MARY LAI SALVAÑA, Ph.D.

ASSISTANT PROFESSOR IN STATISTICS
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Research Interests

EXTREME & CATASTROPHIC EVENTS, RISKS, DISASTERS, CLIMATE & ENVIRONMENTAL DATA SCIENCE, SPATIAL & SPATIO-TEMPORAL STATISTICS, HIGH-PERFORMANCE COMPUTING, COMPUTATIONAL STATISTICS, ARTIFICIAL INTELLIGENCE

Positions

Department of Statistics, University of Connecticut — *Storrs, CT, USA*
ASSISTANT PROFESSOR IN STATISTICS — *December 2023 – Present*
Statistics Department, KAUST — *Jeddah, Saudi Arabia*
VISITING PROFESSOR — *October 2023 – December 2023*
Department of Mathematics, University of Houston — *Houston, TX, USA*
POSTDOCTORAL RESEARCHER — *August 2021 – July 2023*

Education

King Abdullah University of Science and Technology (KAUST) — *Jeddah, Saudi Arabia*
PHD IN STATISTICS — *January 2017 - July 2021*
- Thesis: Lagrangian Spatio-Temporal Covariance Functions for Multivariate Nonstationary Random Fields, Advisor: Marc G. Genton

Ateneo de Manila University — *Manila, Philippines*
MS IN APPLIED MATHEMATICS — *August 2015 - July 2016*
BS IN APPLIED MATHEMATICS — *June 2011 - March 2015*

Honors & Awards

2021   **Al-Kindi Statistics Research Student Award**   *KAUST*

Publications

[1] **Salvaña, M. L. O.** & Tangonan, G. L. (2025) *Predicting Power Grid Failures Using Self-Organized Criticality: A Case Study of the Texas Grid (2014–2022)*. https://arxiv.org/abs/2504.10675v1. To appear in the Special Issue of the Pacific-Basin Finance Journal.

[2] **Salvaña, M. L. O.**, Lenzi, A., & Genton, M. G. (2023). *Spatio-temporal cross-covariance functions under the Lagrangian framework with multiple advections*. Journal of the American Statistical Association, 118(544), 2746-2761. https://doi.org/10.1080/01621459.2022.2078330.

[3] **Salvaña, M. L. O.**, Abdulah, S., Ltaief, H., Sun, Y., Genton, M. G., & Keyes, D. E. (2022). *Parallel space-time likelihood optimization for air pollution prediction on large-scale systems*. PASC '22: Proceedings of the Platform for Advanced Scientific Computing Conference, 17, 1-11. https://dl.acm.org/doi/pdf/10.1145/3539781.3539800.

[4] **Salvaña, M. L. O.**, Abdulah, S., Huang, H., Ltaief, H., Sun, Y., Genton, M. G., & Keyes, D. E. (2021). *High performance multivariate spatial modeling for geostatistical data on manycore systems*. IEEE Transactions on Parallel and Distributed Systems, 32(11), 2719-2733. https://ieeexplore.ieee.org/document/9397281.

[5] **Salvaña, M. L. O.**, & Genton, M. G. (2021). *Lagrangian spatio-temporal nonstationary covariance functions*. Book Chapter in Advances in Contemporary Statistics and Econometrics, Festschrift for Prof. C. Thomas-Agnan, 427-447. https://link.springer.com/chapter/10.1007/978-3-030-73249-3_22.

[6] **Salvaña, M. L. O.** & Genton, M. G. (2020). *Nonstationary cross-covariance functions for multivariate spatio-temporal random fields*. Spatial Statistics, 37, 100411. https://doi.org/10.1016/j.spasta.2020.100411.

Manuscripts

[1] **Salvaña, M. L. O.**, Bolingot, H. J. M. & Tangonan, G. L. (2025) *A Self-Organized Criticality Model of Extreme Events and Cascading Disasters of Hub and Spoke Air Traffic Networks*. http://ssrn.com/abstract=5316736. Under review.

[2] **Salvaña, M. L. O.** & Kang, L. (2025) *Mixed Precision Gaussian Process Regression*. In preparation.

[3] **Salvaña, M. L. O.** (2025) *Multi-Hazard Bayesian Hierarchical Model for Damage Prediction*. https://arxiv.org/pdf/2502.00658. Under review.

[4] Abdulah, S., **Salvaña, M. L. O.**, Sun, Y., Genton, M. G., & Keyes, D. E. (2025) *High Performance Statistical Computing (HPSC): Opportunities, Challenges and Future Directions*. In preparation.

[5] **Salvaña, M. L. O.**, Cao, J., & Jun, M. (2025) *3D bivariate spatial modelling of Argo ocean temperature and salinity profiles.* Under review. https://arxiv.org/pdf/2210.11611.pdf

[6] **Salvaña, M. L. O.** & Genton, M. G. (2025) *Taylor's hypothesis for non-frozen nonstationary spatio-temporal random fields*. In preparation.

[7] **Salvaña, M. L. O.**, Abdulah, S., Kim, M., Helmy, D., Sun, Y., & Genton, M. G. (2025) *MPCR: Multi- and Mixed-Precision Computations Package in R*. https://arxiv.org/pdf/2406.02701. Under review.

