

HIGHLIGHTS FROM INTERPORE JOURNAL, ISSUE 3 (2026)

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How to Cite:

Shokri, N. (2026). Highlights from InterPore Journal, Issue 3 (2026). *InterPore Journal*, 3(3), IPJ020926-1. <https://doi.org/10.69631/71b53y13>

PUBLISHED: 2 September
2026



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One of the most rewarding aspects of working in porous media research is seeing how continuously the field reinvents itself. Advances in experimental techniques, computational approaches, and theoretical understanding continue to reveal processes and connections that were previously difficult to access. The papers collected in this issue reflect this evolving perspective and demonstrate how a deeper understanding of porous systems can emerge from the interaction of different disciplines, methods, and scales.

In this new issue, Hellevang et al. (6) offer a timely invited commentary on crystal nucleation and growth in porous media and its influence on pore structure, fluid flow, and transport. The authors discuss how these processes can be modeled across scales, from molecular mechanisms to field-scale behavior, and highlight the potential of machine learning to help bridge these scales.

Del Mastro and Terzis (4) investigate flow coupling at fluid-porous interfaces using micro-particle image velocimetry in ordered and disordered porous media. By systematically upscaling pore-scale velocity measurements, they show that interfacial slip coefficients depend on pore geometry, porosity, and the averaging procedure, highlighting their scale-dependent nature and the importance of consistent REV-scale averaging.

Ben Elhadj Hamida et al. (1) explore coupled hydro-chemo-mechanical processes during saline weathering of natural stone using time-resolved X-ray microtomography. By combining 3D imaging, Digital Volume Correlation, and deep-learning-based pore segmentation, they elucidate the transport and crystallization mechanisms and show how salt crystallization and dissolution drive deformation and fracture evolution across different pore families.

Burr et al. (2) present an IMplicit Pressure Explicit Saturation (IMPES) solver with a novel adaptive timestep criterion for the simulation of immiscible two-phase flow involving compressible fluid phases. Their approach combines the Courant-Friedrichs-Lewy condition with numerically computed velocity derivatives, demonstrating improved efficiency and robustness across a range of flow regimes without the need to adjust numerical parameters.

Hasan et al. (5) investigate non-Fickian solute transport in unsaturated porous media using pore-network modelling. By examining the effects of saturation, pore-size distribution, and flow conditions, they highlight the shift from anomalous long-tailed behavior at low saturation to Fickian transport as saturation approaches unity. They also reveal important limitations of commonly used continuum-scale models in capturing saturation-dependent dispersion and time-dependent mass transfer.

Cirne et al. (3) present a novel deep-learning approach for predicting reactive mineral dissolution in porous media by incorporating both spatial and temporal information. The approach is designed to overcome limitations of existing methods in accounting for the coupled evolution of interacting fields such as concentration, porosity, and flow rates, while providing accurate predictions at substantially reduced computational cost.

Notably, Mario Del Mastro, co-author of the paper by Del Mastro and Terzis (4), is the first recipient of the Invited Student Paper Award from the InterPore2025 Annual Meeting to be announced. The award recognizes outstanding student presentations at the Annual Meeting by inviting selected students to develop their presented research into a full paper for submission to *InterPore Journal*. The award is granted upon successful peer review and publication, ensuring that the work meets the Journal's scientific standards. Further recipients from InterPore2025 will be announced as their papers are published in upcoming issues. More information about the Invited Student Paper Award is available [here](#).

The studies featured in this issue remind us that progress in porous media research is driven by the continuous interplay between fundamental understanding, methodological advances, and emerging applications. I hope the ideas and findings presented here stimulate further discussion, encourage new collaborations, and provide useful foundations for the questions that our community will address next.

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