POST DOCTORAL POSITION IN THE FIELD OF FIBER-OPTIC BASED MONITORING APPLIED TO ANTHROPOGENIC GEOHAZARDS

Publication date: 20/03/2025
Location: Ineris Nancy, Campus Artem, 92 rue Sergent Blandan, F-54000 Nancy
Type of contract: Post Doctoral position
Duration: 18 months

CONTEXT

Ineris is a French public expert on industrial and environmental risk management, placed under the aegis of the Ministry of the Environment. Its mission is to contribute to the prevention of risks caused by economic activities to health, environment, and the safety of people and goods.

Ineris expands its scientific and technical capabilities in different domains, including risks related to all underground industrial activities. With its forward-looking vision of the major challenges in the energy transition, Ineris investigates innovative monitoring technologies such as fiber optic sensing technologies, which have already been successfully applied in several geotechnical monitoring contexts and bare a great potential for improving hazard and risk assessment in anthropogenic underground exploitation.

Thanks to the continuity of the measurements, the strong resistance to wet, high pressure and temperature environments, the technology provides new insights into the understanding and monitoring of the geomechanic rock, ground and construction behaviors. Nonetheless, sensitivity of these approaches is often limited and the data volume extremely high what implies challenges in field installation (e.g. fiber to ground coupling) and data management (acquisition, processing) which are still under investigation by current research.

MISSION AND OBJECTIVES

The post-doctoral fellow will join the AS2G team (Unité Auscultation et Surveillance Géotechnique et Géophysique) composed of 18 people and will integrate the group that work on the FIMOPTIC project, funded by the French agency of research (ANR). This project focuses on the evaluation of the potential of optic fiber based Distributed Acoustic Sensing (DAS) and Distributed Temperature and Strain Sensing (DTSS) in the context of anthropogenic underground exploitation in a deep excavation mine with the objective to improve hazard assessment with respect to rock mass stability and rock burst prevention.

Based on data sets acquired during several multi-instrumental measurement campaigns in the mine, the fellow will evaluate the sensitivity of the used fiber optic based methods (by means of comparison to standard monitoring tools as strain meters, extensometers, microseismic

monitoring) and analyze the geomechanic rock mass behavior following excavation. In this context, also best practices in fiber installation in the field and data acquisition as well as development of the processing routines will be derived.

A second potential field of application will involve the evaluation of DTSS in the context of ground movement monitoring with potential field applications in solution mining, enhanced geothermal production and/or near fault laboratories. This investigation will potentially involve filed trips as well as DTSS testing in the lab.

The mission includes presentation of results at international scientific meetings and conferences, and contribution to the production of peer-reviewed research reports and scientific publications.

PROFILE AND EXPECTED SKILLS

PhD in Geosciences connected to optic fiber sensing.

The candidate should have good programming and signal processing skills, as well as a good level of English. She/he will work in Nancy at the Ineris lab with regular missions to IPGP (Institut de Physique du Globe de Paris) and with international field missions in Europe.

The candidate should also demonstrate:
- Good organization and research skills,
- Good communication and writing skills (technical documents, scientific papers),
- Synthetic thinking,
- Ability to work in a team, dynamism, and adaptability.

ADDITIONAL INFORMATION

As part of this position, you will work with IPGP researchers, namely Pascal Bernard and Claudio Satriano.

This position is open to people with disabilities.

The application must include a resume, a cover letter and contact information for two persons who can evaluate the candidate's scientific abilities and suitability for the position.

For more information, please contact Jannes-L.KINSCHER@ineris.fr

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