POST-DOCTORAL POSITION

in IHU LIRYC
Institute of Cardiac Electrophysiology and Heart Modeling

UNDERSTAND AND CHARACTERIZE THE BIO-ELECTROMAGNETIC FIELD GENERATED BY THE HEART IN NORMAL AND DISEASED CONDITIONS

CONTEXT

Cardiovascular diseases are the first cause of adult mortality in the world accounting for 29% of deaths. Cardiac-specific diseases are responsible for about 20% of adult mortality , half due to heart failure, and half occurring suddenly (SCD), mostly due to electrical disturbances (VT/VF). Despite major improvements in therapy over the past 30 years, the majority of individuals dying from SCD cannot currently be identified pre-emptively and prevention can be offered to only limited groups by ICD implantation.
Despite recent advances in unravelling the arrhythmia mechanisms, current approaches (based on electrical recordings of the heart) remain insensitive to the specific arrhythmogenic signals. The magnetic field associated with cardiac electrical activity does not suffer from the same limitations and has been assessed in detection of cardiac ischemia and conduction abnormalities.

OBJECTIVES

This post-doctoral research project is focused on the analysis of the magnetic field emitted by the heart under normal and diseased conditions. The first objective is to develop the software and signal processing tools needed to record and visualize the heart activity. The second objective is to identify features specific to ventricular diseases with the aim to develop risk-stratification tools.

LABORATORY

The project is a collaborative work between the Liryc institute and the CEA-Leti laboratory. The Liryc institute (Bordeaux, FR) is a unique institute exclusively dedicated to the 'electrical heart' bringing together 150 scientists, physicians, and engineers from 18 countries. CEA-Leti (Grenoble, FR) has unique expertise in the design of instruments for magnetic field recordings and has extensive experience in magnetoencephalography. As part of this project CEA will develop the experimental devices and the experimental recordings will be hosted on the unique cardiac platform available in Bordeaux. The current position is hosted at the Liryc institute in Bordeaux, FR

JOB DESCRIPTION

The proposed 2 years position will mainly consist of the following tasks:

- Development of an experimental setup and software allowing the recordings and the analysis of signals from Optical Pumped Magnetometers (OPM)
- Numerical and experimental characterization of 3-dimensional magnetic field generated in experimental conditions in normal and diseased hearts
- Validation of the developed experimental system through a series of experiments in collaboration with the experimental team

CANDIDATE

Required education level: PhD or equivalent degree.
Required background: electromagnetics, bio electromagnetics, development in Matlab or equivalent
Knowledge of French is not required, but would be appreciated.

CONTACTS

To apply, please send your motivation letter, CV, and recommendation letters (optional) to:
recrutement@ihu-liryc.fr