

Jichun Xie

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Position

Associate Professor Department of Biostatistics and Bioinformatics, Duke University School of Medicine	2018 – Now
Assistant Professor Department of Biostatistics and Bioinformatics, Duke University School of Medicine	2014 – 2018
Assistant Professor Department of Statistics, Fox School of Business, Temple University	2011 – 2014

Education

Ph.D. in Biostatistics – University of Pennsylvania School of Medicine Dissertation Advisor: T. Tony Cai and Hongzhe Li	2006 – 2011
B.S. in Statistics – School of Mathematics, Peking University	2002 – 2006

Research Interests

Methodology

Large-scale multiple testing; high-dimensional network inference; semi-parametric and non-parametric inference

Application

High-throughput sequencing analysis; cancer genetics and genomics; immunology; EHR data.

Publication

1. Cotch, MF, Peet, J, Shults, J, Stambolian, D, and Xie, J. Quasi-least squares with mixed linear correlation structures. *Statistics and Its Interface* 3, no. 2 (2010): 223-233.
PMID: 22518205, PMCID: PMC3328409
2. Xie, J, Cai, TT, Maris, J, and Li, H. Optimal False Discovery Rate Control for Dependent Data. *Statistics and its interface* 4, no. 4 (January 2011): 417-430.
PMID: 23378870, PMCID: PMC3559028
[Xie, J, Cai, TT, and Li, H. Correction to the paper “Optimal false discovery rate control for dependent data”.

Statistics and its Interface 9, no. 1 (January 1, 2016): 33-35.]

3. Chen, J, Xie, J, and Li, H. A penalized likelihood approach for bivariate conditional normal models for dynamic co-expression analysis. *Biometrics* 67, no. 1 (March 2011): 299-308.

PMID: 20374241, PMCID: PMC2902622

4. Xie, J, Cai, TT, and Li, H. Sample size and power analysis for sparse signal recovery in genome-wide association studies. *Biometrika* 98, no. 2 (June 2011): 273-290.

PMID: 23049128, PMCID: PMC3419390

5. Daye, ZJ, Xie, J, and Li, H. A Sparse structured shrinkage estimator for nonparametric varying-coefficient model with an application in genomics. *Journal of Computational and Graphical Statistics* 21, no. 1 (January 2012): 110-133.

PMID: 22904608, PMCID: PMC3419598

6. Cai, TT, Li, H, Liu, W, and Xie, J. Covariate-adjusted precision matrix estimation with an application in genetical genomics. *Biometrika* 100, no. 1 (March 2013): 139-156.

PMID: 28316337, PMCID: PMC5351557

7. Napoli, A, Xie, J, and Obeid, I. Understanding the temporal evolution of neuronal connectivity in cultured networks using statistical analysis. *BMC neuroscience* 15 (January 21, 2014): 17.

PMID: 24443925, PMCID: PMC3902005

8. Ha, MJ, Sun, W, and Xie, J. PenPC: A two-step approach to estimate the skeletons of high-dimensional directed acyclic graphs. *Biometrics* 72, no. 1 (March 2016): 146-155.

PMID: 26406114, PMCID: PMC4808501

9. Farber, SH, Hatef, J, Han, JL, Marky, AH, Xie, J, Huang, K, Verla, T, Lokhnygina, Y, Collins, TA, and Lad, SP. Implantable neurostimulation for headache disorders: effect on healthcare utilization and expenditures. *Neuromodulation: Journal of the International Neuromodulation Society* 19, no. 3 (April 2016): 319-328.

PMID: 26857099

10. Cai, TT, Li, H, Liu, W, and Xie, J. Joint Estimation of Multiple High-dimensional Precision Matrices. *Statistica Sinica* 26, no. 2 (April 2016): 445-464

PMID: 28316451, PMCID: PMC5351783

11. Krucoff, MO, Cook, S, Adogwa, O, Moreno, J, Yang, S, Xie, J, Firempong, AO, Lad, N, and Bagley, CA. Racial, Socioeconomic, and Gender Disparities in the Presentation, Treatment, and Outcomes of Adult Chiari I Malformations. *World neurosurgery* 97 (January 2017): 431-437.

PMID: 27751919

12. Murphy, KR, Han, JL, Yang, S, Hussaini, SMQ, Elsamadicy, AA, Parente, B, Xie, J, Pagadala, P, and Lad, SP. Prevalence of Specific Types of Pain Diagnoses in a Sample of United States Adults. *Pain physician* 20, no. 2 (February 2017): E257-E268.

