RECENT DEVELOPMENTS IN FLUID–STRUCTURE INTERACTIONS OF PHYSIOLOGICAL SYSTEMS

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ABSTRACT

Capabilities for numerical simulations of physiological flows have evolved tremendously in the last decade. This evolution is due to notable advances in computational architecture; in numerical methodologies — for example, for immersing complex geometries in simple Cartesian grids and for coupling the dynamics of flow and structure (and electrophysiology); in modeling of the rheology and elastic properties of biological materials; and in interfaces between medical imaging and computational mechanics. Many of these advances have been made possible by dynamic partnerships that have emerged between engineers, physicians and biomedical researchers, to the point that simulations are beginning to transition into patient-specific diagnosis and surgical planning. This two-session mini-symposium will bring together several researchers that are making important contributions to the computation of flows and associated multiphysics problems in a variety of physiological contexts. These contributions are being made in a number of areas including cardiovascular flows, respiratory flows, phonation and ocular mechanics. Our two-fold objective is to highlight the state-of-the-art in modeling of physiological flows and to provide a forum for the comparative assessment of underlying numerical methodologies that are making these applications possible. Our list of invitees (which includes researchers from the US, Europe, Australia and Asia) will span a broad range of thematic areas. It is planned that the participants in the mini-symposium will be invited to contribute to a special issue of the journal *Theoretical and Computational Fluid Dynamics* following the Congress.