



**Offer #2022-05478**

## **Post-Doctoral Research Visit F/M Post-doctoral research fellowship in modelling of the immune response to Ebola vaccine**

**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 challenge is to analyze these BIG DATA to answer clinical and biological questions by using appropriate statistical methods. With data on the machinery of a cell to the clinical status of individuals in any circumstances including in clinical trials, new tools are needed to translate information obtained from complex systems into knowledge. This has led to the field of « systems biology » and « systems medicine » by extension, which naturally takes place in the context of translational medicine that links clinical and biological research.

### **Context**

Human-to-human transmission of Ebola virus in West Africa was interrupted in 2016 but the risk of re-emergence of the disease is real. Thus, efforts to develop a safe and effective vaccine against Ebola virus disease with a durable prophylactic effect in communities must continue. The Partnership for Research on Ebola Vaccinations (PREVAC) is an international consortium including the French Institute of Health and Medical Research, the London School of Hygiene & Tropical Medicine, the US National Institutes of Health, health authorities and scientists from Guinea, Liberia, Mali and Sierra Leone, a non-governmental organisation (Alliance for International Medical Action), and Merck, Johnson & Johnson and Bavarian Nordic companies.

The PREVAC trial is a phase IIB, randomised, placebo controlled, multicentre trial evaluating the safety and immunogenicity over 12 months of three vaccine strategies in children and adults. Participants are randomised to one of five groups: (i) vaccination with Ad26.ZEBOV prime and MVA-BN-Filo boost, (ii) vaccination with rVSV-G-ZEBOV-GP prime and a boost of the same vaccine, (iii) vaccination with rVSV-G-ZEBOV-GP vaccine without boost, (iv) placebo group 1 and (v) placebo group 2. Preliminary phases started in Liberia and Guinea in March 2017; the main phase of the trial evaluating the five regimens begun in Liberia, Guinea Sierra Leone and Mali in April 2018 with an enrolment targets of 1,400 adults and 1,400 children.

The PREVAC-UP trial consists in a long term follow-up of patients included in the PREVAC trial to determine (i) the long-term immunogenicity and safety and (ii) durability of humoral and cellular immune responses of Ebola vaccine regimes over 60 months. In this postdoc, we propose to address these two question using mathematical modeling and statistics.

### **Assignment**

The SISTM (Statistics in Systems and Translational Medicine) team directed by Pr. Rodolphe Thiébaud is involved in PREVAC and PREVAC-UP and had been also involved in many international consortium for EBOLA, ie. EBOVAC1 and EBOVAC3 and coordinates EBOVAC2. In this context one of its main goal is to conduct the analysis and the modelling of the immune response to the Ebola vaccine strategy, using data including immunological substudies recording many biomarkers (cell phenotype, functionality, gene expression, antibody titers...).

SISTM is a team belonging to INSERM U1219 Bordeaux Population Health and INRIA Bordeaux Sud-Ouest research institutes. The group is dedicated to the analysis and the modelling of the data generated in epidemiology and medicine with a special focus on vaccines and immune interventions in HIV and other infectious diseases. Its expertise is mainly in biostatistics with a special emphasis on dynamical models based on ODE and statistical learning using moderately high dimensional data.

### **Main activities**

The main objective of this postdoc position will be to use the data gathered through the PREVAC/PREVAC-UP trials to build and fit a model of the immune response to the Ebola vaccine in order to better characterize the response (duration) and better understand the mechanism of its establishment. Model estimation will be performed using maximum likelihood approach as implementer with the SAEM algorithm, for example in the

MONOLIX software of the Lixoft suite. Methodological development will consist in building a series of model building strategies.

## Skills

The candidate should hold a PhD in mathematics, physics or statistics. We are looking for a highly motivated candidate with an outstanding potential and a strong background in statistics and a deep interest in immunology and biological application. Proven experience in R language is required. The ideal candidates are able to work effectively as part of a team, but also to develop and pursue independent ideas. The successful candidates are expected to conduct innovative research at the highest international level.

Experience in modelling and applications in biology is highly recommended and previous work in immunology/Vaccinology, systems biology will be highly appreciated.

The expected starting date can be as soon as possible.

## Remuneration

Salary will follow Inserm rates and can be negotiated to be higher depending on previous experience and skills.

## General Information

- **Theme/Domain** : Optimization, machine learning and statistical methods  
Statistics (Big data) (BAP E)
- **Town/city** : Bordeaux
- **Inria Center** : [Centre Inria de l'université de Bordeaux](#)
- **Starting date** : 2022-12-01
- **Duration of contract** : 12 months
- **Deadline to apply** : 2023-06-30

## Contacts

- **Inria Team** : [SISTM](#)
- **Recruiter** :  
Prague Melanie / [melanie.prague@inria.fr](mailto:melanie.prague@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.

**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

### 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.