



## Niami NASR

From France to Finland



Project: **Electrical Impedance Tomography**

Research topic: **Mathematics**

Finnish Institution: **Mathematics and Systems Analysis of Aalto university**

French Institution: **University of Bordeaux**

Dates of mobility: **02/05/2022 to 06/05/2022**

Program: **Maupertuis Programme (Short Mobility)**



## PRESENTATION

Niami Nasr's main subjects of interest are partial differential equations, inverse problems, and numerical analysis, especially in relation with biology and medicine. More specifically, she works in the project team Inria [CARMEN](#), which is a partnership between [Inria](#) the French national research institute for digital science and technology, [IHU Liryc](#), the Electrophysiology and Heart Modelling Institute that focuses on better understanding and treating of cardiac electrical disorders, and [Bordeaux Mathematics Institute](#). Niami Nasr develops immersed boundary numerical methods for the EIT Complete Electrode Model in the context of electrocardiography. The aim is to recover information on the conductivity of the organs in the volume of the torso.

## ACTIVITIES IN FINLAND

Niami Nasr discussed with Professor [Nuutti Hyvönen](#) several possible subjects of collaboration regarding medical imaging. Firstly her thesis subject aims to develop immersed boundary numerical methods, that can solve the EIT inverse problem modeled by the complete electrode model (CEM). Secondly with professor Hyvönen she discussed the use of the method of Gauss-newton to solve the inverse problem of Electrical Impedance Tomography. The Gauss-Newton algorithm is used to solve nonlinear least squares problems, which is equivalent to minimizing a sum of squared function values. Using this algorithm to solve EIT inverse problem may accelerate the reconstruction process in her code. Finally, she met Nuutti Hyvönen and [Topi Kuutela](#) for discussing 3D resolution in the case of Immersed boundary methods.