Offer #2024-07778

PhD Position F/M Statistical methods for meta-model integration in pharmacology

Contract type : Fixed-term contract

Level of qualifications required : Graduate degree or equivalent

Fonction : PhD Position

Context

The PhD will be funded by the Governmental Acceleration Funding - PEPR Santé Numérique. The candidate will work with all partners of the PEPR DIGPHAT project.

Assignment

Context:

Pharmacology inherently requires modelling mechanisms across various scales: molecular (identifying drug action mechanisms), cellular (e.g., characterizing tissue lesions and biomarkers), and patient (pharmacokinetics/pharmacodynamics population variability). Notably, all these models are fundamentally longitudinal. Integrating these multiple scales is crucial to individualize treatments, including drug selection, optimal dosage, and associated regimens.

Despite the development of mechanistic models (such as those utilizing differential equations) at each scale by different research communities, there is still a lack of interoperability. Combining all relevant meta-models (each representing its own scale) will create a comprehensive digital pharmacology twin.

Traditionally, multiscale modelling has been predominantly developed within the biological sciences. Examples include the integration of data from proteins to organs and the application of multiscale and multimodal approaches for image reconstruction in medical applications. A notable characteristic of these studies is the use of a single model to address each specific outcome.

Objectives:

To propose a general pathway towards pharmacological digital twins by integrating several multiscale and longitudinal meta-models. Digital twins that enable the a priori investigation of a treatment strategy the dynamic assessment of the probability of success based on a patient's longitudinal features.

Main activities

Main activities:

Develop models for:

- checking the coherence of meta-models at the same level
- chaining meta-models across different scales
- estimating new patient trajectories.

Additional activities:

- Write aticlers
- Talk and poster at conferences

Skills

- Specialization in Biostatistics, Statistics or Mathematics.
- R or Phyton coding skills.
- Good English level appreciated.

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs

- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking
- Flexible organization of working hours (after 12 months of employment)
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

General Information

- **Theme/Domain :** Optimization, machine learning and statistical methods
  Statistics (Big data) (BAP E)
- **Town/city :** Paris
- **Inria Center :** Centre Inria de Paris
- **Starting date :** 2024-10-01
- **Duration of contract :** 3 years
- **Deadline to apply :** 2024-07-06

Contacts

- **Inria Team :** HEKA
- **PhD Supervisor :**
  Ursino Moreno / moreno.ursino@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.

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

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.