



**Offer #2019-01733**

## **Post-Doctoral Research Visit F/M Modélisation des tissus en base d'agents.**

**Contract type :** Fixed-term contract

**Renewable contract :** Yes

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

**Fonction :** Post-Doctoral Research Visit

### **About the research centre or Inria department**

Inria, the French National Institute for computer science and applied mathematics, promotes “scientific excellence for technology transfer and society”. Graduates from the world's top universities, Inria's 2,700 employees rise to the challenges of digital sciences. With its open, agile model, Inria is able to explore original approaches with its partners in industry and academia and provide an efficient response to the multidisciplinary and application challenges of the digital transformation. Inria is the source of many innovations that add value and create jobs.

### **Context**

INRIA has developed a strong expertise in mathematical modeling of biological systems with medical applications. Working closely with clinicians from several renowned French and German hospitals and one of the best biology and toxicology institutes in Germany, the team Mamba at its INRIA collaborators have been working on the liver for many years, developing models of liver lesions and regeneration, including tissue lesions of the micro-architecture of the liver. They are currently involved in various projects, including the study of fibrosis to help the development of clinical treatments, the development of a liver created by bioengineering and the study of hepatic intoxication due to paracetamol. Recently, the activities are also extended to other diseases such as lymphoma of the central nervous system, where similar methodologies can be applied.

### **Assignment**

The position will be under the main direction of D. Drasdo. It includes a collaboration with Hôpital Paul Brousse & Le Kremlin-Bicêtre/INSERM, Hôpital Universitaire La Pitié Salpêtrière, Paris, Inst. Curie, and the INRIA team Monc / Bordeaux within two projects, one funded by ANR, the second by the Natl. Inst. of Cancer in France. This requires regular meetings with medical doctors.

The candidate should refine current agent-based models and modeling methods to mimic tissue organisation processes mainly at the histological level. This consists in adapting the agent-based models to new applications within the following fields: disease processes and regeneration in liver micro-architecture, in vitro systems and lymphomas of the central nervous system (PCNSL). The models will be set up, parameterized and validated based on image information. Hence, interest or/and skills in image analysis are welcome.

The recruited person should meet with clinicians and coordinate our activities with internal and external partners.

### **Main activities**

Main activities :

- Development of agent-based models
- Coding the models
- Testing the code
- Running agent-based model simulations on different applications in biotechnology and medicine
- Communication with biologists and clinicians.

### **Skills**

Technical skills and level required :

- Knowledge, ideally experience, on modeling with agent-based models
- Sound knowledge in mechanics
- Good coding skills in C/C++
- Basic knowledge of numerics
- Sound knowledge in modeling biological systems
- Linux, windows

Languages : English (compulsory), French if possible (but not mandatory)

## 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

## Remuneration

Salary based on experience, full benefits

## General Information

- **Theme/Domain** : Modeling and Control for Life Sciences  
Scientific computing (BAP E)
- **Town/city** : Paris
- **Inria Center** : [Centre Inria de Paris](#)
- **Starting date** : 2019-12-01
- **Duration of contract** : 2 years
- **Deadline to apply** : 2019-12-31

## Contacts

- **Inria Team** : [MAMBA](#)
- **Recruiter** :  
Drasdo Dirk / [Dirk.Drasdo@inria.fr](mailto:Dirk.Drasdo@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

Background and knowledge in interdisciplinary research in relation to biology or/and medicine, mathematical modeling in biological systems, and knowledge in programming is required. Ideally this is matlab, C++, Python ...

The candidate should be ready to work in an interdisciplinary team and communicate with biologists and medical doctors. Large level of independency would be welcome.

Moreover, knowledge in development and usage of agent-based model would be extremely useful (example: P Van Liedekerke, MM Palm, N Jagiella, D Drasdo, Simulating tissue mechanics with agent-based models: concepts, perspectives and some novel results, Computational Particle Mechanics 2 (4), 401-444, 2015)

The candidate will have to extend existing code in C++ (code TiSim - tissue simulator).

**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.