# **REGISTRATION & FEES**

The workshop fee is 150 €.

Please register by e-mail: conference-qbf@rub.de.

An invoice and a list of recommended hotels near the venue will be sent to you after registration.

## CONTACT



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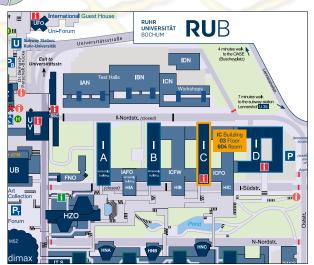
Ruhr University Bochum,

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E-Mail: conference-abf@rub.de Website: www.gbf.rub.de

## LOCATION



IC-Building, Floor 03, Room 604 Ruhr University Bochum Universitätsstraße 150, 44801 Bochum, Germany

# SFB COORDINATOR

Prof. Dr. Günther Meschke

### PROJECT LEADERS

#### Faculty of Civil and Environmental Engineering

Prof. Dr. R. Breitenbücher\* (Mechanics of Materials)

Dr.-Ing. S. Freitag (Structural Mechanics)

Prof. Dr. K. Hackl (Mechanics of Materials)

Prof. Dr. M. König\* (Computing in Engineering)

Dr.-Ing. A. Lavasan (Foundation Engineering, Soil & Rock Mechanics)

Prof. Dr. P. Mark (Concrete Structures)

Prof. Dr. G. Meschke\* (Structural Mechanics)

Prof. Dr. T. Nestorović (Mechanics of Adaptive Systems)

Prof. Dr. T. Schanz (Foundation Engineering, Soil & Rock Mechanics)

Dr.-Ing. B. Schößer (Tunneling and Construction Management)

Prof. Dr. M. Thewes\* (Tunneling and Construction Management)

Prof. Dr. H. Steeb (Continuum Mechanics - University of Stuttgart)

#### **Faculty of Mechanical Engineering**

Dr.-Ing. A. Röttger (Materials Technology) Prof. Dr. W. Theisen (Materials Technology)

#### **Faculty of Geosciences**

Prof. Dr. M. Alber (Engineering Geology & Rock Engineering)

Prof. Dr. W. Friederich (Geophysics)

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#### **RUHR UNIVERSITY BOCHUM**

#### SFB 837 - Interaction Modeling in Mechanized Tunneling

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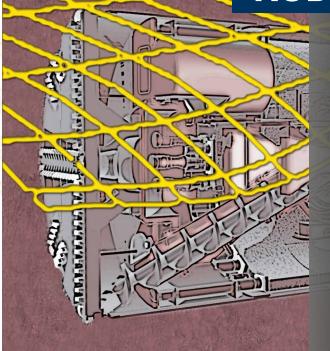
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**RUHR UNIVERSITY BOCHUM** 

COLLABORATIVE RESEARCH CENTER 837 - WORKSHOP -

### **EFFECTIVE STRESS IN MULTIPHASE POROUS MEDIA**



**MECHANIZED TUNNELING** 





Mechanized tunneling is an established flexible and efficient technology for the construction of underground infrastructure, characterized by a dynamic advancement of tunnel boring technologies, increasing diameters and a broadening range of applicability. This rapid development in association with the inherent heterogeneity of the ground poses new challenges to prognosis models.

Considering this background, the subject of the Collaborative Research Center SFB 837 "Interaction models for mechanized tunneling" is the research and development of models, methods and design concepts, which, when adequately interlinked, can deal with the manifold complex interactions of the components and processes involved in mechanized tunneling.

Research within the four project areas of the SFB includes the ground exploration and modeling of the ground, the tunnel boring machine, the lining and annular gap grouting, and the interactions between tunneling and existing structures. Furthermore, the cutting, advancement and logistics processes will be represented using adequate models integrated by means of a consistent SFB-wide information management system.

## EFFECTIVE STRESS IN MULTIPHASE POROUS MEDIA

To date there is an ongoing discussion about how to describe the effect of soil water interaction (in terms of suction) when dealing with the mechanical behavior of partially saturated soils.

One approach is to describe the macroscopic effect of suction in terms of effective stress. This has the fundamental advantage that classical soil mechanic principles can be applied to partially saturated soils.

A growing number of lab tests indicate that the effective stress concept is sufficient to describe macroscopic effects of soil water interaction when dealing with limit state, e.g. shear strength, related problems.

# EFFECTIVE STRESS IN MULTIPHASE POROUS MEDIA

However, a systematic experimental validation, taking into account the full mechanical stress and suction range as well as different failure modes is still missing and different aspects of this approach are under discussion.

On this workshop the state of the art concerning this research field will be discussed. Different invited speakers will present their experimental data, analyze existing and new data sets and present theoretical background and investigations on the level of microstructure.

The workshop is organized by the Chair of Foundation Engineering, Soil and Rock Mechanics.

#### WORKSHOP PROGRAM - SEPTEMBER 15<sup>TH</sup>, 2016

IC-Building, Floor 03, Room 604 - 14:00 - 18:00

14:00 Opening

Tom Schanz

(Ruhr University Bochum)

14:30 Microstructure of compacted soils and its

Eduardo Alonso

(Universitat Politècnica de Catalunya)

15:15 Microstructural evolution of normal and high activity compacted clays

Alessio Ferrari

(École Polytechnique Fédérale de Lausanne)

16:00 Coffee break

16:30 A unified normal compression line for saturated and unsaturated soils

Domenico Gallipoli

(Université de Pau et des Pays de l'Adour)

17:15 A dynamic model for unsaturated soil including hydraulic hysteresis

Nasser Khalili

(UNSW Australia)

#### WORKSHOP PROGRAM - SEPTEMBER 16<sup>TH</sup>, 2016

IC-Building, Floor 03, Room 604 - 08:30 - 14:00

08:30 Experimental validation of effective stress concept in fine grained soils – proposed procedure and first test results

Diethard König<sup>1</sup>, Gunnar Heibrock<sup>2</sup>

(Ruhr University Bochum<sup>1</sup>, Hochschule Kaiserslautern<sup>2</sup>)

09:15 Bishop's parameter: A two-way hydro-mechanical coupling coefficient controlled by soil fabric

Jean Vaunat

(Universitat Politècnica de Catalunya)

10:00 Coffee break

10:30 Effective stresses for unsaturated states stemming from an experimental investigation into the micro-mechanics of unsaturated clays

Matteo Pedrotti, Alessandro Tarantino

(University of Strathclyde Glasgow)

11:15 Effective stress in clays of various mineralogy

Wiebke Baille<sup>1</sup>, Snehasis Tripathy<sup>2</sup>

(Ruhr University Bochum<sup>1</sup>, Cardiff University<sup>2</sup>)

12:00 A Meshfree Method for Fully Coupled Analysis of Flow and Deformation in Unsaturated Porous Media

Arman Khoshghalb

(UNSW Australia)

12:45 Lunch

