

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

### **The Combinatorics of Grothendieck Polynomials (University of Vienna, Supervisor: I. Fischer)**

*Double Grothendieck polynomials had been introduced by Lascoux and Schützenberger in connection with the K-theory of the complete flag variety in 1982. Since then, combinatorial models that realize these polynomials as some kinds of generating functions have been developed and studied. Extending work of Lam, Lee and Shimozono from 2018 on Schubert polynomials, Weigandt has recently shown that Grothendieck polynomials can be seen as weighted sums of non-reduced bumpless pipe dreams. These pipe dreams are in easy bijective correspondence with alternating sign matrices.*

*Alternating sign matrices, on the other hand, are classical objects in combinatorics, and enumerative questions related to them are notorious for being difficult. Much progress on these objects had been possible after the discovery of another connection in the 1990s, namely to statistical physics, where a model for flat ice (known as the six-vertex model) had been introduced several decades earlier. Interestingly, the famous Yang-Baxter equation emerged in the study of this and related statistical physics models.*

*A possible PhD project is the study of this relation between Grothendieck and Schubert polynomials, on the one side, and alternating sign matrices on the other side. Both areas have been very active areas of research in the last decades, and it is expected that known results from one area can lead to new results in the other area.*

The advertised position is associated with the Faculty of Mathematics of the **University of Vienna**. 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 is planned to start on June 1, 2022.

#### **Application Requirements and Procedure**

The candidates must have a master degree (or equivalent) in Mathematics at the moment the PhD position starts. The application documents should contain a letter of motivation; the scientific CV with publications list; higher education certificates/diplomas; and letter(s) of recommendation preferably sent directly to [office@vsmath.at](mailto:office@vsmath.at) by the person writing the letter. Applications have to be sent to [office@vsmath.at](mailto:office@vsmath.at), if possible in a single PDF file. The deadline for applications is **April 30, 2022**.