Job Announcement

The University of Potsdam was founded in 1991 and has firmly established itself within the scientific landscape and developed into an outstanding economic factor and growth engine for the region. The university excels in acquiring third-party funds, has received multiple teaching awards, has a very service-oriented administration, and has been honored several times for its family-friendly culture. About 20,000 students and 3,000 employees study and work at three campuses – Am Neuen Palais, Griebnitzsee and Golm – at one of Germany's most scenic institutions of higher education.

The **DFG-funded Collaborative Research Centre CRC 1294 "Data Assimilation – The Seamless Integration of Data and Models"**, hosted at the **University of Potsdam** and jointly operated with its partner institutions **HU Berlin, TU Berlin, GFZ Potsdam, TU Ilmenau, University of Rostock, and HMU Potsdam**, invites applications for **five positions** mainly based at the University of Potsdam limited until 30 June 2029, to be filled **as soon as possible**:

Academic Staff Member (f/m/d)
Doctoral Position
ID no. 377/2025

The assimilation of time-dependent data into complex evolution models gives rise to some of today's most compelling mathematical and computational challenges. These challenges form the core of CRC 1294. Data assimilation is a rapidly growing field situated at the intersection of mathematics, statistics, machine learning, and a wide range of application areas in the natural and life sciences.

Our aim is to advance the foundations of data assimilation by developing robust and transparent theoretical foundations, establishing principled computational methodologies, and applying these methodologies to emerging domains such as geosciences, neuroscience, pharmacology, and biophysics. Through this integrative approach, we seek to build a deeper theoretical understanding while simultaneously supporting progress in a rapidly evolving research landscape.

The CRC 1294 provides a supportive and stimulating research environment, including a broad and welcoming interdisciplinary community and its own graduate school. Members benefit from excellent research infrastructure, opportunities for conference participation and international exchange, with flexible formats where possible, as well as funding to invite and collaborate with international experts.

The positions. We are seeking applicants for five doctoral positions (75%, TV-L E13) within CRC 1294. All positions are based at the University of Potsdam. For open PhD positions in CRC projects at our partner institutions, please visit their respective websites.

Applicants can apply for up to three of the following positions according to interest and qualification.

A07: Data-based model order reduction for stochastic dynamics (Prof. Dr. Melina Freitag, Research Area: Numerical Linear Algebra)

B07a: Inferring the collective dynamics of active particles by data assimilation (Prof. Dr. Carsten Beta, Research Area: Statistical Physics, Biophysics)

B07b: Inferring the collective dynamics of active particles by data assimilation (Dr. Robert Großmann, Research Area: Statistical Physics, Bayesian Inference)

B10a: Bayesian deep learning to study non-Gaussianity, correlations, and change-points in cell-driven transport (Prof. Dr. Carsten Beta, Research Area: Biological Physics)

B10b: Bayesian deep learning to study non-Gaussianity, correlations, and change-points in cell-driven transport (Prof. Dr. Ralf Metzler, Research Area: Theoretical Physics)

General Requirements: We are looking for highly motivated candidates who can work effectively in an interdisciplinary research environment and enjoy collaborative research. For positions 7a, 7b, 10a, and 10b, close communication and collaboration with researchers from the (applied) mathematical sciences are especially essential. All candidates must be proficient in written and spoken English. The five available positions are described in detail below.

Description of positions:

A07: Data-based model order reduction for stochastic dynamics
(Prof. Dr. Melina Freitag)

Responsibilities: The ideal candidate will develop and analyse projection- and data-driven model order reduction methods for stochastic dynamical systems. They will design algorithms to learn low-dimensional representations from noisy simulation or experimental data and implement reduced-order models for efficient uncertainty quantification and control. They will apply these methods to pharmacological modelling of treatment responses and will publish research results and contribute to open-source software and interdisciplinary collaborations.

Requirements: Master of Science degree in Mathematics, with a profound knowledge in numerical analysis and applied stochastics. Knowledge of model order reduction desirable. Experience with scientific computing in Matlab or Python. Strong ability to work effectively, both independently and in a team.

B07a: Inferring the collective dynamics of active particles by data assimilation
(Prof. Dr. Carsten Beta)

Responsibilities: The collective dynamics of active particles, which are able to self-propel their motion, is a paradigm of nonequilibrium pattern formation. This project brings together tools from stochastic modelling, statistical analysis, and data assimilation to better link experimental observations and mathematical descriptions of active matter. The ideal candidate will conduct interdisciplinary research in this field, with a particular focus on bacterial self-organisation. The project is focused on inferring models for (anomalous) transport in active, pattern-forming bacterial systems; it includes experimental data taking in a biophysics lab as well as data analysis (relying, among others, on single-particle tracking and particle image velocimetry).

Requirements: We are seeking applications from motivated students with an excellent university degree (Master of Science in Physics, preferentially biological and statistical physics) and very good programming skills (Python, Julia, C, Matlab or similar). Applicants shall

be interested in working on active matter with applications to modeling of bacterial pattern formation, at the interface of experiment and theory. Knowledge on the modeling of stochastic processes or Bayesian inference is advantageous. Experimental experience is helpful, but not a prerequisite.

