Aaron Osgood-Zimmerman, Ph.D.

Assistant Professor of Statistics

Curriculum Vitae, Summer 2025

Contact Information

Bucknell University
Department of Mathematics
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Education

University of Washington — Seattle, WA

2022 Ph.D., Statistics

Dissertation: Methods & Interpretations for Spatio-Temporal Public Health Applications
Advisor: Jon Wakefield

2015 M.S., Statistics

Swarthmore College — Swarthmore, PA

2011 B.A., Mathematics & B.S., Engineering

Qualifications

10+ years of applied research experience working with Bayesian and frequentist spatial-temporal statistics. This experience includes working with maximum likelihood estimation, multivariate regression and statistics, Monte Carlo Markov Chains, methods for Bayesian model approximations, Gaussian process regression, and many other statistical models and tools. Additional applied research experience includes climate science, spatial transcriptomics, information visualization, network statistics, developing machine learning algorithms, and web analytics.

4 years leading a team of statisticians and software engineers to build to a large body of code at the Institute for Health Metrics and Evaluation (IHME) that was used daily by more than two dozen other researchers and analysts. This experience includes developing team workflows around a shared code base, increasing the robustness and usability of the code base, improving the underlying statistical modeling and summarization of the model outputs for the users, all while engaging with, teaching and helping to mentor many of the contributers and researchers who use the code.

Excellence in communication between and across fields. My communication skills have been developed through my extensive teaching experience explaining all manner of statistical concepts and results to people with hugely varying analytic backgrounds. At IHME these skills were further sharpened by frequent presentations explaining complex statistical models and their outputs to a wide variety of audiences ranging from expert modelers to public health ministries. Ongoing collaboration with researchers from many different fields has honed my flexible and clear communication style.

Research Interests

My research interests and experience focus on building bespoke spatial statistical modeling frameworks tailored to specific applications and real-world inferential questions. I have extensive experience applying these models in the climate and public health domains. My most recent research project is developing novel spatial statistical models for spatial transcriptomics datasets.

Current Role & Prior Professional Experience

2022-Present Bucknell University Lewisburg, PA
Assistant Professor of Statistics, Department of Mathematics

2019-20 Team Lead, Model Based Geostatistics Research Scientist Seattle, WA
Institute for Health Metrics and Evaluation, Local Burden of Disease (LBD)
Led a team of statisticians and software engineers to develop high-resolution spatial-temporal models used by researchers across the Local Burden of Disease team to estimate and predict the leading causes of children-under-5 deaths. Our models could be tailored to specific applications and was deployed across a large-scale computing cluster.

2016-19 Model Based Geostatistics Researcher Seattle, WA
Institute for Health Metrics and Evaluation, Local Burden of Disease (LBD)
Devised and applied innovative methods in geospatial analysis to produce high-quality and policy- relevant estimates of health-related outcomes at 5×5km resolution.

Teaching Experience

Bucknell University Lewisburg, PA

2024 Instructor, *Statistical Design of Scientific Studies*, MATH 409

2023 Instructor, *Statistical Inference Theory*, MATH 304

2023 Instructor, *Statistics and Engineering*, MATH 227

2022-24 Instructor, (6×) *Statistics I*, MATH 216

University of Washington Seattle, WA

2021-22 Instructor, (2×) *Review of Mathematics for Social Scientists*, CSSS 505

2021 Instructor, *Probability I*, STAT 394

2014 Instructor, *Statistical Reasoning*, STAT 220

2011-14 TA, 6 quarters of undergraduate and graduate statistics courses

Institute for Health Metrics and Evaluation Seattle, WA

2018-22 Instructor, (3×) *Introduction to Geostatistical Modeling and Computing*, short course

2017-18 Instructor, (2×) *Statistics Bootcamp*, short course

2015-17 Instructor, (2×) *Introduction to Bayesian Statistics and INLA*, lecture series

SELECTED PEER-REVIEWED JOURNAL PUBLICATIONS

† denotes co-lead authors

2023 **Osgood-Zimmerman A**, Wakefield J. "A Statistical Introduction to Template Model Builder: A Flexible Tool for Spatial Modeling." *International Statistical Review* 91, no. 2 (2023).

2021 Kinyoki D†, **Osgood-Zimmerman A**†, Bhattacharjee, N†, Local Burden of Disease Anaemia Collaborators. "Anemia prevalence in women of reproductive age in low- and middle-income countries between 2000 and 2018." *Nature Medicine* **27** , 1761–1782 (2021).

2020 Kinyoki D†, **Osgood-Zimmerman A**†, Local Burden of Disease Child Growth Failure Collaborators. "Mapping child growth failure across low-and middle-income countries." *Nature* 577, no. 7789 (2020): 231.

2019 Brady OJ, **Osgood-Zimmerman A**, et al. "The association between Zika virus infection and microcephaly in Brazil 2015–2017: An observational analysis of over 4 million births." *PLOS Medicine* 16, no. 3 (2019): e1002755.

2018 **Osgood-Zimmerman A**†, Millear AI†, Local Burden of Disease Child Growth Failure Collaborators. AJ. "Mapping child growth failure in Africa between 2000 and 2015." *Nature* 555, no. 7694 (2018): 41.

