

The **Vienna School of Mathematics (VSM)** is a joint graduate school of the mathematics faculties of the **University of Vienna** and the **TU Wien**. The VSM is devoted to top-level PhD education in all branches of mathematics. It fosters intra- and interdisciplinary scientific cooperation and networking among students and advisors and aims at increasing the international visibility of the Vienna area as a center for mathematics.

The VSM currently announces a PhD position in the area of

**Structured numerical methods for PDEs based on low-rank tensor decompositions
and artificial neural networks
(University of Vienna, Supervisor: V. Kazeev)**

A low-rank factorization of a matrix provides its low-parametric bilinear parametrization in terms of two factors. Low-rank tensor decompositions and tensor networks generalize this type of representation to the case of many dimensions, one notable example being known as matrix-product states (MPS) in the simulation of quantum systems and as tensor train (TT) decomposition in computational mathematics. The goal of the project is to develop, analyze and implement adaptive, data-driven numerical approximations and algorithms for PDE problems based on the separation of variables and iterated function composition, combining ideas related to low-rank tensor decompositions, tensor networks and artificial neural networks.

Possible research directions include: the analysis of structured approximation for the solutions of certain model PDE problems, the development of efficient structured solvers, the theoretical analysis and high-performance implementation of the associated algorithms, cooperation with specialists in applied fields and the application of the approach and of the associated algorithms to modern problems in quantum physics, chemistry, systems biology, engineering, finance and data science.

The candidates should have a solid theoretical background in numerical mathematics and computational science, programming skills and an aptitude for the implementation and experimental exploration of numerical algorithms. Experience in the development of scientific software is desirable. Proficiency in English (written and spoken) is required.

The advertised position is associated with the Faculty of Mathematics of the **University of Vienna** in the Research Group on Data-driven PDEs of Prof. Dr. Vladimir Kazeev. The successful candidate will become a member of the Vienna School of Mathematics and is expected to actively contribute to its activities. The extent of employment is 30 hours per week. The position will start on September 1, 2020.

Application Requirements and Procedure

The candidates must have a master degree (or equivalent) in Mathematics or a related area at the moment the PhD position starts. The application documents should contain a letter of motivation, an academic CV with a list of publications, higher education certificates/diplomas and, if available, letters of recommendation. Applications are to be submitted through the Job Center of the University of Vienna at the [Reference number 10852](#). The deadline for applications is **July 8, 2020**.