Stanford University
Department of Statistics

DEPARTMENTAL SEMINAR

4:15pm, Tuesday, February 3, 2015
*** Note Special Location ***
McCullough Building 04-490 Room 115
Cookies served at 3:45pm, 1st floor Lounge.

Speaker: Elias Bareinboim
Department of Computer Science,
University of California, Los Angeles

Title: Generalizability in Causal Inference

Abstract:
Causal inference is usually dichotomized into two categories, experimental (Fisher, Cox, Cochran) and observational (Neyman, Rubin, Robins, Dawid, Pearl) which, by and large, are studied separately. Reality is more demanding. Experimental and observational studies are but two extremes of a rich spectrum of research designs that generate the bulk of the data available in practical, large scale situations. In typical medical explorations, for example, data from multiple observations and experiments are collected, coming from distinct experimental setups, different sampling conditions, and heterogeneous populations.

In this talk, I will introduce a theory of causal generalization that provides a principled way for fusing pieces of empirical evidence coming from multiple, heterogeneous sources. I will first introduce a formal language capable of encoding the assumptions necessary to express each problem instance. I will then present conditions and algorithms for deciding whether a given problem instance admits a consistent estimate for the target effects and, if feasible, fuse information from various sources to synthesize such an estimate. These results subsume the analyses conducted in various fields, including “external validity,” “meta-analysis,” “heterogeneity,” “quasi-experiments,” “transportability,” and “sampling selection bias.” I will conclude by presenting new challenges opened by this research.

About this Speaker: Elias Bareinboim is a postdoctoral scholar (and was a Ph.D. student) in the Computer Science Department at the University of California, Los Angeles,
working with Judea Pearl. His interests are in causal and counterfactual inferences and their applications to the health and social sciences. He is also broadly interested in statistics, artificial intelligence, machine learning, and philosophy of science. His doctoral thesis provides the first general framework for solving the generalizability problems in causal inference, which has applications across all the empirical sciences. Bareinboim’s recognitions include the Dan David Prize Scholarship, the Yahoo! Key Scientific Challenges Award, the Outstanding Paper Award at the 2014 Annual Conference of the American Association for Artificial Intelligence (AAAI), and the Edward K. Rice Outstanding Graduate Student.