

## **A theoretical framework for the analysis of Mapper**

Steve Oudot, INRIA

Mapper is probably the most widely used TDA (Topological Data Analysis) tool in the applied sciences and industry. Its main application is in exploratory analysis, where it provides novel data representations that allow for a higher-level understanding of the geometric structures underlying the data. The output of Mapper takes the form of a graph, whose vertices represent homogeneous subpopulations of the data, and whose edges represent certain types of proximity relations. Nevertheless, the inherent instability of the output and the difficult parameter tuning make the method rather difficult to use in practice. This talk will focus on the study of the structural properties of the graphs produced by Mapper, together with their partial stability properties, with a view towards the design of new tools to help users set up the parameters and interpret the outputs.