

DEL AND BETH KIMBLER LECTURE SERIES

High dimensional statistical inference in non-parametric models with applications

Enrique del Castillo, Ph.D.

Biography



Dr. Enrique del Castillo is a Distinguished Professor in the Department of Industrial & Manufacturing Engineering and a Professor in the Department of Statistics at Penn State University. He is the author of over 100 refereed papers which have appeared in a variety of technical journals in Engineering, Statistics and Science. He is the author of the book *Process Optimization, A Statistical Approach* (Springer, 2007), and of the book *Statistical Process Adjustment for Quality Control* (Wiley, 2002). Dr. del Castillo is a past editor-in-chief of the *Journal of Quality Technology* and a past Associate Editor of the *Technometrics* journal. His research has been funded by the National Science Foundation, Intel Corporation, General Motors, Minitab Corporation, and NATO. Dr. del Castillo's educational background is in Mechanical and Electrical Engineering (National U. of Mexico and U. Panamericana, Mexico City), Operations Research (Cornell University) and Industrial Engineering and Statistics (Arizona State U.). He is a former recipient of an NSF CAREER award and is a former Fulbright Scholar. Dr. del Castillo has held visiting professorship positions in several occasions at the Universities of Tilburg (Netherlands), Navarra (Spain), Politecnico di Milano (Italy), Wuerzburg (Germany), and the National University of Singapore.

Abstract

Statistical methods for large datasets are the norm today in applications in science and engineering even for conducting the most fundamental types of inferences. For instance, a considerable body of literature exists for testing very large number of hypotheses in parallel given this is a problem that occurs frequently in the sciences. Also common in applications, but studied relatively much less, are confidence region methods in high dimensions. These regions are necessary when fitting nonparametric response models such as Splines, which actually are functions of a large number of parameters. In this talk, I will first present three diverse applications of high dimensional confidence regions for nonparametric functions in engineering and science, namely 1) applications in pharmaceutical drug development, 2) applications in internet-based video streaming optimization, and 3) applications in nutrition experiments in evolutionary biology. All of these problems are instances of a common theme: finding a confidence region for the optimum point of a flexible nonparametric function (a Thin Plate Spline), usually fitted in a mixture-amount experimental space, while dealing with a high dimensional parameter space. New methodology based on the notion of data-depth for finding the desired regions with guaranteed coverage properties is presented. Towards the end of the talk I will return to application #2) above and will briefly discuss on-going work on the design and analysis of experiments where the controllable factors and responses are located on nodes over a network or graph, i.e., I will introduce the concept of an experimental design on a graph.

Interactive session and refreshments will be served at 12:15-1:30 PM in ENC 2407

CVC 147

11:00am-12:15pm

Friday, September 23rd, 2016

Refreshments

