



Offer #2024-08282

Research Engineer: Data Science and Security for Healthcare Applications

Renewable contract : Yes

Level of qualifications required : A levels or equivalent

Other valued qualifications : PhD in computer science

Fonction : Temporary scientific engineer

Level of experience : From 3 to 5 years

About the research centre or Inria department

The Inria centre at Université Côte d'Azur includes 37 research teams and 8 support services. The centre'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.

Context

The EPIONE project team contributes to the development of the digital patient (e-patient) for digital medicine (e-medicine).

The e-patient (or digital patient) is a set of computer models of the human body capable of describing and simulating the anatomy and physiology of organs and tissues, at different scales, for an individual or a population. It's a framework for integrating and analyzing heterogeneous information measured on the patient from disparate sources: imaging, biology, clinical, sensors, etc.

The e-medicine (or digital medicine) is defined as IT tools applied to the digital patient to assist physicians and surgeons in their medical practice, to evaluate diagnosis/prognosis and to plan, monitor and evaluate therapy.

The models that govern the algorithms designed for e-patients and e-medicine come from a variety of disciplines: computer science, mathematics, medicine, statistics, physics, biology, and so on. The parameters of these models must be adjusted to an individual or a population according to the available images, signals and data.

The Service d'Expérimentation et de Développement (SED) of the Centre Inria d'Université Côte d'Azur leads, coordinates and contributes to Inria development and experimentation activities, working with the scientists on technological actions. The SED from all Inria centers form a network of knowledge and expertise that coordinates to capitalize on the technologies developed in the institute and to develop the hardware and software infrastructures needed for research at Inria.

Fed-BioMed is an open-source federated learning framework for multi-centric, hospital-based medical applications. It focuses on security, access and interoperability with medical data, federated data preprocessing and harmonization, and lifecycle control by the hospital. Fed-BioMed creates a community of clinical, industry and academic partners fostering the adoption of collaborative learning in real-world medical applications. Fed-BioMed project is supported by Inria.

Assignment

Within the context of the research program PEPR Santé Numérique, this position of research engineer will be attached to the EPIONE team and hosted in SED, and will be working in collaboration with the PRIVATICS Inria team.

The overarching scope of this research engineer position is to be the primary contact point between the core engineering team of Fed-BioMed and the researchers of EPIONE and PRIVATICS team. Within this context, the work will revolve around two main goals:

- goal 1) contribution to the development of the core open-source software of Fed-BioMed, and
- goal 2) research and engineering support to the translation of research and methods from EPIONE and PRIVATICS teams to the Fed-BioMed platform.

The work will be based in the Centre Inria d'Université Côte d'Azur. The repartition of time spent between the two goals will be adjusted depending on the project advancement and priorities, and will be planned in advance in agreement between all parties. The project may also require some visits to the hospitals partners of Inria, to follow the deployment of the federated learning platform and facilitate the collaboration activity.

Main activities

- Concerning goal 1, the main tasks consist in contributing to the development of the related prototypes and functionalities integrating the technological core ideas proposed by the researchers, and in participating to the general maintenance of the library and the life of the project (e.g. documentation, reviews, dissemination activities). The engineer is integrated as a member of the Fed-BioMed core development team, working with Agile methodology inspired from Scrum.
- Concerning goal 2, the main tasks consist in participating to the research activity on privacy-preserving methods for federated learning in healthcare. This requires to work with the research personnel, and eventually co-supervise the PhD students recruited within the project.

Skills

This position is intended for PhD, Post-docs or Engineers in the field of computer sciences and security (IT, image processing, robotics, cryptography, automation, simulation and high-performance computing), with a demonstrable background in machine learning and AI-related topics.

Experience and training required (at least one, more preferred)

- Strong experience in software development
- Strong training and / or experience in one or more of the following fields: Data science / Statistics, Machine Learning, Artificial Intelligence, Optimization
- Training in software development / software engineering / software design
- Knowledge of security concepts, technology or tools for machine learning or computer networks
- Knowledge of medical data
- Experience working in team following project management methods, preferably using Agile methodology
- Experience in developing under Linux
- Knowledge / experience in an R&D environment (public or private sector)
- Experience contributing to an open source project is a plus

Skills / know-how (at least one, more preferred)

- Programming languages: Python
- Experience with Machine Learning libraries (e.g PyTorch, TensorFlow, Jax, scikit-learn)
- Experience with data processing (e.g numpy, pandas)
- Knowledge of agile methodology
- Good writing and communication skills
- Good level of technical and scientific English, both oral and written
- Knowledge in one or more of the following tools is also a plus: version management, continuous integration, test driven development, packaging and deployment (git, github, conda, docker)

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

From 2692 € gross monthly (according to degree and experience)

General Information

- **Theme/Domain** : Security and Confidentiality
Biologie et santé, Sciences de la vie et de la terre (BAP A)
- **Town/city** : Sophia Antipolis
- **Inria Center** : [Centre Inria d'Université Côte d'Azur](#)
- **Starting date** : 2024-10-01
- **Duration of contract** : 1 year, 10 months
- **Deadline to apply** : 2024-11-30

Contacts

- **Inria Team** : [EPIONE](#)
- **Recruiter** :
Lorenzi Marco / Marco.Lorenzi@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

- Motivation to acquire new skills at the crossroad between computer science, security, and healthcare,
- Strong communication skills,
- Ability to work in a team environment,
- Flexibility to interact with colleagues with different background and skills,
- Ability to work under deadlines

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

Applications must be submitted online on the Inria website. Collecting applications by other channels is not guaranteed.

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.