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Abstract for an Invited Paper
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Petascale Flow Simulations Using Particles and Grids¹

PETROS KOUMOUTSAKOS, ETH Zurich

How to choose the discretization of flow models in order to harness the power of available computer architectures? Our group explores this question for particle (vortex methods, molecular and dissipative particle dynamics) and grid based (finite difference, finite volume) discretisations for flow simulations across scales. I will discuss methodologies to transition between these methods and their implementation in massively parallel computer architectures. I will present simulations ranging from flows of cells in microfluidic channels to cloud cavitation collapse at 14.5 PFLOP/s.

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