

Department of Mathematical Sciences
Faculty and Graduate Research Colloquium

“Evaluating Treatment Effects using Group Testing with Retesting of Positive Groups”

Aye Aye Maung
University of Louisville

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1:00 – 1:50 PM, RB 449

Abstract:

This talk introduces causal inference techniques into the realm of group testing. Group testing is an efficient strategy for evaluating outcomes within a large population by pooling samples. Originally developed to screen for syphilis for War World II US Army recruits, it has since become a powerful technique to screen for other infectious diseases, such as *Chlamydia trachomatis* (CT), *Neisseria gonorrhoeae* (NG), influenza, herpes, malaria, and more recently, COVID-19. However traditional methods in group testing have been limited to associational analysis and lack the ability to infer direct effects of interventions by accounting for confounders. In this work, we develop an approach to address this issue. We incorporate the technique of inverse probability weighting into standard likelihood-based methods for group testing. Theoretical results are proven to guarantee the asymptotical validity of our approach. Simulation results are established to demonstrate its applicability to various modeled data. Finally, the method is applied to data sourced from the US Flu Vaccine Effectiveness (VE) network, in order to demonstrate its real-world practicability.