Offer #2024-07925

Post-Doctoral Research Visit F/M Sensitivity analysis for the repressilator gene circuit

Contract type: Fixed-term contract
Level of qualifications required: PhD or equivalent
Fonction: Post-Doctoral Research Visit

About the research centre or Inria department

The Inria Saclay-Île-de-France Research Centre was established in 2008. It has developed as part of the Saclay site in partnership with Paris-Saclay University and with the Institut Polytechnique de Paris since 2021.

The centre has 39 project teams, 27 of which operate jointly with Paris-Saclay University and the Institut Polytechnique de Paris. Its activities occupy over 600 scientists and research and innovation support staff, including 54 different nationalities.

Context

Inria is the French national institute for research in computer science, control, and applied mathematics promoting scientific excellence and technology transfer. The research topics of our group are at the intersection of mathematical biology, statistics, control engineering, and statistical physics applied to problems in biology.

Assignment

The objective of this project is to develop and program sensitivity estimation methods for continuous-time Markov chain model of biochemical reactions inside cells that are coupled to the dynamics of growing populations. In addition, a stochastic model of the repressilator gene circuit in bacteria will be constructed based on single-cell microscopy data of our collaborators and the sensitivity estimation methods will be applied to this model to better understand how growth of the bacteria affects the functionality of the repressilator circuit.

Main activities

- Develop sensitivity estimation methods for multi-scale stochastic models based on the Girsanov measure transformation and finite difference methods.
- Test methods on several toy examples.
- Analyse microscopy data of our collaborators.
- Use this microscopy data to construct a stochastic model of a repressilator gene circuit.
- Apply sensitivity estimation methods to this model.

Skills

- Strong programming skills.
- Prior experience with single-cell microscopy data.
- Prior experience with continuous-time Markov chain models of chemical reactions.
- Prior experience with sensitivity analysis.

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 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
According to profile

**General Information**

- **Theme/Domain:** Modeling and Control for Life Sciences  
  Biologie et santé, Sciences de la vie et de la terre (BAP A)
- **Town/city:** Palaiseau  
  **Inria Center:** Centre Inria de Saclay  
  **Starting date:** 2024-11-01  
  **Duration of contract:** 2 years  
  **Deadline to apply:** 2024-10-31

**Contacts**

- **Inria Team:** LIFEWARE  
  **Recruiter:** Ruess Jakob / jakob.ruess@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**

A CV that demonstrate strong scientific skills.

**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.