

JOSH JACOBSON

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EDUCATION

University of Wollongong , Wollongong, NSW	2020–Now
Ph.D. in Statistics	
Thesis: <i>Statistical Methods for Spatio-Temporal Prediction of CO₂ Flux from Multiprocess Satellite Data</i>	
Advisors: Noel Cressie, Andrew Zammit Mangion, and Michael Bertolacci	
University of Colorado Boulder , Boulder, CO	2018–2020
M.S. in Applied Mathematics	
Thesis: <i>Beyond Univariate Calibration: Verifying Spatial Structure in Ensembles of Forecast Fields</i>	
Advisors: William Kleiber and Michael Scheuerer	
University of Colorado Boulder , Boulder, CO	2015–2019
B.S. in Applied Mathematics (with honors)	
Minors in Computer Science, Atmospheric and Oceanic Sciences	

INDUSTRY EXPERIENCE

Jupiter Intelligence , Boulder, CO	2020–2022
Data Science Consultant	
Research: extreme weather events, copula models, approximate Bayesian computation	
Supervisors: Steve Sain and Alexis Hoffman	

SELECTED AWARDS & FELLOWSHIPS

- 2025 **Winner, J.B. Douglas Postgraduate Awards**, Statistical Society of Australia, NSW Branch
- 2025 **Best Lightning Talk**, The Bayesian Young Statisticians Meeting
- 2024 **Best Student Presentation**, 31st Conference of The International Environmetrics Society
- 2021 **Allison Harcourt Best Poster Award**, Early Career & Student Statisticians Conference
- 2021 **Statistical Data Science Fellowship**, Australian Mathematical Sciences Institute
- 2020 **Graduate Fellowship**, University of Wollongong (2020–2024)
- 2020 **Paper of the Month Award**: August 2020, *Nonlinear Processes in Geophysics*

PUBLICATIONS

Google Scholar: https://scholar.google.com/citations?user=MIK_mtoAAAAJ

- [*] **Jacobson, J.**, Bertolacci, M., Zammit-Mangion, A., Schuh, A., & Cressie, N. (2025+). WOMBAT v2.S: A Bayesian inversion framework for attributing global CO₂ flux components from multiprocess data. Submitted preprint: <https://doi.org/10.48550/arxiv.2503.09065>
- [5] Cressie, N., Zammit-Mangion, A., **Jacobson, J.**, & Bertolacci, M. (2023). Earth's CO₂ battle: A view from space. *Significance*, 20(1), 14–19. <https://doi.org/10.1093/jrssig/qmad003>
- [4] **Jacobson, J.**, Cressie, N., & Zammit-Mangion, A. (2023). Spatial statistical prediction of solar-induced chlorophyll fluorescence (SIF) from multivariate OCO-2 data. *Remote Sensing*, 15(16), 4038. <https://doi.org/10.3390/rs15164038>

- [3] Vu, Q., Cao, Y., **Jacobson, J.**, Pearse, A. R., & Zammit-Mangion, A. (2021). Discussion on “Competition on Spatial Statistics for Large Datasets.” *Journal of Agricultural, Biological and Environmental Statistics*, 26, 614-618. <https://doi.org/10.1007/s13253-021-00464-0>
- [2] **Jacobson, J.**, Kleiber, W., Scheuerer, M., & Bellier, J. (2020). Beyond univariate calibration: Verifying spatial structure in ensembles of forecast fields. *Nonlinear Processes in Geophysics*, 27(3), 411-427. <https://doi.org/10.5194/npg-27-411-2020>
- [1] Raseman, W. J., **Jacobson, J.**, & Kasprzyk, J. R. (2019). Parasol: An open source, interactive parallel coordinates library for multi-objective decision making. *Environmental Modelling & Software*, 116, 153-163. <https://doi.org/10.1016/j.envsoft.2019.03.005>

SOFTWARE & DATASETS

WOMBAT v2.S: Workflow for attributing global CO₂ flux components from multiprocess satellite data
<https://github.com/joshhjacobs/wombat-v2s>

coSIF: Dataset of monthly, 0.05-degree cokriging predictions and standard errors for SIF over North America
<https://doi.org/10.5281/zenodo.8078592>

FTE: Workflow for verifying spatial structure in downscaled GEFS reforecast data
<https://github.com/joshhjacobs/FTE>

Parasol: Parallel coordinates visualization library for multi-objective decision-making
<https://github.com/ParasolJS/parasol-es>

TEACHING EXPERIENCE

Teaching Assistant

STAT 101: Introduction to Statistics	University of Wollongong
STAT 251: Fundamentals of Biostatistics	<i>Fall 2025</i>
MATH 255: Mathematics for Computing	<i>Fall 2025</i>
STAT 304: Stochastic Processes and Time Series Analysis	<i>Spring 2025</i>
STAT 332: Generalized Linear Models	<i>Fall 2024</i>
STAT 301: Statistical Methods for Data Science	<i>Spring 2024</i>
STAT 332: Generalized Linear Models	<i>Fall 2023</i>
	<i>Spring 2023</i>

Teaching Assistant

APPM 4350: Fourier Series and Boundary Value Problems	University of Colorado Boulder
CSCI 1320: Introduction to Programming for Engineers	<i>Fall 2018</i>

Spring 2016

PRESENTATIONS

*Denotes presenting author(s).

Invited Presentations

- [6] ***Jacobson, J.**, Bertolacci, M., Zammit-Mangion, A., Schuh, A., & Cressie, N. (November 2025). Scalable Bayesian inference for global CO₂ flux attribution with WOMBAT v2.S. *JB Douglas Postgraduate Awards*, Sydney, NSW.
- [5] ***Jacobson, J.**, Bertolacci, M., Zammit-Mangion, A., Schuh, A., & Cressie, N. (November 2025). Scalable Bayesian inference for global CO₂ flux attribution with WOMBAT v2.S. *Computational Statistics in Data Science Workshop*, Wollongong, NSW.

