

Jian Cao

Postdoctoral Researcher

Statistics Department & Institute of Data Science

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Education

- 2020 *Ph.D.* in Statistics, King Abdullah University of Science and Technology
- 2016 *M.Sc.* in Finance, Shanghai Jiaotong University
- 2014 *B.Sc.* in Applied Mathematics, University of Science and Technology of China

Areas of Specialization

Gaussian Processes, Variable Selection, Spatial Statistics, Computational Statistics, Low-rank Methods, High-performance Computing

Journal Articles

- 2022 Cao, J., Guinness, J., Genton, M. G., & Katzfuss, M. (2022). “Scalable Gaussian-process Regression and Variable Selection using Vecchia Approximations,” revision submitted to *Journal of Machine Learning Research*
- 2022 Cao, J., Durante, D., Genton, M. G. (2022). “Scalable Computation of Predictive Probabilities in Probit Models with Gaussian Process Priors,” accepted by *Journal of Computational and Graphical Statistics*
- 2022 Cao, J., Genton, M. G., Keyes, D. E., & Turkiyyah, G. M. (2022). “tlrmvnmvt: Computing High-Dimensional Multivariate Normal and Student-*t* Probabilities with Low-rank Methods in R,” *Journal of Statistical Software*, **101**, pp.1-25
- 2021 Cao, J., Genton, M. G., Keyes, D. E., & Turkiyyah, G. M. (2021). “Exploiting Low Rank Covariance Structures for Computing High-Dimensional Normal and Student-*t* Probabilities,” *Statistics and Computing*, **31**(1), pp.1-16
- 2021 Cao, J., Genton, M. G., Keyes, D. E., & Turkiyyah, G. M. (2021). “Sum of Kronecker Products Representation and Its Cholesky Factorization for Spatial Covariance Matrices from Large Grids,” *Computational Statistics & Data Analysis*, **157**, pp.107165
- 2019 Cao, J., Genton, M. G., Keyes, D. E., & Turkiyyah, G. M. (2019). “Hierarchical-block Conditioning Approximations for High-dimensional Multivariate Normal Probabilities,” *Statistics and Computing*, **29**, pp.585-598

- 2022 Abdulah, S., Li, Y., Cao, J., Ltaief, H., Keyes, D. E., Genton, M. G., & Sun, Y. (2022). “ExaGeoStatR: A Package for Large-Scale Geostatistics in R,” minor revision for *Environmetrics*
- 2021 Huang, J., Fang, F., Turkiyyah, G., Cao, J., Genton, M. G., & Keyes, D. E. (2021). “An $O(N)$ Algorithm for Computing Expectation of N -dimensional Truncated Multi-variate Normal Distribution I: Fundamentals,” *Advances in Computational Mathematics*, **47**(5), pp.1-34

Talks & Posters

- 2022 ***ISBA World Meeting*** Montreal, Quebec, Canada
Contributed Talk: Scalable Gaussian Process Regression and Variable Selection under Automatic Relevance Determination Kernels
- 2022 ***SETCASA Poster Competition*** College Station, TX, USA
Poster: Scalable Gaussian Process Regression and Variable Selection under Automatic Relevance Determination Kernels
- 2022 ***Texas A&M Statistics Cafe*** College Station, TX, USA
Presentation: Scalable Gaussian Process Regression and Variable Selection under Automatic Relevance Determination Kernels
- 2021 ***TAMIDS Research Conference*** College Station, TX, USA
Presentation: Scalable Gaussian Process Regression and Variable Selection under Automatic Relevance Determination Kernels
- 2020 ***Joint Statistical Meetings*** Virtual Conference
Contributed Session: Sum of Kronecker Products Representation for Spatial Covariance Matrices and Its Factorization
- 2019 ***Joint Statistical Meetings*** Denver, CO, USA
Topic-Contributed Session: Exploiting Low Rank Covariance Structures for Computing High-Dimensional Normal and Student- t Probabilities
- 2018 ***Big Data Meets Large-Scale Computing*** IPAM, Los Angeles, CA, USA
Poster: Exploiting Low Rank Covariance Structures for Computing High-Dimensional Normal and Student- t Probabilities
- 2018 ***Joint Statistical Meetings*** Vancouver, BC, Canada
Poster: Hierarchical-block Conditioning Approximations for High-dimensional Multivariate Normal Probabilities
- 2017 ***Joint Statistical Meetings*** Baltimore, MD, USA
Contributed Session: Hierarchical-block Conditioning Approximations for High-dimensional Multivariate Normal Probabilities

Awards

- 2020 ***Al-Kindi Statistics Student Research Award***
King Abdullah University of Science and Technology
- 2019 ***Winner of the Student Paper Competition***, Section on Statistical Computing
and the Section on Statistical Graphics of ASA
Title: “Exploiting Low Rank Covariance Structures for Computing High-Dimensional
Normal and Student- t Probabilities”

Short Courses

- 2019 ***A Short Course on Deep Learning***, KAUST Saudi Arabia
- 2017 ***Winter School on Hierarchical Matrices***, Kiel Germany

Teaching

- 2022 April TAMIDS Webinar titled “Scalable Gaussian Process Approximation and Optimization”
- 2018 Fall Teaching Assistant for MS level *Probability and Statistics*
- 2017 Fall Teaching Assistant for MS level *Probability and Statistics*

Programming Language

R, C++, and Python

R Package

tlrmvnmvt, published on CRAN

Compute high-dimensional multivariate normal (MVN) and multivariate Student- t (MVT) probabilities with tile-low-rank and block reordering ([LINK](#))