

Industrial and Systems Engineering Seminar

Always Valid Inference: Bringing Sequential Analysis to A/B Testing

Wednesday, April 6

3:15 – Refreshments before the Seminar

3:30 PM – Graduate Seminar

Mechanical Engineering Room 4125 A & B



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A/B tests are typically analyzed via p-values and confidence intervals; but these inferences are wholly unreliable if users make decisions while continuously monitoring their tests. We define always valid p-values that let users try to take advantage of data as fast as it becomes available, providing valid statistical inference whenever they make their decision. Always valid p-values can be interpreted as the natural p-values corresponding to a sequential hypothesis test. Through this connection we derive always valid p-values with good detection properties. Notably, we also extend our approach to address multiple hypothesis testing in the sequential setting. Our methodology has been implemented in a large scale commercial A/B testing platform, from which we present empirical results.

Joint work with Leo Pekelis and David Walsh. This work was carried out with Optimizely, a leading commercial A/B testing platform.

BIO: Ramesh Johari is an Associate Professor at Stanford University, with a full-time appointment in the Department of Management Science and Engineering (MS&E), and courtesy appointments in the Departments of Computer Science (CS) and Electrical Engineering (EE). He co-directs the Social Algorithms Lab (SOAL). He is a member of the Operations Research group in MS&E, the Information Systems Laboratory in EE, the Institute for Computational and Mathematical Engineering, the steering committee of the Stanford Cyber Initiative, and the Stanford Smart Grid Group. He received an A.B. in Mathematics from Harvard (1998), a Certificate of Advanced Study in Mathematics from Cambridge (1999), and a Ph.D. in Electrical Engineering and Computer Science from MIT (2004).