As a University of Excellence, Universität Hamburg is one of the strongest research universities in Germany. As a flagship university in the greater Hamburg region, it nurtures innovative, cooperative contacts to partners within and outside academia. It also provides and promotes sustainable education, knowledge, and knowledge exchange locally, nationally, and internationally.

The Faculty of Mathematics, Informatics and Natural Sciences, Department of Earth Science, Institute of Geophysics invites applications for a

**MARIE SKŁODOWSKA-CURIE ITN EARLY STAGE RESEARCHER FOR THE PROJECT**

**“SPIN ESR 4.2: NONLINEAR SEISMOLOGY MEETS STRUCTURAL HEALTH MONITORING”**

- SALARY IN LINE WITH THE **STANDARD RATES** FOR MSCA REGULATIONS -

The position in accordance with Section 28 subsection 3 of the Hamburg higher education act (Hamburgisches Hochschulgesetz, HmbHG) commences on 01.06.2021.

This is a fixed-term contract in accordance with Section 2 of the academic fixed-term labor contract act (Wissenschaftszeitvertragsgesetz, WissZeitVG). The term is fixed for a period of 36 months. The position calls for 39 hours.

This PhD position is one of the 15 Early Stage Researcher (ESR) positions within the SPIN project ([http://spin-itn.eu](http://spin-itn.eu)). SPIN is an Innovative Training Network (ITN) funded by the European Commission under the Horizon 2020 Marie Sklodowska-Curie Action (MSCA).

SPIN will focus on training 15 PhD candidates in emerging measurement technologies in seismology. We will research the design of monitoring systems for precursory changes in material properties, all while optimizing observation strategies. The unique interdisciplinary and inter-sectoral network will enable PhDs to gain international expertise at excellent research institutions, with meaningful exposure of each PhD candidate to other disciplines and sectors, thus going far beyond the opportunities provided at a single PhD programme. For further information, please consult our website at: [http://spin-itn.eu](http://spin-itn.eu).

**RESPONSIBILITIES:**

Duties primarily include teaching and research. Research associates may also pursue independent research and further academic qualifications.

* Full-time positions currently comprise 39 hours per week.
**SPECIFIC DUTIES:**

Using an optimized sensor deployment based on the work by ESR3.1, the test structure will be instrumented with complementary sensors and both active and passive measurements will be performed. Many bridges, dams, buildings and other structures in Europe have reached an age where deterioration and limited load capacity become a serious problem. Methods of nondestructive testing (NDT) and structural health monitoring (SHM) are important to assess the status and capacity of structures.

In this PhD project, we transfer knowledge between civil engineering and seismology. Our goal is to evaluate and monitor changes of mechanical properties of materials, which are associated with long-term damage development in civil structures. To do this, we will apply seismic wavefield-based techniques to detect and quantify changes in propagation velocity and scattering properties. We will investigate the optimal way to measure self-healing timescales after reversible damage is induced on a concrete test structure.

In parallel, we will assess the sensitivity of velocity changes and of healing timescales to environmental conditions (temperature, pore fluid content, etc). Through this, we investigate whether it is possible to distinguish these effects from the underlying, long-term changes in internal strength of the structure.

This part of the project will benefit from close interactions with other projects in the SPIN network, as well as with other PhD candidates within SPIN, who will evaluate array sensitivity towards transient changes.

Throughout the investigations described above, we will evaluate which benefits to the monitoring methods can be provided by the use of novel sensors (e.g. rotational, strain/DAS). We will design and perform experiments on concrete test structures at BAM (Federal Institute for Materials Research and Testing, Berlin), in close collaboration with the scientists there.

Using an optimized sensor deployment based on the work by a different PhD candidate, the test structure will be instrumented with complementary sensors and both active and passive measurements will be performed.

The long-term goal of this project is to develop seismic wavefield-based methodologies for detecting a monitoring damage and deterioration of dams, wind turbines, high-rise buildings, and other structures, which are constantly under stress.

**REQUIREMENTS:**

We welcome applications from candidates who fulfill the following criteria:

- A completed research-oriented Master's degree in a relevant field (e.g. Geophysics, Physics, ...). The degree must be completed at the time of recruitment.
- An outstanding academic track record
- An excellent command of English, both verbal and written
- Dedication and enthusiasm for research, combined with scientific curiosity, reliability and the capacity to teamwork in an interdisciplinary environment.
- A strong background in wave propagation, as well as experience in signal processing and programming
- Experience with seismic or acoustic laboratory experiments are a definite advantage

Please ensure that you fulfill the following eligibility criteria for ESR (Early Stage Researcher) positions in H2020 MSCA-ITNs, as ineligible candidates cannot be considered: [https://spin-itn.eu/recruitment/#eligibility-criteria](https://spin-itn.eu/recruitment/#eligibility-criteria)

Qualified disabled candidates or applicants with equivalent status receive preference in the application process.
For further information, please contact Prof. Dr. Celine Hadziioannou (celine.hadziioannou@uni-hamburg.de) or consult our website at http://spin-iten.eu.

The application deadline is April 1st, 2021. Applications must include:

• A cover letter in which you describe your motivation and qualifications for the position.
• A CV including relevant competences, skills and publication list, if applicable
• Copies of degree certificate(s) and transcripts of records for previous studies (Bachelor and/or Master). Please indicate expected date of graduation if your Master’s degree is not completed
• Contact information of two references
• Completion of the SPIN application form: http://uhh.de/min-spin-apply

Applications should be sent in one single pdf file with filename `SPIN_YourLastname_YourFirstname.pdf` to spin-applications.min@uni-hamburg.de.

Please do not submit original documents as we are not able to return them. Any documents submitted will be destroyed after the application process has concluded.