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. Currently, the following PhD positions are advertised, each associated to one of the two universities as detailed in the list below. The successful candidates will become members of the Vienna School of Mathematics and are expected to actively contribute to its activities. The extent of employment is 30 hours per week.

1. Continuous Time Dynamics for Nonsmooth Optimization and Saddle Point Problems (University of Vienna, Supervisor: R.I. Boţ); new deadline: March 5, 2020
The thesis project is related to the study of dynamical systems associated to nonsmooth optimization and saddle point problems, and of the numerical methods arising from their discretization.

2. Differential Geometry (University of Vienna, Supervisor: A. Cap)
The thesis project is related to parabolic geometries and/or BGG sequences.

3. Combinatorics (University of Vienna, Supervisor: I. Fischer); new deadline: March 5, 2020
The thesis project is in the area of enumerative combinatorics with emphasis on bijective and algebraic aspects.

4. Sampling Theorems and Variable Bandwidth (University of Vienna, Supervisor: K. Gröchenig)
The thesis project is in the area of applied harmonic analysis and deals with new notions of variable bandwidth with time-frequency methods and corresponding sampling theorems.

5. Analysis of Multicomponent Diffusion Systems with Incomplete Diffusion (TU Wien, Supervisor: A. Jüngel)
The thesis project is related to the existence analysis of diffusive, viscous fluid mixtures and of population mixtures driven by partial pressure gradients.

6. Structured Numerical Methods for PDEs Based on Low-Rank Tensor Networks and Artificial Neural Networks (University of Vienna, Supervisor: V. Kazeev); new deadline: March 5, 2020
The topic of the proposed project is the mathematics of structured numerical methods for PDEs based on tensor networks and artificial neural networks.

7. Combinatorics (University of Vienna, Supervisor: C. Krattenthaler)
The thesis project is in the area of the combinatorics of tableaux and posets.

8. Extendibility of Spacetimes and Lorentzian Length Spaces (University of Vienna, Supervisor: M. Kunzinger)
The thesis project is related to the employment and development of curvature comparison methods, in the framework of the recently established theory of Lorentzian length spaces, to the extendibility problem of spacetimes.

9. Several Complex Variables (University of Vienna, Supervisor: B. Lamel); new deadline: March 5, 2020
The thesis project is related to all active areas of Several Complex Variables, with a strong emphasis on CR geometry.

10. Machine Learning Photochemistry with Low-Rank Tensor Approximation Techniques (University of Vienna, Supervisors: P. Marquetand, U. Stefanelli)
The thesis project is related to the development of new machine learning algorithms for the simulation of photo-induced reactions in the frame of the research platform "ViRAPID - Vienna Platform for Accelerating Photoreaction Discovery".

11. The Borel Reducibility Hierarchy (University of Vienna, Supervisor: B. Miller); new deadline: March 5, 2020
The thesis project will concern Borel reducibility and connections to measurable combinatorics and dichotomy theorems for analytic structures.

12. Deep Neural Network-Based Solutions of Problems in Numerical Analysis (University of Vienna, Supervisor: P. Petersen)
The topic of the proposed project is the theoretical analysis of classical problems in numerical analysis in the framework of modern algorithms of machine learning.

13. Deep Learning in Financial and Actuarial Mathematics (TU Wien, Supervisor: T. Rheinländer)
The aim of the thesis project is to apply neural networks to various problems in finance and/or actuarial science.

14. Isoperimetric Problems in Integral Geometry (TU Wien, Supervisor: F. Schuster)
The thesis project concerns the systematic exploitation of the "valuations point of view" to reshape not only the way isoperimetric inequalities are thought of and applied but also the way these inequalities are established.

15. Variational Methods for Evolution Equations (University of Vienna, Supervisor: U. Stefanelli)
The thesis project is centred on Calculus of Variations for nonlinear evolution problems. Global variational principles and variational approximation techniques will be applied to parabolic and hyperbolic problems, also of degenerate/singular or stochastic type.

16. Variational Modeling of Molecular Geometries (University of Vienna, Supervisor: U. Stefanelli); new deadline: March 3, 2020
The project is centred on the mathematics of discrete particle systems. Crystalline and molecular structures will be investigated from the analytical and the discrete geometrical viewpoint.

17. Two-Dimensional Stochastic Interface Growth (TU Wien, Supervisor: F. Toninelli)
The thesis project focuses on the mathematical (probabilistic) study of stochastic interface growth and its relation with the so-called Kardar-Parisi-Zhang (KPZ) Stochastic PDE.

18. Regularity and Approximations in Optimal Control (TU Wien, Supervisor: V. Veliov)
The thesis project concerns the development and application of methods of variational analysis to problems of optimal control of ordinary and partial differential equations.

Application Requirements and Procedure

The candidates must have a master degree (or equivalent) in Mathematics at the moment the PhD position starts. The detailed descriptions of the open PhD positions and the links to the respective application portals, which also contain information on formal aspects (duration of employment, salary, etc.), are available at:

www.vsmath.at/application

The application documents should contain a letter of motivation; the scientific CV with publication list, if relevant; higher education certificates/diplomas; and letter(s) of recommendation, if required. The deadline for application is **February 20, 2020.**