PMID: 28158163

13. Farber, SH, Murphy, KR, Suryadevara, CM, Babu, R, Yang, S, Feng, L, Xie, J, Perfect, JR, and Lad, SP. Comparing outcomes of early, late, and non-surgical management of intraspinal abscess. *Journal of clinical neuroscience: Official Journal of the Neurosurgical Society of Australasia* 36 (February 2017): 64-71.

PMID: 27836393

14. Xie, J, and Kang, J. High-dimensional tests for functional networks of brain anatomic regions. *Journal of Multivariate Analysis* 156 (April 2017): 70-88.

PMID: 28413234, PMCID: PMC5391152

15. Murphy, KR, Han, JL, Hussaini, SMQ, Yang, S, Parente, B, Xie, J, and Lad, SP. The Volume-Outcome Effect: Impact on Trial-to-Permanent Conversion Rates in Spinal Cord Stimulation. *Neuromodulation: Journal of the International Neuromodulation Society* 20, no. 3 (April 2017): 256-262.

PMID: 27696607, PMCID: PMC5378689

16. Hussaini, SMQ, Murphy, KR, Han, JL, Elsamadicy, AA, Yang, S, Premji, A, Parente, B, Xie, J, Pagadala, P, and Lad, SP. Specialty-Based Variations in Spinal Cord Stimulation Success Rates for Treatment of Chronic Pain. *Neuromodulation: Journal of the International Neuromodulation Society* 20, no. 4 (June 2017): 340-347.

PMID: 28370989, PMCID: PMC5464972

17. Han, JL, Murphy, KR, Hussaini, SMQ, Yang, S, Parente, B, Xie, J, Pagadala, P, and Lad, SP. Explantation Rates and Healthcare Resource Utilization in Spinal Cord Stimulation. *Neuromodulation: Journal of the International Neuromodulation Society* 20, no. 4 (June 2017): 331-339.

PMID: 28205332, PMCID: PMC5464976

18. Elsamadicy, AA, Farber, SH, Yang, S, Hussaini, SMQ, Murphy, KR, Sergesketter, A, Suryadevara, CM, Pagadala, P, Parente, B, Xie, J, and Lad, SP. Impact of Insurance Provider on Overall Costs in Failed Back Surgery Syndrome: A Cost Study of 122,827 Patients. *Neuromodulation: Journal of the International Neuromodulation Society* 20, no. 4 (June 2017): 354-360.

PMID: 28322477, PMCID: PMC5482408

19. Farber, SH, Han, JL, Petraglia Iii, FW, Gramer, R, Yang, S, Pagadala, P, Parente, B, Xie, J, Petrella, JR, and Lad, SP. Increasing Rates of Imaging in Failed Back Surgery Syndrome Patients: Implications for Spinal Cord Stimulation. *Pain physician* 20, no. 6 (September 2017): E969-E977.

PMID: 28934801

20. Farber, SH, Han, JL, Elsamadicy, AA, Hussaini, Q, Yang, S, Pagadala, P, Parente, B, Xie, J, and Lad, SP. Long-term Cost Utility of Spinal Cord Stimulation in Patients with Failed Back Surgery Syndrome. *Pain physician* 20, no. 6 (September 2017): E797-E805.

PMID: 28934786

21. Charalambous, LT, Premji, A, Tybout, C, Hunt, A, Cutshaw, D, Elsamadicy, AA, Yang, S, Xie, J, Giamberardino, C, Pagadala, P, Perfect, JR, and Lad, SP. Prevalence, healthcare resource utilization and overall burden of fungal meningitis in the United States. *Journal of medical microbiology*, 67-2 (December 15, 2017): 215-227.

PMID: 29244019

22. Elsamadicy, AA, Yang, S, Sergesketter, AR, Ashraf, B, Charalambous, L, Kemeny, H, Ejikeme, T, Ren, X, Pagadala, P, Parente, B, Xie, J, and Lad, SP. Prevalence and Cost Analysis of Complex Regional Pain Syndrome (CRPS): A Role for Neuromodulation. *Neuromodulation: journal of the International Neuromodulation Society*, 21-1 (January 2018): 87-92

