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RECENT DEVELOPMENTS IN COMPUTATIONAL INTERFACIAL PHYSICS - METHODS AND APPLICATIONS

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ABSTRACT

Interfacial problems, in which the overall dynamic is coupled to the motion of an interface, are ubiquitous in the physical and life sciences. They are used to model a myriad of real-life applications such as 3D additive manufacturing, multiphase flows or biological morphogenesis, to cite only but a few.

Simulating accurately and efficiently such problems remains a challenging task. It requires the modeling and coupling of multiple physics interacting over several lengths and time scales on non-trivial moving geometries. The complexity of these interactions demands high-accuracy, while their inherent multiscale natures call for efficient adaptive data structures and optimized parallel algorithms.

This mini-symposium will focus on recent advances in numerical and computational methods for interface problems and their applications to real-life science and engineering applications. Specific topics of discussion will include interface representation methods (e.g. level sets, reference maps, phase fields, direct front tracking methods), discretization techniques (e.g. Finite Differences and Volumes, continuous and discontinuous Galerkin, cut-cell, sharp, …) and the design of efficient parallel algorithms.

Overall, this event will offer an excellent opportunity for researchers to learn about a wide variety of recent developments in computational methods as well as their applications, and to stimulate interactions. In particular, we intend to invite a broad range of interdisciplinary participants, with backgrounds in engineering, mathematics, physics, and biology.