The University of Chicago
Department of Statistics

# BAHADUR MEMORIAL LECTURES

## PETER BÜHLMANN
Seminar für Statistik, ETH Zürich

## Causal Statistical Inference and Intervention Experiments for Large-Scale Biological Systems

**TUESDAY, April 17, 2012 at 4:00PM**
133 Eckhart Hall, 5734 S. University Avenue
*Refreshments will be served BEFORE the seminar in Eckhart 110.*

# ABSTRACT

Understanding cause-effect relationships between variables is of great interest in many fields of science. An ambitious but highly desirable goal is to infer causal effects from observational data obtained by observing a system of interest without subjecting it to interventions. This would allow to circumvent severe experimental constraints or to substantially experimental costs. Our main motivation to study this goal comes from applications in biology.

We present recent progress for prediction of causal effects with direct implications on designing new intervention experiments, particularly for high-dimensional, sparse settings with thousands of variables but based on only a few dozens of observations. We highlight exciting possibilities and fundamental limitations. In view of the latter, statistical modeling needs to be complemented with experimental validations: we discuss this in the context of molecular biology for yeast (Saccharomyces Cerevisiae) and the model plant Arabidopsis Thaliana.

For further information and inquiries about building access for persons with disabilities, please contact Dan Moreau at 773.702.8333 or send him an email at dmoreau@galton.uchicago.edu. If you wish to subscribe to our email list, please visit the following website:
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