PMID: 28961359

23. Elsamadicy, AA, Sergesketter, A, Ren, X, Mohammed Qasim Hussaini, S, Laarakker, A, Rahimpour, S, Ejikeme, T, Yang, S, Pagadala, P, Parente, B, Xie, J, and Lad, SP. Drivers and Risk Factors of Unplanned 30-Day Readmission Following Spinal Cord Stimulator Implantation. *Neuromodulation : journal of the International Neuromodulation Society* (September 29, 2017).
PMID: 28961362
24. Feng, Y, Wang, Y, Liu, H, Liu, Z, Mills, C, Owzar, K, Xie, J, Han, Y, Qian, DC, Hung Rj, RJ, Brhane, Y, McLaughlin, J, Brennan, P, Bickeböller, H, Rosenberger, A, Houlston, RS, Caporaso, N, Landi, MT, Brüske, I, Risch, A, Ye, Y, Wu, X, Christiani, DC, Amos, CI, and Wei, Q. Novel genetic variants in the P38MAPK pathway gene ZAK and susceptibility to lung cancer. *Molecular carcinogenesis*, 2018 Feb;57(2):216-24.
PMID: 29071797
25. Duan, B, Hu, J, Liu, H, Wang, Y, Li, H, Liu, S, Xie, J, Owzar, K, Abbruzzese, J, Hurwitz, H, Gao, H, and Wei, Q. Genetic Variants in the Platelet-Derived Growth Factor Subunit B Gene Associated with Pancreatic Cancer Risk. *International journal of cancer* 142-7 (April, 2018): 1322-1331.
PMID: 29168174
26. Lin, J, Gresham, J, Wang, T, Kim, SY, Alvarez, J, Damrauer, JS, Floyd, S, Granek, J, Allen, A, Chan, C, Xie, J, and Owzar, K. bcSeq: An R Package for Fast Sequence Mapping in High-throughput shRNA and CRISPR Screens. *Bioinformatics (Oxford, England)* (May 22, 2018).
PMID: 29790906
27. Lad, SP, Yang, S, Xie, J, Farjat, A, Pagadala, P, and Parente, B. Down the Rabbit Hole: Specialty Influence on SCS Outcomes. *Neuromodulation: Journal of the International Neuromodulation Society* 21, no. 4 (June 2018): 417-420. (Letter)
PMID: 29975008
28. Elsamadicy, AA, Ren, X, Kemeny, H, Charalambous, L, Sergesketter, AR, Rahimpour, S, Williamson, T, Goodwin, CR, Abd-El-Barr, MM, Gottfried, ON, Xie, J, and Lad, SP. Independent Associations With 30- and 90-Day Unplanned Readmissions After Elective Lumbar Spine Surgery: A National Trend Analysis of 144 123 Patients. *Neurosurgery* (June 11, 2018).
PMID: 29893899
29. Elsamadicy, AA, Yang, S, Sergesketter, AR, Ashraf, B, Charalambous, L, Kemeny, H, Ejikeme, T, Ren, X, Pagadala, P, Parente, B, Xie, J, and Lad, SP. Prevalence and Cost Analysis of Complex Regional Pain Syndrome (CRPS): A Role for Neuromodulation. *Neuromodulation: Journal of the International Neuromodulation Society* 21, no. 5 (July 2018): 423-430. (Review)
PMID: 28961359
30. Xu, Y, Liu, H, Liu, S, Wang, Y, Xie, J, Stinchcombe, TE, Su, L, Zhang, R, Christiani, DC, Li, W, and Wei, Q. Genetic variant of IRAK2 in the toll-like receptor signaling pathway and survival of non-small cell lung cancer. *International Journal of Cancer* (July 6, 2018).
PMID: 29978465
31. Zeng, Y; Nie, C; Min, J; Chen, H; Liu, X; Ye, R; Chen, Z; Bai, C; Xie, E; Yin, Z; Lv, Y; Lu, J; Li, J; Ni, T; Bolund, L; Land, KC; Yashin, A; O'Rand, AM; Sun, L; Yang, Z; Tao, W; Gurinovich, A; Franceschi, C; Xie, J; Gu, J; Hou, Y; Liu, X; Xu, X; Robine, J-M; Deelen, J; Sebastiani, P; Slagboom, E; Perls, T; Hauser, E; Gottschalk, W; Tan, Q;

Christensen, K; Shi, X; Lutz, M; Tian, X-L; Yang, H; and Vaupel, J. Sex Differences in Genetic Associations With Longevity. *Jama Netw Open*. 2018 Aug;1(4).

PMID: 30294719; PMCID: PMC6173523

32. Xie, J, and Li, R. False discovery rate control for high dimensional networks of quantile associations conditioning on covariates. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)* 2018 Nov; 80(5): 1015-1034.

