Jian Cao

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Date: August 16, 2023

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

2023	Cao*, J., Kang, M.*, Jimenez, F., Sang, H., Schäfer, F., & Katzfuss, M. (2023). "Variational Sparse Inverse Cholesky Approximation for Latent Gaussian Processes via Double Kullback-Leibler Minimization," accepted by the 40th International Conference on Machine Learning
2022	Cao, J., Guinness, J., Genton, M. G., & Katzfuss, M. (2022). "Scalable Gaussian-process Regression and Variable Selection using Vecchia Approximations," *Journal of Machine Learning Research*, 2022, **23**(348), pp.1-30
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, **31**(3), pp.709-720
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

2023   Cao, J., Zhang, J., Sun, Z., & Katzfuss, M. (2022). "Locally Anisotropic Covariance Functions on the Sphere," in revision for *Journal of Agricultural, Biological and Environmental Statistics*

Talks & Posters

2023   ***2023 International Conference on Machine Learning*** Honolulu, HI, USA
Poster: Variational sparse inverse Cholesky approximation for latent Gaussian processes via double Kullback-Leibler minimization

2023   ***2023 Spatial Statistics*** Boulder, CO, USA
Contributed Session: Variational sparse inverse Cholesky approximation for latent Gaussian processes via double Kullback-Leibler minimization

2023   ***2023 International Indian Statistical Association Conference*** Golden, CO, USA
Invited Session: Variational sparse inverse Cholesky approximation for latent Gaussian processes via double Kullback-Leibler minimization

2023   ***ASA/IMS SPRING RESEARCH CONFERENCE 2023*** Banff, Canada
Contributed Session: Variational sparse inverse Cholesky approximation for latent Gaussian processes via double Kullback-Leibler minimization

2022   ***ENVR 2022 Workshop*** Provo, UT, USA
Poster: Scalable Gaussian Process Regression and Variable Selection under Automatic Relevance Determination Kernels

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)