> # PhD Opportunity in
> ## *Quantum-assisted Framework for Mega-Scale Seismic Evaluation of CERN Strategic Underground Infrastructures*

Dr. Davide Noè Gorini, Assistant Professor at the University of Trento, is seeking a highly motivated PhD student to join his research group on **Quantum Computing for Mega-Scale Multi-Physics Engineering Problems**.

The successful candidate will contribute to the development of a novel **Quantum-based framework for territorial simulations of strategic Infrastructures exposed to natural hazards**. The Quantum framework will be deployed for **high-fidelity seismic evaluations of CERN underground infrastructures hosting the Large Hadron Collider (LHC), its injectors and experiments**.

An advanced **Mega-Scale numerical model of the Soil-Infrastructure system** will be developed, capturing the multi-physics dynamic interactions between the 50 km-long CERN particle accelerator complex and the surrounding subsoil. Due to the remarkable computational complexity, this challenge will be addressed exploiting **Quantum algorithms** and **Quantum simulators**.

The ideal candidate should have a strong background in **Computational Mechanics**. Knowledge of **Quantum Algorithms and Computing, Quantum Information** and **Finite Element Analysis** is highly desirable. Experience with tools such as **OpenSees**, **ABAQUS**, **MATLAB/Simulink** or **Python** is particularly valued. More broadly, candidates with advanced programming skills are encouraged to apply.

This highly multidisciplinary project will greatly benefit from a strong collaboration with the **European Organization for Nuclear Research (CERN, Switzerland) and international partners**. As such, the PhD program offers the opportunity to spend a **research period abroad**, during which the selected candidate will work closely with experts in the field.

Candidate Profile

Applicants are expected to demonstrate:

- Master's degree in **Geotechnical or Structural Engineering**, **Mechanical Engineering**, **Computer Engineering** or **Applied Physics**;
- Background in **Computational Mechanics** and **programming**;
- Experience with the **analysis of dynamic problems**;
- Advanced level of English and collaborative skills.

Contract

- **Position**: PhD studentship
- **Duration**: three years
- **Location**: Department of Civil, Environmental and Mechanical Engineering, University of Trento, Trento, Italy
- **Start date**: November 2025
- **End date**: October 2028

Application process

Interested applicants are preliminary invited to send to Dr. Davide Noè Gorini (davidenoe.gorini@unitn.it) the following material:

1. **Cover Letter** – A formal introduction explaining your interest in the position and how your background aligns with the research (no more than two pages).
2. **Curriculum Vitae** – Detailing your academic background, research experience, publications, and industry experience.
3. **List of References** – Names and contact information for individuals (minimum two, maximum three) who would provide letters of recommendation upon request.
4. **List of Published Papers** (if applicable) – Include journal or conference publications.
5. **English Proficiency Test Scores** – IELTS or TOEFL scores, if applicable.

Should you require any additional information, do not hesitate to reach out at: davidenoe.gorini@unitn.it