

MARY LAI SALVAÑA, Ph.D.

ASSISTANT PROFESSOR IN STATISTICS

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Research Interests

EXTREME & CATASTROPHIC EVENTS, RISKS, DISASTERS, ANTIFRAGILITY, CLIMATE & ENVIRONMENTAL DATA SCIENCE, SPATIAL & SPATIO-TEMPORAL STATISTICS, HIGH-PERFORMANCE COMPUTING, COMPUTATIONAL STATISTICS, BIG DATA, MULTIVARIATE ANALYSIS, DEEP LEARNING, MACHINE LEARNING

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
- Relevant Coursework: Spatial Statistics and Multivariate Statistics (Prof. Marc G. Genton), Statistics of Extremes (Prof. Raphaël Huser), Environmental Statistics (Prof. Ying Sun), Bayesian Statistics (Prof. Håvard Rue), Functional Data Analysis (Prof. Hernando Ombao)

Ateneo de Manila University

Manila, Philippines

MS IN APPLIED MATHEMATICS

August 2015 - July 2016

- Relevant Coursework: Introduction to Options, Financial Derivatives, Stochastic Calculus, Advanced Probability and Martingales, Risk Management in Finance, Operations Research

BS IN APPLIED MATHEMATICS

June 2011 - March 2015

Employment

Department of Statistics, University of Connecticut

Storrs, Connecticut, USA

ASSISTANT PROFESSOR IN STATISTICS

Beginning August 2023

Department of Mathematics, University of Houston

Houston, Texas, USA

POSTDOCTORAL RESEARCHER

August 2021 – July 2023

Honors & Awards

2021

Al-Kindi Statistics Research Student Award

KAUST

Publications

- **Salvaña, M. L. O.**, Lenzi, A., & Genton, M. G. (2022). *Spatio-temporal cross-covariance functions under the Lagrangian framework with Multiple Advections*. Journal of the American Statistical Association. <https://doi.org/10.1080/01621459.2022.2078330>.
- **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>.
- **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>.

- **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.
- **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

- **Salvaña, M. L. O.** & Jun, M. (2022) *3D bivariate spatial modelling of Argo ocean temperature and salinity profiles*. Under review. <https://arxiv.org/pdf/2210.11611.pdf>.
- **Salvaña, M. L. O.** & Genton, M. G. (2022) *Taylor's hypothesis for non-frozen nonstationary spatio-temporal random fields*. In preparation.

Software

- DiffOp: <https://github.com/marysalvana/DiffOp> (Author)
- ExaGeoStat: <https://github.com/ecrc/exageostat> (Contributor)

Presentations

University of Connecticut	<i>Storrs, Connecticut, USA</i>
SEMINAR: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>January 2022</i>
Duke University	<i>Durham, North Carolina, USA</i>
SEMINAR: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>January 2022</i>
Pennsylvania State University	<i>University Park, Pennsylvania, USA</i>
SEMINAR: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>January 2022</i>
Michigan State University	<i>East Lansing, Michigan, USA</i>
SEMINAR: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>January 2022</i>
Auburn University	<i>Auburn, Alabama, USA</i>
SEMINAR: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>January 2022</i>
George Mason University	<i>Fairfax, Virginia, USA</i>
SEMINAR: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>January 2022</i>
University of Iowa	<i>Iowa City, Iowa, USA</i>
SEMINAR: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>December 2022</i>
Indiana University	<i>Bloomington, Indiana, USA</i>
SEMINAR: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>December 2022</i>
Texas A&M University Conference on Advances in Data Science: Theory, Methods, and Computation	<i>College Station, Texas, USA</i>
POSTER PRESENTATION: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>October 2022</i>
ENVR Workshop: Environmental and Ecological Statistical Research and Applications with Societal Impacts	<i>Provo, Utah, USA</i>
POSTER PRESENTATION: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>October 2022</i>
Institute for Mathematical and Statistical Innovation Workshop: Expressing and Exploiting Structure in Modeling, Theory, and Computation with Gaussian Processes	<i>Chicago, USA</i>
POSTER PRESENTATION: 3D bivariate spatial modelling of Argo ocean temperature and salinity profiles	<i>August 2022</i>
Joint Statistical Meeting	<i>Washington DC, USA</i>
TOPIC-CONTRIBUTED TALK: Parallel space-time likelihood optimization for air pollution prediction on large-scale systems	<i>August 2022</i>
Platform for Advanced Scientific Computing (Online)	<i>Basel, Switzerland</i>
TOPIC-CONTRIBUTED TALK: Parallel space-time likelihood optimization for air pollution prediction on large-scale systems.	<i>June 2022</i>

Joint Statistical Meeting (Online)

Philadelphia, Pennsylvania, USA

TOPIC-CONTRIBUTED TALK: Lagrangian spatio-temporal nonstationary covariance functions

August 2020

Joint Statistical Meeting

Denver, Colorado, USA

TOPIC-CONTRIBUTED TALK: Spatio-temporal cross-covariance functions under the Lagrangian framework

August 2019

KAUST Statistics Workshop

Jeddah, Saudi Arabia

POSTER PRESENTATION

November 2018, 2019

Teaching

Statistics Department, KAUST

Jeddah, Saudi Arabia

LINEAR MODELS

August 2020 - December 2020

Professional Associations

- American Statistical Association Member
- New England Statistical Society Member
- Ateneo Innovation Center Research Fellow

Service and Outreach

CONFERENCE ORGANIZATION

The 36th New England Statistics Symposium

Boston University, MA, USA

SESSION CHAIR & ORGANIZER: Opportunities & Challenges in the Use of Statistics in Disaster Science

June 2023

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
- STAT