

## PhD position at GeoRessources Laboratory (Université de Lorraine, France)

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### Near real-time reconciliation of geochemical data acquired with handheld spectroscopic devices. Application to vein Sn-W deposits from the Iberian Belt

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Period: July 2018 – June 2021 (36 months)

Supervisors: Cécile Fabre (PhD, HDR, GeoRessources lab, Université de Lorraine), Jean Cauzid (PhD, GeoRessources lab, Université de Lorraine)

Funding: this project is funded through the H2020 project NEXT (New Exploration Technologies), with a consortium of 16 Partners lead by the GTK (Finnish Geological Survey).

#### **Objective of the project NEXT and description of the PhD**

The H2020 NEXT (New Exploration Technologies) projects aims at leading breakthrough in several technical fields to ease the finding of new ore deposits. Amongst the tools to be developed, handheld tools are to be thought about not as individual sensors but as a combination of devices providing complementary data. These techniques requiring access to low-vegetated areas will be applied on Sn-W deposits from the Iberian province.

One of the Work Package is devoted to data fusion and specifically aims at “developing tools for data calibration and extraction of various field techniques; building a representative spectral library for each technique, and a tool for quick delineation of mineralogy and bulk rock litho-geochemistry in the field.” This task will be conducted together with inputs from the host lab workers, people from the GTK (Geological survey, Finland), MATSA (Mining company, Spain) and the SCIC (Research Institute, Spain) and in close collaboration with the WP coordinator (BEAK, Germany) and partners involved in Task 4.1 dealing with optical spectroscopy: Helmholtz Institute (Research Institute, Germany), EFTAS and DMT (service companies, Germany).

#### **Targeted achievements of the PhD:**

- develop the use of portable devices for spectroscopy applied to rock samples in the host laboratory
- perform data acquisition on targeted ore deposits using both lab and handheld devices including LIBS, XRF, IR, Raman,....
- design a protocol to reconcile geochemical data from various handheld techniques
- Publish the results in papers in top journals, with objectives of publication in journals devoted to i) analytical techniques and ii) mineral deposits.

#### **Qualification and requirements:**

- Ability to work in team, with international partners
- Knowledge in at least one analytical technique based on photon-matter interactions (LIBS, XRF, gamma-ray, Raman, infrared,...)
- Ability to test new methods and instruments
- Knowledge in mineralogy

- Very good written and spoken English are essential (international research program)
- Willingness to travel and reside in different European countries (France and Portugal)

This position requires a degree equivalent to Master of Sciences in the field of geosciences and/or mineral deposits. The student will be registered at the Université de Lorraine.

The successful candidate will join the Mineral Resources Team of GeoRessources Lab (Université de Lorraine; <http://georessources.univ-lorraine.fr/fr/content/ressources-minerales>), with 12 permanent researchers and several PhDs and postdocs. Our institution is the French leader academic laboratory for the study of mineral deposit formation. The institution hosts several research platforms with state-of-the-art instruments for the characterization of experimental and natural products (SEM, EMPA, LA-ICP-MS, micro-tomography, microthermometry, Raman, Infrared spectroscopy). Our institution is part of the Université de Lorraine (<http://welcome.univ-lorraine.fr/en>), with more than 55,000 students and 60 research laboratories. The Earth, Environmental and Universe Sciences cluster 4 laboratories hosting more than 300 researchers and 4 teaching structures.

The successful candidate, according of his motivation, will be able to give courses to students of Bachelor and Master degrees at the Université de Lorraine.

### **Deadlines:**

Applications (CV + cover letter with the name of 2 referees) should be send by June 30th 2018

Interviews will take in early July 2018

The intended starting date is between late July and early September 2018

### **Contacts:**

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