

PhD Opportunity in ***Next-generation Metafoundations for Enhanced Seismic Protection of Nuclear Power Plants exploiting Soil-Structure Interaction***

Prof. Oreste Bursi, Full Professor at the University of Trento (Italy), and **Dr. Davide Noè Gorini**, Assistant Professor at the University of Trento, are seeking a **highly motivated PhD student** to join their research group on **Hazard protection of Civil Engineering Structures**.

The research project aims to advance the frontiers of **Earthquake Engineering, Structural and Geotechnical Engineering, and Metamaterials/Metastructures**. The selected PhD candidate will contribute to the design of cutting-edge **3D seismic protection solutions** for next generation **Nuclear Power Plants (NPPs)**, including **Small Modular Reactors (SMRs)**.

The path leverages the **dynamic interaction** of NPPs with the surrounding soil (**Soil-Structure Interaction, SSI**) to enhance seismic protection. The focus will be on **innovative finite lattice metamaterial-based foundation systems** using **shallow metafoundations** inspired by **locally resonant metastructures** for efficient protection of NPPs under **complex seismic loading, including vertical ground motion**.

The ultimate goal is to establish a **thermodynamic-based framework** for the **high-fidelity analysis and design of next-generation SSI-driven metafoundations** to ensure enhanced seismic protection of NPPs.

The **ideal candidate** should have a strong background in **Structural or Geotechnical Engineering**, with knowledge of **dynamic soil-structure interaction and numerical modeling**. Experience in **Finite Element Analysis (FEA)** and **AI-driven computational methods** is highly desirable. Proficiency in tools such as **OpenSees, ABAQUS, COMSOL Multiphysics, MATLAB/Simulink** is particularly valued. More broadly, candidates with advanced programming skills are encouraged to apply.

This highly multidisciplinary project will benefit from a strong partnership with **Prof. James Ricles and his research group (University of Lehigh, U.S.)**. Accordingly, the project also offers the possibility of spending a period abroad.

Candidate Profile

We are looking for candidates with:

- Master's degree in **Structural Engineering, Geotechnical Engineering**, or a related field and strong motivation for both computational and experimental research;
- Background in **numerical modelling and programming**;
- Experience with **soil-structure interaction and 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
- **Opportunity to spend a research period abroad**
- **Start date:** November 2025
- **End date:** October 2028

Application process

The call and information regarding the public competition are available at the following links:

- [PhD Program](#);
- [Research Subjects](#).

Applications should be submitted through this [link](#). The deadline for submitting applications is Thursday, May 15, 2025, at 4:00 PM (CET).

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