Colloquium: *Tuesday, Januar 24, 2023 at 17.15*

Speaker: *Dr. Robert Beinert*

Talk: *Gromov-Wasserstein Optimal Transport*

Abstract:
Gromov-Wasserstein optimal transport is a generalization of the classical optimal transport problem and allows the comparison of two arbitrary metric measure spaces via the so-called Gromov-Wasserstein metric. Due to its invariance under measure- and distance-preserving transformations, this metric has many applications in graph and shape analysis. Unfortunately, the computation of the Gromov-Wasserstein distance is numerically expensive, limiting its application in machine learning like in classification tasks. To overcome this issue, we propose a linear version of the Gromov-Wasserstein metric, which is based on the geometric structure of the Gromov-Wasserstein space. Numerical examples illustrate that the linear Gromov-Wasserstein transport can replace the expensive computation of pairwise Gromov-Wasserstein distances in certain applications. Furthermore, we introduce the concept of multi-marginal Gromov-Wasserstein transport between a set of metric measure spaces as well as its regularized and unbalanced versions. As a special case, we discuss multi-marginal fused variants, which combine the structure information of an metric measure space with label information from an additional label space. The multi-marginal Gromov-Wasserstein transport has a close relation to (unbalanced, fused) Gromov-Wasserstein barycenter.