

Contact Information

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Education

2003 B.S. Mathematics Peking University, China
2009 Ph.D. Mathematics Stony Brook University, U.S.A.

Current Employment

2019– Associate Professor Department of Mathematics, University of Arizona
2010– Member GIDP in Statistics, University of Arizona

Previous Employment

2009–2010 Research Associate Statistics Lab, Department of ORFE, Princeton University
2010–2013 Visiting Assistant Professor Department of Mathematics, University of Arizona
2013–2019 Assistant Professor Department of Mathematics, University of Arizona

Publications**Refereed Journal Articles**

1. Fan, J., Guo, S. and Hao, N. (2012), Variance Estimation Using Refitted Cross-Validation in Ultra-high Dimensional Regression, *Journal of the Royal Statistical Society: Series B*, 2012, **74**, Part 1, pp. 37-65.
2. Hao, N., Niu, Y.S. and Zhang, H. (2013), Multiple Change-Point Detection via a Screening and Ranking Algorithm, *Statistica Sinica*, 2013, **23**, pp. 1553-1572.
3. Hao, N. and Zhang, H.H. (2014), Interaction Screening for Ultra-High Dimensional Data, *Journal of the American Statistical Association*, 2014, **109**, pp. 1285-1301.
4. Hao, N., Dong, B. and Fan, J., (2015) Sparsifying the Fisher Linear Discriminant by Rotation, *Journal of the Royal Statistical Society: Series B*, 2015, **77**, Part 4, pp. 827-851.
5. Niu, Y.S., Hao, N. and Zhang, H. (2016) Multiple Change-point Detection: a Selective Overview, *Statistical Science*, 2016, **31**, pp. 611-623.
6. Hao, N. and Zhang, H.H. (2017), A Note on High Dimensional Linear Regression with Interactions, *The American Statistician*, 2017, **71**, Issue 4, pp. 291-297.
7. Hao, N. and Zhang, H.H. (2017), Oracle P-values and Variable Screening, *Electronic Journal of Statistics*, 2017, **11**, pp. 3251-3271.
8. Xiao, F., Niu, Y.S., Hao, N., Xu, Y., Jin, Z. and Zhang, H. (2017), modSaRa: a computationally efficient R package for CNV identification, *Bioinformatics*, 2017, **33**, Issue 15, pp. 2384-2385.
9. Niu, Y.S., Hao, N. and Dong B. (2018), A New Reduced-Rank Linear Discriminant Analysis Method and Its Applications, *Statistica Sinica*, 2018, **28**, pp. 189-202.
10. Niu, Y.S., Hao, N. and Zhang, H.H. (2018), Interaction Screening by Partial Correlation, *Statistics and Its Interface*, 2018, **11**, pp. 317-325.
11. Hao, N., Feng, Y. and Zhang, H.H. (2018), Model Selection for High Dimensional Quadratic Regressions via Regularization, *Journal of the American Statistical Association*, 2018, **113**, pp. 615-625.
12. Xiao, F., Luo, X., Hao, N., Niu, Y.S., Xiao, X., Cai, G., Amos, C.I., and Zhang, H. (2019) An Accurate and Powerful Method for Copy Number Variation Detection, *Bioinformatics*, to appear.

13. Shin, S.J., Wu, Y. and Hao, N. (2020), A Backward Procedure for Change-point Detection with Application to Copy Number Variation Detection. *The Canadian Journal of Statistics*, **48**, pp. 366-385.
14. Hao, N., Niu, Y.S., Xiao, F. and Zhang, H. (2020) A Super Scalable Algorithm for Short Segment Detection. *Statistics in Biosciences*.

Refereed Conference Articles

15. Niu, Y.S., Hao, N. and An, L. (2011), Detection of Rare Functional Variants Using Group ISIS, *BMC Proceedings*, 2011, **5**(Suppl 9):S108.
16. Dong, B. and Hao, N. (2015) Semi-supervised High Dimensional Clustering by Tight Wavelet Frames, *SPIE Optical Engineering+ Applications*.

