

# What would it take to Change your Inference? Quantifying the Discourse about Causal Inferences in the Social Sciences

*Presenter:* Ken Frank

## *Motivation*

Statistical inferences are often challenged because of uncontrolled bias. There may be bias due to uncontrolled confounding variables or non-random selection into a sample. We will answer the question about what it would take to change an inference by formalizing the sources of bias and quantifying the discourse about causal inferences in terms of those sources. For example, we will transform challenges such as “But the inference of a treatment effect might not be valid because of pre-existing differences between the treatment groups” to questions such as “How much bias must there have been due to uncontrolled pre-existing differences to make the inference invalid?” “ $QQQ\%$  of the cases would have to be replaced with cases with no treatment effect to change the inference.”

## *Approaches*

In part I we will use Rubin’s causal model to interpret how much bias there must be to invalidate an inference in terms of replacing observed cases with counterfactual cases or cases from an unsampled population. In part II, we will quantify the robustness of causal inferences in terms of correlations associated with unobserved variables or in unsampled populations. Calculations for bivariate and multivariate analysis will be presented using an app: <http://konfound-it.com> as well as macros in STATA and R and a [spreadsheet for calculating indices \[KonFound-it!\]](#).

## *Format*

The format will be a mixture of presentation, individual exploration, and group work. Participants may include graduate students and professors, although all must be comfortable with basic regression and multiple regression. Participants should bring their own laptop, or be willing to work with another student who has a laptop. Participants may choose to bring to the course an example of an inference from a published study or their own work, as well as data analyses they are currently conducting.