32. Xu, Y, Liu, H, Liu, S, Wang, Y, Xie, J, Stinchcombe, TE, Su, L, Zhang, R, Christiani, DC, Li, W, and Wei, Q. Genetic variant of IRAK2 in the toll-like receptor signaling pathway and survival of non-small cell lung cancer. *Int J Cancer* 143, no. 10 (November 15, 2018): 2400-2408.

PMID: 29978465; PMCID: PMC6205899

33. Elsamadicy, AA; Ren, X; Kemeny, H; Charalambous, L; Sergesketter, AR; Rahimpour, S; Williamson, T; Goodwin, CR; Abd-El-Barr, MM; Gottfried, ON; Xie, J; and Lad, SP. Independent Associations With 30- and 90-Day Unplanned Readmissions After Elective Lumbar Spine Surgery: A National Trend Analysis of 144,123 Patients. *Neurosurgery*. 2019 Mar 1;84(3):758-67.

PMID: 29893899

34. Wang, X; Liu, H; Xu, Y; Xie, J; Zhu, D; Amos, CI; Fang, S; Lee, JE; Li, X; Nan, H; Song, Y; and Wei, Q. Genetic variants in the calcium signaling pathway genes are associated with cutaneous melanoma-specific survival. *Carcinogenesis*. 2019 Apr 29;40(2):279-88.

PMID: 30596980; PMCID: PMC6487681

Invited Colloquium and Conference Presentations

2019/07 “Multiple Testing Embedded in an Aggregation Tree to Identify the Stimulated Cells in Flow Cytometry Analysis”

2019 IMS-China International Conference on Statistics and Probability

2019/07 “Multiple Testing Embedded in an Aggregation Tree to Identify the Stimulated Cells in Flow Cytometry Analysis”

2019 ICSA China Conference

2019/05 “Multiple Testing Embedded in an Aggregation Tree to Identify the Stimulated Cells in Flow Cytometry Analysis”

2019 Hangzhou International Conference on Frontiers of Data Science

2017/06 “False Discovery Rate Control for High-Dimensional Network of Conditional Quantile Associations”

Joint Statistical Conference in ICSA, Chicago

- 2017/05 “False Discovery Rate Control for High-Dimensional Network of Conditional Quantile Associations”
School of Statistics, Renmin University of China
- 2017/05 “False Discovery Rate Control for High-Dimensional Network of Conditional Quantile Associations”
Joint Conference of “the application of statistics in the drug control and regulation, Beijing, China
- 2017/05 “PenPC: A Two-Step Approach to Estimate the Skeleton of High Dimensional Directed Acyclic Graphs”
2017 Atlanta Causal Inference Conference, Chapel Hill
- 2017/05 “False Discovery Rate Control for High-Dimensional Network of Conditional Quantile Associations”
Joint Conference for “the Application of Statistics in the Drug Quality Control and Regulation”, National Institute for Food and Drug Control in China, Beijing
- 2016/12 “False Discovery Rate Control for High-Dimensional Network of Conditional Quantile Associations”
ICSA International Conference on Global Growth of Modern Statistics in the 21st Century, Shanghai
- 2016/10 “Testing and Multiple Testing Arbitrary Dependence to Identify Gene Co-expression Pattern Change”
International Conference on Advances in Interdisciplinary Statistics and Combinatorics, Greensboro
- 2016/09 “Testing and Multiple Testing Arbitrary Dependence to Identify Gene Co-expression Pattern Change”
Duke Industry Statistics Symposium, Durham
- 2015/06 “Multiple Testing for General Dependence by Quantile-Based Contingency Tables”
Joint Statistics conference of ICSA, Fort Collins
- 2014/06 “High Dimensional Tests for Functional Brain Networks”
Joint Statistics conference of ICSA, Portland
- 2014/01 “High Dimensional Tests for Brain Networks with Desirable Resolutions”
Department of Statistics, Indiana University
- 2013/08 “Joint Estimation of Multiple Precision Matrices”
Joint Statistical Meetings, Montreal, Canada

