

# Daniele Cucurachi

Based in Cambridge, UK    Nationality: Italian    19/01/1998

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## Summary

Computational physicist with experience in scientific software development and research. Graduated from EPFL, I am currently working with the *Quantum Information Group* (University of Cambridge) on the development of quantum-classical hybrid algorithms. **References available upon request.**

## Education

### University of Cambridge

Visiting student in the Physics Department

- Master's thesis at *Quantum Information Group*

Cambridge, UK

Sep 2022 - May 2023

### EPFL - École Polytechnique Fédérale de Lausanne

Master of Science (MSc) in *Applied Physics*

- Average Grade: **5.63/6**, Median Grade: **5.75/6** (top 10%)

Lausanne, Switzerland

Sep 2020 - May 2023

### Politecnico di Torino

Bachelor of Science (BSc) in *Physics Engineering*

- Final Grade: **110/110 cum laude** (top 5%)

Torino, Italy

Sep 2017 - Jul 2020

## Professional Experience

### Research Assistant

University of Cambridge

- Developed a hybrid algorithm for optimizing parametrized proposal strategies in quantum-enhanced Monte Carlo Markov chains. A Python simulator (state vector method) will soon be available at <https://github.com/DanieleCucurachi/QMCMC.git> (work in progress).

Cambridge, UK

May 2023 – Present

### Quantum Software Engineer

IQM Quantum Computers

- Developed Python libraries for the design and simulation of superconducting quantum processors (QPUs):
  - Conducted code reviews and code design for projects involving up to 15 contributors, ensuring code quality.
  - Collaborated closely with the *IQM Fabrication Team* to design photomasks' layouts and various components of quantum processors, submitting approximately 25 merge/pull requests within my first six months.
  - Developed a routing protocol for routing complex quantum processors which is currently used by the *IQM Design & Simulations Team*.
- Simulated and analyzed the electromagnetic performance of superconducting quantum circuits elements using ANSYS HFSS.

Helsinki, Finland

Feb 2022 – Aug 2022

## Research Projects

### Hybrid Quantum Circuits Lab

EPFL

Designed coplanar waveguides for slow light applications in superconducting circuits. The project involved computer simulations (Sonnet and ANSYS HFSS) and the development of a Python library to optimize and speed up the design process of the devices.

Lausanne, Switzerland

Sep 2021 – Jan 2022

### Laboratory of Semiconductor Materials

EPFL

Characterized Ge-Si core-shell quantum dots through TEM and Raman spectroscopy in order to optimize the crystallization process (Rapid Thermal Annealing) and achieve the necessary crystal quality to utilize them as hole spins qubits.

Lausanne, Switzerland

Sep 2020 – Jan 2021

## Technical Skills

### Programming Languages

Python, C (basic)

### Python Packages

Qiskit, PyTorch, Scikit-Learn, QCCircuits, Gdspy, QuTip, Numpy, Pandas, Scipy, Matplotlib

### Software & Tools

GitLab and GitHub with Git for collaborative programming, ANSYS High Frequency Simulation Software (HFSS), KLayout, Sonnet Software, LTspice (analog circuit simulations),  $\text{\LaTeX}$

### Experience with

Algorithms, Simulations, Data Analysis and Visualization    |    **OS:** Windows, Linux

## Associations

### Vice President

EPFL Quantum Computing Association

- Secured sponsorship and event funding from the company *Quantum Machines*.
- As team leader for a group of five, organized three successful association events and managed advertising campaigns to promote them.
- Last organized event "*EPFL Quantum Hackathon*": approximately 100 international participants, the event focused on chemistry simulations with quantum computers.

Lausanne, Switzerland

Feb 2021 – Sep 2022

## Languages

**Italian**    Native Proficiency

**English**    Full Professional Proficiency: **Level C1 - C2**

**French**    Elementary Proficiency: **Level A2**