



Offer #2024-07889

Post-Doctoral Research Visit F/M Policy learning under distributional shifts

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 centre at Université Côte d'Azur includes 42 research teams and 9 support services. The center's staff (about 500 people) is made up of scientists of different 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 regional 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.

Assignment

Assignments :

With the help of [Julie Josse](#), the recruited person will be taken to conduct innovative research on causal inference.

For a better knowledge of the proposed research subject :

A state of the art, bibliography and scientific references are available at the following URL, do not hesitate to log in the [Premedical website](#)

Collaboration :

The recruited person will be in connection with Aurelien Bellet, Research Director at Inria Montpellier.

The recruited person will be part of the PEPR SMATCH (Statistical and AI based Methods for Advanced Clinical Trials CHallenges in Digital Health) in digital health and will benefit from this network. In particular, he/she will be part of workpackage 2: Enriching clinical trials with multi-sources and multidimensional auxiliary data. The aim is to develop the next generation of methods to combine high-throughput, high-dimensional individual and ancillary data in clinical trials and to evaluate their benefit.

Responsibilities :

The person recruited is responsible for developing methods of data integration in the context of causal inference and will take initiatives for studying statistical properties of policy learning methods under distributional shifts.

Main activities

The inclusion/exclusion criteria of an RCT are closely tied to its ability to reach useful conclusions: across an overly heterogeneous group will kill statistical power on the average effect, but an overly homogeneous group risks misrepresenting the target population. Data fusion, drawing the link between the RCT and individuals outside the trial (Colnet et al. 2021), can address both these problems, in particular by estimating heterogeneous effects, rather than concluding on the average effects. The objective of this project is to use machine-learning methods to estimate heterogeneous effects from an RCT leveraging external data to increase statistical power. This project will provide concrete procedures and recommendations. A theoretical and numerical study will conclude on the finite-sample bias and variance of various machine-learning methods to estimate the CATE (conditional average treatment effect). The same methodology will be applied for time-to-event data. More precisely, we will go through the following steps

- Developing transportability estimators for policy learning and studying their statistical

- properties (asymptotic and finite sample) in particular with different subsets of variables
- Incorporate a temporal aspects and study dynamic treatment regimes
- Testing the suggested methods using numerical simulations and clinical data

In terms of concrete applications, PreMeDICaL has ongoing collaborations with hospitals and other clinical partners. These collaborations will provide opportunities to apply the approaches developed during the Postdoc to concrete use-cases.

Skills

Technical skills and level required : PhD in Statistics, Machine Learning, biostatistics or related fields. Strong statistical computing skill.

Languages : English, French

Relational skills : Excellent writing and communication skills

Benefits package

- 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)

Remuneration

Gross Salary: 2788 € per month

General Information

- **Theme/Domain** : Computational Neuroscience and Medicine Statistics (Big data) (BAP E)
- **Town/city** : Montpellier
- **Inria Center** : [Centre Inria d'Université Côte d'Azur](#)
- **Starting date** : 2024-10-01
- **Duration of contract** : 2 years
- **Deadline to apply** : 2024-07-23

Contacts

- **Inria Team** : [PREMEDICAL](#)
- **Recruiter** :
Josse Julie / julie.josse@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

We are looking for excellent candidates, highly motivated, with background knowledge in mathematics, statistics /machine learning and potentially interested by research motivated by health applications.

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

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.