The DFG-funded **Collaborative Research Center SFB 1294 "Data Assimilation – The Seamless Integration of Data and Models"**, hosted at the University of Potsdam jointly with its partner Institutions HU Berlin, TU Berlin, WIAS Berlin and GFZ Potsdam, invites applications for a **doctoral researcher position** available from October 1st, 2021.

Our vision. The assimilation of time-dependent data sets into complex evolution models leads to unique mathematical and computational challenges. These challenges which provide the central theme of the SFB 1294. Data assimilation constitutes a rapidly expanding field at the confluence of several established research areas in mathematics, statistics and machine learning, on the one hand and applications from the natural sciences and other disciplines. Our vision is to establish a rigorous mathematical underpinning of data assimilation, to develop principled computational methodologies, and to apply these methodologies to newly emerging application fields in the geosciences, neuro-sciences, pharmacology and biophysics.

The SFB 1294 provides an excellent research infrastructure including a large interdisciplinary net-work of researchers and its own graduate school, as well as funding opportunities for conference visits, summer schools, and hosting international experts etc.

The SFB 1294 seeks to promote diversity in research, and encourages qualified applicants of any gender and from any background to apply.

The position. We seek applicants for a doctoral position (TVL - E13 75%) within **Project A07: "Model order reduction for Bayesian inference"**
(PIs: Freitag/Lie)

Bayesian methods are popular for solving inverse problems. However, these methods involve sampling in high dimensional spaces or evaluating complex forward models, and thus tend to be computationally costly. This project will develop computationally efficient Bayesian inference algorithms based on model order reduction and dimension reduction methods. The effect of these methods on the accuracy of the resulting approximate posterior distribution will be studied.

The researcher will develop the mathematical theory of Bayesian inference with dimension reduction, in the context of inverse problems. They will analyse the effect of low-rank approximations and projection-based dimension reduction on the posterior measure for infinite-dimensional parameter spaces, and develop and analyse algorithms for Bayesian inference using model order reduction.

The ideal candidate has mastered measure-theoretic probability, functional analysis, and linear algebra. They have experience in numerical analysis and Markov Chain Monte Carlo methods, and a strong interest in rigorous mathematical analysis and its application to numerical methods for inverse problems. They can provide evidence of these qualifications by coursework, substantial research projects, and/or a master's thesis. In addition, they have

experience with scientific computing in Matlab or Python, and strong ability to work effectively both in a team and on their own. The candidate must be able to communicate effectively in both written and spoken English.

The candidate will work at the Institute of Mathematics at the University of Potsdam under the supervision of Prof. H. C. Lie. They will closely collaborate with the group of Prof. M. Freitag (Institute of Mathematics, University of Potsdam).

The salary is determined by the collective bargaining agreement for public employees in Germany (TV-L 13). All positions are temporary in accordance with Section 2 subsection 1 of the Academic Fixed-Term Contract Law (WissZeitVG). Under the laws of the federal state of Brandenburg, employees under this contract are permitted to dedicate at least 33% of their contract time for their scientific qualification. The SFB 1294 seeks to promote diversity in research, and encourages qualified applicants of any gender and from any background to apply.

Applications to the SFB should be submitted via https://www.geo-x.net/sfb-1294/ by the **22.09.2021** and should include (1) a statement of research interests and motivation, (2) a full CV, (3) the names, e-mail addresses and/or reference letters of at least two referees, (4) academic transcripts and (5) link to electronic copy of your Master/Diploma thesis (6) list of publications/talks/presentations in a single PDF file. Late applications might be considered. Please indicate clearly which of the projects/positions you are applying for (e.g. "A04") and state your motivation accordingly.

See the website www.sfb1294.de for further information or contact hanlie@uni-potsdam.de.