University of Puerto Rico Mayaguez Campus
Faculty of Arts and Sciences
Department of Mathematical Sciences
call box 9000, Mayagüez, P.R. 00681

THE DEPARTMENT OF MATHEMATICAL SCIENCES PROUDLY PRESENTS

COLLOQUIUM

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Personalized Medicine and Generated Effect Modifiers

Eva Petkova, PhD

Associate Professor of Biostatistics
New York University Langone Medical Center, New York, NY

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Personalized medicine focuses on making treatment decisions for an individual patient based on her/his clinical, biological, behavioral and other data. In contrast, for many years clinical trials have been performed to compare different treatments on average across some target population, e.g., individuals with depression. All alone, clinicians have been aware that treatments do not work the same way for all patients, thus even if treatment A is better than treatment B on average, there might be patients who would do better on treatment B than on treatment A. Because of that, in randomized clinical trials researchers not only compare the effect of treatments on average, but they also try to determine whether any patient characteristics have a different effect on the outcome, depending on the treatment. In regression models for the outcome, if there is a non-zero interaction between treatment and a baseline patient characteristic, that predictor is called an effect modifier. Identification of such effect modifiers is crucial as we move towards personalized medicine, i.e., optimizing treatment assignment based on measurements made on a subject when s/he presents for treatment. Recent years have seen rapidly growing interest in personalized medicine, both in clinical research and in statistical methodology. In clinical research, from a secondary goal of classic randomized clinical trials for establishing efficacy of an experimental treatment, finding patient characteristics that can inform which treatment would benefit which patient, has become the central aim of clinical research. There are already a number of studies where the primary goal is to identify biosignatures of treatment response, and the number of such studies is expected to increase in the coming years. In the statistical literature, "personalized medicine" and "optimal treatment regime" continue to be intensely studied after they were first formalized by Murphy (2003) and Robins (2004). A treatment decision is an algorithm that takes as input patient data (X) and outputs a (binary) treatment recommendation – 0 (give treatment A) or 1 (treatment B). An optimal treatment decision would be one that maximizes the treatment benefit averaged over the entire target patient population. In this talk I will present a formal framework for optimal treatment decisions and will illustrate how statistical inferences can be made on different treatment decisions using large number of baseline scalar and functional patient characteristics collected in randomized clinical trials.

Monzón Building, Room 201, 10:45 AM
Refreshments will be served
15 minutes before the colloquium, M213