Offer #2020-02667

Post-Doctorant F/H Quantitative modeling of the response to immunotherapy in non-small cell lung cancer

The offer description below is in French

Contract type : Fixed-term contract

Level of qualifications required : PhD or equivalent

Fonction : Post-Doctoral Research Visit

About the research centre or Inria department

The Inria team MONC is devoted to applications of mathematical modeling, simulations and scientific calculus in oncology with the following aims:

- *Improve our understanding in cancer biology and pharmacology,*
- *Assist the development of novel therapeutic approaches,*
- *Develop personalized decision-helping tools for monitoring the disease and evaluating therapies.*

More precisely, we aim at developing new mathematical models – involving partial differential equations (PDE) and built from a precise biological and medical knowledge – combined with novel data assimilation techniques, image processing, statistical methods and (artificial) intelligence – in order to build numerical tools based on available quantitative data about cancer. The goal is finally to be able to help clinicians and/or biologists to better understand, predict or control tumor growth and possibly evaluate the therapeutic response, in a clinical context or for pre-clinical studies. We plan to develop patient-specific approaches (mainly based on medical imaging) as well as population-type approaches in order to take advantage of clinical cohorts.

Each type of cancer is different and only a limited number of pathologies are targeted among which: lung metastases, meningioma, gliomas, soft-tissue sarcoma, kidney, lung and liver tumors.

Context

The postdoc position will take place within the framework of a partnership between the Inria team MONC in Bordeaux (mathematical modeling), the SMARTc team in Marseille (clinical pharmacology and pharmacometrics) and the public hospitals of Marseille (AP-HM, thoracic clinical oncology) funded by the french National Cancer Institute (INCa). It will consist in developing mechanistic models of the response to immune-checkpoint inhibitors (ICI) with access to unique large-scale (~450 patients), longitudinal and multi-modal biological data generated by the PIONeeR clinical study (RHU program).

Travel expenses between Bordeaux and Marseille as well as participation to major international conferences (e.g. AACR, ASCO) will be covered within the limits of the scale in force.

Assignment

Missions :

With the help of experts in mathematical modeling in oncology, clinical pharmacology and clinical oncology, the recruited person will be in charge to develop and validate biologically-based models of the response to ICI in non-small cell lung cancer. To this end, large data sets containing multi-modal and longitudinal data from immuno-histochemistry, imaging, pharmacokinetics, immunoprofiling, soluble biomarkers and sequencing data (including circulating DNA) will be used. The models will be based on the current knowledge in the field of immuno-oncology. Advanced statistical learning methods combining machine learning techniques and mixed-effect models will be employed for calibration of the models and confrontation with the data.

Pour une meilleure connaissance du sujet de recherche proposé :

See the website of the PIONEER project:https://marseille-immunopole.org/the-pioneer-project/

For relevant previous publications, see:http://benzekry.perso.math.cnrs.fr/recherche.html

Collaboration :

The recruited person will work under the supervision of S. Benzekry and will collaborate with clinical pharmacists and pharmacometricians (Pr J. Ciccolini and SMARTc unit, Center for Research on Cancer of Marseille), as well as clinical oncologists from thoracic oncology (Pr F. Barlesi, AP-HM, Marseille).

Main activities

Main activities:

- Knowledge of the biological and clinical literature (immuno-oncology)
- Data analysis and visualization
- Mechanistic modeling
- Statistical learning and parameter estimation
- Development of predictive tools

Skills

Technical skills and level researched :

- Excellent programing skills (python, R or Matlab)
- Data analysis
- Statistics (ideally, experience in mixed-effects modeling)
- Mechanistic modeling (differential equations)
- Knowledge of cancer biology or medicine

Languages :

- French not mandatory
- Proficient in English.

Good relational skills and ability to work and communicate in an interdisciplinary environment are required.

Benefits package

- Restauration subventionnée
- Transports publics remboursés partiellement
- Possibilité de télétravail (après 6 mois d'ancienneté) et aménagement du temps de travail
- Équipements professionnels à disposition (visioconférence, prêts de matériels informatiques, etc.)
- Prestations sociales, culturelles et sportives (Association de gestion des œuvres sociales d'Inria)
- Accès à la formation professionnelle
- Sécurité sociale

Remuneration

2653€ / month (before taxs)

General Information

- **Theme/Domain :** Modeling and Control for Life Sciences
  Biologie et santé, Sciences de la vie et de la terre (BAP A)
- **Town/city :** Talence
- **Inria Center :** Centre Inria de l'université de Bordeaux
- **Starting date :** 2020-07-01
- **Duration of contract :** 2 years
- **Deadline to apply :** 2020-07-31

Contacts

- **Inria Team :** MONC
- **Recruiter :**
  Benzekry Sebastien / Sebastien.Benzekry@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

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

Thank you to send :
- CV
- Cover letter
- Support letters (mandatory)
- List of publication

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.