Scientific Products/Software

17. Hao, N., Niu, Y.S. and Zhang, H. (2013) R Package **SaRa**.
18. Niu, Y.S., Hao, N. and Dong B. (2015) R Package **SPCALDA**.
19. Feng, Y., Hao, N. and Zhang, H.H. (2015) R Package **RAMP**.
20. Xiao, F., Niu, Y.S., Hao, N., Xu, Y., Jin, Z. and Zhang, H. (2016) R Package **modSaRa**.
21. Hao, N., Niu, Y.S., Xiao, F. and Zhang, H. (2018) R Package **SSSS**.
22. Xiao, F., Luo, X., Hao, N., Niu, Y.S., Xiao, X., Cai, G., Amos, C.I., and Zhang, H. (2018) R Package **modSaRa2**.
23. Shin, S.J., Wu, Y. and Hao, N. (2018) R Package **bwd**.

Awarded Grants

1. Simons Foundation: AMS Simons Travel Grant 2012-2014
Total Awarded: \$4,000
Role: sole PI
2. National Science Foundation: DMS-1309507 2013-2017
“Flexible modeling for high-dimensional complex data: theory, methodology, and computation”
Total Awarded: \$150,000, PI: Hao Zhang.
Role: Co-PI
3. National Science Foundation (NSF) Grant: DMS-1722691 2017-2020
“Collaborative research: scalable and flexible algorithms to detect structural change in complex sequence data”
Total Awarded: \$165,996, PI: Yue Niu.
Role: Co-PI
4. Simons Foundation: Collaboration Grants for Mathematicians 524432 2017-2022
“Scalable methods in high dimensional statistical learning”
Total Awarded: \$42,000.
Role: sole PI
5. National Science Foundation (NSF) Grant: DMS-1937229 2020-2025
“RTG: Applied Mathematics and Statistics for Data-Driven Discovery”
Total Awarded: \$1,252,358, PI: Kevin Lin.
Role: SP

Service

- Conference Organizational Activities
 - 2010 Session Chair Joint Statistical Meetings, Vancouver, Canada.
 - 2015 Session Organizer ICSA China Statistics Conference, Shanghai, China.
 - 2016 Session Organizer&Chair The 10th ICSA International Conference, Shanghai, China.
 - 2018 Session Organizer&Chair TRIPODS Southwest Summer Conference, Biosphere 2, AZ.
 - 2018 Session Organizer ICSA Applied Statistics Symposium, New Brunswick, NJ.
 - 2018 Session Organizer Joint Statistical Meetings, Vancouver, Canada.
 - 2019 Session Chair International Conference on Frontiers of Data Science, Hangzhou, China.
 - 2019 Session Organizer&Chair ICSA China Statistics Conference, Tianjin, China.
- Referee service: Annals of Statistics; Journal of the American Statistical Association; Journal of the Royal Statistical Society: Series B; Biometrika; Biometrics; Bernoulli; Journal of Computational and Graphical Statistics; Journal of Multivariate Analysis; Statistica Sinica; Technometrics; Test; Journal of Machine Learning Research; Journal of Econometrics; Electronic Journal of Statistics; Statistics and its Interface; Statistics & Probability Letters; Computational Statistics and Data Analysis; Statistical Analysis & Data Mining; Physica A; Stat; Metrika; Communication in Statistics; Computational Statistics; Journal of Applied Statistics; Genetic Epidemiology; Nucleic Acids Research; Frontiers in Statistical Genetics and Methodology; Journal of Probability and Statistics.
- National Science Foundation: Panelist (2019).
- Departmental committees
 - 2013-2015 Member, Graduate Admissions Committee, GIDP in Statistics
 - 2014 Member, Progress Report Committee, GIDP in Statistics
 - 2015-2016 Member, Academic Program Review Self-Study Committee, GIDP in Statistics
 - 2017-2018 Member, Undergraduate Committee, Department of Mathematics
 - 2017-2018 Member, Planning Committee, Department of Mathematics
 - 2017-2020 Co-leader, Research Working Group 6, UA TRIPODS
 - 2018-2019 Member, Graduate Committee, Department of Mathematics
 - 2020-2022 Member, Computer Committee, Department of Mathematics
 - 2020-2022 Member, Personnel Committee, Department of Mathematics

Outreach

- K-12 Education
 - 2019– Coach, Mathleague club, Sunrise Drive Elementary School, Tucson, AZ

