University of Southern California

DANIEL J. EPSTEIN DEPARTMENT OF
INDUSTRIAL AND SYSTEMS ENGINEERING

EPSTEIN INSTITUTE SEMINAR • ISE 651 SEMINAR

Machine Learning with Human Intelligence: Principled Corner Cutting (PC^2)

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ABSTRACT

With the ever increasing availability of quantitative information, especially data with complex spatial and/or temporal structures, two closely related fields are undergoing substantial evolution: Machine learning and Statistics. On a grand scale, both have the same goal: separating signal from noise. In terms of methodological choices, however, it is not uncommon to hear machine learners complain about statisticians' excessive worrying over modeling and inferential principles to a degree of being willing to produce nothing, and to hear statisticians express discomfort with machine learners' tendency to let ease of practical implementation trump principled justifications, to a point of being willing to deliver anything. To take advantage of the strengths of both fields, we need to train substantially more *principled corner cutters*. That is, we must train researchers who are at ease in formulating the solution from the soundest principles available, and equally at ease in cutting corners, guided by these principles, to retain as much statistical efficiency as feasible while maintaining algorithmic efficiency under time and resource constraints. This thinking process is demonstrated by applying the *self-consistency principle* (Efron, 1967; Lee, Li and Meng, 2012) to handling incomplete and/or irregularly spaced data with non-parametric and semi-parametric models, including signal processing via wavelets and sparsity estimation via the LASSO and related penalties.

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ELECTRICAL ENGINEERING BLDG ROOM 248
4:00 – 5:20 PM

Biographical Information

Dr. Xiao-Li Meng is the Whipple V. N. Jones Professor of Statistics and Chair, Department of Statistics at Harvard University. His research interests include:

- Statistical inference with partially observed data, pre-processed data, and simulated data.
- Quantifying statistical information and efficiency in scientific studies, particularly for genetic and environmental problems.
- Statistical principles and foundational issues, such as multi-party inferences, the theory of ignorance, and the interplay between Bayesian and frequentist perspectives.
- Effective deterministic and stochastic algorithms for Bayesian and likelihood computation; Markov chain Monte Carlo, especially perfect sampling.
- Bayesian inference, ranking and mapping.
- Multi-resolution modelling for signal and image data.
- Statistical issues in astronomy and astrophysics.
- Modelling and imputation in health and medical studies.
- Elegant mathematical statistics.

Education

- 1990: Ph.D. in Statistics - Harvard University
- 1987: M.A. in Statistics - Harvard University
- 1986: Diploma in Graduate Study of Mathematical Statistics - Research Institute of Mathematics, Fudan University, Shanghai, P.R. China
- 1982: B.S. in Mathematics - Fudan University, Shanghai, P.R. China