

# Harrison H. Zhou

Department of Statistics  
Yale University, New Haven, CT 06520-8290  
Phone: (203) 432-0643 (O), Fax: (203) 432-0633  
Email: [huibin.zhou@yale.edu](mailto:huibin.zhou@yale.edu)  
<http://www.stat.yale.edu/people/harrisonzhou.html>

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## Position

2012/1 -	Yale University Acting Chair	New Haven, CT
2010/7 -	Yale University Professor	New Haven, CT
2009/7 -2010/6	Yale University Associate Professor	New Haven, CT
2004/7 -2009/6	Yale University Assistant Professor	New Haven, CT

## Education

1998-2004	Cornell University Ph.D. in Mathematics, Aug 2004.	Ithaca, NY
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## Research Interests

- Decision theory
- Le Cam theory
- Shrinkage estimation and Model selection
- Function (wavelet) estimation
- Multiple comparisons
- Functional data analysis
- Covariance matrix estimation
- Bioinformatics

## Honors and Awards

- **Tweedie Award**, Institute of Mathematical Statistics, 2010. *For innovative and significant contributions to the theory and methods of nonparametric function estimation; for outstanding contributions to high-dimensional statistical inference, including estimation of large covariance matrices and sparse signals.*
- **Noether Young Researcher Scholar Award**, American Statistical Association, 2009. *For outstanding early career contributions to nonparametric statistics.*
- **National Science Foundation, DMS- 0854975 (PI)**, *Focused Research Group--Statistical Inference for High-Dimensional Data: Theory, Methodology and Applications*, 2009/9-2012/9. *Jointly with T. Tony Cai and Tianxi Cai*

- **National Science Foundation CAREER Award (PI)**, *Asymptotic Decision Theory and Its Applications*, 2007/5 -- 2012/4.
- **Liu Memorial Award**, May 2001. Awarded to the best student researcher of Chinese descent at Cornell. Established in the late 1960s. First mathematics graduate student to receive this honor.

### Papers and Manuscripts

#### *Papers published or accepted*

- Model Selection and Sharp Asymptotic Minimality (with Z. Wu). *To appear. Probability Theory and Related Fields.*
- Optimal Rates of Convergence for Estimating Toeplitz Covariance Matrices (with T. Cai and Zhao Ren). *To appear. Probability Theory and Related Fields.*
- Minimax Estimation of Large Covariance Matrices under  $\ell_1$ -Norm (with T. Cai). *To appear. Statistica Sinica. Discussion Paper.*
- Nonparametric Regression in Natural Exponential Families (with T. Cai). *James O. Berger, T. Tony Cai and Iain M. Johnstone, eds., Borrowing Strength: Theory Powering Applications – A Festschrift for Lawrence D. Brown* (Beachwood, Ohio, USA: Institute of Mathematical Statistics, 2010), 199-215.
- False Discovery Rate Control with Groups (with J. X. Hu and H. Zhao). *J. American Statistical Association*, vol. 105, issue 491, 1215-1227, 2010.
- Nonparametric Regression in Exponential Families (with Lawrence D. Brown and Tony T. Cai). *Annals of Statistics*, 38, 2005-2046, 2010.
- Optimal Rates of Convergence for Covariance Matrix Estimation (with T. Tony Cai and C.-H. Zhang). *Annals of Statistics*, 38, 2118-2144, 2010
- Asymptotic Equivalence of Spectral Density Estimation and Gaussian White Noise (with G.K. Golubev and Michael Nussbaum). *Annals of Statistics*, 38, 181-214, 2010.
- Asymptotic Equivalence and Adaptive Estimation for Robust Nonparametric Regression (with Tony T. Cai). *Annals of Statistics*, 37, 3204-3235, 2009
- Robust Nonparametric Estimation via Wavelet Median Regression (with Lawrence .D. Brown and Tony T. Cai). *Annals of Statistics*, 36, 2055-2084, 2008.
- The Root-unroot Algorithm for Density Estimation as Implemented via Wavelet Block Thresholding (with Lawrence D. Brown, Tony T. Cai, R. Zhang, and Linda H. Zhao). *Probability Theory and Related Fields*, 146, 401-433, 2010
- A Data-Driven Block Thresholding Approach to Wavelet Estimation (with Tony T. Cai). *Annals of Statistics*, 37, 569–595, 2009.
- A Complement to Le Cam's Theorem (with Mark G. Low). *Annals of Statistics*, 35, 1146-1165, 2007.
- Minimax Estimation with Thresholding and its Application to Wavelet Analysis (with J.T. Gene Hwang). *Annals of Statistics*, **33**, 101-125, 2005.

