

# **EINLADUNG**

zum Gastvortrag

von

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**Seminarraum 212-232**, (Karlsplatz 13, Stiege 2, 3. Stock)

## **TCHM MODELLING OF CONCRETE AND INDUSTRIAL APPLICATIONS**

### **ABSTRACT**

A general framework for the analysis of cementitious materials as multiphase porous media is presented and applied for solving some relevant engineering problems. The mathematical model is formulated by using two scales starting from micro level, i.e. from a local form of the governing equations. The final form of the mathematical model is obtained by applying averaging operators to the equations at micro-level, while the constitutive laws are defined directly at the upper scale, according to the so called Hybrid Mixture Theory. This approach allows for taking into account both bulk phases and interfaces of the multiphase system, assures that the second law of thermodynamics is satisfied (no unwanted dissipations) and that the definition of the relevant quantities involved is thermodynamically correct. The chosen procedure does not exclude the possible use of a multiscale approach in the formulation of the material properties. The numerical solution is obtained directly at macro-level by discretizing the governing equations in their final form by means of the Finite Element method. The general model is adapted to the following cases of interest: concrete aging and repair of concrete structures, tunnel vaults under fire and concrete leaching