# PhD Position Quantum Computer Science in Quantum Networks

Fri, 2018-08-03 22:25 - Stephanie Wehner [1] **At:** QuTech, TU Delft
**Deadline:** 20 August, 2018

## Location

QuTech Lorentzweg 1
Delft 2628 CJ Netherlands
52° 0' 3.2112" N, 4° 22' 26.6484" E
See map: Google Maps [2]

PhD positions are available at QuTech, Delft University of Technology to work on quantum communication networks.

Background

The vision of a Quantum Internet is to provide fundamentally new internet technology by enabling quantum communication between any two points on earth. Such a Quantum Internet will – in synergy with the 'classical' internet that we have today - connect quantum processor in order to achieve unparalleled capabilities that are provably impossible using classical communication.

As with any radically new technology, it is hard to predict all uses of the future Quantum Internet, but several major applications have already been identified. One striking application of quantum communication is quantum key distribution (QKD), which allows two remote network nodes to generate an encryption key, enabling the exchange of secret information between any users connected to the Quantum Internet. The security of QKD is guaranteed by the fundamental laws of nature, and thus fully future proof even against any attacker possessing a large-scale quantum computer. Other promising known applications are clock synchronization, extending the baseline of telescopes, secure identification, achieving efficient agreement on distributed data, exponential savings in communication, quantum sensor networks, as well as secure access to remote quantum computers in the cloud.

Central to all these applications is the ability to send quantum bits (qubits). Qubits are fundamentally different from classical bits. While a classical bit can take only two values, '0' and '1', a qubit can be in a superposition of being '0' and '1' at the same time.

Quantum Internet at QuTech

QuTech pursues a targeted effort to make quantum communication networks a reality, including both hardware and software at the cutting edge of research and development. In 2020, QuTech aims to establish the first demonstration network linking quantum processors in different cities, and pursues a long term effort to enable long distance quantum communication.

Position

Fully funded PhD positions are available to work on:
- The design and realization of the world's first network stack for quantum networks
- The design and realization of the world's first software system for running quantum network applications

Requirements

- You have a master’s degree in computer science, engineering or physics at the time of taking on the position. While a prior course in quantum information is desirable, an excellent track record in computer science and willingness to learn is possible.
- You enjoy experimenting with different approaches, and are excited by theoretical designs as well as hands-on software implementations meant to ultimately use real quantum hardware.
- You enjoy working in a team and bring excellent organizational, communication and interpersonal skills
- You are creative and flexible working in a mission driven environment to realize quantum networks

How to apply

Applications can be made via the general application form [3], please check QuTech and indicate in your motivation letter that you are applying for this position.

For questions please email Prof. Stephanie Wehner at s [dot] d [dot] c [dot] wehner [at] tudelft [dot] nl

This position is in the group of Stephanie Wehner in the Quantum Internet Roadmap at QuTech, in collaboration with Przemek Pawelczak at the Department of Software Technologies, TU Delft.

Funding Notes

Fully funded positions as part of the Quantum Internet Alliance [4] and located at QuTech http://qutech.nl [5].

- PhD [6]

**Source URL:** http://qurope.eu/db/jobs/phd-position-quantum-computer-science-quantum-networks

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