Emergency Math

Life of a group of Mathematicians when a Hospital is on Campus

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Abstract

When working on mathematical and numerical problems in medicine, and for cardiovascular diseases in particular, there are (at least) two challenges. One is the identification of sophisticated methodologies for tackling difficult problems by the best tools with the exactness and the elegance of mathematical formalism. The other is to give practical answers with a clinical impact. The formalization of the most urgent practical problems, the identification of the right trade-off between accuracy and efficiency, the set up of the most appropriate resources (hardware and software) to give reliable answers within a clinical timeline are all tasks to be achieved to establish an effective collaboration with physicians and clinicians. In this talk we will address the experience we are living in a privileged place like Emory, where the University hospital is one side of the campus, the Math & Science building being another one. "Privileged" because we have the opportunity of transferring our mathematical and numerical background to the clinical practice just crossing the campus. However, the gap between the ideal world of mathematics and the real experience is not filled so easily, and the "emergency" sometimes knocks at our door. We will see cases in which a strong integration among medical expertise, imaging tools and mathematical backgorund created the conditions for improving our knowledge on pathologies (coronary occlusions, aneurysms) , therapies (drugs), surgery (stenting, grafting, etc.) and the opportunities risen by new infrastructures (like Clouds).

The responsability of being part of a team working daily on patients (often in critical situations) is not only exciting but also part of a dream that we want to realize: improving healthcare by an extensive methodological transfer of mathematics into clinics.

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