

Two Research Associate positions at the National Technical University of Athens:

## **NOVEL MULTI-SCALE COMPUTATIONAL MODELING FOR THE IMPACT QUANTIFICATION OF CLIMATE CHANGE AND EXTREME WATER HAZARDS ON CULTURAL HERITAGE**

### **Overview of positions**

Climate change (CC) and extreme natural hazards are threatening our cultural heritage (CH). Coastal, underwater, urban and landscape CH structures can be exposed to (i) one or more types of extreme water hazards, such as, hydrometeorological extremes (flash floods, storm surge) and geophysical hazards (tsunamis), and (ii) gradual environmental stressors that cumulatively deteriorate the CH and amplify the risk for damage. The state-of-the-art solutions cannot always provide a holistic approach to deal with these effects. The recently funded Horizon Europe project **“TRIQUERTA: Toolbox for assessing and mitigating climate change risks and natural hazards threatening cultural heritage”** (<https://triquetra-project.eu/>), which is coordinated by the National Technical University of Athens (NTUA), aims to address the challenge of safeguarding and protecting Europe’s CH by advancing the fundamental understanding of the interaction of extreme water hazards and multi-hazard scenarios with the historic built environment, quantifying the potential impact on different types of structures and typologies, and discovering, implementing, evaluating and promoting innovative solutions.

The two new researchers will have a hydraulic or coastal engineering background and will focus on (i) the prediction of the inland floods, extreme waves, storm surge and/or tsunami flow at the location of the CH sites via mid-fidelity regional modelling, (ii) the quantification of the fluid-structure interaction (FSI) and the hydrodynamic effects (e.g. pressures, forces) on the different typologies of CH structures via high-fidelity computational fluid dynamics and FSI modelling, and (iii) the assessment of cascading effects via multi-physics modelling. The researchers will join a multi-disciplinary team in the School of Civil Engineering at NTUA and will be supervised by Drs. D. Istrati and C. Spyarakos, while they will also collaborate with colleagues from the School of Rural and Surveying Engineering and the 21 European partners of the consortium that bring unique expertise in different areas, such as, geological hazard assessment, remote sensing technologies and the development of novel in-situ sensors. The researchers of the project will have the opportunity to grow professionally, develop an international exposure through the multi-national collaborations with leading experts from several EU countries and make an impact on our society through the next-generation multi-physics digital models, the risk assessment module and the TRIQUERTA decision support platform that will be developed and shared with the relevant stakeholders in order to help them protect the CH sites.

### **Qualifications**

**Position 1:** Strong background (MSc or PhD) in **hydraulic/coastal engineering** with preferred experience in computational hydraulics; flood risk assessment; computational fluids dynamics; flow-structure-interaction

**Position 2:** Strong background (MSc or PhD) in **coastal engineering** with preferred experience in numerical modeling of wave hydrodynamics and coastal flooding; computational fluid dynamics; wave-structure interaction; modeling of tsunami inundation

- Track record (e.g. thesis, research publications) in some of the aforementioned areas
- Problem-solving skills, strong technical writing and communication skills in English
- Motivation and ability to work well in multi-disciplinary research teams

## Other information

Please send a CV and some evidence of your qualifications to Dr. Istrati (distrati@mail.ntua.gr) with the subject “*TR\_WaterHazards*” before **September 24<sup>th</sup>, 2023** at 11:59PM CET. Interviews will begin shortly afterwards.

Preferred starting date: Earliest possible (e.g. in October).

Duration of positions: 2 years from start date

Salary commensurate with experience and national standards.



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The researcher will become part of the NTUA School of Civil Engineering, which is considered one of the top civil engineering schools in Europe and in 2022 was ranked 5<sup>th</sup> globally by the Shanghai ranking system (<https://www.shanghairanking.com/rankings/gras/2022/RS0211>) and in the top 50 by the QS ranking system (<https://www.topuniversities.com/university-rankings/university-subject-rankings/2023/civil-structural-engineering>)