Stanford University
Department of Statistics

DEPARTMENTAL SEMINAR

4:30pm, Tuesday, November 17, 2015

*** Note Special Location ***
Main Quad Building 01-370 Room 370
Cookies served at 4pm, 1st floor Lounge.

Speaker: Nicolai Meinshausen
Department of Statistics,
ETH Zurich

Title: Causal discovery with confidence using invariance principles

Abstract:
What is interesting about causal inference? One of the most compelling aspects is that any prediction under a causal model is valid in environments that are possibly very different to the environment used for inference. For example, variables can be actively changed and predictions will still be valid and useful. This invariance is very useful but still leaves open the difficult question of inference. We propose to turn this invariance principle around and exploit the invariance for inference. If we observe a system in different environments (or under different but possibly not well specified interventions) we can identify all models that are invariant. We know that any causal model has to be in this subset of invariant models. This allows causal inference with valid confidence intervals. We propose different estimators, depending on the nature of the interventions and depending on whether hidden variables and feedbacks are present. Some empirical examples demonstrate the power and possible pitfalls of this approach.