



## **Offer #2026-10055**

# **Post-Doctoral Research Visit F/M Inria-CWI Postdoc on Robust Sequential Tests, Estimation, and Bandits**

**Contract type :** Fixed-term contract

**Level of qualifications required :** PhD or equivalent

**Fonction :** Post-Doctoral Research Visit

**Level of experience :** Up to 3 years

## **About the research centre or Inria department**

Created in 2008, the Inria center at the University of Lille employs 360 people, including 305 scientists in 16 research teams. Recognized for its strong involvement in the socio-economic development of the Hauts-De-France region, the Inria center at the University of Lille maintains a close relationship with large companies and SMEs. By fostering synergies between researchers and industry, Inria contributes to the transfer of skills and expertise in the field of digital technologies, and provides access to the best of European and international research for the benefit of innovation and businesses, particularly in the region.

For over 10 years, the Inria center at the University of Lille has been at the heart of Lille's university and scientific ecosystem, as well as at the heart of Frenchtech, with a technology showroom based on avenue de Bretagne in Lille, on the EuraTechnologies site of economic excellence dedicated to information and communication technologies (ICT).

## **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, 2026 and not later than January, 1st 2027. 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).

## **Assignment**

Candidates for postdoctoral positions are recruited after the completion of their Ph.D. or a first postdoctoral period. To be eligible, candidates must have defended their Ph.D. no more than 3 years before the start date of the contract. As the start date will be between November 1, 2026 and January 1, 2027, the latest eligible Ph.D. defense date will vary accordingly (approximately between November 1, 2023 and January 1, 2024). 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.

**Deadline for application:** June 7, 2026

## Main activities

The postdoc project is hosted jointly by INRIA Lille and CWI in Amsterdam. These national research centers have ongoing collaborations in the area of bandits and statistical testing. The current postdoc project revolves around the question of **sequential robust estimation**. This includes for example mean estimation in the Huber model with adversarial corruptions (Mathieu et al., 2022; Agrawal et al., 2024) and A/B testing under mild model misspecification.

Robust statistics and robust estimation deal with inference and estimation when the data have outliers, i.e. a small proportion of the data is arbitrary and does not come from the distribution from which we want to learn (Ronchetti and Huber, 2009; Wilcox, 2012). As these outliers can make most classical non-robust statistics arbitrarily bad, the classical approaches of least square regression and maximum likelihood estimates have to be significantly modified. The effect of outliers is even stronger when the sample-size is small, in which case it is customary to use sequential methods to stop collection of data as soon as we have enough to conclude. Depending on when the outliers are collected, a sequential test may completely fail– stops very early and ends up with a wrong conclusion with high confidence.

More specifically, we are interested in studying two types of statistics, namely the Generalized Likelihood Ratio Test statistic (GLRT) (Kaufmann and Koolen, 2021; Agrawal et al., 2024) and the closely related KLinf statistic (Degenne and Mathieu, 2024), for the sequential setting and specific corruption models. Both these statistics are popular tools in statistical testing due to their close relation to information theoretic lower bounds on the minimal sample size needed to conclude. These statistics have already been applied successfully to estimation, confidence intervals and testing in both parametric and non-parametric models. Though the GLRT and KLinf statistics are well-defined in some of the corrupted settings (Agrawal et al., 2024), their concentrations are not sufficiently understood for most of the practical distributions.

In this context, the postdoc will work with us to resolve challenges of sequential robust estimation problem with specific distributional assumptions, structure and corruption styles. Specifically, we would work on one or more of these problems:

- Behaviour of GLRTs under different models of corruptions and structures of data distributions,
- Tightness and coverage of anytime-valid and robust confidence intervals in terms of KLInf,
- Concentration of KLInf driven robust mean estimation under corruptions beyond Gaussians.

The postdoc will study, employ and develop statistical frameworks including GLRT, KLInf, GRO and E-values (Grunwald et al., 2024), martingales (Ruf et al., 2022; Kaufmann and Koolen, 2021), online learning and universal prediction (Agrawal et al., 2021).

