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**Computational hemodynamics research across the extremes of age**

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**Abstract**

Hemodynamics problems often possess complex and multifaceted attributes that make real-world experimentation challenging. Computational modelling has been the gold standard for the assessment of such problems, highlighting key aspects of the underlying blood flow mechanisms in discrete conditions, while conducing to the development of novel prediction tools. In this talk, we will present three compelling cardiovascular topics that we address with the use of high-fidelity numerical approaches: a) multi-scale computational methods for obesity-altered hemodynamics in children and adolescents; b) blood flow dynamics in the surviving adult congenital heart patient; and c) simulation of cerebral aneurysm by flow diversion. The role of haemodynamic factors, particularly wall shear stress, and the use of state-of-the-art simulation methodologies will be presented. Cross-disciplinary perspectives between these topics and future efforts will be discussed.