Indiana University Indianapolis
Department of Mathematical Sciences

Statistics Seminar

12:15pm—1:15pm, Tuesday, October 01, 2024
Zoom Meeting: Meeting ID: 845 0989 4694

Speaker: Bikram Karmakar
Department of Statistics, University of Florida

Title: A new paradigm for causal inference in the presence of unmeasured confounders by calibrating a resistant population's variance

Abstract:

The assumption that all the confounders between the treatment and outcome have been measured is central to causal inference from observational studies. However, the statistical methodology and empirical literature show diverging attitudes toward this assumption. A significant section of current methodological development assumes no unmeasured confounders and aims to find fine-tuned methods to estimate the overall or more specific effects. In contrast, nearly all published observational studies discuss the possibility of bias in their inference due to unmeasured confounders. This gap may be reduced by removing the untestable 'no unmeasured confounders' assumption while also not asking for the additional special structures of the study, e.g., negative control or exogenous variability.

We will examine the assumption of no unmeasured confounders and discuss the identification and estimation of the causal effects. After that, in a general set-up that allows unmeasured confounding, we show that the conditional treatment effect can be identified as one of two possible values. We require (a) a nondeterministic treatment assignment, (b) that all effect modifiers are measured, and (c) a resistant population that was not exposed to the treatment or, if exposed, is unaffected by the treatment. Assumptions (a) and (b) are mild and (b) can be relaxed. For (c), which is a new assumption, we show that a resistant population is often available in practice. We develop a large sample inference methodology and demonstrate our proposed method in a study of the effect of surface mining in central Appalachia on birth weight that finds a harmful effect.

Bio:
Dr. Bikram Karmakar is an Assistant Professor in the Statistics Department at UF. Prof Karmakar teaches advanced courses in statistics

and probability and Graduate courses in statistical methodology. His research focuses on methodologies for causal deduction primarily motivated by social and health science problems, supported partly by grants from the US National Science Foundation and the National Institute of Health.