The candidate is expected to conduct the research activities, that is bibliographical search, proposing original ideas related to the topic and developing them, presenting the work in the School seminar, workshops and conferences. Due to the collaborative nature of the project, the candidate is also expected to spend a part of time at CWI Amsterdam. The candidate should aim to publish the research results in premier conferences and journals of our field of research (e.g. ICML, NeurIPS, COLT, IJCAI, AAI, JMLR, Annals of Stat.). Since the work involves and impacts responsible AI in general, the successful candidate should collaborate in writing scientific articles aiming towards the larger audience.

### *References*

Agrawal, S., Koolen, W. M., and Juneja, S. (2021). Optimal best-arm identification methods for tail-risk measures. *Advances in neural information processing systems*, 34:25578–25590.

Agrawal, S., Mathieu, T., Basu, D., and Maillard, O.-A. (2024). Crimed: Lower and upper bounds on regret for bandits with unbounded stochastic corruption. In *International Conference on Algorithmic Learning Theory*, pages 74–124. PMLR.

Degenne, R. and Mathieu, T. (2024). Information lower bounds for robust mean estimation.

Grunwald, P., de Heide, R., and Koolen, W. (2024). Safe testing. *Journal of the Royal Statistical Society. Series B: Statistical Methodology*, 86(5):1136–1137.

Kaufmann, E. and Koolen, W. M. (2021). Mixture martingales revisited with

applications to sequential tests and confidence intervals. *The Journal of Machine Learning Research*, 22(1):11140–11183.

Mathieu, T., Basu, D., and Maillard, O.-A. (2022). Bandits corrupted by nature: Lower bounds on regret and robust optimistic algorithms. *Transactions on Machine Learning Research*.

Ronchetti, E. M. and Huber, P. J. (2009). *Robust statistics*. John Wiley & Sons Hoboken, NJ, USA.

Ruf, J., Larsson, M., Koolen, W. M., and Ramdas, A. (2022). A composite generalization of Ville's martingale theorem. arXiv preprint arXiv:2203.04485.

Wilcox, R. R. (2012). *Introduction to robust estimation and hypothesis testing*. Academic press.

## Skills

The candidate should preferably have the following skills:

- A strong background in mathematics/statistics
- A good knowledge of machine learning, statistics, and algorithms
- Broad interest for robust statistics and/or hypothesis testing
- Knowledge of programming languages such as Python, Julia
- Some experience with implementation and experimentation (a plus)
- A good command of English

Please follow the instructions given in <https://team.inria.fr/magnet/how-to-apply/> to set up your application file. In brief, the application of the candidate should include his/her CV, an application letter, (two or more) recommendation letters, and the school transcripts. It is recommended that the candidate contacts Debabrota Basu, Timothee Mathieu, and Wouter Koolen while preparing the application.

## 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
- Social security coverage

## Remuneration

2 788 € Monthly Gross Salary

## General Information

- **Theme/Domain** : Optimization, machine learning and statistical methods  
Statistics (Big data) (BAP E)
- **Town/city** : Villeneuve d'Ascq
- **Inria Center** : [Centre Inria de l'Université de Lille](#)
- **Starting date** : 2026-11-01
- **Duration of contract** : 2 years
- **Deadline to apply** : 2026-06-07

## Contacts

- **Inria Team** : [SCOOL](#)
- **Recruiter** :  
Basu Debabrota / [debabrota.basu@inria.fr](mailto:debabrota.basu@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

A successful candidate should:

- collaborate inside the team, and with the external researchers and engineers if needed
- be ready to collaborate with researchers in CWI Amsterdam and visit them for a duration
- organise the work systematically
- be keen to learn new theory and algorithms developed in the fast-changing field of reinforcement learning and bandits
- engage in meetings and discussions regularly

**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**

Please send your CV and 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.