

## **Deep Neural Network-Based Solutions of Problems in Numerical Analysis (University of Vienna, Supervisor: P. Petersen)**

Machine learning is nowadays influencing virtually every aspect of everyday life. The practical success of these techniques notwithstanding, there remains overwhelming mathematical uncertainty as to why these techniques perform so well. A fundamental obstacle to more profound understanding is the fact that the underlying data models are typically not understood and cannot be modelled analytically.

In this project, we aim at applying machine learning and especially deep learning techniques in areas where one has full knowledge of the underlying dynamics of the problem. Typical examples are the numerical solution of (parametric) partial differential equations or the solution of inverse problems. Based on knowledge of the underlying model, we will aim at developing deterministic success guarantees in contrast to the, currently prevalent, probabilistic results.

The framework of this position is very flexible in the sense that alternative projects can be developed jointly with the applicant based on their interest. The candidates should have a solid theoretical background in functional and numerical analysis, as well as experience in programming. Applications have to be sent via the Job Center of the University of Vienna at the [Reference number 10216](#). The deadline for application is **February 20, 2020**.