Thea Sukianto

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Education

Ph.D. in Statistics, Carnegie Mellon University August 2021 – July 2026

- Advisor: Prof. Mikael Kuusela
- **Thesis:** "Addressing statistical and computational challenges in ocean heat content modeling with Argo floats"

B.S. in Applied Mathematics, Boise State University August 2018 – May 2021
(Statistics Emphasis, Computer Science Minor, Intermediate Japanese Minor)

Research Interests

Broadly, I am an applied/computational statistician interested in statistical methods for scientific problems, especially in the physical sciences.

Interests: spatial statistics, uncertainty quantification, machine learning, scalable methods for large/complex data, neural simulation-based inference

Publications

In preparation

Sukianto, T., Kuusela, M., Giglio, D., Mondal, A., Ma, P., Nychka, D., and Stein, M.L. Locally stationary Argo ocean heat content estimates: Modeling, validation and uncertainty quantification (to be submitted to *Journal of Climate*)

Sukianto, T., Giglio, D., and Kuusela, M. Vertical spatio-temporal modeling for improved global ocean heat content estimation (to be submitted to *Journal of the American Statistical Association: Applications and Case Studies*)

Under review

Lee, J., Lee, M., and **Sukianto, T.** Seasonal trend assessment of US extreme precipitation via changepoint segmentation (under review, *Advances in Statistical Climatology, Meteorology and Oceanography*)

Published

Sala, J., Giglio, D., Capotondi, A., **Sukianto, T.**, and Kuusela, M. Leading dynamical processes of global marine heatwaves in an ocean state estimate. *Ocean Science* 21, 2463–2479 (2025).

Johnson, G., Lumpkin, R., Alexander, M., Amaya, D., Beckley, B., Boyer, T., Bringas, F., Carter, B., Cetinić, I., Chambers, D., Chan, D., Cheng, L., Dong, S., Elipot, S., Feely, R., Franz, B., Fu, Y., Gao, M., Garg, J., Giglio, D., Gilson, J., Goes, M., Graham, G., Hamlington, B., Hobbs, W., Hu, Z., Huang, B., Ishii, M., Jacox, M., Jersild, A., Jevrejeva, S., Johns, W., Killick, R., Kuusela, M., Landschützer, P., Leuliette, E., Liu, C., Locarnini, R., Lozier, S., Lyman, J., Merrifield, M., Mishonov, A., Mitchum, G., Moat, B., Nerem, R., Oe, M., Perez, R., Pita, I., Purkey, S., Reagan, J., Sato, K., Schmid, C., Smeed, D., Smith, R., Stackhouse, P., **Sukianto, T.**, Sweet, W., Thompson, P., Triñanes, J., Volkov, D., Wanninkhof, R., Weller, R., Westberry, T., Widlansky, M., Willis, J., Yin, X., Yu, L. and Zhang, H., Global Oceans. *Bulletin of the American Meteorological Society* 105, S156–S213 (2024).

Hakuba, M. Z., Fourest, S., Boyer, T., Meyssignac, B., Carton, J. A., Forget, G., Cheng, L., Giglio, D., Johnson, G. C., Kato, S., Killick, R. E., Kolodziejczyk, N., Kuusela, M., Landerer, F., Llovel, W., Locarnini, R., Loeb, N., Lyman, J. M., Mishonov, A., Pilewskie, P., Reagan, J., Storto, A., **Sukianto, T**. and von Schuckmann, K. Trends and variability in Earth's energy imbalance and ocean heat uptake since 2005. *Surveys in Geophysics* 45, 1721–1756 (2024).

Software Packages and Data Products

D. Giglio, **T. Sukianto**, and M. Kuusela. Global ocean heat content anomalies and ocean heat uptake based on mapping Argo data using local Gaussian processes. Zenodo (2024).

