
**Level of qualifications required**: Graduate degree or equivalent

**Function**: PhD Position

**About the research centre or Inria department**

The Inria Sophia Antipolis - Méditerranée center counts 37 research teams and 9 support departments. The center's staff (about 600 people including 400 Inria employees) is composed of scientists of different nationalities (250 foreigners of 50 nationalities), engineers, technicians and administrators. 1/3 of the staff are civil servants, the others are contractual. The majority of the research teams at the center are located in Sophia Antipolis and Nice in the Alpes-Maritimes. Six teams are based in Montpellier and a team is hosted by the computer science department of the University of Bologna in Italy. The Center is a member of the University and Institution Community (ComUE) "Université Côte d'Azur (UCA)".

**Context**

Inverse potential problems, where a source is to be determined from measurements of the field at a distance from its support, arise in many scientific areas. Applications we have in mind here comprise the analysis of Electro-Encephalographic (EEG) data, where the location of foci of electric activity in the brain are to be found, as well as inverse magnetization problems in Paleomagnetism where the magnetization distribution is to be computed and yields important information on the past history of rocks. They share a common framework, namely the source is the divergence of a measure. However, the geometry of the measurements is different, as well as the fact that the field is harmonic in Paleomagnetism but only piecewise harmonic in EEG (where several layers separate the source from the measurement place). The purpose of the thesis is twofold: to study regularization techniques, based on constraining the total variation of the measure whose divergence is the source on the one hand, and to study the inverse propagation process of the field across the layers for the case of a piecewise harmonic field on the other hand. The geometry of the layers could typically be spherical or modeled on other smooth surfaces.

**Assignment**

The purpose of the thesis is twofold: to study regularization techniques, based on constraining the total variation of the measure whose divergence is the source on the one hand, and to study the inverse propagation process of the field across the layers for the case of a piecewise harmonic field on the other hand. The geometry of the layers could typically be spherical or modeled on other smooth surfaces.

This study will offer an opportunity to balance theoretical work in harmonic analysis with numerical work in optimization. In particular, experiments on real data will be conducted.

**Main activities**

To conduct research in the afore-mentioned subject.

**Benefits package**

- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities
Remuneration
Duration: 36 months
Location: Sophia Antipolis, France
Gross Salary per month: 1982€ brut per month (year 1 & 2) and 2085€ brut/month (year 3)

General Information
- Town/city: Sophia Antipolis
- Inria Center: CRI Sophia Antipolis - Méditerranée
- Starting date: 2018-10-01
- Duration of contract: 3 years, 1 month
- Deadline to apply: 2018-05-06

Contacts
- Inria Team: SRH-SOP
- Recruiter: Leblond Juliette / juliette.leblond@inria.fr

The keys to success
The candidate should have developed a taste for mathematical analysis and/or classical physics. Depending on its background, the subject can be pushed into numerical implementation or into more theoretical developments.

About Inria
Inria, the French National Institute for computer science and applied mathematics, promotes "scientific excellence for technology transfer and society". Graduates from the world's top universities, Inria's 2,700 employees rise to the challenges of digital sciences. With its open, agile model, Inria is able to explore original approaches with its partners in industry and academia and provide an efficient response to the multidisciplinary and application challenges of the digital transformation. Inria is the source of many innovations that add value and create jobs.

Conditions for application
- Defence Security:
  This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.
- Recruitment Policy:
  As part of its diversity policy, all Inria positions are accessible to people with disabilities.

Warning: you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.