#### *Papers submitted*

- Optimal Volatility Matrix Estimation for High Dimensional Diffusions With Noise Contamination (with M. Tao and Y. Wang). *Submitted to Annals of Statistics*.
- Optimal Rates of Convergence for Sparse Covariance Matrix Estimation (with T. Cai). *Under revision. Annals of Statistics*.
- Functional Regression for General Exponential Families (with W. Dou, D. Pollard). Submitted. ). *Under revision. Annals of Statistics*.
- A Note on Quantile Coupling Inequalities and Their Applications. Submitted.
- Adaptive Functional Linear Regression (with Tony T. Cai). Submitted.

#### *Ph.D. Dissertation*

- Minimax Estimation with Thresholding and Asymptotic Equivalence for Gaussian Variance Regression. Advisors: J. T. Gene Hwang and Michael Nussbaum.

#### *Discussions*

- Discussion of "Sure independence screening for ultra-high dimensional feature space" by Fan and Lv (with Xihong Lin), *Journal of the Royal Statistical Society, Series B*, 70, 903-904, 2008.

### **Professional Service**

- Member of the program committee, *ICSA Applied Statistics Symposium, June 2012, Boston*.
- Co-organizer of a workshop, *NSF Workshop for High-Dimensional Data: Theory, Methodology and Applications*, May 31 – June 2, 2012, Yale. Jointly with Tony Cai and Tianxi Cai.
- Member of the scientific committee, *The Third IMS-China International Conference, 2011*.
- Co-organizer of a workshop, *NSF Workshop on High Dimensional Data*, May 2011 (<http://people.hsph.harvard.edu/~linli/workshop/index.html>), Nantucket. Jointly with Tony Cai and Tianxi Cai.
- Member of the IMS Committee to Select Editors-in-chief for all journals, 2010-2013
- Associate Editor, *Journal of Nonparametric Statistics*, 2011 – 2014.
- Associate Editor, *Annals of Statistics*, 2010 Jan – 2012 Dec.
- Co-Editor, a special issue of *Statistics and Its Interface*, for the second IMS-China International Conference, 2009-2010.
- Co-Chair of the organizing committee, *International Conference on Statistics and Society*, July 2010 (<http://stat.yale.edu/Conferences/ICSS2010/index.html>), China.
- Review Panel, National Science Foundation.
- Organizer of a workshop, *Innovation and Inventiveness in Statistical Methodologies*, May 2009 (<http://www.stat.yale.edu/Conferences/Stats2009/>), Yale.
- Member of the scientific committee, *the third IMS-China International Conference, 2011*.
- Member of the scientific committee, *the second IMS-China International Conference, 2009*.
- Organizer of an invited session on "Recent advances in large covariance matrix estimation", *the third IMS-China International Conference, 2011*, Xi' An, China.
- Organizer of an invited session on "Large Covariance Matrices Estimation and Its Applications", *the second IMS-China International Conference, 2009*, Weihai, China.
- Organizer of an invited session on "High dimensional data analysis", *the first IMS-China International Conference, 2008*, Hangzhou, China.

