



## Graduate School Event

# Thesis Defense: Topological Methods in Discrete Geometry and Theoretical Computer Science

**Gianluca Tasinato (Wagner Group)**

Wagner Group

Host: Johannes Fink

This thesis investigates the interplay between algebraic and topological methods and combinatorial problems, focusing on approximate graph colourings and mass partitioning. The unifying theme throughout the dissertation is the use of continuous maps and symmetry constraints to extract combinatorial insights. We first explore approximate graph colouring problems and more generally promise constraint satisfaction problems. Using tools from equivariant topology in combination with the general theory of polymorphism of a promise constraint satisfaction problem, we establish hardness for specific types of approximations. In the second part, we address mass partitioning problems, where one seeks to divide geometric objects or measures in Euclidean space into parts of equal size using hyperplanes. Employing techniques from topological combinatorics (configuration space/test map setup and Borsuk-Ulam type theorems), we both obtain a new equipartitioning result in the and provide a fast algorithm for computing equipartitioning of point sets in 3D.

**Wednesday, July 9, 2025 02:00pm - 03:00pm**

Sunstone Bldg / Ground floor / Big Seminar Room B (I23.EG.102)



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: <https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.