



Offer #2024-07815

Doctorant F/H Algorithmes alternatifs pour la simulation de modèles sur réseau

Contract type : Fixed-term contract

Level of qualifications required : Graduate degree or equivalent

Fonction : PhD Position

Level of experience : Recently graduated

About the research centre or Inria department

The Inria research centre in Lyon is the 9th Inria research centre, formally created in January 2022. It brings together approximately 300 people in 17 research teams and research support services.

Its staff are distributed in Villeurbanne, Lyon Gerland, and Saint-Etienne.

The Lyon centre is active in the fields of software, distributed and high-performance computing, embedded systems, quantum computing and privacy in the digital world, but also in digital health and computational biology.

Context

The position is open in a highly interdisciplinary context: the Inria MOSAIC team, composed of mathematicians, physicists and computer scientists specialized in the modeling and theoretical and numerical study of morphogenesis. The MOSAIC team is part of the laboratory of Plant Reproduction and Development of the Ecole Normale Supérieure de Lyon, whose expertise, ranging from molecular genetics to biophysical modeling and systems biology, is internationally recognized.

Stochastic lattice models are of constant interest to the scientific community, both for their fundamental properties and the wide variety of applications they offer, notably in statistical physics, computational biology and population ecology. Their numerical simulation often requires the use of MCMC (Markov chain Monte Carlo) techniques. The subject of this thesis is part of a project aiming at proposing alternative algorithms for the simulation of these models by studying and estimating the law of the contours formed by the nodes of the lattice having common characteristics.

Assignment

The objective of this thesis project is to explore alternative simulation techniques to MCMC methods for the simulation of stochastic lattice models. These will have to be validated both theoretically and numerically and be competitive with the algorithms from the literature on a number of models of interest. To this end, we will focus on modeling, estimating and simulating the contours formed by nodes of the lattice with common characteristics, which will require the development of specific methods for qualitative and quantitative comparison of configurations. A significant part of the project will be devoted to the development of an efficient and interactive simulation library.

Skills

* Technical skills and level required : Master/engineering degree in applied mathematics or computer science. Good programming skills.

* Languages : French / English

* Other valued appreciated : Probability, combinatorics, machine learning

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 (90 days / year) and flexible organization of working hours (except for internship)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage under conditions

Remuneration

1st and 2nd year: 2100 euros gross salary /month

3rd year: 2190 euros gross salary / month

General Information

- **Theme/Domain** : Computational Biology System & Networks (BAP E)
- **Town/city** : Lyon
- **Inria Center** : [Centre Inria de Lyon](#)
- **Starting date** : 2024-09-01
- **Duration of contract** : 3 years
- **Deadline to apply** : 2024-07-10

Contacts

- **Inria Team** : [MOSAIC](#) (DGD-S)
- **PhD Supervisor** :
Azais Romain / Romain.Azais@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

Applications must be submitted online via the Inria website. Processing of applications submitted via other channels is not guaranteed.

Defence security:

This position is likely to be assigned to a restricted area (ZRR), as defined in decree no. 2011-1425 relating to the protection of the nation's scientific and technical potential (PPST). Authorisation to access a zone is issued by the head of the establishment, following a favourable ministerial opinion, as defined in the decree of 03 July 2012 relating to the PPST. An unfavourable ministerial opinion for a post assigned to a ZRR would result in the recruitment being cancelled.

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.