

Host' programu Mobility visit: Jorge Sánchez Arciniegas, Valencia, Spain



Štvrtok 29.01.2026 o 10:30

Seminárna miestnosť

Pavilónu lekárskych vied BMC SAV

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Mathematical Modelling of Cardiac Electrophysiology: From Equations to Patient-Specific Predictions

Abstract:

Mathematical modelling provides a principled way to connect cardiac structure, biophysics, and clinical data to explain normal and pathological physiology. In this talk, I will introduce key models used in computational cardiology, from reaction–diffusion formulations of electrical propagation to models of cardiac mechanics and electromechanical coupling, as well as simplified (0D/1D) representations of hemodynamics, highlighting how these frameworks can be calibrated and validated using patient-specific information. I will also present a pipeline for building subject-specific models (geometry, tissue properties, boundary conditions, and functional readouts) and discuss how simulations can be used to interpret mechanisms of arrhythmias and to explore in silico scenarios relevant to therapy planning. Finally, the presentation will outline current challenges and opportunities for reproducibility, uncertainty quantification, and clinical translation.

Experience

 **Postdoctoral Researcher**
Ci²B - Center for Research and Innovation in Bioengineering · Full-time
UPV Feb 2025 - Present

 **Postdoctoral Fellowship**
Karlsruhe Institute of Technology (KIT)
Oct 2024 - Present

 **Associate Professor**
VIU - Universidad Internacional de Valencia
Dec 2023 - Present
Machine learning and artificial intelligence

Education

 **Karlsruhe Institute of Technology (KIT)**
Doctor of Philosophy - PhD, Biomedical/Medical Engineering
Jun 2018 - Jul 2021
Skills: Problem Solving · Communication · TensorFlow · Liderazgo de proyectos · Written Communication

 **Universitat Politècnica de València (UPV)**
Master of Engineering (M.Eng.), Ingeniería biomédica/médica
2014 - 2016
Skills: Problem Solving · Communication · Equipos de proyecto · Liderazgo de proyectos · Written Communication

 **Universidad de las Fuerzas Armadas - ESPE**
Grado en Ingeniería, Mecatrónica
2007 - 2014