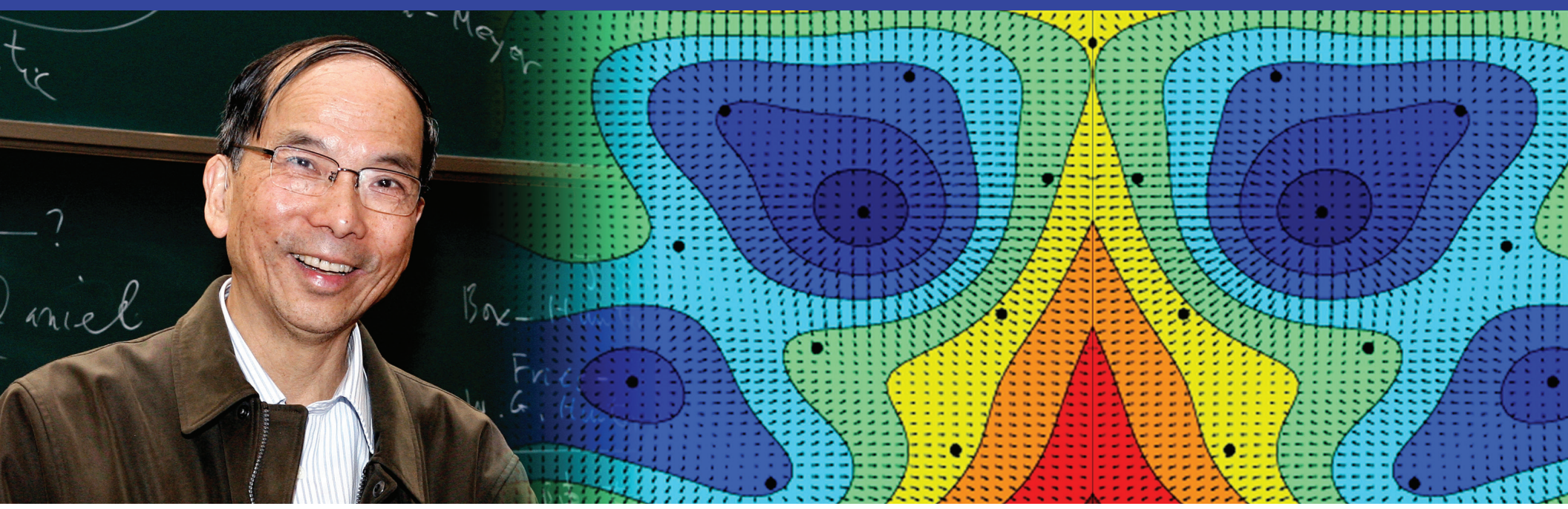
DISTINGUISHED LECTURE SERIES IN STATISTICAL SCIENCE

C. F. Jeff Wu

Georgia Institute of Technology



C. F. Jeff Wu is the Coca-Cola Chair in Engineering Statistics and Professor in the H. Milton Stewart School of Industrial and Systems Engineering at the Georgia Institute of Technology. He is known for his work on the convergence of the EM algorithm, resampling methods such as the bootstrap and jackknife, and industrial statistics, including design of experiments, and robust parameter design (Taguchi methods).

Professor Wu earned a B.Sc. in Mathematics from National Taiwan University (1971), and a Ph.D. in Statistics from University of California, Berkeley (1976). He has been a faculty member at the University of Wisconsin, Madison (1977-1988), the University of Waterloo (1988-1993), the University of Michigan (1993-2003). In his 1997 inaugural lecture for his appointment to the H. C. Carver Professorship at the University of Michigan, he coined the term **data science** and advocated to rename statistics to data science and statisticians to data scientists.

Dr. Wu has received numerous honors, awards, and recognitions for his work. Some of these include the COPSS Presidents' Award (1987), the Shewhart Medal (2008), the COPSS R. A. Fisher Lectureship (2011), the Deming Lecturer Award (2012), the Shewhart Medal of the American Society for Quality, and an honorary degree from the University of Waterloo (2008). He has published over 175 peer-reviewed articles and two books.

September 28 and 29, 2020 • Online

General Lecture: Sep 28, 3:30-4:30 pm

Navier-Stokes, spatial-temporal kriging and combustion stability: a prominent example of physics-based analytics

Most "learning" in big data is driven by the data alone. Some people may believe this is sufficient because of the sheer data size. If the physical world is involved, this approach is often insufficient. In this talk I will give a recent study to illustrate how physics and data are used jointly to learn about the "truth" of the physical world. It also serves as an example of physics-based analytics, which in itself has many forms and meanings. In an attempt to understand the turbulence behavior of an injector, a new design methodology is needed which combines engineering physics, computer simulations and statistical modeling. There are two key challenges: the simulation of high-fidelity spatial-temporal flows (using the Navier-Stokes equations) is computationally expensive, and the analysis and modeling of this data requires physical insights and statistical tools. A surrogate model is presented for efficient flow prediction in injectors with varying geometries, devices commonly used in many engineering applications. The novelty lies in incorporating properties of the fluid flow as simplifying model assumptions, which allows for quick emulation in practical turnaround times, and also reveals interesting flow physics which can guide further investigations.

Technical Lecture: Sep 29, 3:30-4:30pm

cmenet: a new method for bi-level variable selection of conditional main effects

This talk introduces a novel method for selecting main effects and a set of reparametrized predictors called conditional main effects (CMEs), which capture the conditional effect of a factor at a fixed level of another factor. CMEs represent interpretable, domain-specific phenomena for a wide range of applications in engineering, social sciences and genomics. The key challenge is in incorporating the grouped structure of CMEs within the variable selection procedure itself.
We propose a new method, cmenet, which employs two principles (CME coupling and CME reduction) to effectively navigate the selection algorithm. Simulations demonstrate the improved performance of cmenet over generic variable selection methods. Applied to a gene association study on fly wing shape, cmenet not only provides more parsimonious models and improved predictive performance over existing methods, but also reveals important insights on gene activation behavior which can guide further experiments (joint with Simon Mak, paper in JASA Theory & Methods.)

Free event | Registration required: https://dlss2020-jeff-wu.eventbrite.ca

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