1 PRE/POST DOCTORAL POSITION

The Cardiac Modeling Group belongs to the Electronics Engineering Department of the Polytechnical University of Valencia (UPV), Spain. The group is integrated by 5 faculty members and a variable number of post-doctoral and PhD students. We seek two highly motivated **candidate** (predoctoral or postdoctoral) to develop computational multiscale personalized models of the electrical activity of the heart to enable the *in silico* testing of drug efficacy and safety under healthy and pathological conditions. The candidates will be contracted for three years and working in the frame of the EU funded research project:
"Simulation of Cardiac Devices & Drugs for in-silico Testing and Certification" (SimCardioTest), Call H2020-SC1-DTH-2018-2020, Research and Innovation Action (Topic SC1-DTH-06-2020).
The candidate will be fully integrated in the group as active members.

The group has an ample experience in modeling and simulating the electrical activity of the heart. Throughout our cardiac simulation work, we have developed and analyzed cardiac action potential (AP) models of different tissues (atrium, ventricle, and Purkinje) and different animal species (dog, rabbit, guinea pig, and human) under normal and under several pathological conditions, such as ischemia, heart failure, atrial fibrillation, and mutations. The group also has a valuable experience in modeling the effects of drugs on different ionic channels. Moreover, we have developed computational tools for the simulation of the electrophysiological activity of a variety of tissue structures (unicellular, one-dimensional, bi-dimensional and tri-dimensional).

ROLE SUMMARY:

The candidate will develop cellular to 3D cardiac personalized models to simulate the effects of drugs on the electrical activity of the heart. Methods of image processing and mathematical modeling will be used to achieve the objectives. The candidate will receive data from our collaborators from the clinical and pharmaceutical field to build realistic and personalized models, as well as population of models considering variability and uncertainty.

CANDIDATE RESPONSIBILITIES:

1. Development of drug ion channel interaction models and assess drug effects at the cellular level in healthy and pathological virtual populations.
2. Development of multiscale personalised models, as well as populations of models, where variability will be considered. Differences in gender and age will also be considered.
3. In silico assessment of safety and efficacy of drugs in validated, anatomically-based multi-scale predictive cardiac models for healthy and patient-specific disease conditions.
4. Identification of selective and specific biomarkers to improve prediction of drug efficacy and safety.
5. Uncertainty quantification and propagation.

CONTRACT DETAILS:

Applications: February 2022
Initial date: March-April 2022
Duration: 3 years at full and exclusive dedication.

QUALIFICATIONS:

- PhD in in Engineering, Mathematics or Physics will be highly valued.
- Master Degree in Biomedical Engineering, Applied Mathematics, Physics, other Engineering degrees or related discipline with strong numerical components focusing on mathematical modeling, simulation, and image processing.
- Training and/or experience in mechanistic modeling of electrophysiological systems is preferred.
- Understanding of ordinary and partial differential equations and how these can be applied in the development of complex models of electrophysiological models.
- In-depth, hands-on knowledge of modeling and simulation software (MATLAB, C/C++, Fortran).
- Keen interest in learning new computational skills.
- Self-directed with ability to work independently.
- Excellent communication and writing skills in English.
- Keen interest in living in the sunny Valencia.

CONTACT:

For additional information about the position and details on how to apply, please contact Full Professor: Javier Saiz (jsaiz@ci2b.upv.es) by the March 15.