



At the Institute for Geomechanics and Geotechnics,
at the Institute for Computational Modeling in Civil Engineering and
at the Institute for Dynamics and Vibration
of the Technische Universität Braunschweig
a total of four positions are available as

Scientific Assistant
(pay group 13 TV-L)

in the project

SEMOTI

funded by Federal Ministry for the Environment, Nature Conservation, Nuclear Safety
and Consumer Protection (BMUV)

SEMOTI deals with new methods of machine learning and uncertainty quantification in the context of computational modeling of geomechanical and geotechnical processes. As an example, a digital twin of a deep geological repository will be investigated for the planning and excavation of a disposal route. The main focus of the advertised positions is the adaptation of the rock mechanics processes in the planning and excavation of a deep geological repository to digital methods, the calibration and optimization of geomechanical models based on adaptive and error-driven surrogate modeling, as well as the use of new methods for sensitivity-based dimensionality reduction.

The positions are to be filled by May 1st, 2023 and are limited for a period of 36 months. The payment is according to EG 13 TV-L. The positions offer the possibility to pursue a PhD, which is explicitly supported by the professorships.

About us

The working group Data-Driven Modeling and Simulation of Mechanical Systems is headed by Prof. Dr.-Ing. Henning Wessels. Prof. Dr.-Ing. Ulrich Römer heads the working group Uncertainties in Technical Systems and Prof. Dr.-Ing. Joachim Stahlmann the Institute of Geomechanics and Geotechnics. In this project, the three working groups cooperate at the interface of geomechanical modeling, numerical simulation, machine learning and uncertainty quantification. Our common goal is to develop methods that are able to interpret uncertain monitoring data using geomechanical models in order to improve the overall safety of deep geological disposal.

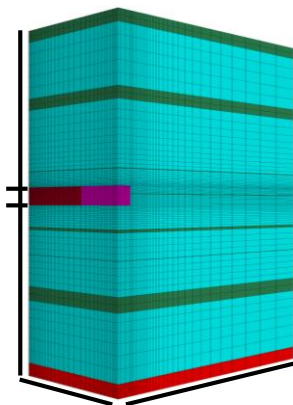


Figure 1: Parametric virtual demonstrator as a basis for a digital twin.



Your tasks

- Independent research and conceptual design of numerical, stochastic and data-driven methods
- Implementation of adaptive surrogate models for calibration, optimization and global sensitivity analysis
- Description of rock mechanics processes in underground cavity construction with Artificial Intelligence
- Close interdisciplinary collaboration of researchers from the three areas.
- Writing of scientific publications and project reports
- Presentation of project results at (inter-)national conferences

Qualification requirements (alternative)

iRMB und IDS:

- Above-average academic degree in engineering, mathematics, material or natural sciences (Master's degree or comparable)
- Sound knowledge in at least two areas of mechanics, numerics, machine learning, and stochastic modeling, as evidenced by attendance of relevant courses and related student projects/theses
- Knowledge of a programming language, preferably Python
- Experience in programming, also using methods such as git and docker

IGG:

- Above-average scientific degree in engineering (civil or environmental engineering)
- Good knowledge in the field of geotechnical engineering and underground cavity construction
- Good knowledge in the field of rock mechanics and in the field of numerical simulation

What we expect

- Intrinsic motivation for independent, scientific research
- Profound English skills
- Team spirit and strong communication skills

What we offer

- Attractive work environment in a committed young team
- Great creative freedom with plenty of room for own ideas and personal development
- Participation in continuing education programs of the Graduate Academy Grad^{TUBS}
- Extensive range of sports offered by the TU Braunschweig
- Individual support to conduct a research stay abroad
- A pleasant office atmosphere - but home office is possible



Application

Please send your meaningful application documents in **one** PDF file with the usual documents (motivation letter, CV, copies of certificates, references) **as soon as possible**, but no later than **March 31, 2023**, by e-mail to:

Prof. Dr.-Ing. Henning Wessels

Institut für Rechnergestützte Modellierung im Bauingenieurwesen, TU Braunschweig
Pockelsstraße 3 in 38106 Braunschweig

E-Mail: h.wessels@tu-braunschweig.de

Web: <https://www.tu-braunschweig.de/irmb/>

Prof. Dr.-Ing. Ulrich Römer

Institut für Dynamik und Schwingungen, TU Braunschweig
Langer Kamp 19 in 38106 Braunschweig

E-Mail: u.roemer@tu-braunschweig.de

Web: <https://www.tu-braunschweig.de/ids/>

or

Prof. Dr.-Ing. Joachim Stahlmann

Institut für Geomechanik und Geotechnik, TU Braunschweig
Beethovenstraße 51b in 38106 Braunschweig

E-Mail: j.stahlmann@tu-braunschweig.de

Web: <https://www.tu-braunschweig.de/igg/>

The Technische Universität Braunschweig strives to reduce under-representation in all areas and positions in the sense of the NGG. Therefore, applications from women are particularly welcome. Severely handicapped persons are preferred in case of equal suitability. Proof of eligibility must be submitted. Applications from people of all nationalities are welcome. Personal data will be stored for the purposes of the application process. Application costs cannot be reimbursed.