

ESR2.1 Modelling Ground-motion from Induced Seismicity in Urban Areas

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

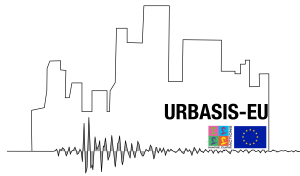
Supervisors: Ben Edwards (University of Liverpool) - Dino Bindi (GFZ Potsdam) – Fabrice Cotton (GFZ Potsdam)

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

Induced seismicity has become the focus of attention due to the sharp increase observed globally, particularly close to injection wells. When such operations are close to urban areas (as often in Europe), even small to moderate induced earthquakes may produce ground motion strong enough to produce damage. In this project, earthquakes in close proximity (within 5-10 km) to urban areas will be analysed to investigate their impact at the surface. The temporal and spectral characteristics of induced seismicity (such as stress-drop, attenuation, site effects, shaking duration) will be determined using a harmonised database that will integrate existing data sources (e.g. from the UK, Switzerland, California, Germany, France). Ground motion will be analysed by developing and extending approaches applied to tectonic seismicity. State-of-the art knowledge, such as results from site-specific geotechnical and geophysical investigations, will be explored within the concept of scenario specific (non-ergodic) modelling to determine their use in ground-motion models for induced earthquakes.



The student will join multi-disciplinary research groups at the University of Liverpool and within the URBASIS-EU consortium. The School of Environmental Sciences and The Institute for Risk and Uncertainty are home to more than 200 PhD students from several disciplines in relation to science and engineering. This project will involve close collaboration with GFZ Potsdam, where the researcher will spend several months. The project will also involve secondment with an industrial partner (AXA Paris).

The URBASIS consortium is funded by European Commission's Innovative Training Network (ITN) program. This research project (one of fifteen across the consortium) will take place at the University of Liverpool, UK, within the Faculty of Science and Engineering (School of Environmental Sciences and the Institute for Risk and Uncertainty).

Requirements and Application

The successful applicant must have a Master's degree in mathematics, physics, geophysics, engineering seismology or similar. The applicant is expected to have a strong background in the analysis of large datasets, development of numerical models, inversion methodologies and computer programming. Knowledge of concepts in seismology and engineering seismology and Python programming is an advantage. Excellent undergraduate and Master's degree grades are expected as well as a high level of written and spoken English.

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 is to be enrolled as a PhD student at the University of Liverpool. 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 Liverpool will make the final decision for allocating the stipend.

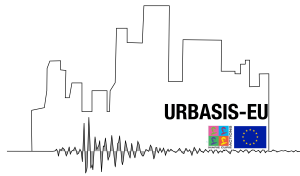
URBASIS-EU wishes to reflect the diversity of society and welcomes applications from all qualified candidates regardless of personal background or belief. We encourage applications from everyone irrespective of gender and ethnic group but, as women and members of ethnic minority groups are currently 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 CV cover letter etc. 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 ESR2.1 (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
- **Ben Edwards** : ben.edwards@liverpool.ac.uk, School of Environmental Sciences, University of Liverpool for specific questions regarding this PhD project.
- **Florence Cataye**, URBASIS project manager : florence.cataye@univ-grenoble-alpes.fr for administrative questions