**Offre n°2024-07645**

**Post-Doctoral Research Visit F/M DRI Campaign [Inria Brasil]: Mathematical modeling of vector-borne diseases**

*Le descriptif de l’offre ci-dessous est en Anglais*

**Type de contrat :** CDD

**Contrat renouvelable :** Oui

**Niveau de diplôme exigé :** Thèse ou équivalent

**Fonction :** Post-Doctorant

**A propos du centre ou de la direction fonctionnelle**

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.

**Contexte et atouts du poste**

**Context**

Every year Inria International Relations Department has a few postdoctoral positions in order to support Inria international collaborations.

The postdoctoral contract will have a duration of **12 to 24 months**. The default start date is **November 1st, 2024 and not later than January, 1st 2025**. The postdoctoral fellow will be recruited by one of the Inria Centres in France but it is recommended that the time is shared between France and the partner’s country (please note that the postdoctoral fellow has to start his/her contract being in France and that the visits have to respect Inria rules for missions).

**Mission confiée**

Candidates for postdoctoral positions are recruited after the end of their Ph.D. **after a first postdoctoral period**: for the candidates who obtained their PhD in the **Northern hemisphere**, the date of the Ph.D. defense shall be later than September 1, 2022; in the **Southern hemisphere**, later than April 1, 2022.

In order to encourage mobility, the postdoctoral position must take place in a scientific environment that is truly different from the one of the Ph.D. (and, if applicable, from the position held since the Ph.D.); particular attention is thus paid to French or international candidates who obtained their doctorate abroad.

**Mathematical modeling of vector-borne diseases**

Diseases transmitted by the Aedes mosquito, such as dengue, Zika, and Chikungunya, are still difficult to control because there is no effective vaccine yet. To date, all control efforts focus on the mosquito population and include traditional techniques such as mechanical techniques to reduce mosquito breeding sites and chemical techniques that kill mosquito larvae and adult stages. Recently, the release of Wolbachia-carrying mosquitoes has been cited as a promise to stop arbovirus transmission, but several bottlenecks still compromise the effectiveness of this technique. Our goal is to address some of these issues:

(i) the impact of diapause and quiescence on mosquito dynamics;

(ii) the competition between infected and wild mosquitoes in a scenario of imperfect vertical transmission and cytoplasmic incompatibility;

(iii) the evolution of the Wolbachia-Aedes symbiont;
(iv) evaluation of selected biological vector control strategies that include the release of sterile male Wolbachia-infected mosquitoes to reduce dengue transmission.

The modeling techniques that will be preferred to address these issues are those based on age-structured non-autonomous partial differential equations to account for mosquito life cycles as well as environmental conditions such as temperature and humidity.

The candidate will join the Dracula team. He/she will have the opportunity to learn from each of the team members who are leading experts in this field of research. He/she will participate in our bi-weekly meetings and monthly seminars.

The Dracula team is very dynamic and will also provide a pleasant working environment with the interaction of other PhD and post-doc students as well as visiting faculty.

In addition, the candidate will participate in our regular exchanges with the team of Claudia Pio Ferreira (São Paulo State University, UNESP), our main collaborator on the subject within the framework of our Inria-Brazil projects.

**Principales activités**

- Design, analysis and simulation of age-structured PDEs to model the life cycle of mosquitoes
- Write documentation
- Write reports and articles
- Present the works’ progress to partners

**Compétences**

Technical skills and level required: The candidate will have experience in biomathematics, ideally with knowledge of age-structured models. In addition, the following knowledge will be considered an asset: use of various mathematical formalisms, experience in numerical simulations, experience in parameter estimation.

Languages: English

Relational skills: A good ability to work in a team will be appreciated.

**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 (90 days / year) and flexible organization of working hours (except for internship)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage under conditions

**Rémunération**

2788 € gross salary / month

**Informations générales**

- **Thème/Domaine**: Modélisation et commande pour le vivant Biologie et santé, Sciences de la vie et de la terre (BAP A)
- **Ville**: Villeurbanne
- **Centre Inria**: [Centre Inria de Lyon](https://www.inria.fr)
- **Date de prise de fonction souhaitée**: 2024-11-01
- **Durée de contrat**: 1 an, 6 mois
- **Date limite pour postuler**: 2024-06-02

**Contacts**

- **Équipe Inria**: DRACULA
- **Recruteur**: Adimy Mostafa / mostafa.adimy@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’efforce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l’économie.

**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**

Deadline for application: June 2, 2024

**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.