

# Numerical modeling of blood flows

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## Abstract

In this talk I will introduce important concepts related to the mathematical modeling and data-based numerical simulations of blood flows. First, I will give a motivation for the application of such models in the clinical context. Secondly, I will overview the challenges involved in the boundary conditions. In particular, I will detail novel backflow stabilization techniques for open boundaries (i.e. where Neumann conditions are applied) [1]. Finally, I will show several results concerning inverse problems in blood flows based on medical imaging data, namely: (a) Parameter and state estimation in fluid-structure interaction problems [2], (b) pressure drop estimation in stenotic vessels from velocity measurements [3], and (c) treatment of geometric uncertainties.

*Keywords:* hemodynamics, Navier-Stokes equations, inverse problems

## References

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