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The Department of Mathematics at the University of Dayton presents
The 10th Annual Kenneth C. Schraut Memorial Lecture
Saturday, November 7, 2009



These Aren't Your Mothers and Fathers Experiments

Dr. Thomas J. Santner

The Ohio State University

Abstract: Informal experimentation is as old as humankind. Statisticians became seriously involved in the conduct of experiments during the early 1900s when they devised methods for the design of efficient field trials to improve agricultural yields. During the 1900s statistical methodology was developed for many complicated sampling settings and a wide variety of design objectives. For example, Taguchi emphasized designing experiments for the goal of creating "robust product designs," i.e., products whose performance was as impervious as possible to variability in the constituent components of the final product. Within the last 15 years experimentation has been heavily influenced by high speed computing and developments in numerical algorithms. The starting place for this computational influence is the work of applied mathematicians who have created sophisticated theoretical models of the input-output relationships of many engineering and biological systems. The implementations of such models in computer codes are routinely used as surrogates (or adjuncts) for physical experiments. This use of a computer code is often termed a "computer experiment." Automobiles, airplanes, and prosthetic devices are but a few of the many products whose development relies heavily on computer experiments. This talk will describe the breadth of applications of computer experiments and sketch the framework used to think about the analysis of data from them. We will also give some (unsolicited) advice about graduate school and life beyond the undergraduate degree.

About the speaker:

Professor Santner, who received his B.S. (1969) from the University of Dayton and his M.S. (1971) and Ph.D. (1973) from Purdue University is a Professor in the Department of Statistics at The Ohio State University. Professor Santner was a member of the faculty at Cornell University from 1973-1989 before joining the faculty at the Ohio State University in 1990. He served as chair of the Department of Statistics

during 1992-2000 and he is also a former Director of the Department's Statistical Consulting Service. He currently serves as chair of the Department of Biostatistics in the Ohio State University College of Public Health. He has held various visiting positions including a position as a Fulbright Scholar at Ludwig Maximilians Universität in Munich, Germany, and visiting positions at Cornell University and Duke University.

Professor Santner's research interests are in the design of experiments and the analysis of discrete data. He is the co-author of three books, *The Statistical Analysis of Discrete Data* (with Diane Duffy), Springer-Verlag, Inc. (1989), *Design and Analysis of Experiments for Statistical Selection, Screening, and Multiple Comparisons* (with R. E. Bechhofer and D. M. Goldsman), J. Wiley and Sons (1995), and *The Design and Analysis of Computer Experiments* (with Brian Williams and Bill Notz), Springer-Verlag, Inc. (2003).

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