ESR 1.2 - Ground-motion models for stable continental part of Europe

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 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

Ground-motion models used in engineering seismology are calibrated on global databases that are usually created by mixing data from different active regions (e.g. Italy, Greece, Turkey). New seismological data recorded by local networks in the more stable part of Europe (UK, Germany, France, Switzerland) have started to show, however, that regional variations of faulting, earthquakes and crustal properties are significant within Europe. A better understanding of the links between geology, earthquake properties, and ground motion is then needed to understand these ground-motion regional variations and their impact on seismic hazard assessment. The ESR will aim to assess the spatial variability of physical factors controlling ground-motion regional variations (e.g., Brune stress-drop, anelastic attenuation) and to provide new regionally adjusted empirical and physics-based ground-motion models for Europe, with focus on the stable continental regions. Large data sets of recorded earthquakes will be extracted from open repositories (e.g. EIDA) and customized processing procedures will be developed for data selection. Spectral inversion techniques will be developed and
applied to isolate the source, propagation and site effects and, finally, the distributions of source and attenuation parameters will be obtained through parametric regressions. The ESR will also aim at improving the parametric information of events (either natural or induced), such as depth and magnitude, and at applying the obtained distributions of source and propagation parameters to both numerical simulations and ground motion prediction equation analysis.

The project is funded by ITN EU program. It will take place at German Research Centre for Geosciences - GFZ, Potsdam, Germany and at the University of Potsdam. The successful applicant will also spend several months at the University of Liverpool and at AON Benfield.

Requirements and Application
The successful applicant must have a Master degree in seismology, earthquake engineering and engineering seismology or similar. The applicant is expected to have a very strong statistics and signal processing background. Furthermore, good programming skills and knowledge of open data and machine learning are 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 in accordance with the regulations of the PhD Program at the University. 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 Administration of University of Potsdam will make the final 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 ESR1.2 (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.

- **Fabrice Cotton**: fcotton@gfz-potsdam.de, GFZ-Potsdam, for specific questions regarding this PhD project.

- **Florence Cataye**, URBASIS project manager: florence.cataye@univ-grenoble-alpes.fr for administrative questions.