Offer #2025-09110

Post-Doctorant F/H Mathematical analysis of metastable processes

The offer description below is in French

Contract type : Fixed-term contract

Level of qualifications required : PhD or equivalent

Fonction : Post-Doctoral Research Visit

Level of experience : Recently graduated

Context

The source of many phenomena in physical and life sciences, and in most engineering disciplines, is to be found in microscopic features of the system under consideration. Linking the properties of matter at these different scales is a major challenge, both from the theoretical perspective (understanding how to link a model or an equation at a certain scale to another one at a different scale) and the numerical one (how to couple two consistent descriptions of matter, e.g. atomistic and continuum, using the same code).

MATHERIALS originally focused on computational chemistry issues (electronic structure calculations for materials, laser control of chemical reactions) before gradually widening its scope beyond such considerations and their applications, and applying its expertise to related topics at very different scales. This has led to studies in molecular dynamics (in situ molecular system evolution), in computational statistical mechanics (computation of ensemble averages), and studies of relationships with more traditional mechanical models at the continuum scale and multiscale simulation of fluid or solid materials in general (including periodic and random homogenization).

MATHERIALS currently offers a range of expertise, rarely found on the international scene, in a number of promising topics for numerical simulation and applied mathematics in general: molecular chemistry, solid-state physics, numerical modeling in materials science, etc.

Assignment

The aim of the postdoctoral work will be to quantify, from a mathematical viewpoint, the metastability of certain stochastic processes through the study of quasi-stationary distributions, in particular in the situation where the metastability has an entropic origin.

Main activities

The postdoctoral fellow will conduct his/her research within the MATHERIALS team, interacting mostly with Tony Lelievre, Gabriel Stoltz and Urbain Vaes. He/She will write research articles and present his/her work in international conferences.

Skills

Langues : français, anglais

Compétences additionnelles appréciées : capacité à présenter clairement des résultats mathématiques

Benefits package

- Restauration subventionnée
- Transports publics remboursés partiellement
- Congés: 7 semaines de congés annuels + 10 jours de RTT (base temps plein) + possibilité d'autorisations d'absence exceptionnelle (ex : enfants malades, déménagement)
- Possibilité de télétravail et aménagement du temps de travail
- Équipements professionnels à disposition (visioconférence, prêts de matériels informatiques, etc.)
- Prestations sociales, culturelles et sportives (Association de gestion des œuvres sociales d'Inria)
- Accès à la formation professionnelle
- Sécurité sociale

General Information

- **Theme/Domain :** Stochastic approaches
  Scientific computing (BAP E)
- **Town/city :** Paris
- **Inria Center :** Centre Inria de Paris
- **Starting date :** 2025-09-01
- **Duration of contract :** 12 months
- **Deadline to apply :** 2025-08-06

Contacts

- **Inria Team :** MATHERIALS
- **Recruiter :**
  Vaes Urbain / urbain.vaes@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

The candidate is required to have a strong experience with the mathematical techniques related to analysis of dynamics encountered in computational statistical physics (e.g. longtime convergence of hypoelliptic Fokker-Planck equations associated with Langevin dynamics, spectral analysis of generator of diffusion processes, etc).

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.