2018-00809 - PhD position: Inferring gene regulatory networks from single-cell data.

**Contract type:** Public service fixed-term contract  
**Level of qualifications required:** Graduate degree or equivalent  
**Fonction:** PhD Position

About the research centre or Inria department

Grenoble Rhône-Alpes Research Center groups together a few less than 800 people in 35 research teams and 9 research support departments.

Staff is localized on 5 campuses in Grenoble and Lyon, in close collaboration with labs, research and higher education institutions in Grenoble and Lyon, but also with the economic players in these areas.

Present in the fields of software, high-performance computing, Internet of things, image and data, but also simulation in oceanography and biology, it participates at the best level of international scientific achievements and collaborations in both Europe and the rest of the world.

**Context**

COSMIC will focus on B-cell lymphoma (BCL) and rheumatoid arthritis (RA), prototypical diseases originating from abnormal functioning of immune cells. The PhD candidate will investigate gene regulatory network inference from single-cell data. These networks aim at being plugged into computational multiscale models of the germinal center; developed by Consortium partners, that will help focusing on BCL and RA and in particular on the molecular perturbations that could affect the cellular level. In order to account for the stochasticity that arises from single-cell transcriptomics data, inference will be thought as a fitting procedure for a mechanistic gene network (coupled piecewise deterministic Markov processes) model followed by a statistical inference.

**Details**


**Our research team**

The Inria Dracula team focuses on multiscale modeling of biological processes, with an emphasis on the development of tools and methods for multiscale modeling of differentiation processes in fast renewing cell populations. For more information see https://dracula.univ-lyon1.fr/ and https://www.inria.fr/en/teams/dracula

**Assignment**

The PhD candidate will investigate gene regulatory network inference from single-cell transcriptomics data, using probabilistic models (piecewise deterministic Markov processes). These networks aim at being plugged into computational multiscale models of the germinal center that will help focusing on specific diseases and in particular on the molecular perturbations that could affect cellular dynamics.

**Main activities**

**Background**

EU countries face large health challenges to combat chronic diseases including immune disorders. Recently, systems medicine has emerged as a promising discipline to accelerate the translation of basic research into applications for improved diagnostics and personalized treatment. Its power arises from the integration of laboratory and computational approaches crossing research disciplines and sectors to solve biomedical and clinical questions.

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This 3-year PhD position is funded by the Marie Skłodowska-Curie actions of the European Union’s Horizon 2020 research and innovation program under grant agreement No 765158. You will be appointed as fulltime PhD for 3 years with Inria Grenoble Rhône Alpes Research Center.

**Host:**  
Dr. Olivier Gandrillon / Dr. Fabien Crauste  
Inria Team-Project Dracula (http://dracula.univ-lyon1.fr/)  
Inria Research Center Grenoble Rhône Alpes (https://www.inria.fr/en/centre/grenoble)  
56 boulevard Niels Bohr, 69100 Villeurbanne  
France  
**Duration:** 36 months

**Skills**

**Technical skills and level required:**

- Candidates should have a Master’s degree in mathematics, computer sciences, or similar with a strong interest in biology.
- Experience with Markov processes, differential equations and/or agent-based modeling
- Basic statistical knowledge and experience with R

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**General Information**

- **Theme/Domain:** Modeling and Control for Life Sciences  
  Scientific computing (BAP E)  
  Inria Center: CRI Grenoble - Rhône-Alpes  
  **Starting date:** 2018-09-01  
  **Duration of contract:** 3 years  
  **Deadline to apply:** 2018-06-01

**Contacts**

- **Inria Team:** DRACULA  
  **Recruiter:** Gandrillon Olivier / olivier.gandrillon@inria.fr

**About Inria**

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 2700 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.

**Conditions for application**

**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). Authorization 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.

**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.
Strong programming skills
Excellent higher education track record and strong scientific curiosity.

Languages: Fluent spoken and written English skills

Relational skills: We seek a highly motivated scientist who enjoys an interdisciplinary environment and an interdisciplinary project, able to work independently but also as part of a team.

Other valued appreciated:
- Experience in systems biology or systems medicine
- Experience in interacting with biologists and medical doctors.

Benefits package
- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

Remuneration
The gross month salary will be at least 2800€, with a potential bonus depending on the familial situation.