Stanford University

Statistics
SCHOOL OF HUMANITIES & SCIENCES

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Joint Appointment or Affiliation:
Economics

Research Interests:

- bootstrap
- subsampling and resampling methods
- multiple hypothesis testing
- large sample theory
- econometrics

Personal Website:
Stanford Profiles

PERSONAL BACKGROUND: I grew up in an Italian New Jersey family and was fortunate to attend Princeton where I was influenced by John Tukey and terrific mentor Nick Jewell. I got my Ph.D. from Berkeley in 1986, and am so appreciative that I knew many of the great statisticians of the 20th century, including Erich Lehmann, Lucien LeCam, David Freedman, Rudy Beran, and others. I joined the faculty at Stanford in 1986 when I was 25 and have been at Stanford ever since. My professional life combines intellectual advancement, teaching, and mentoring of young students and researchers by sharing of knowledge and promoting academic integrity. But I also lead a balanced life with passions in music (having performed at Carnegie Hall), tennis (ranked nationally in my age group), cooking, architecture, and other interests.

Research Statement:
Statistics is concerned with making sense or inferences about the world based on limited information and uncertainties. In contrast, mathematics is exact, where the goal is to prove theorems based on a well-defined set of assumptions. It is the juxtaposition of statistics and mathematics that I find intriguing and challenging. Mathematical statistics serves to precisely quantify and explain what can be learned

through data in spite of having to acknowledge our uncertainty in the process.

While much of my own research has been theoretically oriented, much of it has been motivated by a desire to develop practical statistical methodology in order to construct techniques that may be applied safely in practice. I have been particularly interested in advancing "nonparametric" techniques that do not rely on the statistician having to invoke unverifiable assumptions. In my work, I have tried to explore the extent of applicability of bootstrap, subsampling and other resampling methods, as well as understanding their limitations.

In recent years, I have been interested in developing new methods for multiple testing and multivariate inference, especially driven by the availability of massive data sets. For example current methods in biotechnology generate ultra high throughput data, where expression levels in tens of thousands of genes or SNP data with hundreds of thousands of locations must be analyzed simultaneously. Multiple testing methods can be used to understand the hidden structure in the data rather than random artifacts (due to "data snooping"). In addition, the analysis of data is complicated by large number of features with unknown dependence structures, heterogeneity, model fitting, high dimensionality and other unknown sources of variation. The statistician is then faced with the challenge of accounting for all possible errors resulting from a complex data analysis, so that any resulting inferences or interesting conclusions can reliable be viewed as real structure (and is reproducible or has predictive power). Thus, my goals are the development of universal statistical tools that can be applied to such diverse fields as econometrics, climate science, genetics, clinical trials, finance, education, etc. The many burgeoning fields of applications demand new statistical methods, creating exciting opportunities for statisticians and data scientists.

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