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Statistical Shape Analysis of Complex Natural Structures

Wednesday, February 7th, 2024
11:50 AM
96 Frelinghuysen Road, CoRE Building, Room 431

Zoom Meeting: Meeting ID: 969 0606 4706
Password: 745339

https://rutgers.zoom.us/j/96906064706?pwd=ZklvbExpRVBJQ3c5dUhhYTFuR2ZrZz09

Light refreshments will be served in Hill 452, 11:15am

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.

Bio: Anuj Srivastava is a Professor in the Department of Statistics and a Distinguished Research Professor at the Florida State University. He is also a faculty appointee at National Institute of Standards and Technology (NIST) as a mathematical statistician. He obtained his Ph.D. from Washington University in St. Louis; after being a postdoc at Brown University for one year, he joined the faculty of FSU in 1997. His research interests include statistical analysis on nonlinear manifolds, statistical computer vision, functional data analysis, and shape analysis. He has held several visiting positions at European universities, including INRIA, France, the University of Lille, France, and Durham University, UK. He has graduated 35+ PhD students so far in his career, with placements in academia, industry, and government labs. He has co-authored more than 300 papers in peer-reviewed journals, top-tier conferences, and several books, including the 2016 Springer textbook on "Functional and Shape Data Analysis." He is a fellow of several institutions in Statistics (IMS and ASA), electrical engineering (IEEE), and computer science (AAAS and IAPR)