



# THE UNIVERSITY OF CHICAGO

Department of Statistics

## STATISTICS COLLOQUIUM

---

GUANG CHENG

Department of Statistics  
Purdue University

### Nonparametric Inference for Small Data and Big Data

MONDAY, March 26, 2018 at 4:30 PM

Eckhart 133, 5734 S. University Avenue

*Refreshments before the seminar at 4:00PM in Jones 111*

#### ABSTRACT

This talk offers new perspectives on nonparametric inference when the sample size is very small or very big. The small-data part explores the possibility of establishing statistical inference with finite sample validity that does not rely on large sample theory. As data size grows rapidly nowadays, the asymptotic validity is no longer an issue, but high computational complexity becomes a new concern. The big-data part thus develops nonparametric inference procedures with a particular focus on the computational-and-statistical tradeoff. To be specific, we consider nonparametric testing in smoothing spline models under Gaussian errors. The first testing procedure is developed with Type I and II errors being controlled for any finite sample size. To tackle computational challenges, the second procedure employs a random projection strategy. Notably, we derive the minimum number of random projections that is sufficient for achieving testing optimality. Simulations and real data analysis demonstrate the finite sample advantage of the first one and the computational limit of the second one.

---

For further information and inquiries about building access for persons with disabilities, please contact Jonathan Rodriguez at 773.702.8333 or send him an email at [jgrodriguez@galton.uchicago.edu](mailto:jgrodriguez@galton.uchicago.edu). If you wish to subscribe to our email list, please visit the following website:  
<https://lists.uchicago.edu/web/subscribe/statseminars>.