



Semiconductor qubits promise significant advantages for further scale-up of quantum computers. The core technologies are researched and developed conjointly at the JARA-Institute for Quantum Information (IQI). ARQUE systems mission is to build a scalable quantum computer based on this technology. The possibility for unprecedented breakthroughs in information processing using quantum computers has spurred basic research for decades. Tackling such problems, even beyond the capabilities of current generation supercomputers, seems now to be nearly within reach. The rapidly growing interest in this research field outside of academia is testified by privately funded largescale development programs. ARQUE Systems collaborates closely with IQI and several large industrial partners and semiconductor foundries. A major experimental research effort of ARQUE Systems is to demonstrate the ultimate potential of semiconductor qubits as hardware for quantum computers and for quantum networking in a fully integrated semiconductor processor with integrated low-power control logic, an architecture that could scale to millions of qubits.

We are looking to recruit a

PostDoc Position – Scalable semiconductor qubits for quantum computing

Your Job:

Building on in-house fabricated devices, we have recently demonstrated the ability to shuttle electrons and qubits between gate-defined quantum dots in Si/SiGe over long distances using only four different AC-voltages [e.g. [arXiv:2307.04897](https://arxiv.org/abs/2307.04897)]. This patented technology enables a fully scalable quantum computing architecture [[arXiv:2306.16348](https://arxiv.org/abs/2306.16348)] for spin-qubits in silicon. You become part of our mission to demonstrate the first scalable, SiGe quantum computer chips. This mission requires skills from various disciplines and we offer jobs for a broad range of experiences and talents:

- Device fabrication in an academic cleanroom and migration to industrially fabricated devices
- Screening of material properties and optimization
- Modelling and benchmarking qubit chips (qubit connectivity by shuttling, qubits gates, initialization and detection)
- Designing chip architectures aligned to quantum algorithms
- Programming control and analysis software.
- Design and implementation of low-noise electronics, e.g., for qubit readout

ARQUE Systems is a spin-off from the JARA-Institute for Quantum Information of RWTH Aachen University and Research Center Jülich. ARQUE has decades of experience with semiconductor qubit technology. Our patented, highly scalable qubit architecture addresses key challenges associated with the scale-up required for broad quantum advantage on relevant real-world problems.

ARQUE Systems ambition is to dominate the quantum computing hardware market.



The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible. We look forward to receiving your application.

Questions about the vacancy?

Get in touch with via
contact@arque.systems

Your Profile:

- Master's degree and PhD in physics or a similar discipline
- Experimental and/or theory experience in quantum control experiments with spin qubits
- Experience with fabrication / characterization and/or modelling of nano-semiconductor devices
- Good software development skills
- Experience in sub-Kelvin cryogenic and low-noise transport techniques
- Good communication skills
- A strong drive to conduct ambitious, cutting-edge research towards scalable quantum computing in a professional working environment
- A research track record commensurate with our ambition

Our Offer:

Besides the involvement in a very exciting research field, we offer:

- Involvement in a unique holistic approach spanning from exploring new ideas to their technological implementation.
- A strong network, in particular with respect to semiconductor technology
- Innovative infrastructure
- Very good team atmosphere
- A balanced working environment
- A broader research environment with a strong quantum computing focus
- A competitive salary and benefits package
- Full-time position with the option of slightly reduced working hours and 30 days of annual leave

While this announcement mostly targets a regular postdoc position, candidates with the appropriate track record will be considered for a permanent position as a research scientist now or at a later stage.

We offer you an exciting and varied role in an international and interdisciplinary working environment.

We welcome applications from people with diverse backgrounds, e.g., in terms of age, gender, disability, sexual orientation/identity, and social, ethnic and religious origin. A diverse and inclusive working environment with equal opportunities in which everyone can realize their potential is important to us.