Lyndsay Shand

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EDUCATION

May 2017 **Ph.D. in Statistics**, University of Illinois at Urbana-Champaign
Advisor: Dr. Bo Li, Dissertation: "Methods and Applications for Space-Time Data"
M.S. in Statistics, University of Illinois at Urbana-Champaign

May 2012 **B.S. in Mathematics**, Bucknell University
B.A. in Spanish, Bucknell University

EXPERIENCE

May 2021 - present **R&D Statistician**, Principal Member of the Technical Staff
Sandia National Laboratories (SNL), Albuquerque, New Mexico

Oct. 2021 - present **Adjunct Clinical Assistant Professor**, Department of Statistics
University of Illinois Urbana-Champaign, Champaign, Illinois

June 2017 - May 2021 **R&D Statistician**, Senior Member of the Technical Staff
Sandia National Laboratories (SNL), Albuquerque, New Mexico

Jan. 2013 - June 2017 **Consultant, Co-founder**, *Statistics in the Community (StatCom)*, a pro-bono statistical consulting organization
University of Illinois, Urbana-Champaign, Champaign, Illinois

AWARDS

2025 **Early Investigator Award**
American Statistical Association, Section on Statistics and the Environment
"for outstanding contributions to statistics for climate research with high impact on national security, building multidisciplinary and multi-institutional teams in this area, exceptional mentoring of staff, postdocs, and students in environmental statistics, creating collaborations between climate and data sciences for national laboratories and the larger environmental statistics community, and for providing excellent professional service to ASA/ENVR."

2016 **Campus Award for Excellence in Public Engagement**
University of Illinois Urbana-Champaign
For cofounding pro-bono statistical consulting organization for local, non-profit and government organizations.

RELEVANT PROJECTS

Oct. 2025 - present **PI***: Multivariate Compound Extreme Events*
- Developing statistical methods tor assessing risk of compound natural hazards to grid resiliency.

Oct. 2024 - present *Multivariate Compound Extreme Events*
- Developing statistical methods tor assessing risk of compound natural hazards to grid resiliency.

Oct. 2021 - present **Program Lead:** *Multi-Lab Climate Security Program*
- First of its kind program to bring together the data science and climate communities across multiple labs to provide extreme weather risk assessments for our U.S. government partners.
- Developing statistical tools to solve climate security problems

Oct. 2021 - present *Autocalibration and Validation of DOE's earth system model (E3SM)*
- **Editor Highlight, Journal of Advances in Modeling Earth Systems**
- Developed novel statistical methodology to autocalibrate the E3SM atmosphere model.
- Evaluating the performance of AI emulator for E3SM

Oct. 2021 - Sept. 2024 *Technical Lead: Observational methods for large spatio-temporal data*
-Developed novel methods for observational data to quantify sequential changes in the atmosphere
-internally funded $15M research program, CLDERA: sandia.gov/cldera
- team of 40+ Sandia staff and university collaborators: U. Illinois, Texas A&M U., U. Michigan
- **Highlighted in NYT article "The U.S. is Building an Early Warning System to Detect Geoengineering"**

June 2018 - Sept. 2020 *PI: Data-Driven Methods for Analyzing Ship Tracks*
-Internal research grant w/ external collaborations: U. Washington and Naval Postgraduate School
-**External News Release:** https://newsreleases.sandia.gov/ship_tracks

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PROFESSIONAL SERVICE

American Statistical Association (ASA)
Committee for Women in Statistics (CoWiS) December 2025 - present
Section on Statistics and the Environment Program Chair Jan. 2026 - Dec. 2026
Section on Statistics and the Environment Program Chair-Elect Jan. 2025 - Dec. 2025
Section on Statistics and the Environment Secretary Jan. 2024 - Dec. 2024
Section on Statistics and the Environment Treasurer, Jan. 2022 - Dec. 2023
Statistics in Defense and National Security Section, Committee on Awards and Fellows, Jan. 2021 - present

ASCMO Special Issue "Artificial Intelligence and Machine Learning in Climate Science Research." Associate Editor, November 2024-November 2026

Institute for Geospatial Understanding through an Integrative Discovery Environment (I-GUIDE)Forum Program committee member, July 2023

American Geophysical Union (AGU) - Member since 2018

The International Environmetrics Society (TIES) - Member since 2023
Co-organizer for 2026 TIES Conference, December 2026

The International Society for Bayesian Analytics (ISBA)
Associate Web Editor, Jan. 2019 - Dec. 2021
Section on the Environment Treasurer, Jan. 2019 - Dec. 2022

Journal Referee:*Journal of Royal Statistical Society, Spatial Statistics, Journal of the American Statistical Association, Biometrics, Environmetrics, Ecological Applications, Journal of Agricultural, Biological, and Environmental Statistics, Computing in Science and Engineering, Journal of Applied Statistics*

RECENT INVITED PRESENTATIONS

August 2025	*Invited Session Panelist.* Environmental Statistics &Data Science: Where do we go from here? *Joint Statistical Meetings 2026*, Nashville, TN
February 27, 2025	Statistics for Climate Security: From Model Calibration to Climate Extremes *Conference on Data Analysis*, Santa Fe, NM
February 20, 2025	*Invited Panelist.* Statistics at the National Labs *Frontiers of Statistics and Engineering: 2035 and Beyond. National Academy of Sciences, Engineering and Medicine.* Virtual
October 4, 2025	A multivariate dynamic linear model for characterizing the downstream impacts of the Mt Pinatubo eruption. *ENVR Workshop*, Boulder, CO
June 11, 2024	An autotuning approach to DOE's earth system model using machine learning *SIAM MPE 2024*, Portland, OR
February 19, 2024	Multi-step attribution – the bridge to enable climate security *Gordon Research Conference: Climate Engineering*, Lucca, Italy (Poster)