- [4] ***Jacobson, J.**, *Bertolacci, M., Zammit-Mangion, A., Schuh, A., & Cressie, N. (September 2025). WOMBAT v2.S: A Bayesian inversion framework for CO₂ flux attribution. *NASA Orbiting Carbon Observatory-2/3 Science Team Meeting*, Fort Collins, CO (via Teams).
- [3] ***Jacobson, J.**, Bertolacci, M., *Zammit-Mangion, A., Schuh, A., & Cressie, N. (September 2025). WOMBAT v2.S: A Bayesian inversion framework for CO₂ flux attribution. *NASA Orbiting Carbon Observatory-2/3 Science Team Meeting: Uncertainty Quantification Breakout*, Online.
- [2] ***Jacobson, J.**, Bertolacci, M., Zammit-Mangion, A., Schuh, A., & Cressie, N. (March 2025). A Bayesian hierarchical model for CO₂ flux estimation from multiprocess satellite data. *Seminar, Department of Statistics, University of New South Wales*, Sydney, NSW.
- [1] ***Jacobson, J.**, Harr, P., & Sain, S. (April 2023). A fully-Bayesian spatial copula model for joint-frequency analysis of extreme events. *Seminar, National Institute for Applied Statistics Research Australia (NIASRA)*, Wollongong, NSW.

Contributed Presentations

- [11] ***Jacobson, J.**, Bertolacci, M., Zammit-Mangion, A., Schuh, A., & Cressie, N. (April 2025). A Bayesian hierarchical model for CO₂ flux estimation from multiprocess satellite data. *The Bayesian Young Statisticians Meeting (BAYSM)*, Online.
- [10] ***Jacobson, J.**, Bertolacci, M., Zammit-Mangion, A., Schuh, A., & Cressie, N. (December 2024). A Bayesian hierarchical model for CO₂ flux estimation from multiprocess satellite data. *31st Conference of The International Environmetrics Society*, Adelaide, SA.
- [9] ***Jacobson, J.**, Cressie, N., & Zammit-Mangion, A. (December 2023). Spatial prediction of solar-induced fluorescence (SIF) from multiprocess satellite data. *Australian Statistical Conference*, Wollongong, NSW.
- [8] ***Jacobson, J.**, Cressie, N., & Zammit-Mangion, A. (October 2023). coSIF: Spatial statistical prediction of SIF from multiprocess OCO-2 data. *NASA Orbiting Carbon Observatory-2/3 Science Team Meeting: SIF Breakout*, Boulder, CO (via Teams).
- [7] ***Jacobson, J.**, Harr, P., & Sain, S. (January 2023). A fully-Bayesian spatial copula model for joint-frequency analysis of extreme events. *American Meteorological Society 103rd Annual Meeting*, Denver, CO.
- [6] *Hoffman, A., Sain, S., & **Jacobson, J.** (August 2022). Data Science and Applied Statistics in Climate Risk Analysis. *Joint Statistical Meetings*, Washington, D.C.
- [5] ***Jacobson, J.**, Cressie, N., & Zammit-Mangion, A. (July 2021). Multivariate spatial prediction of column-averaged carbon dioxide over North America. *Australian Mathematical Sciences Institute (AMSI) Winter School*, Online.
- [4] ***Jacobson, J.**, Cressie, N., & Zammit-Mangion, A. (July 2021). Spatial prediction of column-averaged carbon dioxide over the globe. *Australian and New Zealand Statistical Conference*, Online.
- [3] *Hoffman, A., Sain, S., & **Jacobson, J.** (January 2021). Flexible Python-based statistical workflow for flood risk estimates applied across CMIP6 models. *American Meteorological Society 101st Annual Meeting*, Online.
- [2] ***Jacobson, J.**, Kleiber, W., Scheuerer, M., & Bellier, J. (November 2019). Verification of spatial structure in ensembles of forecast fields. *Seminar, Department of Mathematics, University of Zurich*, Zurich, Switzerland.
- [1] *Raseman, W. J., ***Jacobson, J.**, & Kasprzyk, J. R. (September 2018). Interactive visualizations for multi-objective optimization problems. *Rocky Mountain Advanced Computing Consortium HPC Symposium*, Boulder, CO.

Contributed Posters

- [3] ***Jacobson, J.**, Bertolacci, M., Zammit-Mangion, A., Schuh, A., & Cressie, N. (October 2024). A multivariate Bayesian hierarchical model for global CO₂ surface flux. *ENVR Workshop on Spatial Data Science for the Environment*, Boulder, CO.
- [2] ***Jacobson, J.**, Cressie, N., & Zammit-Mangion, A. (July 2021). Multivariate spatial-dependence modelling with satellite data. *Early Career & Student Statisticians Conference*, Online.
- [1] *Hoffman, A., Sain, S., & **Jacobson, J.** (December 2020). Flexible methodology for hyperlocal flooding risk due to sea level rise. *American Geophysical Union 2020 Fall Meeting*, Online.

ACADEMIC SERVICE

Outreach Volunteer

Fall 2024

School of Mathematics and Applied Statistics, University of Wollongong

Head of Postgraduate Seminar Series

Spring 2024

School of Mathematics and Applied Statistics, University of Wollongong

Co-host of “Probably Novel Radio Show and Podcast”

Spring 2019

Radio 1190, Department of Applied Mathematics, University of Colorado Boulder

PROFESSIONAL MEMBERSHIPS

American Geophysical Union

American Meteorological Society

American Statistical Association

International Society for Bayesian Analysis

Statistical Society of Australia

The International Environmetrics Society