J. Champion and **T. Sukianto**. animaltracker: Animal Tracker. CRAN (2020).

Presentations

Contributed Talks

- "Advances in spatio-temporal modeling of ocean heat content with Argo floats", Spatial Statistics, Noordwijk, The Netherlands (2025)
- "A reproducible uncertainty quantification framework for ocean heat content with space-time dependent local conditional simulations", Joint Statistical Meetings, Portland, OR (2024)
- "Toward improved ocean heat content mapping and uncertainty quantification by modeling vertical spatio-temporal dependence", 15th International Meeting on Statistical Climatology, Toulouse, France (2024)
- "Toward improved global ocean heat content uncertainty quantification by modeling vertical spatio-temporal dependence", Ocean Sciences Meeting, New Orleans, LA (2024)
- "Improving global ocean heat content uncertainties by modeling vertical spatio-temporal dependence", Joint Statistical Meetings, Toronto, Canada (2023)
- "Toward improved global ocean heat content uncertainty quantification by modeling vertical spatio-temporal dependence", Spatial Statistics, Boulder, CO (2023)
- "Toward improved ocean heat content mapping and uncertainty quantification by modeling vertical spatio-temporal dependence", WCRP-ESA Earth Energy Imbalance Assessment Workshop, Rome, Italy (2023)
- "Expanding accessibility and scalability of ambient noise seismic data processing tools through an open-source cloud-based software application", Seismological Society of America Annual Meeting, virtual (2021)
- "Exploring parametric methods for modeling European soccer team goals", Carnegie Mellon Sports Analytics Conference, virtual (2020)

Posters

- "Advances in neural likelihood for irregular spatial data with Argo floats", STAMPS Workshop on Neural Simulation-Based Inference, Pittsburgh, PA (2025)
- "Improving global ocean heat content uncertainties by modeling vertical spatio-temporal dependence", ASA Section on Statistics and the Environment Workshop, Boulder, CO (2024)
- "A seasonal trend and changepoint analysis of United States extreme precipitation", Boise State Undergraduate Research Showcase, Boise, ID (2021)
- "Will it snow? Using R to estimate and visualize probability of precipitation", Boise State Research Computing Days, Boise, ID (2021)
- "Animaltracker: Streamlining spatio-temporal analysis and visualization of high sampling rate animal data", Boise State Undergraduate Research Showcase, Boise, ID (2020)
- "Exploring the robustness of deep learning architectures", University of Michigan Symposium on Big Data, Human Health, and Statistics, Ann Arbor, MI (2019)

Seminars

- "Gradient computations made easy with JAX", StatBytes seminar, Pittsburgh, PA (2024)

Teaching

Teaching assistant, Carnegie Mellon University Department of Statistics & Data Science

- 36-750 Statistical Computing (Fall 2025)
- 36-650 Statistical Computing (Fall 2022, Fall 2023, Fall 2024)
- 36-350 Statistical Computing (Spring 2022, Spring 2023)
- 36-471/671 Time Series (Spring 2024, Spring 2025)
- 36-469 Special Topics: Statistical Genomics and High Dimensional Inference (Summer 2025)
- 36-468/668 Special Topics: Text Analysis (Fall 2021)
- MSCF Probability Prep Course (Summer 2025)

Teaching assistant, Boise State University Department of Mathematics

- MATH 361 Probability & Statistics I (Spring 2021)
- MATH 360 Engineering Statistics (Spring 2020)
- MATH 254 Introduction to Statistics (Fall 2020)
- MATH 154 Statistical Reasoning (2019)

Academic Service

Coordinator, Statistical Methods for the Physical Sciences (STAMPS) @ CMU Research Center — 2024 - 2026

Session chair, STAMPS Workshop on Neural Simulation-Based Inference — 2025

Member, American Statistical Association (Pittsburgh Chapter & Section on Statistics and the Environment) — 2022 - Present

Funding Awards

- CMU Department of Statistics & Data Science student travel funding award (2025)
- StatBytes conference travel funding award (2024)
- Carnegie Mellon University Graduate Student Association/Provost's Office conference travel funding award (2023, 2024)

Professional Activities

Participant, US CLIVAR Ocean Uncertainty Quantification Summer School — 2024, *Miami, FL*

Research assistant, Environmental Seismology Lab, Boise State University Department of Geosciences — 2019 - 2021, *Boise, ID*

Research assistant, Boise State University Department of Mathematics — 2018 - 2021, *Boise, ID*

Summer research intern, 2020
Carnegie Mellon Sports Analytics Center *Pittsburgh, PA*

Summer research intern, MLD3 group, University of Michigan 2019
Department of Electrical Engineering and Computer Science *Ann Arbor, MI*

Research assistant, 2017 - 2019
Intermountain Bird Observatory *Boise, ID*

Research assistant, ISPM lab, 2016 - 2017
Boise State University Department of Computer Science *Boise, ID*

Technical Skills

Programming Languages: Extensive experience with Python (incl. PyTorch), MATLAB, and R; some experience with Julia and Java

Other: Extensive experience with high-performance computing (HPC) systems