

The Helmholtz Centre Potsdam – GFZ German Research Centre for Geosciences is the national research centre for Earth sciences in Germany. With approx. 1280 employees, the GFZ is conducting interdisciplinary research on the “System Earth” and the influence of humans on the planet. As a member of the Helmholtz Association, it is part of Germany’s largest science organization. Section 2.6 “*Seismic Hazard and Risk Dynamics*” invites applications for a

PhD Position “Multi-stage stress field models from borehole to regional scale” (m/f) Job Vacancy No. 0363

A key challenge for the safe usage of the underground is the quantification of the 3D stress field to assess the distance to failure of pre-existing faults or the generation of new fractures. This is of particular importance in the new German site selection process for a deep geological repository (DGR) for high-level nuclear waste. The initial distance to failure is needed to predict the long-term impact of natural loads (e.g. earthquakes, glaciation) and man-made changes (excavation, heat generation). A pre-requisite for this prediction is the 3D continuous description of the initial stress field from borehole to regional scale, i.e. from meter to 10s of kilometer. Based on the work of Ziegler et al. (2016, <http://dx.doi.org/10.5194/se-7-1365-2016>) a rigorous multi-stage workflow has to be further developed and validated using the sparse and incomplete point-wise information of the stress field for model calibration. The project work is basic research to develop key tools and basic understanding of 3D geomechanical modelling of the in situ stress state and to train the next generation of experts that are needed for this research field.

The PhD position is part of the BMWi project SpannEnD (Stress Field Germany) which is a collaboration of the Karlsruhe Institute of Technology KIT and the Technical University of Darmstadt. The PhD position is linked to two complementary PhD positions at these partner institutions that focus on larger scale geomechanical models, scaling of rock properties and the representation of faults and fractures at different model scales. The project is also linked to the World Stress Map project (world-stress-map.org) which is an international network of leading scientists and the new DGR research project iCross comprising five Helmholtz Research Centers (starts in 2018).

Your tasks:

- Set up of a database of stress magnitude data for Germany
- Development of a quality ranking scheme for the different stress magnitude measurement tools
- Implementation of a robust multi-stage workflow for geomechanical models from regional to borehole scale
- Automating the model calibration, validation of the model workflow and quantification of model uncertainties
- Interpretation and publication of the results and presentations at international conferences

Your qualifications:

- Master’s degree (or equivalent) in Geophysics, Geology, Geotechnics or Physics is mandatory
- Experience in numerical simulation tools and programming skills (e.g. Python or C/C++) are of advantage
- very good command of spoken and written English is essential

Starting date: as soon as possible

Fixed term: 3 years

Working hours: PhD is part-time 75% (currently 29.5 h/week)

Salary: The pay scale grouping will be into pay group EG 13 TVöD-Bund (Tarifgebiet Ost) provided that all tariff related, professional and personal requirements are met.

Location: Potsdam

You can expect a very diverse and challenging job in an international work environment that is characterized by exciting research projects. The compatibility of work and family life is of particular concern to the GFZ. Therefore, it offers the opportunity for flexible working time and workplaces. Moreover, there is a kindergarten located on the research campus.

The GFZ is a partner with Geo.X (www.geo-x.net), and as such it is well connected with other geoscience institutions in Potsdam und Berlin. Geo.X forms the largest regional cluster of geoscientific expertise in Europe and offers excellent opportunities for cooperation and development.

Please submit your application by **15th February 2018** quoting the reference **No. 0363** via email to **applications@gfz-potsdam.de**. Please combine your application documents (letter of motivation, CV and certificates) into a single PDF file with a size of up to 3 megabytes.

Equal opportunity is an inherent part of our personnel policy. Therefore we are particularly welcoming applications from qualified women. Severely disabled persons will be given preferential treatment in the case of equal qualification.

We will retain your application documents for at least three months, even if the application is not successful. If you have any questions regarding this job offer, please feel free to call Ms Buge at +49 (0) 331-288-28878.