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Lecture: *Ice Sheet Model Calibration using Zero-Inflated Continuous Spatial Data*

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Abstract:
Rapid changes in Earth's cryosphere caused by human activity can lead to significant environmental impacts. Computer models provide a useful tool for understanding the behavior and projecting the future of Arctic and Antarctic ice sheets. However, these models are typically subject to large parametric uncertainties due to poorly constrained model input parameters that govern the behavior of simulated ice sheets. Computer model calibration provides a formal statistical framework to reduce and quantify the uncertainty due to such parameters. Calibration of ice sheet models is often challenging because the relevant model output and observational data take the form of zero-inflated continuous spatial data; handling of such data type is one of the open problems in the field of spatial statistics. In this work, we will introduce potential ideas to overcome the computational and inferential challenges by combining the logistics principal component analysis (LPCA) and likelihood based principal component analysis. I will demonstrate the fidelity of our approach using the example of calibrating PSU-3D ice model based on Bedmap2 dataset.