Ellen Luckins (University of Oxford)

Averaged interface conditions: evaporation fronts in porous media

Homogenisation methods are powerful tools for deriving effective PDE models for processes incorporating multiple length-scales. For physical systems in which interface processes are crucial to the overall system, we might ask how the microstructure impacts the effective interface conditions, in addition to the PDEs in the bulk. In this talk we derive an effective model for the motion of an evaporation front through porous media, combining homogenisation and boundary layer analysis to derive averaged interface conditions at the evaporation front. Our analysis results in a new effective parameter in the boundary conditions, which encodes how the shape and speed of the porescale evaporating interfaces impact the overall drying process.