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**Friday, September 27, 2024**

**12:00-1:00 pm**

**Biotechnology Center Auditorium  
or via Zoom**

<https://uwmadison.zoom.us/j/97615509019>

# Statistical Shape Analysis of Complex Natural Structures

**Abstract:** Statistical modeling and analysis of structured data is a fast-growing field in Statistics and Data Science. Rapid advances in imaging techniques have led to tremendous amounts of data for analyzing imaged objects across several scientific disciplines. Examples include shapes of cancer cells, botanical trees, human biometrics, 3D genome, brain anatomical structures, crowd videos, nano-manufacturing, and so on. Shapes are relevant even in non-imaging data contexts, e.g., the shapes of COVID rate curves or the shapes of activity cycles in lifestyle data. Imposing statistical models and inferences on shapes seems daunting because the shape is an abstract notion and one requires precise mathematical representations to quantify shapes. This talk has two parts. In the first part, I will present some recent developments in "elastic representations" of structures such as functions, curves, surfaces, and graphs. In the second part, I will focus on statistical analyses: computing shape summaries, estimation under shape constraints, hypothesis testing, time-series models, and regression models involving shapes.



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