Helmholtz-Zentrum Dresden-Rossendorf e.V.

With cutting-edge research in the fields of ENERGY, HEALTH and MATTER, around 1,500 employees from more than 70 nations at Helmholtz-Zentrum Dresden-Rossendorf (HZDR) are committed to mastering the great challenges facing society today. At the Helmholtz Institute Freiberg for Resource Technology (HIF), innovative technologies for the circular economy are developed to provide and use mineral and metal-bearing raw materials more efficiently and to recycle them in an environmentally friendly way. The Group Geometallurgy and Particle Based Process Modelling is looking for a PhD Student (f/m/d) Development of soft-sensors connected to particlebased separation models to control flotation processes.

PhD Student (f/m/d) Development of softsensors connected to particle-based separation models to control flotation processes

City: Freiberg; Starting date (earliest): 01/03/26; Duration: 36 months;
Remuneration: TVöD-Bund; Reference number: 2025/159; Closing date: 06/01/26

Working field

- Develop and implement soft-sensor concepts for continuous monitoring of ore microstructures along the entire process chain using machine-learning (ML) techniques and validate soft-sensor outputs against laboratory reference measurements
- Perform systematic laboratory flotation experiments (varying grinding and flotation conditions); collect and curate high-frequency time-series data
- Train particle-based separation models (PSMs), linking micro-structural descriptors to flotation performance
- Identify and evaluate online-measurable proxies (e.g., froth-camera metrics, X-ray fluorescence) for ore microstructures; conduct offline µXRF/TIMA analyses to simulate various XRF-system configurations
- Scale-up and pilot-test the developed concepts on a mini-pilot flotation rig
- Document results and prepare scientific publications, conference presentations and project reports; contribute to the overall project work plan and milestones

Requirements

- Completed university studies (Master/Diploma) in the field of Chemical/Metallurgical/(Mineral) Process Engineering, Data Science, Statistics, Machine Learning or related field
- Good knowledge of mineral processing and statistics
- Familiarity with soft-sensor concepts and data-driven process monitoring
- Understanding of ore microstructures, particle characterization, and mineralogy
- Independent, self-driven researcher with a strong problem-solving mindset
- Proven team player, able to collaborate across multiple institutions

- Critical thinking to assess model performance, detect artefacts, and ensure scientific rigor
- Proficiency in Python (or Julia/R) for data handling, ML model development, and statistical analysis
- Ready to work with time-series data, sensor fusion, and feature engineering
- Very good knowledge of English is mandatory, knowledge of German is an advantage

What we offer

- A vibrant research community in an open, diverse and international work environment
- Scientific excellence and extensive professional networking opportunities
- A structured PhD program with a comprehensive range of continuing education and networking opportunities - more information about the PhD program at the HZDR can be found here
- Salary and social benefits in accordance with the collective agreement for the public sector (TVöD-Bund) including 30 days of paid holiday leave, company pension scheme (VBL)
- We support a good work-life balance with the possibility of part-time employment, mobile working and flexible working hours
- Numerous company health management offerings
- Employee discounts with well-known providers via the platform Corporate Benefits
- An employer subsidy for the "Deutschland-Ticket Jobticket"

Application

We look forward to receiving your application documents (including cover letter, CV, diplomas/transcripts, etc.), which you can submit via our online-applicationsystem: https://www.hzdr.de/db/Cms?pNid=490&pLang=en&pOid=76156

More information at https://stellenticket.de/199839/TUB/
Offer visible until 01/01/26