BAM
Bundesanstalt für Materialforschung und -prüfung

To strengthen our team in the division 7.7 "Modelling and Simulation" in Berlin-Steglitz, starting 01.01.2022, we are looking for a

PhD student (m/f/d) in the field of engineering, applied physics, mathematics or comparable

Salary group 13 TVöD
Temporary contract until 31.12.2024
Full-time / suitable as part-time employment

The Bundesanstalt für Materialforschung und -prüfung (BAM) is a materials research organization in Germany. Our mission is to ensure safety in technology and chemistry. We perform research and testing in materials science, materials engineering and chemistry to improve the safety of products and processes. At BAM we do research that matters. Our work covers a broad array of topics in the focus areas of energy, infrastructure, environment, materials, and analytical sciences.

We are looking for talented people to join us.

Your responsibilities include: Physics-based simulation models such as parameterized differential equations allow to simulate complex problems. These models are often generalizable, i.e. applying the models to slightly different problems if often possible. However, the model must include all the relevant physical phenomena. On the other hand, machine learning approaches such as neural networks or Gaussian processes allow to model any complex functional relation. But they usually require much larger data sets for training and have only a very limited extrapolation quality.

The aim of the project is to couple these two approaches. The global relations are described by a physics-based model whose parameters are identified using Bayesian inference. In addition, local approximations based on machine learning models allow to include additional physical phenomena.

This project is a collaboration between division BAM 7.7 "Modeling and simulation", BAM S.3 "eScience" and the Technical University Munich integrated into their PhD program. The project is embedded into an international research environment and offers ideal conditions for creative students.

Your responsibilities include:

- Development and implementation of numerical solution procedures for partial differential equations (Finite Element Method, implementation into FEniCS)
- Parameter estimation using Bayesian inference
- Coupling physics-based models with machine learning approaches (e.g. Gaussian processes)
- Presentation and publication of the results in research journals as well as on national and international conferences
- Interdisciplinary cooperation and transfer with national and international research groups

Your qualifications:

- Very good university degree (diploma/master) in engineering, applied physics, mathematics or comparable
- Very good experiences in technical mechanics and finite element method
- Experience in developing FEM-applications

- Very good programming skills (C++, python)
- Ideally experience in machine learning applications
- Ideally experience with Bayesian inference for parameter estimation
- Excellent English skills, both written and spoken
- Good German skills, both written and spoken
- Good communication and Information behaviour, goal-oriented and structured way of working
- Ability to work in a Team / willingness to cooperate, willingness to learn and initiative / commitment

We offer:

- Interdisciplinary research at the interface of politics, economics and society
- Work in national and international networks with universities, research institutes and industrial companies
- Outstanding facilities and infrastructure
- Flexible working hours and mobile working

Your application: We welcome applications via the online application form by 28.11.2021. Alternatively, you can also send your application by post, quoting the reference number 247/21-7.7 to:

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Unter den Eichen 87
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GERMANY
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Dr. Unger will be glad to answer any specific questions you may have. Please get in touch via the telephone number +49 30 8104-3787 and/or by email to Joerg.Unger@bam.de.

BAM pursues the goal of professional equality between women and men. We therefore particularly welcome applications from women. In addition, BAM supports the integration of severely disabled persons and therefore especially welcomes their applications. With regard to the fulfilment of the job advertisement requirements, the application documents are examined individually. Recognised severely disabled persons will be given preferential consideration if they are equally suitable.

The advertised position requires a low level of physical aptitude.

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I am interested and would like to apply

Back

BAM actively supports the compatibility of work and family and has been certified as a family- and life-phase-conscious employer by the "audit berufundfamilie" since 2015.