Statistics 490/590:
Causal Inference
Syllabus

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Office Hours: Wednesday, 9:15am-10:15am; by appointment.

Class Website: https://canvas.upenn.edu/courses/1440575

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Recommended Texts: The notes and handouts will aim to be self-sufficient. A recommended text is
P. Rosenbaum (2017), *Observation & Experiment: Introduction to Causal Inference*, Harvard University Press.

Course description: Question about cause are at the heart of many everyday decisions and public policy questions. Does eating an egg every day cause people to live longer or shorter or have no effect? Do gun control laws cause more or less murders or have no effect? Causal inference is the subfield of statistics that considers how we should make inferences about such questions. This course will cover the key concepts and methods of causal inference. Planned topics include the potential outcomes framework for causal inference; causal inference in randomized experiments; experimental design; controlling for unmeasured confounders in observational studies; sensitivity analysis for unmeasured confounding; tests of hidden bias; elaborate theories; and instrumental variables.

Course Requirements: There will be homework assignments and a final project. Grades will be based 50 percent on the homework and 50 percent on the final project.

Computing software: We will make use of the freeware statistical computing software R. R can be downloaded from http://www.r-project.org/ .

Course Prerequisites: Stat 102 (or Stat 112 or Stat 431), Stat 430 and knowledge of R such as that covered in Stat 405.