Offre n°2025-09159

Engeneer F/M - Optimization of therapeutic strategies for pediatric cancers using mathematical modeling of intra-tumor heterogeneity

Le descriptif de l'offre ci-dessous est en Anglais

Type de contrat : CDD

Niveau de diplôme exigé : Bac + 5 ou équivalent

Fonction : Ingénieur scientifique contractuel

Corps d'accueil : Ingénieur de Recherche (IR)

Niveau d'expérience souhaité : Jeune diplômé

A propos du centre ou de la direction fonctionnelle

The Inria centre at Université Côte d'Azur includes 42 research teams and 9 support services. The centre's staff (about 500 people) is made up of scientists of di?erent nationalities, engineers, technicians and administrative staff. The teams are mainly located on the university campuses of Sophia Antipolis and Nice as well as Montpellier, in close collaboration with research and higher education laboratories and establishments (Université Côte d'Azur, CNRS, INRAE, INSERM ...), but also with the regiona economic players.

With a presence in the fields of computational neuroscience and biology, data science and modeling, software engineering and certification, as well as collaborative robotics, the Inria Centre at Université Côte d'Azur is a major player in terms of scientific excellence through its results and collaborations at both European and international levels.

Contexte et atouts du poste

This engineer position will be located in the Inria-Inserm team COMPO (COMputational Pharmacology in Oncology), located in the La Timone health campus. The team is composed of mathematicians, data scientists, pharmacists and clinicians and is a unique multidisciplinary environment focused on developing novel computational tools for decision-making in clinical oncology.

The engineer will join the INCa- (French National Cancer Institute) funded project COPYCAT: Combining Organoid technology with Mathematics to develop innovative models mimicking tumor cellular heterogeneity and plasticity for pediatric oncology. It is a collaboration between

- Laura Broutier's team (Cell death and childhood cancers team, Center of Research on Cancer of Lyon (CRCL), Inserm, CNRS)
- Eddy Pasquier's team (REMAP-4Kids, Center of Research on Cancer of Marseille (CRCM), Inserm, CNRS)
- COMPO (Inria and CRCM, Marseille)

He / she will also take part to the larger, INCa-funded, SouthRock consortium for pediatric cancers research between Lyon and Marseille.

This post will be co-supervised by S. Benzekry and E. Ventre.

Mission confiée

Objective

To develop mechanistic mathematical models from patient-derived organoid data in order to propose novel drug combinations and scheduling regimen tackling intra-tumor resistance to treatment in pediatric rhabdomyosarcoma (RMS).

Data

From patients biopsies at diagnosis and relapse

- Molecular:
  - DNAseq 500X
  - bulk RNAseq
  - MethylEpic
  - scRNA-seq
- Histological images

Same from patient-derived RMS-organoids (RMS-O), both untreated and treated with multiple drugs and combinations, in addition to markers of differentiation, viability assays and qRT-PCR. in ? 3 genetically engineered RMS-O.

Part of the data has already been published in [1] and the other has been generated since the start of the project in 2023.

Methods

The mathematical and computational tools will be developed departing from existing methods:

- The CARDAMOM software for molecular data [2]
- Mixed-effects pharmacokinetics / pharmacodynamics modeling of tumor response / resistance [3]

[1] Savary, C. et al (Broutier, L.). Fusion-negative rhabdomyosarcoma 3D organoids to predict effective drug combinations: A proof-of-concept on cell death inducers. Cell Rep. Med. 4, 101339 (2023).

[2] Ventre, E., Herbach, U., Espinasse, T., Benoit, G. & Gandrillon, O. One model fits all: Combining inference and simulation of gene regulatory networks. PLOS Comput. Biol. 19, e1010962 (2023).

[3] Imbs, D. et al (Benzekry, S.). Revisiting Bevacizumab + Cytotoxics Scheduling Using Mathematical Modeling: Proof of Concept Study in Experimental Non-Small Cell Lung Carcinoma. Cpt Pharmacometrics Syst Pharmacol 7, 42–50 (2018).

Principales activités

Main activities:

- Literature
- Bulk and single cell omics data analysis and modeling
- Pharmacokinetics / pharmacodynamics modeling of resistance to treatments
- Software development
- Interactions with the biological and clinical partners
- Writing scientific publications
- Communications in scientific events
- Responsibilities within COMPO (mentoring students,...)

Additional activities:

- Continuous integration / continuous deployment of the code
- Data visualization
- Statistical reporting to the partners
- Participation to the maintainment of COMPO software

Compétences

Technical skills and level required :

- Excellent programming skills in a scripting language (R and/or Python)
- Hands-on experience with molecular data analysis (bulk / single-cell is a plus)
- Hands-on experience with real-world biological and clinical data analysis
- Strong background in applied mathematics and statistics
- Ideally, experience in mixed-effects modeling
- Strong motivation for biological and medical of computational methods
- Knowledge of biology and/or medicine is a plus
- Ability to work both independently and as a team, good relational skills

Additional:

- English speaking
- Strong academic writing skills
- Strong oral presentation skills

Avantages

- 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
- Contribution to mutual insurance (subject to conditions)

Rémunération

From 2692 € gross monthly (according to degree and experience)

Informations générales

- **Thème/Domaine :** Biologie numérique
  Biologie et santé, Sciences de la vie et de la terre (BAP A)
- **Ville :** Marseille
- **Centre Inria :** Centre Inria d'Université Côte d'Azur
- **Date de prise de fonction souhaitée :** 2025-11-01
- **Durée de contrat :** 1 an, 4 mois
- **Date limite pour postuler :** 2025-08-31

Contacts

- **Équipe Inria :** COMPO
- **Recruteur :**
  Benzekry Sebastien / Sebastien.Benzekry@inria.fr

A propos d'Inria

Inria est l’institut national de recherche dédié aux sciences et technologies du numérique. Il emploie 2600 personnes. Ses 215 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3900 scientifiques pour relever les défis du numérique, souvent à l’interface d’autres disciplines. L’institut fait appel à de nombreux talents dans plus d’une quarantaine de métiers différents. 900 personnels d’appui à la recherche et à l’innovation contribuent à faire émerger et grandir des projets scientifiques ou entrepreneuriaux

qui impactent le monde. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 200 start-up. L'institut s'e?orce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

L'essentiel pour réussir

You don't just apply the reference method to a given problem; instead, you are eager to thoroughly understand the information contained in the data.

Attention: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.

Consignes pour postuler

Applications must be submitted online on the Inria website. Collecting applications by other channels is not guaranteed.

The position is open to:
- Inria internal mobility, remuneration according to statutory conditions
- mobility from other public body, by posting for a period of three years, renewable, remuneration according to statutory conditions
- in short term contract from service fixed-term

Sécurité défense :
Ce poste est susceptible d'être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L'autorisation d'accès à une zone est délivrée par le chef d'établissement, après avis ministériel favorable, tel que défini dans l'arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l'annulation du recrutement.

Politique de recrutement :
Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.