Stat & Data Science Seminar

University of Texas at Arlington
College of Science
Center for Data Science Research and Education (CDSRE)
Proudly Presents:

Jackson Barth, PhD

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Baylor University

3:30 pm – 4:20 pm, Friday, Sept. 20th
PKH 110

"A Meta-analysis based Hierarchical Variance Model for Powering One and Two-sample t-tests"

Abstract:

Sample size determination (SSD) is essential in statistical inferenceand hypothesis testing, as it directly affects the accuracy and power of the analysis.We propose a SSD methodology for one and two-sample t-tests that ensuresclinical relevance using a pre-determined unstandardized effect size. Our novelapproach leverages Bayesian meta-analysis to account for the uncertainty surroundingthe variance, a common issue in SSD. By incorporating prior knowledge fromrelated studies via a Bayesian gamma-inverse gamma model, we obtain an informativeposterior predictive distribution for the variance that leads to better decisionsabout sample size. For efficient posterior sampling, we propose an empirical Bayesapproach, which is further combined with a quantile simulation approach tofacilitate computation. Simulations and empirical studies demonstrate that ourmethodology outperforms other aggregate approaches (simple average, weightedaverage, median) in variance estimation for SSD, especially in meta-analyses withlarge disparity in sample size and moderate variance. Thus, it offers a robust andpractical solution for sample size determination in t-tests.

Refreshments before the talk and socializing following the talk
Attend seminars online upon request to uta.cos.ds@gmail.com
https://www.uta.edu/academics/schools-colleges/science/departments/division-data-science/events