

ESR 4.2 - Time dependency of seismic risk in urban areas

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

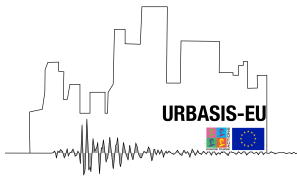
Supervisor - Stéphane Drouet (GEOTER - Auriol) - Ramon Secanell (GEOTER) - Philippe Guéguen (UGA Grenoble)

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

Seismic-risk assessment is based on the knowledge of hazard and vulnerability. Mitigation solutions depend on their economic and technical performance (mitigation investment/ risk- reduction efficiency). Through building behaviour modelling, vulnerability functions will be derived and analysed for natural and induced seismicity, including the time-variant of the seismic vulnerability and seismic risk (in relation to WP1 and WP2). On one hand, hazard can vary with time (e.g., after a strong earthquake, the aftershock sequence can also threaten the infrastructure of interest; and stress changes can locally and sustainably modify the seismicity rate and the hazard). On the other hand, vulnerability depends on the building integrity and can change through time due to different modifications and upgrades (e.g., obsolescence, climatic events, earthquakes, retrofitting actions). The ESR will study the ways to quantify the risk time dependency, including seismicity variations and building degradation.

The URBASIS consortium is funded by European Commission's Innovative Training Network (ITN) program. This research project will take place at GEOTER, France, and the student will be enrolled at the University Grenoble Alpes, France. This project will involve close collaboration with ISTERRE of the University of Grenoble Alpes, where the researcher will spend several months. The project will also involve secondment with RESONANCE (Geneva).



Requirements and Application

The successful applicant must have a Master degree in seismology, earthquake engineering, engineering seismology or similar. The applicant is expected to have a strong statistics, signal processing and building structural analysis background. Furthermore, knowledge of open data and machine learning 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 Doctoral School of University Grenoble Alpes in accordance with the regulations of Terre-Univers-Environment on 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 Dean of the Doctoral School of University Grenoble Alpes 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 ESR4.2 (to be reminded in the application form)

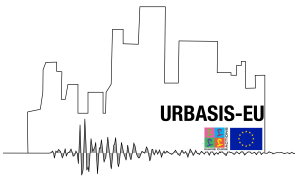
Deadline : February, 23rd 2019

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 (ISTerre, Earth Science Institute, Université Grenoble Alpes) for general questions regarding the URBASIS consortium, concerning the scientific and training aspects of the ITN program
- **Stéphane Drouet** : s.drouet@fugro.com , or Ramon Secanell : r.secanell@fugro.com concerning the scientific aspects of this PhD project.
- **Florence Cataye**, URBASIS project manager: florence.cataye@univ-grenoble-alpes.fr for administrative questions.



For more information of Doctoral School: <https://doctorat.univ-grenoble-alpes.fr/en/> and <https://ed-tue.osug.fr/?lang=en>