Conferences/Scholarly Presentations

Colloquia and Seminars

1. “Multiple Change-Point Detection via a Screening and Ranking Algorithm”, Statistics GIDP Colloquium, University of Arizona, Tucson, AZ, Mar. 2012
2. “An Introduction to High Dimensional Statistical Learning”, Sichuan University, Chengdu, Sichuan, China, Jul. 2012
3. “Selection of Interaction Effects for Ultra-High Dimensional Data”, Colloquium, Southwestern University of Finance and Economics, Chengdu, Sichuan, China, Jul. 2012
4. “Identify Interactions for Ultra-High Dimensional Data”, Colloquium, Department of Statistics & Biostatistics, Rutgers University, Piscataway, NJ, Nov. 2012
5. “Equivariant Estimators in High Dimensional Models”, Modeling and Computation Seminar, Department of Mathematics, University of Arizona, Tucson, AZ, Nov. 2012
6. “Identify Interactions for High Dimensional Data”, Colloquium, Department of Mathematics, Tulane University, New Orleans, LA, Jan. 2013

7. “Identify Interactions for High Dimensional Data”, Seminar, Department of Statistics, Chinese University of Hong Kong, Hong Kong, Feb. 2013
8. “Identify Interactions for High Dimensional Data”, Seminar, Department of Management Sciences, City University of Hong Kong, Hong Kong, Feb. 2013
9. “Identify Interactions for High Dimensional Data”, Statistics Seminar, Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ, Feb. 2013
10. “Identify Interactions for High Dimensional Data”, Colloquium, School of Mathematical and Statistical Sciences, Arizona State University, Tempe, AZ, Feb. 2013
11. “Identify Interactions for High Dimensional Data”, Colloquium, Department of Mathematics, University of Arizona, Tucson, AZ, Feb. 2013
12. “A Rotational Approach to High Dimensional Classification”, Seminar, Institute of Applied Mathematics, AMSS, CAS, Beijing, China, Jun. 2013
13. “A Rotational Approach to High Dimensional Classification”, Seminar, Center for Statistical Science, Peking University, Beijing, China, Jun. 2013
14. “Reduced-Rank Linear Discriminant Analysis”, Biostatistics Seminar, Yale School of Public Health, New Haven, Aug. 2015
15. “Recent Developments on Multiple Change-point Detection”, Seminar, School of Economics, Shanghai University of Finance and Economics, Shanghai, China, Dec. 2016
16. “Model Selection for High Dimensional Quadratic Regression Models”, Statistics Colloquium, Center for Statistical Science, Tsinghua University, Beijing, China, Dec. 2016
17. “Recent Developments on Multiple Change-point Detection”, Seminar, Institute of Statistics and Big Data, Renmin University of China, Beijing, China, Jan. 2017
18. “Simultaneous Inference for Multiple Change points”, Statistics Seminar, School of Mathematical and Statistical Sciences, Arizona State University, Tempe, AZ, Oct. 2017
19. “Overview of Statistical Dimension Reduction Techniques”, UA TRIPODS Seminar, University of Arizona, Tucson, AZ, Nov. 2017
20. “An Introduction to Statistical Research”, Research Tutorial Groups Seminar, Department of Mathematics, University of Arizona, Tucson, AZ, Mar. 2018
21. “A Super Scalable Algorithm for Short Segment Detection”, Statistics Colloquium, University of Arizona, Tucson, AZ, Oct. 2018
22. “Geometry of Intervals”, Undergraduate Research Seminar, University of Arizona, Tucson, AZ, Nov. 2018
23. “A Super Scalable Algorithm for Short Segment Detection”, Seminar, Chinese Academy of Sciences, Beijing, China, Jun. 2019
24. “Variance Estimation for Complex models”, MNS Seminar at New College, Arizona State University West, Phoenix, Sep. 2019
25. “Equivariant Variance estimation for multiple change-point model”, Statistics and Data Science Seminar, University of Illinois at Chicago, Oct. 2019

Invited Talks in Conferences and Symposia

26. “Variance Estimation Using Refitted Cross-Validation in Ultrahigh Dimensional Regression”, 2010 Joint Statistical Meetings, Vancouver, Canada, Aug. 2010
27. “The Screening and Ranking Algorithm to Detect DNA Copy Number Variations”, ICSA 2011 Applied Statistics Symposium, New York City, NY, Jun. 2011
28. “Selection of Interaction Effects for Ultra-High Dimensional Data”, Conference on Statistical Learning and Data Mining, University of Michigan, Ann Arbor, MI, Jun. 2012

