Offer #2025-09205

Research software engineer

Contract type : Fixed-term contract

Renewable contract : Yes

Level of qualifications required : Graduate degree or equivalent

Other valued qualifications : PhD

Fonction : Temporary scientific engineer

Level of experience : From 3 to 5 years

Context

The QAT (Quantum computing Architectures, Algorithms, Applications, and their Theory) team is hiring one software research engineer.

QAT is a new team at the Inria Paris research center. It focuses on a variety of topics, ranging from quantum computing to cryptography and error correction, while considering the diversity of existing physical platforms.

In terms of software development, the team's overarching philosophy is to develop tools that facilitate the exploration of algorithms and protocols in analytically unattainable regimes, to better understand and improve them.

The team's projects span multiple levels of the quantum software stack (machines and simulators), including:

- **Low-Level Software:**
    - Creating software environments and tools for operating quantum machines.
    - Developing simulators for the measurement-based computing model. This open-source, international project addresses topics like noise simulation, simulator efficiency, software performance, pre-processing, compilation, and HPC implementation.
    - Developping simulation tools for quantum-network-based applications

- **Intermediate Level:**
    - Noise estimation libraries.
    - Benchmarking libraries for quantum machines or software environments simulating quantum machines.

- **High-Level Software:**
    - Libraries for verified quantum computation.
    - Tools for variational quantum computing.

As part of Inria (National Institute for Research in Digital Science and Technology), the QAT team is one of the institute's key contributors to France's National Quantum Technology Strategy. The team co-leads various research funding tools such as the Priority Research Program and Equipment initiative (PEPR) "Quantum" and the "Hybrid Quantum Initiative" (HQI) platform. These actions support both fundamental research and its applications.

Assignment

One of the QAT team's objectives is to develop robust software environments that advance its research themes while disseminating these tools broadly within the quantum community, especially through the HQI initiative.

The primary role of the software engineer will be to leverage their expertise in software development and knowledge of quantum technologies to contribute to these projects.

More specifically, the hired engineer will:

- Participate in ongoing projects.
- Propose, create, and structure robust, reusable libraries for new projects of high scientific interest to the team and the broader community.

Main activities

The engineer will engage in development and experimentation activities within the QAT team in close collaboration with Inria researchers. This includes:

- Developing and experimenting with quantum simulation platforms (mockups, specifications, design, coding, and testing) and eventually quantum computers, while preparing developer and user documentation.
- Proposing modular architectures and sustainable abstractions that enable the reuse of developments across diverse experimental platforms that will evolve over time.
- Building the foundations of a software environment that facilitates reproducible research, including creating datasets for publication and reuse, as well as distributing software components that are shareable, evaluable, and reusable by third parties.
- Conducting code profiling to identify and implement optimizations for improved performance.

Skills

Education and Experience:

- Engineering degree in computer science with training in quantum technologies, or Master's/PhD in a related field with software development experience.
- At least 2 years of experience with an engineering degree or Master's.

Essential Skills:

- Proficiency in Python.
- Basic knowledge of quantum mechanics.
- Familiarity with the software development lifecycle, tools, and methodologies.
- Expertise in version control systems (especially Git), automated documentation tools, automated testing, and continuous integration.
- Strong technical and scientific English, both written and spoken.
- Autonomy, curiosity, and attention to detail.
- Strong writing skills.

Desirable Skills:

- Experience with collaborative software development.
- Knowledge/experience in an R&D environment (public or private).

Skills to Acquire During the Role:

- Proficiency with tools like Atos Qaptiva, Qiskit, NetSquid, and SquidASM.

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

General Information

- **Theme/Domain :** Algorithmics, Computer Algebra and Cryptology Software engineering (BAP E)
- **Town/city :** Paris
- **Inria Center :** Centre Inria de Paris
- **Starting date :** 2025-10-01
- **Duration of contract :** 12 months
- **Deadline to apply :** 2025-08-31

Contacts

- **Inria Team :** CASCADE
- **Recruiter :**
  Garnier Maxime / maxime.garnier@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

- You are a computer engineer interested in quantum technologies or a recent graduate (Master's or PhD) in a related field (e.g., computer science, physics) with software development experience.
- You are eager to contribute to ambitious projects within the institute.
- You are passionate about working in an innovative scientific and technological environment.
- You are skilled at collaborative work on scientific and technical/software projects.
- You are enthusiastic about learning new skills from others.
- You have excellent interpersonal skills.
- You possess fluent English skills, both written and spoken.

> **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.