



**Offer #2021-03580**

## **Post-Doctoral Research Visit F/M Mathematical analysis of metastable processes**

**Renewable contract :** Yes

**Level of qualifications required :** PhD or equivalent

**Fonction :** Post-Doctoral Research Visit

### **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.

### **Main activities**

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

### **Skills**

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).

The documents expected for the application are: CV, list of publications, recommendation letters, PhD reports (or some statement by the PhD supervisor confirming a tentative date of defense).

### **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 (after 6 months of employment) 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

## General Information

- **Theme/Domain** : Numerical schemes and simulations  
Scientific computing (BAP E)
- **Town/city** : Paris
- **Inria Center** : [Centre Inria de Paris](#)
- **Starting date** : 2021-11-01
- **Duration of contract** : 1 year, 4 months
- **Deadline to apply** : 2021-05-24

## Contacts

- **Inria Team** : [MATHERIALS](#)
- **Recruiter** :  
Stoltz Gabriel / [Gabriel.Stoltz@inria.fr](mailto:Gabriel.Stoltz@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.