- Organizer of an invited session on "Asymptotic Decision Theory on Nonparametric Estimation", IMS Annual Meeting, 2007, Salk City, Utah, USA.
- Organizer of an invited session on "Shrinkage Theory and its Applications to Bioinformatics and Machine Learning", *ICSA 2006 Applied Statistics Symposium*, USA.
- Associate Editor, a special issue of *Journal of Nonparametric Statistics*.
- Referee for *Annals of Statistics*, *Journal of The American Statistical Association*, *JRSSB*, *Bernoulli*, *Econometric Theory*, *Probability Theory and Related Fields*, *J. of Machine Learning Research*, *J. of Multivariate Analysis*, *J. of Statistical Planning and Inference*, *PNAS*, *Stochastic Processes and their Applications*, *Statistics and Probability Letter*, *Statistica Sinica*.

#### Invited Presentations

- Invited speaker, *Nonparametric and High-dimensional Statistics*, December 17-21, 2012, France.
- Invited speaker, *High Dimensional Statistics: Advances and Challenges*, August 2012, Singapore.
- Invited speaker, *The Second IMS-Asia Pacific Rim Meeting*, July 23-26, 2012, Japan.
- Invited speaker, *ICSA Applied Statistics Symposium, June 2012, Boston*.
- Invited speaker, June 20-24, 2012, Purdue.
- Invited speaker, *First Conference of the International Society for NonParametric Statistics (ISNPS)*, June 15-20, 2012, Greece.
- Invited speaker, *Large Scale Statistical Inference and Learning: Challenges and New Directions*, April 28-29, 2012, U. Minnesota.
- Invited participant, March 2012, Oberwolfach, Germany
- Invited speaker, *The Seventh SJTU Workshop on Natural Sciences: Frontier Problems in Modern Statistics*, Jan 5-6, 2012, China.
- Keynote Speaker, *Information Theory and Shrinkage Estimation*, November 2011, Info-Metrics Institute, American University.
- Invited participant and speaker, October 2011, Oberwolfach, Germany
- Invited speaker, JSM, August 2011, Miami.
- Invited speaker, *The Third IMS-China International Conference*, July 2011, Xi'an, China.
- Invited speaker, *Bayesian Semi/Non Parametric Econometrics and Statistics*, June 2011, Yale.
- Invited speaker, *High Dimensional Statistics: Advances and Challenges*, May 2011, Singapore.
- Invited speaker, *Random Matrices and High Dimensional Statistics*, April 2011, University of Minnesota.
- Invited speaker, *Information Theory and Applications Workshop*, February 2011, UCSD.
- Invited speaker, *The Eighth ICSA International Conference: Frontiers of Interdisciplinary and Methodological Statistical Research*, Dec. 19-22, 2010, China.
- Invited speaker, A conference at the Wharton school in honor of L. D. Brown, Dec. 15-17, 2010, Philadelphia.
- Invited speaker, IMS Annual meeting, Aug. 9-13, 2010, Gothenburg, Sweden.
- Invited speaker, JSM, Noether Awards Invited Session, Vancouver, BC, Canada, July 31-Aug. 5, 2010.
- Invited speaker, Tweedie New Researcher Invited Lecture, *2010 New Researchers Conference*, Vancouver, BC, Canada, July 27-30, 2010
- Invited speaker, *International Conference on Statistics and Society*, July 10-12, 2010, China.

