Job vacancy #2023-06758

PhD Position F/M PhD fellowship F/M Methods and models for the clinical evaluation of Digital Medical Devices

Contract type: Fixed-term contract
Level of qualifications required: Graduate degree or equivalent
Function: PhD Position

Context

- HEKA and SISTM are collaborating in the context of the new national initiatives to support the digital transformation of medical practices.

  In this context, the objectives of the HEKA-SISTM collaboration are to propose efficacy and safety/risk assessment via clinical evaluations of AI based DMDs aiming at diagnostics, therapeutics, monitoring patient's disease, managing patient's care organization and improving prevention and healthcare.

  More generally, in terms of methodological development and breakthroughs, this collaboration will specifically propose major advance in several innovative pathways under novel computational models approaches:

  1. Propose new methodological paradigms for the clinical evaluation of DMD and AI based algorithms in the context of perpetual clinical trials and perpetual agile or interim risk assessment,
  2. Use, model, and tailor auxiliary multidimensional and multi-source of data (preclinical and clinical) to better design and analyze clinical trials of all phases.
  3. Explore the appropriateness and the relevance to use these heterogeneous data sources, create new trial data sources based on modelling and simulations such as in silico trials, synthetic controls, etc. to reduce trial sample size and accelerate development.

This is in this context, at the interface between clinical epidemiology, applied mathematics and biostatistics, that HEKA and SISTM are offering a PhD position.

Teams involved:

- **HeKA** ([https://team.inria.fr/heka/](https://team.inria.fr/heka/)) is a common project-team of Inria, Inserm and Université Paris Cité. HeKA is affiliated with the “Centre de Recherche des Cordeliers” and Inria Paris. HeKA is a multidisciplinary team composed of researchers, clinicians-researchers, teacher-researchers from Inria, Inserm, University Paris Cité and AP-HP, associated with departments of the European Hospital Georges Pompidou, Necker Hospital and the Imagine Institute.

  HEKA Research themes are biomedical informatics, biostatistics and applied mathematics for clinical decision support. The objective of HeKA is to develop methodologies, tools and their applications in clinics towards a learning health system, i.e., a health system that leverages clinical data collected to extract agiley and reliably novel medical knowledge that, in turn, continuously improves healthcare. HEKA relies on the availability of EHRs (Electronic Health Records), clinical trials, cohorts and other linked data to develop models for stratification and prediction with the potential of improving the precision and the personalization of treatments, and in turn the quality of healthcare.

- **SISTM** ([https://www.inria.fr/en/sistm](https://www.inria.fr/en/sistm)) is a common project team of Inria, Insem and Université de Bordeaux. SISTM is affiliated with the Bordeaux Population Health Institute and Inria de l’Université de Bordeaux. SISTM is composed of researchers and clinicians-researchers from Inria, Inserm, Université de Bordeaux and the CHU de Bordeaux. SISTM is also the main component of the data science department of the Vaccine Research Institute which with the Bordeaux Hospital Clinical Trial Unit provides most of SISTM research applications. SISTM addresses the challenge of analyzing big data to answer clinical and biological questions by using appropriate statistical methods. With data such as those reflecting the machinery of a cell or such as the clinical status of individuals for instance in clinical trials, new tools are needed to translate information obtained from complex systems into knowledge. This has led to the field of « systems biology » and by extension « systems biology ».
medicine », which naturally takes place in the context of translational medicine that links clinical and biological research.

The methods SISTM develops are mainly based on either mechanistic modeling using differential equation systems or on statistical learning methods. The general paradigm of SISTM approach is to include as much information as available to answer a given question. This information comes from the available data but also from prior biological information available defining the structure of the model or restricting the space of the parameter values.

**Position objectives and better knowledge of the proposed subject:**

In this context, the candidate will inscribe her/his research on the following axes:

- Development of innovative clinical study models DMD
- Writing scientific papers and reports in English
- Organize and prepare documents that could support the presentation to stakeholders of applications and methodological solutions for the clinical validation of DMD.

The proposed PhD position will thus be part of this general strategy that will cover the entire spectrum from DMD-specific methods development to communication/dissemination to the decision-making stakeholder.

**Is regular travel foreseen for this position?**

The candidate will travel between Paris and Bordeaux. Travel expenses are covered within the limits of the scale in force.

**Assignment**

**Mission:**

The PhD applicant is expected to work with both the HEKA and the SISTM teams.

To this purpose, the candidate will integrate teams involving clinical epidemiologists, medical informatics, applied mathematicians and biostatisticians in a very attractive environment with computing facilities and many interactions with high level stakeholders.

**Collaboration:**

The candidate will be under the supervision of both Sarah Zohar (HEKA) and Rodolphe Thiébaut (SISTM).

As the PhD position is a collaboration between HEKA in Paris and SISTM in Bordeaux, the localization of the candidate will be the result of discussing the project and the expectations of the applicant.

**Responsibilities:**

The candidate is expected that beyond pursuing her/his subject, she/he will participate to the teams scientific discussions and activities.

**Main activities**

- Conduct the planned research project in collaboration with both HEKA and SISTM teams
- Propose innovative methods for the evaluation of DMDs
- Develop programs/applications/R-Packages for the corresponding methods
- Publish the results of the planned research in peer reviewed publications

**Skills**

- Coding Python or/and R
- Scientific English writing

**Benefits package**

- Subsidized meals
- Partial reimbursement of public transport costs
- Possibility of teleworking and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage
Remuneration

- 2082€ / month (before taxes) during the first 2 years,
- 2190€ / month (before taxes) during the third year.

General Information

- Theme/Domain: Computational Biology
  Statistics (Big data) (BAP E)
- Town/city: ISPED, Bordeaux
- Inria Center: Centre Inria de l'université de Bordeaux
- Starting date: 2024-01-01
- Duration of contract: 3 years
- Deadline to apply: 2023-11-05

Contacts

- Inria Team: SISTM (DGD-S)
- PhD Supervisor: Thiebaut Rodolphe / Rodolphe.Thiebaut@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

The keys to success

We are looking for a highly motivated candidate with an outstanding potential. The candidate should hold a Master 2 and have a good background in clinical epidemiology, applied mathematics or (bio)statistics or computer sciences.

A medical profile with the above expertise would be a plus, as well as a strong interest in digital tools such as DMDs, Internet of Things and AI.

The successful candidates are expected to conduct innovative research at the highest international level.

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.

Instruction to apply

Thank you to send:
- CV
- Cover letter
- Master marks and ranking
- Support letter(s)

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.