ESR 4.3 Testing of seismicity and attenuation models/decision support
**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 centrepiece 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 dependency 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.

Job description

Testing of scientific models should accompany their creation. The Collaboratory for the Study of Earthquake Predictability (CSEP) has advanced testing of seismicity models with community-agreed testing methods and procedures, and improved investigating the quality of the model input data, namely the catalogue completeness and the magnitudes. However, in the realm of ground-shaking models, one of the larger uncertainties in seismic hazard, testing procedures are still in development as are testable ground-shaking ("ground-motions") models. With the upcoming large ground-motion observation datasets, this ESR will address the problems in soil ground-motion modelling in a multi-fold approach: 1. Organizing existing and new ground-shaking datasets (sensors, classical networks' datasets) and associated proxies (V_s30, basin depth, city-environment); 2. Testing possible proxies for soil amplification modeling using large databases and dense networks of sensors; 3. Testing site amplifications assumptions (e.g. non linearity) through targeted prospective testing as outlined in the CSEP 2.0 strategy; 4. Derive possible proxies describing the type of city-environment and evaluate the impact of this city-environment on ground-shaking variability and amplitude. These study lines will be combined with the development of a new testing strategy along the lines of CSEP testing and, finally, deliver a new perspective on soil ground-motion models and the necessary precision to
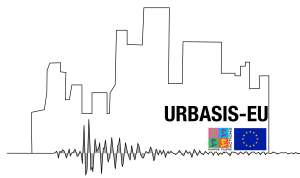
significantly reduce epistemic uncertainties in this area and for the entire hazard model. Given the uncertain nature of hazard assessments for low-probability events, the reduction of epistemic uncertainties is a much desired target. The ESR will collaborate with researchers responsible for model creation (WP1 and WP2) to introduce testability of models to the highest degree possible. Such an approach requires a significant change in attenuation model development because of the full specification of input and forecast data.

The URBASIS consortium is funded by European Commission's Innovative Training Network (ITN) program. This research project will take place at the GFZ German Research Centre for Geosciences, Potsdam, Germany, and the student will be enrolled at the University of Potsdam. This project will involve close collaboration with ETH Zurich, where the researcher will spend several months. The project will also involve secondment with AON-Benfield.

Requirements and Application

The successful applicant must have a Master degree in seismology or geophysics. The applicant is expected to have a strong background in seismology and a good expertise of programming languages (python, but also of linux and shell scripting). The PhD student should be able to work with large datasets and be good at software development. Furthermore, knowledge of statistics is an advantage. 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. 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 Potsdam**. 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 Dean of the **University of Potsdam** will make a decision for allocating the stipend.

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/**
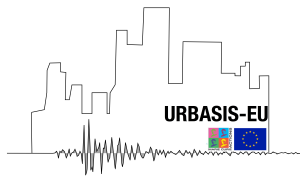
Vacancy number : URBASIS-EU ESR4.3 (to be reminded in the application form)

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 (ISTerre, Earth Science Institute, Université Grenoble Alpes) for general questions regarding the URBASIS consortium, concerning the scientific and training aspects of the ITN program.
- **Danijel Schorlemmer** : ds@gfz-potsdam.de concerning the scientific aspects of this PhD project.
- **Florence Cataye**, URBASIS project manager : florence.cataye@univ-grenoble-alpes.fr for administrative questions.