

# SPIN

MONITORING A  
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## SPIN ESR 3.4: Ambient signals as a tool to characterize material properties

**Host institution:** University of Hamburg (UHH)



Universität Hamburg

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### Supervisors:

main supervisor: Dr. Celine Hadziioannou (University of Hamburg, D)

co-supervisors: Dr. Sven Schippkus (University of Hamburg, D)

Dr. Eleonore Stutzmann (Institut de Physique du Globe de Paris, F)

**Application deadline** April 1st, 2021

**Earliest possible starting date:** summer 2021

### General information

This PhD position is one of the 15 Early Stage Researcher (ESR) positions within the SPIN project (<http://spin-itn.eu>). SPIN is an Innovative Training Network (ITN) funded by the European Commission under the Horizon 2020 Marie Skłodowska-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 candidates to gain international expertise at excellent research institutions, with meaningful exposure to other disciplines and sectors, thus going far beyond the opportunities provided in an individual PhD programme. For further information on the project, please consult our website at: <http://spin-itn.eu>.

### Project description

Many of the recent observations of transient changes of subsurface material properties are based on extracting deterministic signals from the seismic background noise field. Since seismologists have started using the continuously available ambient noise for monitoring applications, the interest in the location and behaviour of ambient noise sources has increased.

Using data already available from pilot projects with new sensors (rotations, DAS, large-N arrays), we will characterize the time-dependent distribution of noise sources at different frequencies and scales (e.g. urban noise, local environmental noise, ocean noise on the global scale). What can the inclusion of additional ground motion observables tell us about how the noise sources work?

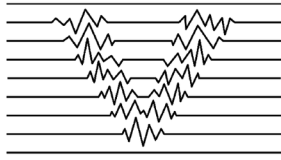
Once noise generation mechanisms are better understood, it will become possible to accurately distinguish effects that are due to changing noise source characteristics from actual changes in the subsurface. How do the noise field characteristics affect the accuracy of noise cross-correlation signals? What about seismic noise interferometry with new observables?



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The project will benefit from interactions with other PhD projects within the SPIN network. For example, coherence based analysis, developed by a different PhD candidate, will be incorporated into the ambient noise signal characterization approach. Land-based array observations will be compared to ocean floor observations studied by another research group in SPIN. The outcome of this PhD project will directly influence several projects that focus on applications on volcano, permafrost and structural health monitoring.

## Required skills and experience

We welcome applications from candidates who fulfill the following criteria:

- A completed research-oriented university degree, such as a Master's degree or BSc Hons, in a relevant field (e.g. Geophysics, Physics, ..) The PhD enrollment requirements will depend on the hosting institute, please refer to the individual project descriptions and institute webpages.
- An outstanding academic track record
- A good 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

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>

## Application Procedure

The **application deadline is April 1st, 2021**. Application evaluations will start immediately, and will continue until all positions are filled. We wish to reflect the diversity of society and we welcome applications from all qualified candidates regardless of personal background. The selection will be exclusively based on qualification without regard to gender identity, sexual orientation, religion, national origin or age.

### 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 yet 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](mailto:spin-applications.min@uni-hamburg.de)

## Data handling

By applying to a PhD position, you agree that all data concerning your application may be stored electronically and distributed among the supervisors involved in the selection procedure within the MSCA ITN SPIN. If you do not agree, your application cannot be processed further, due to the project's centralised recruitment process. The data are used solely for the recruitment process and we do not share information about you with any third party.



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