2009

2009 Undergraduate Mathematics Day Poster

University of Dayton. Department of Mathematics

Undergraduate Mathematics Day

At the University of Dayton

Saturday, November 7, 2009

- **An undergraduate mathematics conference**
- **Contributed 15-minute talks on mathematics research, mathematics education, history of mathematics, and applications of mathematics**
- **Two invited addresses**
- **Electronic Conference Proceedings**
- **No registration fee, complimentary lunch**
- **Limited support for housing and travel**
- **Talks are presented mostly by undergraduates.**

Registration and information: **http://academic.udayton.edu/mathevents/Fall09/**
Further Information: **Paul.Eloe@notes.udayton.edu**

Abstract Deadline: Wednesday, October 28, 2009

The Tenth Annual Schraut Memorial Lecture

Thomas Santner, The Ohio State University

These Aren't Your Mothers and Fathers Experiments

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.

Kristin Duncan, San Diego State University

Keeping Up-to-Date With Bayes

Bayes' theorem, a rule for updating probabilities as new information is obtained, may be over two centuries old but it has been the driving force behind many of the most significant recent advances in statistics and other sciences. In this talk we will review Bayes' theorem and the evolution of Bayesian inference. The talk will touch on the philosophical differences between Bayesians and frequentists which caused controversy and heated debate in the statistics community for years. We will illustrate how Bayesian methods can be applied to analyzing criminal evidence, determining the best way to conduct clinical trials, and developing more useful software.

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