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MS 15
Direct numerical simulation methods for multiphase flows

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After over five decades of research, computational methods for multiphase flows still constitute an incredibly active research topic in computational mechanics. Moving fluid interfaces that separate fluids of very different properties and can freely break up and coalesce, driven by forces and thermophysical processes localized to the fluid interface, still pose significant challenges. Concretely, simulating multiphase flows driven by surface tension forces, fluid phases with considerably different densities, multiphase flows in technical systems with geometrically complex domains, wetting phenomena, phase-change, and the flow of surface-active agents are challenging individually. A computational method that can reliably address all those challenges at the same time has yet to be developed.
This minisymposium aims to connect researchers actively developing DNS methods for multiphase flows and spark dialogues, cooperations, and new ideas. We invite contributions about computational methods for tracking/capturing evolving fluid interfaces: Arbitrary Lagrangian-Eulerian (ALE), Level Set, Front Tracking, and Volume-of-Fluid methods, as well as their hybrids. Equally relevant is the discretization of multiphase Navier-Stokes equations, including models and discretizations for forces and transport processes on and across the fluid interface. Contributions covering Phase-Field methods and Lattice-Boltzmann methods are equally encouraged. We heartily invite the researchers to submit presentations that delve deep into the problem and its (potential) solution, as this fosters scientific exchange. Along that line, presenting negative scientific results is strongly encouraged.