

STATISTICS COLLOQUIUM

MONDAY, JANUARY 25, 2010

TALK: 4:00 PM — SCIENCE CENTER ROOM 705

RECEPTION: 5:15 PM — SCIENCE CENTER, 7TH FLOOR

“Tree-Ring Based Climate Reconstruction”

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ABSTRACT

The climate is always changing. To help understand the potential effect that current climate change may have on our planet, we need to put these changes into historical perspective. This poses a problem, since we only have climate data extending back at most one or two centuries. However, there exist a range of imperfect covariates to climate that extend from many hundred to many thousands of years. This presents a statistical challenge: how do we quantify uncertainty about historical climate given these covariates? Using tree-ring growth measurements as an example, I will explore two statistical issues: (i) the pre-processing of data, and (ii) statistical calibration, neither of which are appropriately addressed in current reconstruction methods. I will explore the properties of each procedure and show how they influence the resulting predictions. I develop a model-based hierarchical approach to the problem and highlight additional challenges and possible future directions.