Stevanovich Center
for Financial Mathematics
at the University Of Chicago

5727 South University Avenue
Chicago, IL 60637
773-834-8563

May 20-23, 2019

Geometric Data Analysis

Program

Updated May 21

This conference is made possible by the generous philanthropy of
University of Chicago Trustee Steve G. Stevanovich

Monday, May 20

8 - 9 AM	Registration, light breakfast, and opening words	
9 - 10 AM	Sayan Mukherjee	Fiber Bundles in Probabilistic Models
10 - 10:15 AM	Break	
10:15 – 11:15 AM	Mikhail Belkin	Rethinking the Bias-variance Trade-off
11:15 - 11:30 AM	Break	
11:30 AM - 12:30 PM	Tamal Krishna Dey	Generalized Persistence Algorithm for Multi-parameter Persistence Modules
12:30 – 2 PM	Lunch break	
2 – 3 PM	Amit Singer	Multi-target Detection and Cryo-EM Imaging by Autocorrelation Analysis
3 - 3:15 PM	Break	
3:15- 4:15 PM	Paul Bendich	Self-similarity matrices for high-dimensional time series: applications to cross-modal comparison, heterogeneous sensor fusion, and phase-aware data compression

Poster Session #1 (4:15 – 5:50 PM)	
Nan Wu Duke University	Asymptotic Analysis of Locally Linear Embedding
Zhengchao Wan Ohio State University	The Wasserstein Transform
Alexander Wagner University of Florida	Embeddings of Persistence Diagrams into Hilbert Spaces
Siddharth Vishwanath Penn State University	Statistical Invariance for the Asymptotic Behavior of Betti Numbers in the Thermodynamic Regime
Giuseppe Vinci Rice University	Persistent Homology Theory and Applications to Galaxy Shapes Classification
Do Tran Duke University	Behavior of Fréchet means and central limit theorems on spheres
Kritika Singhal Ohio State University	Sketching and Clustering Metric Measure Spaces
Carlos Ronchi Universidade de São Paulo	Persistent Homology and the Protein Folding Problem
Erika Roldan Roa Ohio State University	Geometric, Topological, and Combinatorial Properties of the Eden Cell Growth Model
Yohai Reani Technion, Israel Institute of Technology	Bootstrapping Methods for Homology of Random Data
Eduardo Paluzo-Hidalgo Universidad de Sevilla	Reducing the Size of Datasets
Gregory Ongie University of Chicago	Low Algebraic Dimension Matrix Completion
Osman Okutan Ohio State University	Quantitative Simplification of Filtered Simplicial Complexes
Bradley Nelson Stanford University	Fiber-wise Topological Data Analysis
James Murphy Tufts University	Unsupervised Geometric Learning: Theory and Applications
Chui Moon Southern Methodist University	Statistical inference combined with persistent homology for predicting fluid flow in porous media
Joshua Mirth Colorado State University	Morse Theory for Wasserstein Spaces

Tuesday, May 21

8:30 – 9 AM	Light breakfast	
9 - 10 AM	Jeff Brock	A Case for Model-Driven Discovery and a Geometric Lens on Topological Data
10 - 10:15 AM	Break	
10:15 – 11:15 AM	Takashi Owada	Weak Convergence Results for Topological Crackle
11:15 - 11:30 AM	Break	
11:30 AM - 12:30 PM	Gennady Samorodnistsky	The Betti Numbers in the Multiparamater Model
12:30 – 2 PM	Lunch break	
2 – 3 PM	Clément Levrard	Estimation and Approximations of Distance Functions (for geometric inference)
3 - 3:15 PM	Break	
3:15- 4:15 PM	Herbert Edelsbrunner	Tri-partition of a Polytopal Complex
4:15 - 4:30 PM	Break	
4:30 –5:30 PM	Benjamin Schweinhart	Persistent Homology of Random Geometric Complexes on Fractals
6 –8 PM	Bowling Party (open to all attendees)	

Wednesday, May 22		
8:30 AM	Light breakfast	
9 - 10 AM	Ezra Miller	Primary Distance for Multipersistence
10 – 10:15 AM	Break	
10:15- 11:15 AM	Mauro Maggioni	Statistical Learning & Dynamical Systems: Exploiting Hidden Low-dimensional Structures
11:15 – 11:30 AM	Break	
11:30 AM – 12:30 PM	Daniela Egas Santander	Topology and Neuroscience
12:30 - 2 PM	Lunch break	
2:00 PM	Omer Bobrowski	Homological Percolation: The Formation of Giant Cycles
3:00 PM	Break	
3:15 PM	Katharine Turner	Injectivity results relating to the persistent homology transform and the Euler characteristic transform

Poster Session #2 (4:15 to 5:50 PM)	
Ashleigh Thomas Duke University	Computing Real Multipersistence
Nikola Milicevic University of Florida	Homological Algebra of Persistence Modules
Hengrui Luo Ohio State University	Asymptotic Detection of Strictly Lower Dimensional Topological Features
Sunhyuk Lim Ohio State University	Gromov-type spectral distances and the convergence of the heat kernel
Mao Li Donald Danforth Plant Science Center	Data Exposure for Plant Biology
Didong Li Duke University	Manifold Approximation with Spherelets
Henry Kvinge Colorado State University	Irreducible components of reduction: applications of representation theory to dimensionality reduction
Woojin Kim Ohio State University	Stable Persistent Homology Features of Dynamic Metric Spaces
Akshay Goel Kyushu University, Japan	Persistent homology of random Čech complexes on Manifolds
Tegan Emerson US Naval Research Laboratory	Sparse Signal Processing using Path-Augmented Methods
Alex Elchesen University of Florida	Virtual Persistence Diagrams
Mitchell Eithun Michigan State University	Algorithmic Isolation of Phyllotactic Growth Patterns
Parker Edwards University of Florida	Persistence Landscapes are Graded Persistence Diagrams
Asim Dey University of Texas at Dallas	What Do Network Motifs Tell Us about Robustness and Reliability of Complex Networks?
Samir Chowdhury Ohio State University	Gromov-Wasserstein Distances: Fast Network Comparison Via Optimal Transport
Johnathan Bush Colorado State University	Metric Thickenings of the Circle, Orbitopes, and Borsuk–Ulam Theorems

Thursday, May 23

8:30 AM	Light breakfast	
9 - 10AM	Rebecca Willett	Algebraic Variety Models for High-Rank Matrix Completion
10 – 10:15 AM	Break	
10:15 – 11:15 AM	Facundo Mémoli	Stable Persistent Homology for Dynamic Metric Spaces
11:15 – 11:30 AM	Break	
11:30 AM 12:30 PM	Jonathan Taylor	Proximal change of measure in selective inference
12:30 – 2 PM	Lunch break	
2 - 3 PM	Bertrand Michel	Statistical Analysis and Parameter Selection for Mapper
3 – 3:15 PM	Break	
3:15 – 4:15 PM	Tingran Gao	Multi-Frequency Angular Synchronization
4:15 – 4:30 PM	Break	
4:30 – 5:30 PM	Yuliy Baryshnikov	Sketches of Manifolds
5:30 – 5:45 PM	Closing remarks	