29. “An FDR Approach for Multiple Change-Point Detection”, ENAR 2013 Spring Meeting, Orlando, FL, Mar. 2013
30. “Identify Interactions for High Dimensional Data”, IMS-China International Conference on Statistics and Probability, Chengdu, Sichuan, China, Jul. 2013
31. “Statistical Methods for Detection and Analysis of Copy Number Variations”, The 59th World Statistics Congress, Hong Kong, China, Aug. 2013
32. “New Methods for Interaction Selection”, 2014 ICSA and KISS Joint Applied Statistics Symposium, Portland, Oregon, Jun. 2014
33. “A Rotate-and-Solve Procedure for High Dimensional Classification”, Conference on Statistical Learning and Data Science, University of North Carolina at Chapel Hill, NC, Jun. 2016
34. “A Rotate-and-Solve Procedure for High Dimensional Classification”, 2016 ICSA Applied Statistics Symposium, Atlanta, GA, Jun. 2016
35. “False Discovery Rate Control for Multiple Change-point Detection”, The 10th ICSA international conference, Shanghai, China, Dec. 2016
36. “Simultaneous Inference for Multiple Change points”, 2017 ICSA Applied Statistics Symposium, Chicago, IL, Jun. 2017
37. “Dimension Reduction via Quadratic Discriminant Analysis”, 2018 ICSA China Conference with the Focus on Data Science, Qingdao, China, Jul. 2018
38. “Model Selection for High Dimensional Quadratic Regression Models”, MJU First International workshop on data science, Fuzhou, China, Jul. 2018
39. “Oracle P-values and Variable Screening”, 2019 Hangzhou International Conference on Frontiers of Data Science, Hangzhou, China, May 2019
40. “A Backward Procedure for Change-point Detection with Applications to Copy Number Variation Detection”, 2019 ICSA China Conference, Tianjin, China, Jul. 2019

Contributed Conference Talk

41. “Group Iterative Sure Independence Screening”, ENAR 2011 Spring Meeting, Miami, FL, Mar. 2011

Poster

42. “Interaction Screening for Ultra-High Dimensional Data”, 14th Meeting of New Researchers in Statistics and Probability, San Diego, CA, Jul. 2012

Student Advisory

Ph.D. Dissertations Directed (Completed)

1. Yue Zeng (Ph.D. 2017), “Variable Screening in Multi-Category Classification for Ultra-High Dimensional Data”. GIDP in Statistics, University of Arizona, co-advisor Hao Helen Zhang

Ph.D. Dissertations Directed (In-Progress)

2. Ruiyang Wu, Department of Mathematics, University of Arizona. 2017-

Master Students (Chair)

1. Ruoyu Huang (2016), GIDP in Statistics, University of Arizona.

Graduate Students (Dissertation Committee Member)

1. Sylvain Lacaze (Ph.D. 2015), Department of Aerospace and Mechanical Engineering, University of Arizona.
2. Meng Lu (Ph.D. in progress), GIDP in Statistics, University of Arizona.
3. Ahmad Hakeem Abdul Wahab (M.S. 2015), GIDP in Statistics, University of Arizona.
4. Jing Li (M.S. 2018), GIDP in Statistics, University of Arizona.

Undergraduate Students (Honor Thesis Advisor)

1. Malin Elisabeth Rapp-Olsson (2013).

Professional Membership

- Lifetime International Chinese Statistical Association (ICSA)
2019– Western North American Region of The International Biometric Society (WNAR)

Teaching Experience

The University of Arizona

- DATA 375 *Introduction to Statistical Computing*, Spring 2019
- MATH 125 *Calculus I*, Fall 2012
- MATH 129 *Calculus II*, Spring 2013, Spring 2014, Fall 2016, Spring 2017, Spring 2019, Fall 2020
- MATH 263 *Introduction to Statistics and Biostatistics*, Fall 2010, Fall 2015, Spring 2016
- MATH 363 *Introduction to Statistical Methods*, Fall 2017
- MATH 466 *Theory of Statistics*, Fall 2011, Fall 2017
- MATH 529 *Topics in Modern Analysis (Multivariate Statistics)*, Spring 2015
- MATH/STAT 567A *Theoretical Statistics I*, Spring 2014, Spring 2016, Spring 2018, Fall 2020
- MATH/STAT 567B *Theoretical Statistics II*, Fall 2018
- STAT 675 *Statistical Computing*, Spring 2011; Spring 2012