**Numerical Analysis and Scientific Computing Seminar**

*Scientific Computing at Emory: Challenges and Perspectives of Clinical Cardiovascular Mathematics*

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**Abstract:** While mathematical models and numerical simulations have been proving a tremendous potential impact to the understanding and the care of Cardiovascular Diseases, their use in the clinical practice - even if growing up - is still limited. This is due to several reasons, both practical and cultural. An interdisciplinary collaboration between clinicians and mathematicians/computer scientists is not easy to sustain over a long time, not only for the difference of academic and scientific targets, but also for the intrinsic challenges raised by the clinical activity for what attains their mathematical aspects. The need for processing a large volume of patients, the diversity of cases encountered in patient-specific settings, the rigorous certification of the reliability of the results are only some of the specific challenges, calling for efficient methods, reduced-order models, uncertainty quantification, data assimilation.

In this talk, I will report some of the methodological developments in the "translational" activity to finalize mathematical and numerical tools to the clinical practice. Specifically, I will address problems in modeling the geometry of patient-specific coronaries after a stent deployment, of uncertainty quantification of defective boundary problems and of data assimilation for cardiac conductivities. Perspectives of numerical modeling in clinical routine will be discussed, in view of the recent developments of data-based methodologies and the success of entrepreneurial initiatives in the field of cardiovascular mathematics.

A summary of other interdisciplinary projects running at the interface between Mathematics and Computer Science in the Scientific Computing Group will be provided too.

Friday, September 20, 2019, 10:30 am  
Mathematics and Science Center: MSC W201

**Computer Science**  
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