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Robust Mendelian randomization by leveraging genetic interactions and variance QTL.

Wednesday, April 24th, 2024
11:50 AM
96 Frelinghuysen Road, CoRE Building, Room 431

Zoom Meeting: Meeting ID: 969 0606 4706
Password: 745339

https://rutgers.zoom.us/j/96906064706?pwd=ZklvbExpRVBJQ3c5dUhhYTFuR2ZrZz09

Light refreshments will be served in Hill 452, 11:15am

Abstract: Mendelian randomization (MR) uses genetic variants as instrument variables (IV) to identify and estimate causal effects in the presence of potential unmeasured confounding. However, potential violations of core IV assumptions threaten the validity of MR in biomedical studies. In this talk, I will introduce two methods to address such violations. First, in the multiple IV framework, we proposed to use genetic interactions to remove the bias due to violations of the IV independence and exclusion restriction assumptions; and estimation can be easily carried out using existing off-the-shelf software. Second, in the single IV framework, we proposed a mixed-scale robust identification strategy by leveraging outcome variance quantitative trait loci under the following two homogeneity assumptions: (i) homogeneous causal effect on the additive scale; and (ii) homogeneous confounding bias on the odds ratio scale. We further proposed an efficient one-step update estimator based on a preliminary consistent three-stage estimator. The proposed methods are illustrated using UK Biobank data.

Bio: Dr. Zhonghua Liu is Assistant Professor in the Department of Biostatistics at Columbia University since 2022. His primary research interests include statistical genetics/genomics, causal inference, and machine/deep learning algorithms and their applications in public health and medicine. He was Assistant Professor in the Department of Statistics and Actuarial Science at The University of Hong Kong from 2018 to 2022, and he worked at Morgan Stanley in New York City from 2016 to 2018. He obtained his doctorate in biostatistics from Harvard University in 2015 and received postdoctoral training at Harvard University and Broad Institute of Harvard and MIT from 2015-2016.