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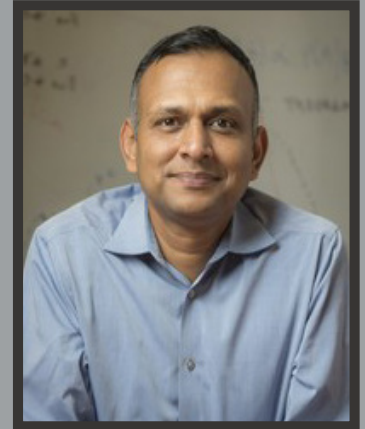
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DRUGS, DATA AND ME: BAYESIAN INTEGRATIVE APPROACHES TO ENABLE PRECISION MEDICINE

ABSTRACT:

At the heart of Precision Medicine is connecting the right drug/therapy to the right patient. The extensive acquisition of high-throughput molecular and drug profiling data across diverse model systems have made precision medicine efforts a realistic possibility. Modern precision medicine endeavors are at an inflexion point – facing the fundamental challenge of assimilating, organizing, analyzing and interpreting multi-domain data types to make individualized health decisions. Each of these distinct data types provides a different, partly independent but complementary, high-resolution view, of various biological and disease processes. From an analytic viewpoint, modeling and inference in such studies is challenging, not only due to high dimensionality, but also due to presence of structured dependencies (e.g. pathway/regulatory mechanisms, serial and spatial correlations). Integrative analyses of these multi-domain data, combined with patients' clinical outcomes, can help us quantify and interpret the complex biological processes that characterize a disease, as well as how these processes relate to the eventual progression and development of the disease. This talk will cover probabilistic Bayesian statistical and computational frameworks that acknowledge and exploit these inherent complex structural relationships, for both biomarker discovery, and clinical prediction, to aid evidence-based translational and individualized medicine. The approaches will be illustrated using several case examples in oncology.

BIO: Veera Balandandayuthapani received his PhD in Statistics from Texas A&M University under the supervision of Raymond J. Carroll and Bani Mallick. His research interests explores the potential of Bayesian probabilistic models and machine learning methods to assist in medical and health sciences. These methods are motivated by large and complex datasets such as high-throughput genomics, epigenomics, transcriptomics and proteomics as well as high-resolution neuro- and cancer- imaging. He is currently a Professor of Biostatistics at University of Michigan (UM), where he also serves as the Director of the Cancer Data Science Shared Resource.

He has received several prestigious awards that include being selected as Myrto Lefkopoulou Distinguished Lectureship from Harvard School of Public Health and the H. O. Hartley award from the Department of Statistics as well as the Young Investigator Award from the International Indian Statistical Association (IISA). He is a fellow of the American Statistical Association and an elected member of the International Statistical Institute. He serves or has served on the Editorial board for major bio/-statistical journals such as Journal of American Statistical Association, Annals of Applied Statistics, Biometrics and Sankhya.

Thursday, November 11, 2021
12:00 PM - 1:00 PM, CST
Online webinar only. No meeting room.

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