CLEMSON-UGA JOINT SEMINAR

A Robust Method for Estimating Optimal Treatment Regimes[*]

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M-101 Martin Hall
Reception: 4:00 p.m. O Foyer Martin Hall

ABSTRACT
A treatment regime is a rule that assigns a treatment, among a set of possible treatment options, to a patient as a function of his/her individual characteristics, hence "personalizing" treatment to the patient. A goal is to identify the optimal treatment regime; that is, the regime that, if followed by the entire population of patients, would lead to the best outcome on average. Given data from a clinical trial or observational study, for a single treatment decision, the optimal regime can be found by assuming a regression model for the expected outcome conditional on observed treatment and covariates, where, for a given set of covariates, the optimal treatment is the one that yields the most favorable expected outcome. However, clearly, treatment assignment via such a regime is suspect if this regression model is incorrectly specified. Even if misspecified, such a regression model defines a class of regimes; moreover, for reasons of cost, interpretability, or feasibility of implementation, investigators may wish to focus on a class of regimes having a certain form. Accordingly, rather than focusing on the optimal regime, we consider finding the optimal regime within a specified class by finding the regime that optimizes an estimator of overall population mean outcome. To take into account possible confounding in an observational study and to increase precision, we use a doubly robust augmented inverse probability weighted estimator for this purpose. Simulations and application to data from a breast cancer clinical trial demonstrate the performance of the method.
[*]Joint work with: Baqun Zhang, Northwestern University; Anastasios A. Tsiatis and Eric. B. Laber, North Carolina State University

BIO
Marie Davidian is William Neal Reynolds Professor of Statistics at North Carolina State University (NCSU) and Adjunct Professor of Biostatistics and Bioinformatics at Duke University. Marie received her Ph.D. in Statistics in 1987 from the University of North Carolina at Chapel Hill and is a Fellow of the American Statistical Association (ASA), the Institute of Mathematical Statistics (IMS), and the American Association for the Advancement of Science, and is an elected member of the International Statistical Institute. She has received numerous awards including the 2007 Janet L. Norwood Award for Outstanding Achievement by a Woman in the Statistical Sciences; the 2009 George W. Snedecor and the 2011 F.N. David Awards presented by the Committee of Presidents of Statistical Societies; and the 2010 NCSU Alexander Quarles Holladay Medal for Excellence. She is currently President of the ASA.