

# Metric geometry of spaces of persistence diagrams

*Wednesday, 7 December 2022 16:30 (30 minutes)*

Persistence diagrams are fundamental objects in topological data analysis. They are pictorial representations of persistence homology modules, which in turn describe topological features of a data set when viewed at different scales or levels, i.e. along a filtration. However, given a data set, it is possible to obtain different persistence diagrams depending on the filtration, so it is natural to study the space of all persistence diagrams. Such space has several interesting geometric and topological properties.

In collaboration with Fernando Galaz-García (Durham University), Luis Guijarro (Universidad Autónoma de Madrid) and Ingrid Membrillo-Solis (University of Southampton, London Metropolitan University), we study a family of functors that assign to each metric pair  $(X, A)$  a metric space of persistence diagrams  $\mathcal{D}_p(X, A)$  with points in  $X$  and finite  $p$ -persistence with respect to  $A$ . This construction in the case  $(X, A) = (\mathbb{R}^2, \Delta)$  give as a result the usual spaces of persistence diagrams. We will present a continuity result with respect to the Gromov-Hausdorff convergence in the setting of metric pairs, as well as some other properties already known for the usual spaces of persistence diagrams which hold in this generality.

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