B07b: Inferring the collective dynamics of active particles by data assimilation
(Dr. Robert Großmann)

Responsibilities: The collective dynamics of so-called active particles, which are able to self-propel their motion, is a paradigm of nonequilibrium pattern formation. This project brings together tools from stochastic modelling, statistical analysis, and data assimilation to better link experimental observations and mathematical descriptions of active matter. The ideal candidate will conduct interdisciplinary research in this field, with a particular focus on inferring coarse-grained, nonlinear descriptions of interacting active particle systems.

Requirements: We are looking for motivated, outstanding PhD candidates interested in working on active matter theory. We are seeking applicants from physics, preferentially with a background in statistical physics, nonlinear dynamics or applied mathematics, and with very good programming skills (Python, Julia, C, Matlab, or similar). Experience in one of the fields of Bayesian inference, parameter estimation, machine learning or Monte-Carlo simulation is required. Furthermore, knowledge on the modeling of stochastic processes is desired.

B10a: Bayesian deep learning to study non-Gaussianity, correlations, and change-points in cell-driven transport
(Prof. Dr. Carsten Beta)

Responsibilities: This project focuses on the random motion of colloidal particles in a bath of active nonequilibrium agents composed of a layer of motile amoeboid cells — a composite bio-hybrid system that can be seen as a versatile laboratory model to study how foreign bodies interact with a dynamic tissue environment. The ideal candidate will conduct experiments to quantify the particle movement under a wide range of different conditions, focusing in particular on anomalous transport characteristics, providing the basis for data-driven model development. Apart from the experimental work, this will include the development of computer-based tools for image processing, statistical analysis of the particle trajectories, and, in close collaboration with the theoretical partners in the project, the application of Bayesian Deep Learning techniques for model classification and uncertainty quantification.

Requirements: We are seeking motivated applicants with an excellent university degree in physics, preferentially with a background in biological and statistical physics, interested in working at the interface of experiment and theory. Experience in optical microscopy and handling of cell cultures is helpful, but not required. Programming skills for image processing (Python, Matlab, or similar) and a background in theoretical modeling of active matter and stochastic processes are advantageous.

B10b: Bayesian deep learning to study non-Gaussianity, correlations, and change-points in cell-driven transport
(Prof. Dr. Ralf Metzler)

Responsibilities: The task of this project part focuses on the stochastic modelling of the random motion of colloidal cargo particles as measured in the experimental part. The ideal candidate will analyse the measured trajectories and develop iteratively a model for the cargo motion. This task will combine generalised stochastic model building (analytical calculations and stochastic simulations) with Bayesian Deep Learning tools for model classification and uncertainty estimation of the model parameters. The goal is to identify a minimal model for the particle motion with its distinct non-Gaussian displacement

distribution and correlated dynamics.

Requirements: We are seeking motivated applicants with an excellent university degree in physics or applied mathematics, preferentially with a background in statistical physics and stochastic processes of passive and active matter, interested in working at the interface of experiment and theory. Programming skills of stochastic processes are advantageous.

Further academic qualification (doctorate) is possible. At least one third of your working hours will be reserved for your own academic research.

The successful candidates will work 30 hours per week (75 %). The positions are classified within remuneration group 13 of the collective wage agreement among the German federal states ("Tarifvertrag für den öffentlichen Dienst der Länder" – TV-L). The fixed term of employment is in accordance with Section 2 subsection 1 of the German Act on Fixed-Term Employment Contracts in Science and Academia (Wissenschaftszeitvertragsgesetz or WissZeitVG).

The University of Potsdam/ The SFB 1294 values the diversity of its community and pursues the goals of equal opportunity regardless of gender, nationality, ethnic and social origin, religion/belief, disability, age, and sexual orientation and identity. Applications from abroad and from persons with a migration background are expressly encouraged. The university strives for a balanced gender ratio in all employment groups; in areas where women are underrepresented, women are given preference in case of equal suitability (Section 7 paragraph 4 of the Brandenburg Higher Education Act). People with disabilities are given preferential consideration in case of equal suitability. In aptitude tests and selection interviews, individual compensation measures for disadvantages are granted, taking the specific disability into consideration. If a person with a disability would like to make use of individual compensation measures, please state this in the application letter.
For further information see www.sfb1294.de or contact the project PIs directly.

Candidate evaluation will begin immediately after the application deadline on **January 15, 2026**, with an anticipated project start on **1 March 2026**. Interviews will take place within three weeks after the application deadline and can also be conducted online via Zoom. Applications to the SFB should be submitted via email to sfb1294@uni-potsdam.de and should include (1) a statement of research interests and motivation, (2) a full CV, (3) the names and email addresses of at least two referees as well as their reference letters, (4) academic transcripts, (5) a link to an electronic copy of your Master's/Diploma thesis, and (6) a list of publications, talks, or presentations (if any are available) in a single PDF file. Please indicate clearly which of the projects/positions you are applying for (e.g., "B07a") and state your motivation accordingly.

Potsdam, December 4, 2025