

Department Seminars

Reinforcement Learning, Clinical Trials and Individualized Therapy



Michael R. Kosorok, PhD

Professor and Chair of Statistics and Operations Research
University of North Carolina at Chapel Hill

Abstract:

There has been significant recent research activity in developing therapies that are tailored to each individual. In this talk, we will discuss a new approach to finding such therapies in treatment settings involving multiple decision times. For example, in treating advanced non-small cell lung cancer, patients typically experience two or more lines of treatment. A very important clinical question is what treatment to administer during the first line, among the many approved first line treatments. Then, at the end of the first line treatment, two more questions are when to begin the second line of treatment and what treatment to administer among the approved second line treatments. In this setting, there are two decision times, one at the onset of first line treatment and one at the end of first line treatment. We will discuss a new kind of clinical trial, based on reinforcement learning methods from computer science, that finds an optimal--or nearly optimal--individualized treatment plan at each decision time which is a function of available patient prognostic information. A very different example in the treatment of lung infections in cystic fibrosis will also be presented. Challenges in design, modeling, computation and inference will be discussed along with some of the implementation issues.

Collaborators: Mark Socinski, Yiyun Tang, Donglin Zeng and Yufan Zhao, University of North Carolina at Chapel Hill

Friday,

March 27, 2009

5275 MSC

12:00-1:00 p.m.