

Abstracts:

Upscaling of a phase field formulation for reactive transport

Dr. Carina Bringedal (University of Stuttgart)

In this talk, I will present a phase field formulation for single-phase flow with solute transport, where ions take part in a mineral precipitation-dissolution reaction. Such a system can be formulated through conservation equations for mass, momentum, and solute in time-evolving domains with a sharp interface separating the domains, but I here consider a phase field formulation where the interface has a non-zero width. We go through how the sharp-interface formulation is recovered when the width of the diffuse interface approaches zero. By considering a porous domain with periodic perforations, the phase field formulation can be upscaled to Darcy scale, where the permeability and effective diffusivity are formulated through cell problems incorporating the phase field variable.

Free interfaces in porous media

PD Dr. Bogdan Matioc (University of Regensburg)

I will present two abstract settings which are suitable for solving quasilinear respectively fully nonlinear parabolic equations and which enable one to establish optimal well-posedness and regularity results. For quasilinear parabolic equations a new version of the principle of linearized stability is also discussed. This quasilinear principle of linearized stability holds in general interpolation spaces and is established outside the setting of maximal regularity. Applications of these theories to fluid flows in porous media are included.