Distinguished Visitor Lecture Series

Susan Murphy
Harvard University

Susan Murphy is Professor of Statistics at Harvard University, Radcliffe Alumnae Professor at the Radcliffe Institute, Harvard University, and Professor of Computer Science at the Harvard John A. Paulson School of Engineering and Applied Sciences. Her current research interests concern clinical trial design and the development of data analytic methods for informing multi-stage decision making in health, particularly in mobile health. She is a 2013 MacArthur Fellow, a member of the National Academy of Sciences and the National Academy of Medicine, both of the US National Academies. She is currently president of the Bernoulli Society and incoming president of the Institute for Mathematical Statistics.

Stratified Micro-randomized Trials with Applications in Mobile Health

18 February 2019 (Monday)
9.00 – 10.00am, IMS Auditorium

Technological advancements in the field of mobile devices and wearable sensors make it possible to deliver treatments anytime and anywhere to users like you and me. Increasingly the delivery of these treatments is triggered by detections of vulnerability. Two challenges are that vulnerability may be impacted by prior treatment and treatment provided at time t is expected to have an impact on users over a span of time during which subsequent treatments may be provided. Here we discuss our work on the design of a mobile health smoking cessation study in which the above two challenges arose. Multiple online data analysis algorithms are used for detection, for example, of physiological stress as well as forecasting the remaining number of vulnerable times in the day. These algorithms are then inputs into a randomization algorithm that ensures that each user is randomized to each treatment an appropriate number of times per day. The stratified micro-randomized trial involves not only considerations of the randomization algorithm but a precise statement of the meaning of the causal treatment effects along with primary analyses and sample size calculations.

Challenges in Developing Learning Algorithms to Personalize Treatment in Real Time

25 February 2019 (Monday)
9.00 – 10.00am, IMS Auditorium

A formidable challenge in designing sequential treatments is to determine when and in which context it is best to deliver treatments. Consider treatment for individuals struggling with chronic health conditions. Operationally designing the sequential treatments involves the construction of decision rules that input current context of an individual and output a recommended treatment. That is, the treatment is adapted to the individual's context; the context may include current health status, current level of social support and current level of adherence for example. Data sets on individuals with records of time-varying context and treatment delivery can be used to inform the construction of the decision rules. There is much interest in personalizing the decision rules, particularly in real time as the individual experiences sequences of treatment. Here we discuss our work in designing online "bandit" learning algorithms for use in personalizing mobile health interventions.
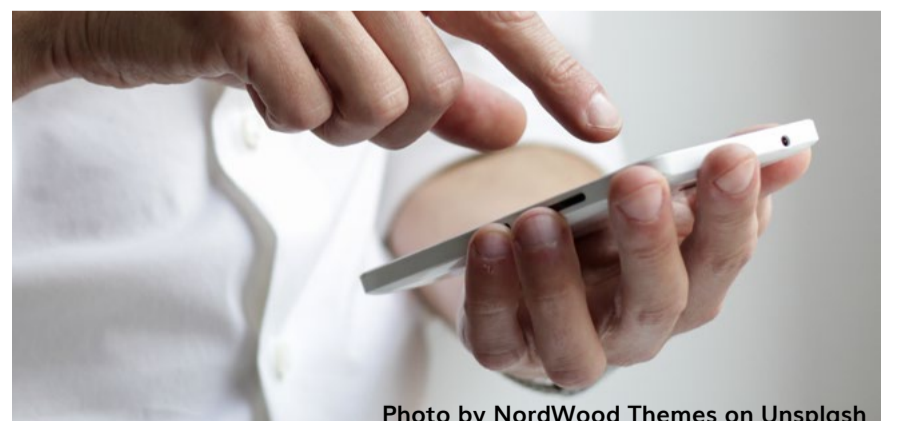
Photo by NordWood Themes on Unsplash

Venue and Organizer
Institute for Mathematical Sciences
National University of Singapore
3 Prince George's Park
Singapore 118402