# 2019-01763 – Post-Doctoral Research Visit F/M Post-doctoral research fellowship in modelling of the immune response to Ebola vaccine

**Contract type** : Fixed-term contract
**Renewable contract** : Oui
**Level of qualifications required** : PhD or equivalent
**Fonction** : Post-Doctoral Research Visit
**Level of experience** : Recently graduated

## 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.
The statistical analysis of these data is facing several issues:

- There are more parameters (p) to estimate than individuals (n)
- The types/nature of data are various
- The relationship between variables is often complex (e.g. non linear) and can change over time to tackle these issues we are developing specific approaches for these questions, often related to immunology.

The methods are mainly based on either mecanistic modeling using differential equation systems or on statistical learning methods. The general paradigm of our approach is to include as much information as available to answer a given question. This information comes from the available data but also from prior biological information available defining the structure of the model or restricting the space of the parameter values. We develop and apply our methods mainly for applications belonging to clinical research especially HIV immunology. For instance, several projects are devoted to the modelling of the response to antiretroviral treatments, immune interventions or vaccine in HIV infected patients.

Applications are provided by the Vaccine Research Institute (VRI), other teams in the research centre and the Bordeaux Hospital Clinical Trial Unit (CTU).

## Context

The EBOVAC3 project aims to assess, through clinical trials in children and adults in Africa, the safety and effectiveness of an Ebola vaccine regimen. As such it will help to improve the world's preparedness to deal with an Ebola outbreak. The project focuses on the 'prime-boost' Ebola vaccine regimen (Ad26.ZEBOV and MVA-BN-Filo) prime-boost' Ebola vaccine regimen, in which patients are first given a dose to prime the immune system, and then a boost dose which is intended to enhance the immune response over time. Building on work carried out under the EBOVAC1 (http://www.ebovac.org/) and the EBOVAC2 (http://www.ebovac2.com/) projects, EBOVAC3 ( will run clinical trials in children in Sierra Leone, Guinea and the Democratic Republic of Congo. It will also follow up people who participated in earlier clinical trials in Sierra Leone, to assess the safety and efficacy of the vaccine in the longer term. Finally, the project aims to characterize the outbreak preparedness of Sierra Leone, Guinea and the Democratic Republic of Congo.

The SISTM (Statistics in Systems and Translational Medicine) team directed by Pr. Rodolphe Thiébaut is involved in 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 the data produced in Phase I and II clinical trials (in Europe and Africa), including immunological substudies recording many biomarkers (cell phenotype, functionality, gene expression, antibody titers...).

## General Information

- **Theme/Domain** : Modeling and Control for Life Sciences
  Statistics (Big data) (BAP E)
- **Town/city** : Talence
- **Inria Center** : CRI Bordeaux - Sud-Ouest
- **Starting date** : 2021-03-01
- **Duration of contract** : 2 years
- **Deadline to apply** : 2021-12-31

## Contacts

- **Inria Team** : SISTM
- **Recruiter** :
  Prague Melanie / 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.

## The keys to success

The candidate should hold a PhD in mathematics, physics or statistics. We are looking for an 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.

## 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.

**Warning** : you must enter your e-mail address in order to save your

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.

## Assignment

The main objective of this postdoc position will be to use the data gathered through the EBOVAC projects 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.

The candidate will be integrated in a team of biostatisticians and modelers working on related topics: modeling of HIV vaccine response. The candidate will benefit from a very attractive environment with computing facilities and close collaborations with mathematicians (from INRIA and INSERM research centers) and immunologists (from the EBOVAC consortia as well as from the Labex Vaccine Research Institute).

## Main activities

It is expected that the successfull candidate will conduct novel research in the proposed topic and will be able to quickly valorize it by writing articles and presenting in conferences. The postdoctoral fellow will be considered as a junior researchor.

## Skills

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

## Benefits package

- Subsidized meal
- Public transport partially reimbursed
- Possibility of teleworking (after 6 months of seniority) and organisation of working time
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports services (Inria Social Work Management Association)
- Access to vocational training
- Social security

## Remuneration

2653€ / month (before taxs)