

# BIOENGINEERING SEMINAR

FALL 2021

## Topological data analysis for graphs

### Abstract

In recent years, topological and geometric data analysis (TGDA) has emerged as a new and promising field for processing, analyzing and understanding complex data. Indeed, geometry and topology form natural platforms for data analysis, with geometry describing the "shape" and "structure" behind data; and topology characterizing / summarizing both the domain where data are sampled from, as well as functions and maps associated to them. In this talk, I will show how topological objects (persistent homology and discrete Morse theory) can be used for analyzing graphs, especially in inferring graph skeleton of data. I aim to show how topological ideas can be integrated with algorithmic treatment to handle low / high dimensional data effectively, how such approaches can be combined with machine learning pipelines for further data analysis tasks, and how they are applied to analyzing neuroanatomy data. This talk is based on multiple projects with multiple collaborators and references will be given during the talk.

### Biography

Yusu Wang is currently Professor in the Halicioglu Data Science Institute at University of California, San Diego. Prior to joining UCSD, she was Professor in the Computer Science and Engineering Department at the Ohio State University. She obtained her PhD degree from Duke University in 2004, where she received the Best PhD Dissertation Award at the Computer Science Department. From 2004-2005, she was a post-doctoral fellow at Stanford University. Yusu Wang primarily works in the fields of Computational geometry, and Computational and applied topology. She is particularly interested in developing effective and theoretically justified algorithms for data analysis using geometric and topological ideas and methods, as well as in applying them to practical domains, including computational neuroscience and material science. She received DOE Early Career Principal Investigator Award in 2006, and NSF Career Award in 2008. Her work received several best paper awards. She is on the editorial boards for SIAM Journal on Computing (SICOMP) and Journal of Computational Geometry (JoCG). She is currently a member of the Computational Geometry Steering Committee. She also serves in SIGACT CATCS and AWM Meetings Committee.



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**Thursday, October 28  
12:00-1:00 pm**

Join Zoom Meeting

<https://gmu.zoom.us/j/91001788853?pwd=enZXRXFneG1zdk5NNlVM5WtnQlJMUT09>

Meeting ID: 910 0178 8853  
Passcode: 229574

