Offer #2023-07067

Internship: mathematical model of metabolic network of liver cell during liver steatosis

Level of qualifications required : Master's or equivalent
Fonction : Internship Research

About the research centre or Inria department

The Inria Saclay-Île-de-France Research Centre was established in 2008. It has developed as part of the Saclay site in partnership with Paris-Saclay University and with the Institut Polytechnique de Paris since 2021.

The centre has 39 project teams, 27 of which operate jointly with Paris-Saclay University and the Institut Polytechnique de Paris. Its activities occupy over 600 scientists and research and innovation support staff, including 54 different nationalities.

Context

Within the framework of a partnership (you can choose between)

- not applicable,
- collaboration between 2 Inria teams:
- collaboration with {{team_Inria} and the start-up {*****},
- project/programme/European fund {*****},
- public with {French National Research Agency (ANR), local and regional authorities, academic partners, *****}
- value-creation and technology transfer contracts with {*****}.

a package/model/prototype/application/interface/infrastructure/other specify {*****} more specifically dedicated to {*****}.

Is regular travel foreseen for this post ? "Do not hesitate to make this known and to ensure that "travel expenses are covered within the limits of the scale in force".

Assignment

Context

Fatty liver disease (steatosis) is a common liver complaint in western countries. It is usually caused by excessive calories (e.g. overnutrition or abuse of alcohol) which lead to fat (lipid) buildup in the liver and might progress to liver fibrosis, cirrhosis or even cancer if the fat/lipid accumulation reaches a severe level. To better understand the progression of steatosis, it is necessary to explore the mechanism of lipid metabolism of the liver. The project is an ongoing collaboration between Team SIMBIOTX, Inria and external partners. The internship will be supervised by Jieling Zhao and Dirk Drasdo (https://team.inria.fr/simbiotx/) with input from our international collaborators.

Objectives

The main scientific objectives of this internship are to

1. Set up a kinetic model using the known lipid metabolic network of the liver
2. Simulate the lipid dynamic in the liver cell during steatosis progression
3. Analyze which interactions or components in the metabolic network play the most important roles
4. Simplify the metabolic network and calibrate the parameters to fit the simplified model with the original model

For a better knowledge of the subject


Main activities

Main activities
• Construct ODEs (ordinary differential equations) system for the corresponding metabolic network
• Learn how to use tools and libraries to solve the ODE system
• Literature review on related topics
• Development of a simplified kinetic model of lipid metabolism
• Writing of a scientific paper

Skills

• Technical: Linux, Python or C/C++, github
• Language: English (at work proficiency)

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 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

Remuneration

According to profile

General Information

• Theme/Domain: Computational Biology
• Biologie et santé, Sciences de la vie et de la terre (BAP A)
• Town/city: Palaiseau
• Inria Center: Centre Inria de Saclay
• Starting date: 2024-01-02
• Duration of contract: 5 months
• Deadline to apply: 2024-02-29

Contacts

• Inria Team: SIMBIOTX
• Recruiter: Zhao Jieling / jieling.zhao@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:

• Students in Engineering, Mathematics, Physics, Computer sciences, or related

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.