Software

[1] DiffOp: https://github.com/marysalvana/DiffOp (Author)

[2] ExaGeoStat: https://github.com/ecrc/exageostat (Contributor)

[3] MPCR: https://github.com/stsds/MPCR (Contributor)

Invited Talks and Presentations

[1] **Oxford Programme for Sustainable Infrastructure Systems Research Seminar,** *July 2025* — *University of Oxford, Oxford, UK*

[2] **Contemporary Advances in Statistics of Extremes Workshop,** *July 2025* — *University of Missouri, Columbia, MO, USA*

[3] **ICSA Applied Statistics Symposium,** *June 2025* — *University of Connecticut, Storrs, CT, USA*

[4] **Statistical and Data Sciences Speaker Series,** *April 2025* — *Smith College, Northampton, MA, USA*

[5] **CRAFT Spring 2025 IAB Meeting,** *March 2025* — *Rensselaer Polytechnic Institute, Troy, NY, USA*

[6] **Department of Bioinformatics and Biostatistics Seminar Series,** *March 2025* — *University of Louisville, Louisville, KY, USA*

[7] **UConn/UMass Joint Statistics Colloquium,** *October 2024* — *University of Massachusetts Amherst, Amherst, MA, USA*

[8] **Joint Statistical Meeting,** *August 2024* — *Portland, OR, USA*

[9] **EAC-ISBA Conference,** *June 2024* — *The Education University of Hong Kong, Hong Kong*

[10] **New England Statistics Symposium,** *May 2024* — *University of Connecticut, Storrs, CT, USA*

[11] **Statistics Workshop,** *November 2023* — *KAUST, Jeddah, Saudi Arabia*

[12] **Statistics Colloquium,** *January 2023* — *University of Connecticut, Storrs, CT, USA*

[13] **Statistics Colloquium,** *January 2023* — *Duke University, Durham, NC, USA*

[14] **Statistics Colloquium,** *January 2023* — *Pennsylvania State University, University Park, PA, USA*

[15] **Statistics Colloquium,** *January 2023* — *Michigan State University, East Lansing, MI, USA*

[16] **Statistics Colloquium,** *January 2023* — *Auburn University, Auburn, AL, USA*

[17] **Statistics Colloquium,** *January 2023* — *George Mason University, Fairfax, VA, USA*

[18] **Statistics Colloquium,** *December 2022* — *University of Iowa, Iowa City, IA, USA*

[19] **Statistics Colloquium,** *December 2022* — *Indiana University, Bloomington, IN, USA*

[20] **Conference on Advances in Data Science: Theory, Methods, and Computation,** *October 2022* — *Texas A&M University, College Station, TX, USA*

[21] **Environmental and Ecological Statistical Research and Applications with Societal Impacts Workshop,** *October 2022* — *Provo, UT, USA*

[22] **Institute for Mathematical and Statistical Innovation Workshop: Expressing and Exploiting Structure in Modeling, Theory, and Computation with Gaussian Processes,** *August 2022* — *University of Chicago, Chicago, IL, USA*

[23] **Joint Statistical Meeting,** *August 2022* — *Washington DC, USA*

[24] **Platform for Advanced Scientific Computing,** *June 2022* — *Basel, Switzerland*

[25] **Joint Statistical Meeting,** *August 2020* — *Philadelphia, PA, USA*

[26] **Joint Statistical Meeting,** *August 2019* — *Denver, CO, USA*

Short Course

[1] 2024: *Large Scale Spatial Data Science* (Half day), **Joint Statistical Meeting**   *Portland, OR, USA*
[2] 2024: *Large Scale Spatial Data Science* (Full day), **The 37ᵗʰ New England Statistics Symposium**   *University of Connecticut, Storrs, CT, USA*

Teaching

Department of Statistics, University of Connecticut   *Storrs, CT, USA*
[1] *Analysis of Experiments (STAT3115Q/5315)*, 3-credit undergraduate/graduate level, Spring 2025
[2] *Applied Spatio-Temporal Statistics (STAT 4845/5845)*, 3-credit undergraduate/graduate level, Fall 2024
[3] *Introduction to Mathematical Statistics I (STAT 3375Q)*, 3-credit undergraduate level, Spring 2024

Statistics Department, KAUST   *Jeddah, Saudi Arabia*
[1] *Linear Models*, 3-credit graduate level, Fall 2020

Conference Organization

[1] 2025: Poster and Scholarship Subcommittee, **2025 Statistics in Pharmaceuticals (SiP)**   *University of Connecticut, Storrs, CT, USA*
[2] 2024: Poster and Scholarship Subcommittee, **2024 Statistics in Pharmaceuticals (SiP)**   *University of Connecticut, Storrs, CT, USA*
[3] 2024: Session Chair, *Sports Analytics Beyond the Field*, **2024 UConn Sports Analytics Symposium (UCSAS)**
                                                          University of Connecticut, Storrs, CT, USA
[4] 2023: Session Organizer & Session Chair, *Opportunities & Challenges in the Use of Statistics in Disaster Science*, **2023 New England Statistics Symposium (NESS)**   *Boston University, MA, USA*

Departmental Service

Department of Statistics, University of Connecticut   *Storrs, CT, USA*
[1] 2024 Fall: Field of Dreams Conference
[2] 2024-2025: Department Events Committee
[3] 2024-2025 Fall/Spring: UCONN STAT Colloquium Series
[4] 2024-2025 Fall/Spring: R. Makuch Distinguished Lecture Committee
[5] 2024 Spring: Library/Tech Reports Committee

Professional Associations

[1] American Statistical Association Member
[2] New England Statistical Society Member
[3] Institute of Mathematical Statistics Member
[4] Caucus for Women in Statistics and Data Science Country Representative (Philippines)
[5] Ateneo Innovation Center Research Fellow

Journal Reviews

Journal of Computational and Graphical Statistics, Journal of the Royal Statistical Society: Series C, Computational Statistics and Data Analysis, Statistics and Computing, Journal of Data Science, Data Science in Science, STAT, Biostatistics, Environmetrics, Applied Stochastic Models Business Industry

Grant Reviews

NSF DMS Statistics Panel Review, 2025.