



**Offer #2022-05380**

## **Engineer - Scientific programmer in federate learning and multi-party computation techniques for prostate cancer (F/M)**

**Contract type** : Fixed-term contract

**Level of qualifications required** : Graduate degree or equivalent

**Fonction** : Temporary scientific engineer

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

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

The Inria Lille - Nord Europe Research Centre was founded in 2008 and employs a staff of 320, including 280 scientists working in fourteen research teams. Recognised for its outstanding contribution to the socio-economic development of the Hauts-De-France région, the Inria Lille - Nord Europe Research Centre undertakes research in the field of computer science in collaboration with a range of academic, institutional and industrial partners.

The strategy of the Centre is to develop an internationally renowned centre of excellence with a significant impact on the City of Lille and its surrounding area. It works to achieve this by pursuing a range of ambitious research projects in such fields of computer science as the intelligence of data and adaptive software systems. Building on the synergies between research and industry, Inria is a major contributor to skills and technology transfer in the field of computer science.

### **Context**

This engineer position will be supported by the [HE Flute project](#). While this position will be in the MAGNET team in Lille, we will collaborate with the several European project partners.

While AI techniques are becoming ever more powerful, there is a growing concern about potential risks and abuses. As a result, there has been an increasing interest in research directions such as privacy-preserving machine learning, explainable machine learning, fairness and data protection legislation. Privacy-preserving machine learning aims at learning (and publishing or applying) a model from data while the data is not revealed. Notions such as (local) differential privacy and its generalizations allow to bound the amount of information revealed.

The goal of the multi-disciplinary FLUTE project is to advance and scale up data-driven healthcare by developing novel methods for privacy-preserving cross-border utilization of data hubs. Advanced research will be performed to push the performance envelope of secure multi-party computation in Federated Learning, including the associated AI models and secure execution environments.

The INRIA MAGNET team (and hence the recruited collaborators) will contribute to this project among others by researching machine learning algorithms and multi-party protocols with improved scalability in the context of medical data, e.g., by exploiting data sparsity. This research will involve both theoretical and more applied components. As coordinator INRIA will also contribute to the integration of the software developed in the FLUTE project (and the complementary TRUMPET project).

### **Assignment**

The recruited engineer will collaborate with colleagues in the MAGNET team and the FLUTE project consortium. In particular, the work will contribute to FLUTE's platform, by collaboratively designing and developing the overall architecture and contributing modules providing privacy enhancing technologies (PETs) and privacy assessment functionality based on MAGNET scientific advances

By default all developed software will be open-source.

### **Main activities**

- Studying new algorithms for reasoning about data privacy
- Design and prototyping of key algorithms
- Create appropriate documentation
- Integrate such implementations in the FLUTE platform

- test algorithms and run experiments

## Skills

Technical skills and level required :

- a strong understanding of distributed algorithms
- software design and development skills (relevant code may include Python and/or C/C++)
- understanding of process models and (probabilistic) reasoning techniques

Languages :

- Mastering English is essential

Relational skills :

- smoothly working in a team in a research environment
- effective communication and collaboration

## 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

According to the profile

## General Information

- **Theme/Domain** : Data and Knowledge Representation and Processing  
Software Experimental platforms (BAP E)
- **Town/city** : Villeneuve d'Ascq
- **Inria Center** : [Centre Inria de l'Université de Lille](#)
- **Starting date** : 2024-02-01
- **Duration of contract** : 3 years
- **Deadline to apply** : 2024-04-01

## Contacts

- **Inria Team** : [MAGNET](#)
- **Recruiter** :  
Ramon Jan / [jan.ramon@inria.fr](mailto:jan.ramon@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 a candidate with a strong background in computer science, with interest in research (including the mathematics needed to realize privacy) who welcomes the broad range of challenges leading to a successful result.

The development to which the engineers will contribute will include among others parts requiring (a) highly efficient mathematical code (for the reasoning components), (b) communication and security related modules, and (c) interaction with AI libraries (e.g., scikit learn). Being familiar with at least one of these areas of software development is an important asset.

**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

CV + application letter + recommendation letters + List of publications

Academic transcripts, project report

### **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.