2018 Graetz N, Friedman J, **Osgood-Zimmerman A**, et al. "Mapping local variation in educational attainment across Africa." *Nature* 555, no. 7694 (2018): 48.

2018 Reiner Jr RC, Graetz N, Casey DC, Troeger C, Garcia GM, Mosser JF, Deshpande A, Swartz SJ, Ray SE, Blacker BF, Rao PC, **Osgood-Zimmerman A**, et al. "Local variation in childhood diarrheal morbidity and mortality in Africa, 2000-15." *New England Journal of Medicine* 379.12 (2018): 1128-1138.

2017 Golding N†, Burstein R†, Longbottom J, Browne AJ, Fullman N, **Osgood-Zimmerman A**, et al. "Mapping under-5 and neonatal mortality in Africa, 2000–15: a baseline analysis for the Sustainable Development Goals." *The Lancet* 390, no. 10108 (2017): 2171-2182.

2017 Deribe K, Cano J, Giorgi E, Pigott DM, Golding N, Pullan RL, Noor AM, Cromwell EA, **Osgood-Zimmerman A**, et al. "Estimating the number of cases of podoconiosis in Ethiopia using geostatistical methods." *Wellcome Open Research* (2017): 2:78.

2015 Bolin D, Guttorp P, Januzzi A, Jones D, Novak M, Podschwit H, Richardson L, Särkkä A, Sowder C, **Osgood-Zimmerman A**. "Statistical prediction of global sea level from global temperature." *Statistica Sinica* (2015): 351-367.

2014 Guttorp P, Januzzi A, Novak M, Podschwit H, Richardson L, Sowder CD, **Osgood-Zimmerman A**, Bolin D, Särkkä A. "Assessing the uncertainty in projecting local mean sea level from global temperature." *Journal of Applied Meteorology and Climatology* 53, no. 9 (2014): 2163-2170.

2012 Wang SC, **Osgood-Zimmerman A**, McVeigh B. "Confidence Intervals for the Duration of Mass Extinction." *Paleobiology* (2012), 38(2), 265-277.

Under Review or In Preparation

2025 **Osgood-Zimmerman A**, Mercer L, Wakefield J, Ferlay J, Plummer M, Bray F. "Joint Modeling of Cancer Incidence and Mortality: Estimating Rates of Breast Cancer in Europe." *Manuscript under revision for resubmission in 2025.*

Invited Presentations

2024 **Osgood-Zimmerman A**. "Spatial Statistics for Spatial Transcriptomics." Presented at: Yale University, Computational Biology Group; Sep 9, 2024.

2021 **Osgood-Zimmerman A**. "Jointly Estimating EU Cancer Mortality and Incidence Across Age, Period, & Location." Presented at: Bucknell University; Nov 18, 2021.

2021 **Osgood-Zimmerman A**. "An Introduction to Geostatistics and Precision Public Health." Presented at: Middlebury College; Oct 28, 2021.

2018 **Osgood-Zimmerman A**. "A Deep Dive into Geostatistical Methods for Public Health." Presented at: Ministry of Health, Manila, Philippines; Nov 13, 2018.

2018 **Osgood-Zimmerman A**. "Mapping multiple diseases and risk factors: practical lessons from diagnosing modeled spatiotemporal health predictions." Presented at: Royal Statistical Society 2018 International Conference; Sept 3-6, 2018; Cardiff, Wales.

2017 **Osgood-Zimmerman A**. "The Big 5: mapping the leading causes of under-5 deaths in Africa and around the world." Presented at: International Workshop on Disease Mapping in Low-resource Settings; Sept 14-15, 2017; Lancaster, UK.

Service and University Citizenship

Department

2022-24 Mathmatics Dept. Curriculum Committee — Bucknell University

2023-24 Mathmatics Dept. Competitions Committee — Bucknell University

2023 Aspiring PUI Workshop applications review — Bucknell University

2020 PhD admission applications review — University of Washington

University

2023-24 Honors Council — Bucknell University

2023-24 Teaching and Learning Center Advisory Board — Bucknell University

2011-12 Graduate and Professional Student Senator — University of Washington

Profession

2014-16 STATMOS Webmaster
Research Network for **St**atistical Methods for **Atm**ospheric and **O**ceanic **S**ciences

2014-16 AMS Probability and Statistics Committee

Reviewer for:

Communications Medecine (Nature Portfolio)
Lancet Planetary Health
Journal of Data Science
PLOS: Neglected Tropical Diseases

Recent Professional Development

2023-24 Project NExT Fellow (Green '23 Cohort) Mathematical Association of America
Selected participant in the MAA's teaching-focused professional development program.

2023 United States Conference on Teaching Statistics State College, PA

Media Coverage

2018 World View Letter, by Kofi Annan, in *Nature* 555, 7 (2018).

Personal

Computer Skills

Expert in R, including spatial analyses, parallelization, and visualization.
Fluent in Git, TEX (LATEX, BIBTEX), `bash`, and Emacs.
Familiar with Python, C++, SQL, Bash, Matlab, Mathematica, HTML.

Interests

Spending time with my family, gardening, bicycling, ultimate frisbee, hiking, camping, cooking, playing piano, reading science fiction, history, and philosophy.