PUBLICATIONS

Wagman, B., **L. Shand** and G. Collins (2026). Automated Calibration of E3SMv3. *In Revisions.*

Wang, M., T. Harris, **L. Shand**, B. Li (2026) Evaluating Fingerprint of Mt. Pinatubo Eruption on Stratospheric Temperatures with Spatial Functional Changepoints. *Under Review.*

Garrett, R, **L. Shand**, J. G. and Huerta (2025). A multivariate dynamic linear model for characterizing downstream impact of the Mt Pinatubo volcanic eruption. *Environmetrics*

36(6). DOI:10.1002/env.70030.

Wheeler, L., B. Wagman, W. Smith, P. Davies, B. Cook, S. Brunell, A. Glen, D. Hackenburg, J. Lien, **L. Shand**, T. Zeitler (2025). Design and Simulation of a Logistically Constrained High Latitude, Low Altitude Stratospheric Aerosol Injection Scenario. *Environmental Research Letters.* 20(4): 044011.

Jun, S, **L. Shand**, and B. Li (2025). Tracing the impacts of Mount Pinatubo eruption on regional climate using spatially-varying changepoint detection. *Annnals of Applied Statistics.* 19(1): 465-484.

Bull, Diana L., et al. "CLimate Impact: Determining Etiology thRough pAthways (CLDERA)." *Sandia Technical Report.* Sep. 2024. https://doi.org/10.2172/2480139

Wheeler, L., T. Zeitler, S. Brunell, J. Lien, **L. Shand**, B. Wagman, C. Martinez, K. Potter (2023). A Performance Assessment for Climate Intervention (PACI): Preliminary Application to a Stratospheric Aerosol Injection Scenario *Frontiers in Environmental Science, section Interdisciplinary Climate Studies.* 11. https://doi.org/10.3389/fenvs.2023.1205515

Yarger, A., B. Wagman, **L. Shand**, and K. Chowdhary (2024). An autotuning approach to DOE's earth system model using machine learning. *Journal of Advances in Modeling Earth Systems*. 16, e2023MS003961. https://doi.org/10.1029/2023MS003961

Patel, L. and **L. Shand** (2022). Towards data assimilation of ship induced aerosol-cloud interactions. *Environmental Data Science*. 1, E31. doi:10.1017/eds.2022.21. DOI: https://doi.org/10.1017/eds.2022.21

Larson, K.,**L. Shand**, A. Staid, S. Gray, E. L. Roesler, and D. Lyons (2022). An Optical Flow Approach to Tracking Ship Track Behavior Using GOES-R Satellite Imagery. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing.* 15. DOI: 10.1109/JSTARS.2022.3193024

Shand, L. and B. Li (2022). Invited Discussion: Bayesian Nonstationary and Nonparametric Covariance Estimation for Large Spatial Data. *Bayesian Analysis* 17 (1). 291–351.

Tucker J.D., **L. Shand**, and K. Chowdhary (2021). Multimodal Bayesian registration of noisy functions using Hamiltonian Monte Carlo. *Computational Statistics & Data Analysis.* 163. 6272–6282. https://doi.org/10.1016/j.csda.2021.107298

Shand, L., Hillman, B., Patel, L., Huerta, G., Tucker, J.D., Staid, A., Lyons, D., E. Schliep (2021). Integrative data-driven approaches for characterization & prediction of aerosol-cloud processes. *AI4ESP* White Paper. DOI: https://doi.org/10.2172/1769729

Patel, L., and **L. Shand** (2020). Simulating cloud-aerosol interactions made by ship emissions. In JSM Proceedings, Section on Statistics and the Environment. Alexandria, VA: American Statistical Association. 2282-2295.

Patel, L., **L. Shand**, J. D. Tucker, and G. Huerta (2020). Assessing Extreme Value Analysis to predict rare events from the Global Terrorism Database. In JSM Proceedings, Section on Statistics in Defense and National Security. Alexandria, VA: American Statistical Association.

Harris, T., Tucker J.D., B. Li, and **L. Shand** (2020). Elastic depths for detecting shape anomalies in functional data. *Technometrics.* DOI: 10.1080/00401706.2020.1811156

Tucker J.D., **L. Shand**, and J.R. Lewis. (2018). Handling Missing Data in Self-Exciting Point Process Models. *Spatial Statistics*. 29.160-176

Guo S., M. A. Cooper., and **L. Shand**. 2018. A statistical representation of pyrotechnic research igniter output. AIP Conference Proceedings. 1979 (1). doi: 10.1063/1.5044973

Shand L., B. Li, T. Park, and D. Albarracín (2017). Spatially Varying Autoregressive Models for Prediction of New HIV Diagnoses. *Journal of the Royal Statisical Society: Series C. 67 (11). doi: 10.1111/rssc.12269*

Shand, L. and B. Li (2016). Modeling nonstationary in space and time.*Biometrics*. doi:10.1111/biom12656.

Shand L., W. M. Brown, L. F. Chaves, T.L. Goldberg, G. Hamer, L. Haramis, U. Kitron, E. D. Walker, and M. O. Ruiz (2015). Predicting West Nile Virus infection risk from the synergistic effects of rainfall and temperature. *Journal of Medical Entomology*, 1-10. doi: 10.1093/jme/tjw042.