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Alessandro Veneziani* (avenez2@emory.edu), 400 Dowman Dr, Suite N418, Atlanta, GA 30322. *Challenges for the efficient solution of PDEs in patient-specific geometries with applications to cardiovascular diseases.*

Mathematical and numerical modeling of cardiovascular problems has experienced a terrific progress in the last years, evolving into a unique tool for patient-specific analysis. However, the extensive introduction of numerical procedures in an established clinical routine still presents methodological challenges. A rigorous merging of available data (images, measures) and mathematical models is expected to reduce the uncertainty intrinsic in mathematical models featuring parameters that would require a patient-specific quantification; and to improve the overall quality of information provided by measures. Computational costs of assimilation procedures may be quite high, as typically we need to solve inverse problems. In this talk, we will address some methods developed to bring operatively numerical simulations into the clinical routine. In particular, (1) geometrical problems related to the reconstruction of patient-specific morphologies in coronaries after deployment of vascular prostheses; (2) parameter estimation of fluid dynamics and electrocardiology; (3) hierarchical modeling of the solution of partial differential equations in domains featuring a prevalent mainstream, like arteries will be considered. (Received February 10, 2014)