# The Beat of Math

Alfio Quarteroni
Politecnico di Milano, Italy, and Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland (professor emeritus)

Abstract

Mathematical models based on first principles allow the description of the blood motion in the human circulatory system, as well as the interaction between electrical, mechanical and fluid-dynamical processes occurring in the heart. This is a classical environment where multi-physics processes have to be addressed. Appropriate numerical strategies can be devised to allow for the analysis of both heart function and dysfunction, and the simulation, control and optimization of therapy and surgery.

This presentation will address some of these issues and a few representative applications of clinical interest.

Acknowledgment: The work presented in this talk is part of the project iHEART that has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 740132)