Offer #2026-10054

Post-Doctoral Research Visit F/M Distributed Learning for Streaming Data

Contract type : Fixed-term contract

Level of qualifications required : PhD or equivalent

Fonction : Post-Doctoral Research Visit

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)

This postdoctoral position will be carried out in the context of an existing Inria Associate Team project PRIDeL between Simula, Inria, and NYCU on real-time distributed learning. The project will be supervised by Dr. Malcolm Egan (Inria) and Dr. Hsuan-Yin Lin (Simula), in collaboration with Prof. Yu-Chih Huang (NYCU, Taiwan).

Simula UiB AS is a research institute owned by Simula Research Laboratory AS and the University of Bergen (UiB). It collaborates closely with leading universities in Norway and abroad, both in terms of research and education of master's and PhD students. One of its goals is to increase Norway's cybersecurity expertise through research and education in cryptography and information theory.

Simula Research Laboratory AS is a publicly owned research lab that conducts Information and Communication Technology (ICT) research in the fields of scientific computing, software engineering, communication systems, machine learning and cyber security. Simula's main objective is to create knowledge about fundamental scientific challenges that are of genuine value to society. This is achieved through high-quality research, education of graduate students, industry collaboration, technology transfer, and commercialisation. Since 2001, scientific evaluations conducted by the Research Council of Norway have repeatedly placed Simula at the forefront of international research in ICT. In 2025, a new evaluation ranked Simula the highest of all Norwegian research institutions regarding impact and publication quality (p.14 in National EVALMIT rapport).

Research Challenge

In industrial systems, large-scale sensing (e.g., for weather, pollution, or mobility monitoring) and even within mobile wireless networks, a large quantity of data is observed by sensing devices. Historically, learning or inference based on this data has only been possible via communication to a centralized datacenter. As the computational capabilities of sensing devices improve, inference is shifting towards the edge by exploiting small servers close to the sensing devices. For example, in smart cities, internet of things (IoT) sensors continuously update environmental monitoring data; on mobile devices, users frequently generate and transmit data that is stored and processed locally; and in autonomous vehicle systems, real-time situational awareness relies on continuously refreshed contextual inputs to make rapid and adaptive decisions.

The overall goal of the PRIDeL project is to address the problem of co-designing communication-efficient and private real-time distributed learning in edge inference networks. This goal is currently being attacked through three key objectives:

1. *Coping with Communication Constraints on Real-time Federated and Distributed Learning.*
2. *Data Freshness and Personalization.*
3. *Private, Communication-Efficient Distributed Learning for Streaming Data.*

Assignment

This postdoctoral position will address one or multiple objectives in the co-design of communication-efficient and private real-time distributed learning in edge inference networks. Both theoretical and experimental approaches are of interest.

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 later than December 31, 2026.**

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.

Main activities

In collaboration with Dr. Egan, Dr. Yin, and Prof. Huang who have a combined expertise in learning, communications, and differential privacy, the successful candidate will work on a holistic approach at the intersection of learning, communications, and privacy in distributed learning systems with streaming data, where new data arrives over time. Depending on the candidates profile, both experimental and theory-oriented perspectives can be adopted.

Using theoretical analysis of distributed learning systems (convergence theory and generalization error bounds) *or* experimental studies (large-scale systems supported by the Grid5000 cluster), the successful candidate will develop new distributed algorithms for learning with streaming data. A key factor will be formalizing and accounting for freshness of data utilized in training and inference. Depending on the profile of the candidate, the focus will either be on the design of the learning mechanism, design of the communication network to support efficient learning, or design of differential privacy schemes.

Working with collaborators in the context of the PRIDeL project, the algorithms developed by the candidate will be integrated into a holistic framework for distributed learning with streaming data.

Skills

The successful candidate should have completed a PhD on either theoretical or experimental aspects of either:

- Distributed or federated learning
- Learning with time series data
- Differential privacy
- Communication networks for learning

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 (after 6 months of employment) 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 € gross monthly

General Information

- **Theme/Domain :** Networks and Telecommunications
  System & Networks (BAP E)
- **Town/city :** Villeurbanne
- **Inria Center :** Centre Inria de Lyon
- **Starting date :** 2027-01-01
- **Duration of contract :** 1 year, 4 months
- **Deadline to apply :** 2026-12-31

Contacts

- **Inria Team :** MARACAS
- **Recruiter :**
  Egan Malcolm / malcom.egan@inria.fr

About Inria

Inria, the French national institute for research in digital science and technology, supports the French government in national research and innovation strategies in the digital field, acting as Digital Programs Agency. Inria leads over 300 research and innovation projects with its 3,500 scientists, engineers, and support staff, in partnership with universities and the digital ecosystem (businesses, entrepreneurs, and public stakeholders). Together, we explore strategic fields such as artificial intelligence, cybersecurity, quantum computing, cloud technologies, digital transformation in healthcare, digital twins, and digital technologies for defence. We develop practical solutions such as software, tech startups, partnerships with national companies, and cutting-edge training programmes. Our goal is to drive scientific, technological, and industrial excellence to ensure France's digital sovereignty.

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.