- Invited speaker, *Probability and Statistics---an international conference in honor of P.L. Hsu's 100th birthday*, July 5-7, 2010.
- Invited speaker, *International Conference at Yunnan University*, July 2-4, 2010, China.
- Invited speaker, *2010 ICSA Applied Statistics Symposium*, June 20-23, 2010, Indiana.
- Invited speaker, *2010 New England Statistics Symposium*, April 27, 2010, Harvard.
- Invited participant, *Modern Nonparametric Statistics*, March 28-April 3, 2010, Oberwolfach, Germany.
- Invited speaker, session on "Functional Data Analysis", *JSM, Aug., 2009*, Washington DC.
- Invited speaker, *the first IMS-Asia Pacific Rim Meeting*, July 2009, Seoul, Korea.
- Invited speaker, *the second IMS-China International Conference*, July 2009, Weihai, China.
- Invited lecture series on "Hypothesis testing and minimax estimation", statistics department, the Wharton school, University of Pennsylvania, fall 2008.
- Invited speaker, *High-Dimensional Data Analysis: Perspectives from the Interface of Statistics, Biosciences, and Information Sciences*, Oct 24-25, 2008, Harvard.
- Invited speaker, session on "Methodological Advances in Testing and Estimation of Gene Expression Differences", *JSM 2008*.
- Invited speaker, *Beijing International Conference on Machine Learning and Data Mining, June 2008*, Beijing, China.
- Invited participant, *Statistical Theory and Methods for Complex, High-Dimensional Data, 7 January - 1 March 2008*, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK.
- Invited speaker, Chair of plenary sessions, *International Conference on the Frontier of Statistics: High Dimensional Data Analysis, 2007*, Kunming, China.
- Invited speaker, *International Workshop on Applied Probability (IWAP), 2006*.
- Invited talks in other departments: Cornell stat., Wayne State math., Columbia Stat. (three times), Penn State stat., UC Davis stat., Ohio State stat., Iowa State stat, UConn stat, IBM Watson, Boston U. Math (twice), Rutgers stat., UC Berkeley Stat., Harvard Stat., Harvard Biostat., Beijing University math, Renming University Stat., Newton Institute at Cambridge, UPenn Wharton School, Columbia Biostat, Temple Fox School, NYU Stern, Princeton, Wisconsin, CMU.

### Teaching

- Spring 2011, Stat 611, *Decision Theory*.
- Fall 2005 and Fall 2006, [Stat 610](#), *Statistical Inference*.
- Spring 2005 and Spring 2006 and Spring 2007, [Stat 242/542](#), *Theory of Statistics*.
- Spring 2006, Fall 2009 and Fall 2011, [Stat 680](#), *Nonparametric Estimation*.
- Fall 2006 and Fall 2007, [Stat 241/541](#), *Probability Theory with Applications*.
- Spring 2007 and Spring 2009, [Stat 619](#), *Statistical Decision Theory*.
- Fall 2007, [Stat 673](#), *Functional Data Analysis*.
- Fall 2009 and Fall 2011, Stat 106/506, *Data Analysis*
- Spring 2010, Stat 365/665, *Data Mining and Machine Learning*

### Ph. D. Students

- Zhao Ren (Statistics department, anticipated graduation May 2014)
- Arlene Kim (Statistics department, anticipated graduation May 2011)
- James Xing Hu (Statistics department, 2011)
- Wei Dou (co-advisor with David Pollard, Statistics department, 2010)
- Peisi Yan (Statistics department, 2011)

- Zheyang Wu (Committee member, Biostatistics division, May 2009)

### Grants

- **National Cancer Institute (Co-PI)**, *Chinese Herbal Medicine as a Novel Paradigm for Cancer Chemotherapy*, 9/1/2011-8/31/2016
- **National Science Foundation, DMS- 0854975 (PI)**, *Focused Research Group--Statistical Inference for High-Dimensional Data: Theory, Methodology and Applications*, 2009/9-2012/9. Jointly with T. Tony Cai and Tianxi Cai
- **National Science Foundation, DMS-0852498 (PI)**, *Innovation and Inventiveness in Statistical Methodologies*, 2008/12 -- 2009/11.
- **National Science Foundation CAREER Award (PI)**, *Asymptotic Decision Theory and Its Applications*, 2007/5 -- 2012/4.

### University Service

- Member of Standing Advisory and Appointments Committee for the School of Public Health (SPH)
- Member of PhD Admission Committee of Statistics Department.
- Freshman Advisor for Silliman College.

### Professional Affiliations

- American Statistical Association
- Institute of Mathematical Statistics
- International Chinese Statistical Association