- 2013/06 “PenPC: A Two-Step Approach to Estimate the Skeleton of High Dimensional Directed Acyclic Graphs”
IMS China Meeting, Chengdu, China
- 2013/06 “Optimal High Dimensional Multiple Testing Under Linear Models”
Joint Statistics conference of ICSA, Bethesda
- 2013/04 “Optimal High Dimensional Multiple Testing Under Linear Models”
Department of Mathematics, New Jersey Institute of Technology
- 2013/02 “High Dimensional Network Estimation with Applications in Genetical Genomics Data”
Department of Biostatistics, Thomas Jefferson University
- 2012/11 “High Dimensional Network Estimation with Applications in Genetical Genomics Data”
Division of Biostatistics, Fox Chase Cancer Center
- 2012/08 “Optimal Surrogate and Optimal Multiple Testing Procedure for Linear Model”
International Conference on Robust Statistics, Burlington
- 2012/06 “Joint Estimation of Multiple Precision Matrices”
Joint Statistics conference of ICSA, Boston
- 2012/06 “Joint Estimation of Multiple Precision Matrices”
ASA Sectional Meeting on Statistical Learning and Data Mining, Ann Arbor
- 2012/02 “High Dimensional Precision Matrix Estimation”
Department of Statistics and Applied Probability, University of California, Santa Barbara
- 2012/02 “High Dimensional Precision Matrix Estimation”
Department of Statistics, Michigan State University
- 2012/01 “High Dimensional Precision Matrix Estimation”
Department of Statistics, Indiana University
- 2012/01 “High Dimensional Precision Matrix Estimation”
Division of Statistics, University of Texas at Austin
- 2011/09 “High Dimensional Precision Matrix Estimation with Applications in Genomics”, Department
of Statistics
North Carolina State University

2011/05	“High Dimensional Precision Matrix Estimation with Applications in Genomics”, Department of Biostatistics Columbia University
2011/05	“High Dimensional Precision Matrix Estimation with Applications in Genomics”, Department of Statistics Temple University
2011/01	“High Dimensional Precision Matrix Estimation with Applications in Genomics”, Department of Statistics Rutgers University

Organizations and Participation

- 1 Member of review panel on NIH NIA U19 grant application in 2017 and 2018.
- 2 Member of Lingzi Lu Memorial Award (jointed appointed by ASA and ICSA) Committee in 2017-2019
- 3 Member of review panel on DOE BSSD “Systems Biology Enabled Research on the Roles of Microbiomes in Nutrient Cycling Processes” in 2019.

Education/Training Activities

Course Teaching

- 1 BIOS 704: Introduction to Statistical Theory and Methods II, Spring 2015
- 2 BIOS 707: Statistical Methods for Learning and Discovery, co-teaching with Dr. Koruos Owzar in Fall 2014 and Fall 2015, Solo-teaching in Fall 2016
- 3 BIOS 906: Statistical Inference, Fall 2017 - Fall 2019

Course Development

- 1 BIOS 707: This course is a required course for the data mining track master students. It focuses on introducing commonly-used methods in supervised and unsupervised learning, real data application, coding in R, and scientific plotting.
- 2 BIOS 906: This is a PHD level inference course, required for all the PHD students. It focuses on point estimation and hypothesis testing. For the point estimation part, the emphasis is put on loss function, risk function, optimal estimators under various criteria (UMRU, Pitman estimator, Bayes rule, minimax, etc.), admissibility, large sample asymptotic and their related theorems and algorithms (such as EM algorithm). For the hypothesis testing part, the emphasis is put on power and optimality in hypothesis testing (UMP and UMPU test, etc.), and the relationship between confidence regions and hypothesis testing.

Mentoring Activities

Adviser of PHD Student

Graduation Date

John Pura, Department of Biostatistics and Bioinformatics, Duke University	09/2019 (Expected)
Jiyuan Fang, Department of Biostatistics and Bioinformatics, Duke University	05/2022 (Expected)
Xuechan Li, Department of Biostatistics and Bioinformatics, Duke University	05/2022 (Expected)

Adviser of MS Students

Xiaodi Qin, Department of Biostatistics and Bioinformatics, Duke University

Graduation Date

05/2017

Departmental Services

Departmental Senior Leadership Committee

2019.02 - Present

Department of Biostatistics and Bioinformatics, Duke University School of Medicine

MS Interim co-DGS

2019.02 - Present

Department of Biostatistics and Bioinformatics, Duke University School of Medicine

PHD Theory Qualifying Exam Committee – Member

2014 - 2019

Department of Biostatistics and Bioinformatics, Duke University School of Medicine

MS Qualifying Exam Committee – Member

2014

Department of Biostatistics and Bioinformatics, Duke University School of Medicine

PHD Admission Committee – Member

2017 - 2019

Department of Biostatistics and Bioinformatics, Duke University School of Medicine

MS Admission Committee – Member

2017

Department of Biostatistics and Bioinformatics, Duke University School of Medicine

PHD Admission Committee – Member

2017 - 2019

Program of Computational Biology and Bioinformatics, Duke University