Research Assistant for a M.Sc. thesis project on a Quantum Algorithm Execution Interface
Aalto University

Job Title	Research Assistant for a M.Sc. thesis project on a Quantum Algorithm Execution Interface
Department	T412 Department of Information and Communications Engineering
Institution	Aalto University , , Finland
Date Posted	Dec. 3, 2024
Application Deadline	Open until filled
Position Start Date	Available immediately
Job Categories	Graduate Student
Academic Field(s)	Engineering - Other
Job Website	https://aalto.wd3.myworkdayjobs.com/aalto/job/Otaniemi-Espoo-Finland/Research-Assistant-for-a-MSc-thesis-project-on-a-Quantum-Algorithm-Execution-Interface_R41576
Apply By Email	

Job Description

Aalto University is where science and art meet technology and business. We shape a sustainable future by making research breakthroughs in and across our disciplines, sparking the game changers of tomorrow and creating novel solutions to major global challenges. Our community is made up of 13 000 students, 400 professors and close to 4 500 other faculty and staff working on our dynamic campus in Espoo, Greater Helsinki, Finland. Diversity is part of who we are, and we actively work to ensure our community’s diversity and inclusiveness. This is why we warmly encourage qualified candidates from all backgrounds to join our community.

The Department of Information and Communications Engineering is looking for a Research Assistant

Research Assistant for a M.Sc. thesis project on a Quantum Algorithm Execution Interface
Aalto University

for a M.Sc. thesis project on a Quantum Algorithm Execution Interface.

The Department of Information and Communications Engineering has an open posi-tion for an M.Sc thesis student to work on an interface to enable execution of quantum algorithms. The work is in the context of Business Finland Quantum Computation campaign and will be performed in close collaboration with Quantrolox Oy.

Quantum computation is typically described as quantum circuits, in which a computation is performed as a sequence of quantum gates, measurements, initializations of qubits to known values. Current implementations of quantum computers that are capable of executing quantum circuits typically consist of quantum devices that are housed in a special purpose environment and controlled by special purpose electronics. For example, a quantum computer based on superconducting transmon qubits would typically consist of a Quantum Processing Unit, a cryostat capable of cooling the QPU down to Millikelvin temperatures, room temperature electronics for sending signals to the QPU and capturing data from it, cabling between the QPU and the room temperature electronics, and a software system enabling executing of quantum circuits through the room temperature electronics on the QPU. The software system can be further divided into two parts: * Control software * Application tool chain

The former focuses on optimising the control signals to be sent to the QPU and the latter focuses on development and execution of quantum circuits.

Your role and goals
In collaboration with QuantrolOx, the plan is to investigate properties of an interface that allows application tool chains to integrate with control software. The purpose of the project is to define and implement such an interface, capable of a limited instruction set, mainly consisting of single qubit operations. OpenQASM provides a good starting point for the definition of the interface. The company will provide remote access to quantum computing systems in Delft, The Netherlands. In addition to implementing an interface for application tool chains, the aim of the project is to execute a small quantum algo-rithm through the interface on an actual quantum computer, and to measure the distri-butions of errors happening during algorithm execution

Your network and team
The positions are at the Department of Information and Communications Engineering of Aalto School of Electrical Engineering. The work will be done in close collaboration with QuantrolOx Oy. Prof. Olav Tirkkonen will supervise the project, and Ulo Parts will act as thesis advisor. The company will nominate a co-advisor.

Your experience and ambitions

Research Assistant for a M.Sc. thesis project on a Quantum Algorithm Execution Interface
Aalto University

Required qualifications: * Understanding of the fundamentals of quantum computation * Good analytical and problem-solving skills * Good programming skills in Python * Good written and oral communication skills in English. Finnish language is not required.

What we offer
You have the possibility to graduate as an M.Sc. in the rapidly progressing field of quantum software. The thesis project duration is six months. The salary of a Research Assistant is 2500 EUR/month. The planned starting date is Jan 15, 2025. The workplace is at the premises of the department in Otaniemi, and in part at the premises of the partner company in Keilaniemi.

To apply
Please share the following application materials with us through our recruitment site ("Apply now!"). * Brief cover letter (max two pages). * CV (max four pages) with a list of publications, if any. * Academic transcripts of your B.Sc and M.Sc. studies.

by Dec 20, 2024. We will go through applications, and we may invite suitable candidates to interview already during the application period. You will hear from us the latest in first week of January 2025.

Please note: Aalto University's employees should apply for the position via our internal HR system Workday (Internal Jobs) by using their existing Workday user account (not via the external webpage for open positions).

For more information regarding the open position, please contact professor Olav Tirkkonen ([url=mailto:olav.tirkkonen@aalto.fi]olav.tirkkonen@aalto.fi). In any question regarding the recruitment process, please contact HR Advisor Monika Mäkinen (hr-elec@aalto.fi).

Want to know more about us and your future colleagues? You can watch these videos: [url=https://www.youtube.com/watch?v=5k_og_6zUJQ]Aalto University - Towards a better world, [url=https://www.youtube.com/watch?v=dUfEGVM-ZP8&feature=youtu.be]Aalto People , and [url=https://www.youtube.com/watch?v=ZK6pDWm1_CE]Shaping a Sustainable Future. Read more about working at Aalto: [url=https://www.aalto.fi/en/careers-at-aalto]https://www.aalto.fi/en/careers-at-aalto
Check out our new virtual campus experience: [url=https://virtualtour.aalto.fi/]https://virtualtour.aalto.fi/

About Finland
Finland is a great place for living with or without family - it is a safe, politically stable and well-organized Nordic society. Finland is consistently ranked high in quality of life and was just listed again as the happiest country in the world: [url=https://worldhappiness.report/news/its-a-three-peat-finland-keeps-

Research Assistant for a M.Sc. thesis project on a Quantum Algorithm Execution Interface
Aalto University

top-spot-as-happiest-country-in-world/]https://worldhappiness.report/news/its-a-three-peat-finland-keeps-top-spot-as-happiest-country-in-world/. For more information about living in Finland: [url=https://www.aalto.fi/en/careers-at-aalto/for-international-staff]https://www.aalto.fi/en/careers-at-aalto/for-international-staff .

Contact Information

Please reference Academickeys in your cover letter when applying for or inquiring about this job announcement.

Contact

Finland