



## Texas State Topology Seminar

Friday, March 3, 11:00-noon, in DERR 229.

Dr. Anton Dochtermann  
" Persistent Homology"

### ABSTRACT

Suppose  $X$  is a collection of points sampled from some unknown space. A fundamental question in topological data analysis (TDA) is to measure topological features of the underlying space from the point cloud itself, to determine the 'shape of the data'. We survey work of Edelsbrunner, Carlsson and others in which one assigns a parametrized collection of simplicial complexes to the data, and computes how simplicial homology changes throughout the family. Via some basic commutative algebra, the emergence/disappearance of Betti numbers can then be encoded in 'barcodes' where the 'persistent homology' can be used to interpret holes in the underlying space. If time permits we may mention other algebraic/categorical approaches including zig-zag persistence, multidimensional persistence, barcode stability, etc.



## Texas State Topology Seminar

Friday, March 3, 11:00-noon, in DERR 229.

Dr. Anton Dochtermann  
" Persistent Homology"

### ABSTRACT

Suppose  $X$  is a collection of points sampled from some unknown space. A fundamental question in topological data analysis (TDA) is to measure topological features of the underlying space from the point cloud itself, to determine the 'shape of the data'. We survey work of Edelsbrunner, Carlsson and others in which one assigns a parametrized collection of simplicial complexes to the data, and computes how simplicial homology changes throughout the family. Via some basic commutative algebra, the emergence/disappearance of Betti numbers can then be encoded in 'barcodes' where the 'persistent homology' can be used to interpret holes in the underlying space. If time permits we may mention other algebraic/categorical approaches including zig-zag persistence, multidimensional persistence, barcode stability, etc.