

# Axel Voigt Group – Project 1

## **Analysing structure-property relations in equilibrium and non-equilibrium hyperuniform systems**

Hyperuniform (HU) systems are a class of point arrangements or fields featuring strongly suppressed density fluctuations on large scales. This research project aims to develop an advanced description and control of HU patterns across scales (from global to local), enabling then the study of some emergent structure-property relations of HU patterns with great potential and investigating both equilibrium and non-equilibrium properties of general interest. We will extend classical descriptions based on global properties only, including (topological) information on local arrangements and structures. Energy-based formulations will address targeted, prototypical static, and equilibrium properties like an elastic response to load. Specific applications are then planned to inspect the impact of hyperuniformity and local structures in transport and non-equilibrium phenomena, e.g. cell arrangements in tissue and active turbulence on bacterial colonies.

You should have a degree in Mathematics or Physics with a specialization in data science and/or scientific computing and be interested in interdisciplinary work.