

Nanochemomechanics of shale: coupled WDS-indentation analysis

**Amer Deirieh, J. Alberto Ortega, and Franz-Josef Ulm**

Shale swelling/shrinkage, suction and osmosis

**Russell T. Ewy**

Polish experience with testing of selected shales as material for road base courses

**Leszek Rafalski, Jadwiga Wilczek**

Experimental methods for characterization of cap rock properties for CO<sub>2</sub> storage

**E. Aker, E. Skurtveit, L. Grande, F. Cuisiat, Ø. Johnsen, M. Soldal, B.Bohloli**

## 7. Treated and weathered geomaterials

Using shear wave velocity to determine the cementation effect of soft Bangkok clay mixed with cement and fly ash

**K. Piriyaikul, S. Pochalard**

Settlement Calculation and Back-Analysis of Soil Properties for a test embankment on a soft clay ground improved by PVD and vacuum-assisted preloading at a site in Vung Tau, Viet Nam

**Nguyen Duy Quang, Su Minh Dang**

Evaluation of geotechnical properties and liquefaction behavior of cohesive subgrade soil stabilized with fly ash, gypsum and lime

**Saad F. Ibrahim Al. Abdullah**

Experimental methodology for chemo-mechanical weathering of calcarenites

**M. O. Ciantia, R. Castellanza, C. di Prisco, T. Hueckel**