



Offer #2024-07895

Research engineer position in numerical methods

Contract type : Fixed-term contract

Level of qualifications required : Graduate degree or equivalent

Other valued qualifications : Master degree

Fonction : Temporary scientific engineer

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 the **Inria team MOSAIC**. The team scientific activity revolves around mathematical **modeling** and digital simulation **in the field of plant developmental biology**. The main task of the sought engineer will be to extend an existing python library (BVPy) and provide a set of tools to implement simulations of plant tissue morphogenesis within the framework of Finite Element Methods (**FEM**). The goal is to enable the implementation of Initial and Boundary Value Problem (**BVP & IBVP**) on **dynamical structures**, generated from 3D acquisitions of living tissues. This mission will be carried in collaboration with researchers and engineers of the team as well as close biologist collaborators.

Assignment

Missions:

Supervised by Olivier Ali (researcher at Inria), Julien Derr (full professor at ENS Lyon) and Manuel Petit (research engineer at Inria), the sought engineer will extend the existing library BVPy, initially developed within the team to solve BVP and IBVP on static domains. The following upgrades are expected:

1. Handling of complex meshes extracted from 3D fluorescent microscopy acquisitions.
2. Implementation of a remeshing module to edit these meshes, to enable the simulation of tissular growth.
3. Code optimization through parallelization in order to address complex "multi-physics" scenarios.

For more context and details:

- Team website: [MOSAIC](#) and the hosting biology lab website: [RDP](#).
- Librarie BVPy V1.0: publication in [Journal of Open Source Software](#) and [gitlab](#) repository.
- Published prove of concept: [Boudon, Ali, Chopard et al PLoS Comp Biol 2015](#)

Collaboration :

The succesful candidate will be supervised by [Olivier Ali](#) and [Julien Derr](#), in close interaction with the engineer staff of the team.

Responsibilities:

The succesful candidate will be in charge of the technological development of the library. He/She will also help the team members (scientists, students) in their usage of the new library to address their

specific scientific questions. He/She could also supervised students and interns that will eventually join the project in the future.

Main activities

Main activities:

- Design and develop the architecture and the new components of the BVPy library.
- Implement a dynamic remeshing module (based on GMSH and/or CGal).
- Optimize the library performances through parallelization.

Side activities:

- Promotion of the library towards internal and external partners through scientific and technical presentations.
- Realization of training materials (tutorials, notebooks) and training sessions to sustain this promotion.

Skills

Technical skills:

- Expertise in numerical methods for scientific computing.
- Theoretical knowledge and practical experience in Finite Element Methods.
- Knowledge in python and experience with standard modern programming tools (IDEs, versionin...)

Language:

- English
- French (Optional but could be useful for daily and informal interactions)

Other skills:

- Scientific meeting chairmanship.

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 Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage under conditions

Remuneration

From 2692 € (depending on experience and qualifications).

General Information

- **Theme/Domain** : Modeling and Control for Life Sciences
Scientific computing (BAP E)
- **Town/city** : Lyon
- **Inria Center** : [Centre Inria de Lyon](#)
- **Starting date** : 2024-10-01
- **Duration of contract** : 2 years
- **Deadline to apply** : 2024-07-26

Contacts

- **Inria Team** : [MOSAIC](#)
- **Recruiter** :
Ali Olivier / olivier.ali@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

We seek a highly motivated candidate with a strong background on applied mathematics and/or computer science. The successful candidate will have an expertise in numerical methods for scientific computing. As the MOSAIC team is mostly working in a collaborative manner, we also expect the candidate to be a team player that thrives in collective projects. Our working environment and our scientific field is by essence multi-disciplinary, therefore a genuine scientific curiosity, especially toward life sciences, is expected.

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 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.