

INTERNATIONAL WORKSHOP ON MIXING AND TRANSPORT IN MEDIA WITH MORPHOLOGY MODIFICATIONS

FRIDAY MAY 8TH, 2026

TU THE FUTURE WORKSHOP ZONE, BUILDING BF, 9:00 – 18:30

Transport of heat and chemical species in environmental and geophysical flows is strongly influenced by the geometry and morphology of the domains in which these flows occur. From subsurface formations to aquatic systems, flow dynamics result from the interplay between driving mechanisms (e.g., buoyancy-driven convection) and dissipative processes (e.g., viscous and diffusive transport). In turn, these flows can reshape the surrounding solid boundaries, creating feedback that further affect heat and mass transfer. Examples range from rocks dissolving through chemical interactions with flowing fluids to the melting of snowpacks driven by atmospheric temperature variations. In all these cases, the evolution of the system emerges from the coupled dynamics of fluid flow and evolving solid boundaries. Predicting such behaviour remains challenging due to the multiphase nature of the processes and the wide range of spatial and temporal scales involved.

This workshop brings together international experts working in the fields of porous media, convection and multiphase flows. The event also marks the start of the ERC-funded project MORPHOS (2025–2030) based at TU Wien. The project aims to develop a predictive physical description of these processes by combining laboratory experiments, numerical simulations, and theory to uncover the fundamental mechanisms governing flow-morphology interactions.

Organizer: Marco De Paoli (Wolfgang Pauli Institute c/o TU Wien)

Co-organized by TU Wien and Wolfgang Pauli Institute. Funded by the European Union (ERC, MORPHOS, 101163625).

Venue: TU The Future Workshop Zone

The TU The Future Workshop Zone, located at Getreidemarkt 9 (Building BF, rooftop, room D03), 1060 Vienna. The venue is centrally located and well-connected to Vienna's extensive public transportation network. The U1/U2/U4 Karlsplatz station and multiple tram lines (1, 62, 71 and D) are within a short walking distance.



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9:00 – 9:30	Registration
9:30 – 9:40	Marco De Paoli , Opening
9:40 – 10:30	Session 1 - Flow in fractures
9:40 – 10:05	Insa Neuweiler , Morphology of fluid-fluid interfaces during drainage in fractured porous media
10:05 – 10:30	Alessandro Lenci , Mechanisms, Upscaling, and Prediction of Anomalous Transport in Fractured Geothermal Systems
10:30 – 10:55	Coffee break
10:55 – 11:00	Alfredo Soldati , Welcome address
11:00 – 12:50	Session 2 – CO2 sequestration
11:00 – 12:00	Keynote lecture: Lyesse Laoui , Carbon Dioxide Injection into Deep Aquifers: a Geomechanical Perspective
12:00 – 12:25	Keita Yoshioka , Numerical Modeling of Desiccation Cracking in Caprock during CO2 Geological Sequestration
12:25 – 12:50	Leon Keim , Convective Dissolution of CO2 in Karst: From Porous Media to Conduits
12:50 – 14:00	Lunch
14:00 – 15:15	Session 3 – Mixing in subsurface flows
14:00 – 14:25	Juan Hidalgo , Effect of permeability heterogeneity on reactive convective dissolution
14:25 – 14:50	Tomás Aquino , Medium structure and water saturation control spatial flow variability in porous media
14:50 – 15:15	Mamta Jotkar , How dead-end pores impact miscible viscous fingering: A pore-scale perspective
15:15 – 15:45	Coffee break
15:45 – 16:35	Session 4 - Multiphase and biological flows
15:45 – 16:10	Holger Ott , Coupled Transport and Microbial Controls on Hydrogen-Driven Bioreactive Transport: Microfluidic Experiments and Pore-Scale Simulations
16:10 – 16:35	Mahdi Saeedipour , Unresolved red blood cells: a multiscale bridge between blood flow and in-vivo oxygen transport
16:35 – 17:05	Coffee break
17:05 – 18:30	Session 5 – Surface water flows
17:05 – 17:30	Koen Blankaert , Hydro-and morphodynamics of turbidity currents induced by river inflows into lakes
17:30 – 17:55	Diego Perissutti , Morphodynamics of ice ripples and scallops under strong shear turbulence
17:55 – 18:20	Hari Muppurala , Generation of interfacial waves by shear currents in water
18:20 – 18:30	Marco De Paoli , Closing remarks
19:30 -	Dinner (15 minutes walk)