

Opening for 1 PhD position

MULTI-HAZARD INFRASTRUCTURE RISK ASSESSMENT FOR CLIMATE ADAPTATION (MIRACA)

Project summary

There is an urgent need to adapt Europe's critical infrastructure (CI) to our rapidly changing climate. Public authorities need support to enable them to pinpoint the locations of risks from climate change and develop affordable strategies to enhance infrastructure systems' resilience. Existing methods for climate risk analysis are not tailored to the complexities of CI, because they do not properly account for systems interdependencies, as well as still containing key data gaps. The mission of the **Multihazard Infrastructure Risk Assessment for Climate Adaptation (MIRACA)** project is **to catalyse and empower** the implementation of adaptation measures for CI throughout Europe, by providing public authorities with a toolkit to take evidence-based decisions.

MIRACA will develop a **decision-support toolkit**, consisting of (i) a **Guidance** on technical and economic appraisal of adaptation strategies, (ii) a decision-support **technical workbench** and (iii) a decision-support **online exploratory viewer**. These will be based upon a climate risk assessment framework that extends beyond-state-of-the-art in CI systems analysis and appraisal of the resilience of adaptation solutions. Advanced new methods of data acquisition will fill critical gaps in knowledge of the vulnerability and costs of CI. New model capabilities will be developed to fully appraise the benefits for people and businesses of climate-resilient infrastructure systems.

3-year PhD student position

Main activities:

- Review and identify the existing information gaps on CI asset exposure and vulnerability and create the building blocks for the pan-European harmonised exposure and vulnerability database. In addition, state-of-the-art frameworks and tools to assess vulnerability and losses of CI in a single- and a multi-hazard environment will be reviewed.
- Contribute on the creating of a Pan-European harmonized exposure database. The exposure database will include inventory data (e.g., construction type, quality and cost) on single CI assets (e.g., schools, hospitals) and on complex networks and systems (e.g., road, rail, ports, airports, gas).
- Review on the characteristic disruptions and socio-economic direct and indirect losses of CI in Europe during historical events. Contribute on the creation of a Pan-European harmonised database of CI vulnerability information, which will include reconstruction costs per asset, and vulnerability/fragility curves for the different hazards and exposure categories.
- Work on specific case studies to assess the multi-hazard risk for individual CI assets, using the harmonised hazard, exposure and vulnerability data.

Supervisor: Associate Professor Dimitris Pitilakis, Department of Civil Engineering, Aristotle University of Thessaloniki (www.dpitilakis.work)

Applications from groups traditionally under-represented within our discipline are encouraged and gender equality is supported.