

# COMPUTATIONAL MATH SEMINAR

*Multiphase fluid dynamics at leadership-class scale: Models,  
numerics, and algorithms*

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**Abstract:** Computational fluid dynamics (CFD) simulations utilize the lions share of HPC resources the world over. Still, the CFD community has a fragmented and generally closed-source software stack. This paradigm must change if the community hopes to keep pace with the rapid evolution of HPC resources,. In this talk I will present our efforts in this direction. State-of-the-art computational models for simulating multiphase flows will be presented with application to problems in biomedicine, defense, and energy. Algorithms for near-optimal performance on the latest HPC resources will be interrogated. I will also discuss our effort towards painless embedding of the ever more common data-driven models in scalable simulation codes. All software discussed in this talk is freely and openly available on our Github pages with permissive licensing: <https://github.com/comp-physics> and <https://github.com/mflowcode>

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Mathematics and Science Center: MSC W201

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