Fellow R6: Novel data-based early warning indicators of critical cardiovascular transitions

Closed position

Supervisor: Prof. C. Masoller
Host institution: Universitat Politècnica de Catalunya (**UPC**), Barcelona, Spain
Duration: 36 months
PhD program: Doctoral School in Computational and Applied Physics
Research group: Physics Dept. Nonlinear Dynamics, Nonlinear Optics and Lasers (DONLL)
Secondments (short visits) at: Max-Planck-Institut für Dynamik und Selbstorganisation (**MPI**, Germany), company **AMBROSYS GmbH** (Germany) and company **Beamagine** (Spain)
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Objectives

To develop new algorithms able to provide reliable early warning indication of dynamical transitions to critical states such as arrhythmia and cardiac defibrillation. From freely available multivariate datasets (i.e.: physionet) as well as from high-resolution spatio-temporal electrophysiological recording, a large number of characteristic features will be extracted, using advanced methods of time-series and image analysis. The performance of the features will be tested using machine learning (ML) algorithms, with the goal of identifying the subset of features that provide reliable early warning indications about the risk of a sudden transition to a critical state.

What is offered

To work within an interdisciplinary environment, receiving training from leading experts in non-linear optics and non-linear dynamics in a full-time Ph.D. position for 36 months, in which living and mobility costs will be fully covered with a gross salary of 34.375,60 € per year.

Required skills

We are seeking an enthusiastic candidate that has solid programming skills, and background in **data science, machine learning, computer science.** Background in either physics, math, or biophysics with **broad knowledge of nonlinear dynamical systems** and complexity science are desirable.

Additional skills

- The candidate must proficient in English (oral and written). Basic knowledge of Spanish or Catalan is desirable.
- Ability to work in an interdisciplinary environment.
- Effective communication skills.
- Adaptability and problem-solving skills.