Statistics Seminar

Department of Mathematics and Statistics

DATE:	Thursday, November 13, 2025
TIME:	1:30pm – 2:30pm
LOCATION:	WH 100E
SPEAKER:	David Collins, Binghamton University
TITLE:	Bayesian D-optimal design of experiments with quantitative and qualitative responses

Abstract

Systems with both quantitative and qualitative responses are widely encountered in many applications. Design of experiment methods are needed when experiments are conducted to study such systems. Classic experimental design methods are unsuitable here because they often focus on one type of response. In this paper, we develop a Bayesian D-optimal design method for experiments with one continuous and one binary response. Both noninformative and conjugate informative prior distributions on the unknown parameters are considered. The proposed design criterion has meaningful interpretations regarding the D-optimality for the models for both types of responses. An efficient point-exchange search algorithm is developed to construct the local D-optimal designs for given parameter values. Global D-optimal designs are obtained by accumulating the frequencies of the design points in local D-optimal designs, where the parameters are sampled from the prior distributions. The performances of the proposed methods are evaluated through two examples. This is a published paper in The New England Journal of Statistics in Data Science as Kang et al. (2023).