Jian Cao

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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," accepted by *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, pp.1-12

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

2022   Abdulah, S., Li, Y., Cao, J., Ltaief, H., Keyes, D. E., Genton, M. G., & Sun, Y. (2022). "Large-scale Environmental Data Science with ExaGeoStatR," accepted by *Environmetrics*

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

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
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	Cao, J., Zhang, J., Sun, Z., & Katzfuss, M. (2022). "Locally Anisotropic Covariance Functions on the Sphere," submitted

Talks & Posters

2022	***IMSI Gaussian Processes Workshop*** Chicago, IL, USA Poster: Scalable Gaussian Process Regression and Variable Selection under Automatic Relevance Determination Kernels
2022	***Joint Statistical Meetings*** Washington D.C., USA Contributed Session: Scalable Gaussian Process Regression and Variable Selection under Automatic Relevance Determination Kernels
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 "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 Languages

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)