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, GFZ Potsdam, and TU Ilmenau invites applications for a postdoctoral researcher position.

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

The position. We seek applicants for a postdoctoral position (TVL - E13) within Project A03: "Sequential and adaptive learning under dependence and non-standard objective functions" from April 2024 (at the earliest) to June 2025 (PIs: Alexandra Carpentier / Jana de Wiljes). Applications will be accepted until the position is filled.

The project considers the problem of learning sequentially, adaptively and on the basis of partial information in an uncertain environment. In this setting, the learner sequentially and actively collects the data, which is not available beforehand, in a batch form. The objective of the recommendation system (learner) is to recommend at each time *t* an item (a set of actions) to a user that fits their needs. The recommendation system does not observe the preferences of the users, but only their opinions on what the recommendation system has recommended as items previously. This raises many interesting problems, for example, finding optimal sequential strategies that can rapidly single out the most liked items, or efficiently determining the preferences of users, etc. In many real-life cases, the collected data has dependencies, and the objectives of the learner can vary. In this project, we consider a setting where our aim is to design strategies to collect (or to sample) sequentially and adaptively the data so that it can be assimilated by the model in the most effective way possible. An important milestone that we achieved was to extend the bandit problem to a case where the samples produced by each arm were allowed to depend on each other, via a mixing assumption. Our aim in the next phase is to generalize the results of the first phase, targeting dependent and non-stationary bandit settings, to the case where the set of actions is continuous. Spatial and temporal dependencies and non-stationarities will interact, giving rise to new problems and challenges.

The candidates should have a Ph.D. in applied mathematics or theoretical computer science (related to theoretical statistics or theoretical machine learning). The ideal applicant has also experience with sequential methods and/or dependent data. The candidate must be able to communicate effectively in both written and spoken English. Workplace will be at the Department of Mathematics at the University of Potsdam.

For more information about the CRC, please see our website: www.sfb1294.de. Please send your application (letter of motivation, CV, publication list; compiled in one PDF file) to sfb1294@uni-potsdam.de). For specific queries on the position please contact Alexandra Carpentier (email: carpentier@uni-potsdam.de) or Jana de Wiljes (jana.de-wiljes@tu-ilmenau.de).