

ESR 3.2 -Innovative methodologies for soil-structure interaction assessment

A Research PhD position in the URBASIS ITN funded by the EC

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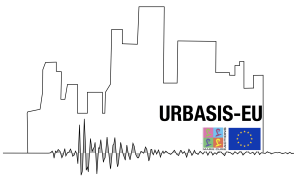
Recent devastating earthquakes and induced seismicity near infrastructures must become the centre-piece of analysis in reducing risk and increasing resilience, facing up to global urban population growth in the coming decades and the concentration of wealth in cities. The prediction of seismic ground motion and response of structures are key issues in reduction of seismic urban risk. There is therefore a demand for highly trained scientists with a broad understanding of engineering seismology and earthquake engineering, skills being essential in academic research, in private companies with activities related to risk mitigation and energy facilities and for policy makers. The URBASIS-EU project aims to provide a multi-disciplinary training platform for young scientists in order to develop their individual project and to promote their entrepreneurship and their employability toward the academic, private and insurance or decision-making sector. High-quality supervision of the young scientists will be ensured through the international recognition of the URBASIS-EU partners. A comprehensive set of transferable skills will be developed through innovative and interdisciplinary joint research projects between academic and non-academic partners on the prediction of seismic hazard in urban areas considering low-probability/high-consequences events and induced seismicity related to the exploitation of energy resources; the seismic ground motion prediction within the non-free-field urban area; the coupling between ground motion and structures/infrastructures responses for natural and induced seismicity including time dependent vulnerability; and the systemic risk of interconnected urban systems. URBASIS-EU will create a lasting collaboration for the establishment of a European network of academic and non-academic experts, improving the interface with decision-makers.

More information: <https://urbasis-eu.osug.fr/?lang=en>

Job description

The variability of seismic ground motion during an earthquake within an urban area is affected by changes of the shallow geological structure over short distances, and the response of the built structures. While numerical simulations have been carried out in the past using simplified models, empirical experiments aiming at collecting real data for studying wave propagation in such complicated systems have always been hampered by the number of seismological stations that would be necessary to accurately sample the wave-field in this 3D system.

Benefiting from an extensive and dense deployment of seismological stations (from some tens to hundreds) in the free field and within buildings, the ESR will focus on the development of methodologies for data analysis of seismic noise, weak and strong motion, to provide a comprehensive view of wave propagation within the soil and in through the built structures, and their interaction. In particular, the analysis of the composition of the wave-field, in terms of different waves and their respective contribution will be carried out. Techniques will be mainly based on the extension in 3D or 2D array analysis methods and on the comparison of their results with those obtained by standard (e.g., operative Modal Analysis, Frequency Domain Decomposition) analyses and numerical simulations.



We expect that innovative techniques for studying wave propagation in a comprehensive way in the case of soil-structure and soil-city interaction will be developed. A close cooperation with ESR 3.3 and ESR4.1 is expected.

The URBASIS consortium is funded by European Commission's Innovative Training Network (ITN) program. This research project will take place at the Istituto Nazionale di Oceanografia e di Geofisica Sperimentale in Trieste (IT), and the student will be enrolled at the University of Trieste Italy. This project will involve close collaboration with AUTH Thessaloniki, where the researcher will spend several months.

Requirements and Application

The successful applicant must have a Master degree in one of the following disciplines: geophysics, seismology, earthquake engineering and engineering seismology or similar. The applicant is expected to have a very strong mathematical and signal processing background. Furthermore, knowledge of programming languages is necessary. Excellent undergraduate and master degree grades are expected. A high level of written and spoken English is also expected.

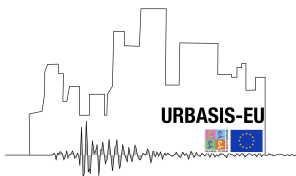
PhD stipends are allocated to individuals who hold a Master's degree or a qualification that allows access to Doctoral studies in the issuing country. PhD stipends are normally for a period of 3 years. It is a prerequisite for allocation of the stipend that the candidate will be enrolled as a PhD student at the University of Trieste in accordance with its regulations on the PhD Program. Foreign degrees are assessed by the University of Trieste Examination Panel to ensure that they are of the equivalent level of Italian qualifications, in compliance with the relevant laws in force in Italy and in the awarding country, as well as with international treaties or agreements on the recognition of foreign qualifications. PhD stipends are normally for a period of 3 years. According to the URBASIS-EU, the progress of the PhD student shall be assessed every 12 months. It is a prerequisite for continuation of salary payment that the previous progress is approved at the time of the evaluation.

The qualifications of the applicant will be assessed by the **Selection committee**. On the basis of the recommendation of the **Selection** committee, the Faculty of the PhD Course in Earth Science, Fluid-Dynamics, and Mathematics. Interactions and Methods of University of Trieste will make the final decision on the admission of the applicant to the PhD Program.

URBASIS-EU wishes to reflect the diversity of society and welcomes applications from all qualified candidates regardless of personal background or belief. We encourage applications from everyone irrespective of gender and ethnic group but, as women and members of ethnic minority groups are currently under-represented at this level of post, we would encourage applications from members of these groups. Appointment will be based on merit alone.

Application must be in a form of a single PDF file including a CV, a cover letter, academic transcripts, and the names and complete contact information and letter of two referees sent through :

- **the consortium web-page <https://urbasis-eu.osug.fr/?lang=en>**
- **the EU EURAXESS portal <https://euraxess.ec.europa.eu/>**



Vacancy number : URBASIS-EU ESR3.2 (to be reminded in the application form)

Deadline : February, 23rd 2019

Salary : According to the European Commission and local standards ; minimum gross wage is 3500 euros before local taxes

Contact Information

You may obtain further information from :

- **Philippe Guéguen**, URBASIS project coordinator : philippe.gueguen@univ-grenoble-alpes.fr (Earth Science Institute, Université Grenoble Alpes) for general questions regarding the URBASIS consortium or concerning the scientific and training aspects of the ITN program
- **Stefano Parolai** : sparolai@inogs.it, OGS, concerning the scientific aspects of the stipend
- **Florence Cataye**, URBASIS project manager : florence.cataye@univ-grenoble-alpes.fr for administrative questions

For more information of Doctoral School: <https://web.units.it/dottorato/esfm/en>