

Vacancy Notice No. B 32/23 (B4.4)

The **FEDERAL INSTITUTE FOR GEO-SCIENCES AND NATURAL RESOURCES (BGR)** is looking for you for the position of
01.07.23 or earlier **limited for 3 years until 30.06.2026 at the latest** as a
research assistant (m/f/d)

The FEDERAL INSTITUTE FOR GEO-SCIENCES AND NATURAL RESOURCES (BGR) is the central geoscientific consulting institution of the German federal government with headquarters in Hannover and two additional offices in Berlin-Spandau and Cottbus. As a geoscientific competence center, it advises and informs the federal government and the German economy on all geoscientific and natural resources management issues.

The European HORIZON Europe research project MultiMiner aims to develop new data processing algorithms for the exploration of critical raw materials and the monitoring of mining activities that are scalable and transferable. The focus is on Machine Learning (ML) and Deep Learning (DL) approaches dealing with no or little training data (Weakly Supervised Learning and Unsupervised Learning, respectively) and synergistically use data from different sensors (e.g., EnMAP, drones, Sentinel-1/-2) and different resolutions (spatial and spectral). To increase long-term autonomy in key strategic commodities, it is important to bring together the capabilities of new scientific developments.

Your tasks:

- Further development of application-oriented, transferable methods for the detection of different mineral raw material deposits and mineral resources
- Development and use of methods from the fields of Machine Learning (ML) and Deep Learning (DL) and AI approaches for the (synergetic) evaluation and use of a wide variety of remotely sensed data in the fields of "Mineral Resource Deposits" and "Geology".
- Merging remote sensing data and geological - mineralogical data from different sources using ML/DL methods.
- Digital processing and interpretation of multiscale and multisensor remote sensing data especially hyperspectral and multispectral remote sensing data in the context of raw material exploration.
- Participation in geoscientific field campaigns (also in alpine terrain) incl. hyperspectral measurements with UAV and field spectrometer
- Presentation of the work results to the professional public at important national and international conferences and publication in recognized scientific media

Your profile:

You have a university degree (Master's or equivalent) in geology - or a geoscientific course with a focus on geology - with a content focus on remote sensing and ideally mineral resources.

This is what we expect from you:

- Very good knowledge and practical experience in geological/resources remote sensing as well as in geological processing and geoscientific analysis of remote sensing data incl. the corresponding data processing software (e.g. ENVI, ERDAS)
- Knowledge and experience in machine learning and interpretation of modern spectral remote sensing data for geological and geological deposit research.
- Machine Learning (ML) and Deep Learning (DL) experience; ideally experience with methods to learn from small datasets (Weakly Supervised learning, Transfer Learning, Data Augmentation).
- Knowledge of common ML and DL libraries and frameworks (e.g. Keras, TensorFlow, scikit-learn, CARET, ...).
- Programming experience Python, R
- Experience in the development of transferable methods based on physical data especially remote sensing data.
- Experience in handling and using sensors and remote sensing methods
- Geological field experience as well as willingness and ability to work also in alpine terrain
- Very good coordination, communication and teamwork skills
- Distinct ability and willingness to work independently and goal-oriented
- Initiative and flexibility
- Very good knowledge of English comparable to level C1 GeR
- Good knowledge of German comparable to level B2 GeR, willingness to use it proactively and to deepen skills in the German language on a professional basis
- Minimum physical fitness, ability to perform geological field work in mountainous, rough terrain, high altitude and tropical fitness.

Ideally you bring with you:

- Work experience at a (federal) government agency or a federal departmental research institution.
- Experience with hyperspectral remote sensing data
- Experience in building hyperspectral databases
- Experience with hyperspectral field work and airborne campaigns

We offer you:

- Responsible and varied activities at the Hannover location
- Grouping, depending on personal requirements, up to **pay group 14 TV EntgO Bund**
- A continuous offer of further education and training

Depending on the field of activity, mobile working and flexible working time models are possible.

The BGR has a health service, very good public transport links, free parking for employees and a canteen.

Applications from people of all nationalities, regardless of their origin, gender, religion or belief, disability, age or sexual identity are welcome. The language of communication is German. The BGR also pursues the goal of professional equality between women and men. We therefore particularly welcome applications from women. Furthermore, the BGR strives to increase the proportion of severely disabled people; they will therefore be given preferential consideration in the event of equal suitability.

Please send your application with meaningful documents (including your certificates and proof of qualification), if possible **by e-mail**, to the following **e-mail** address by **14.04.2023**, quoting the job advertisement number **B 32/23** and the password "**MultiMiner**":

jobs@bgr.de

You can find more information about our facility on the Internet at www.bgr.bund.de. For telephone information, please call Dr.-Ing. Thomas Lege at +49 511/643- 3001.

The BGR is interested in the medium through which you became aware of this job advertisement. Therefore, please indicate where you first became aware of this job posting.

The protection of your data is important to us. For more information on the handling of your personal data in the event of an application to BGR, please refer to the data protection declaration at <https://www.bgr.bund.de/datenschutzerklaerung-bewerbungsdaten>.