Daniel Zilber

Email: daniel.zilber@nih.gov Location: Matthews, North Carolina GitHub: github.com/dzilber

EDUCATION

Texas A&M University (TAMU)	College Station, TX
Doctor of Philosophy in Statistics, Advisor: Matthias Katzfuss and Debdeep Pati	May 2021
 Thesis: Application, Methodology, and Theory for Gaussian Processes 	
 Stanford University Master in Management Science, GPA: 3.89/4.00 – Concentration in Operations Research 	Palo Alto, CA June 2012
University of North Carolina at Chapel Hill	Chapel Hill, NC
Bachelor of Science in Mathematics, GPA: 3.47/4.00	May 2010

PUBLICATIONS

- [1] D. Zilber and K. Messier, "Reflected generalized concentration addition and bayesian hierarchical models to improve chemical mixture prediction", *Plos one*, vol. 19, no. 3, e0298687, 2024.
- [2] D. Zilber, D. R. Thompson, M. Katzfuss, V. Natraj, J. Hobbs, and A. Braverman, "Spatial surface reflectance retrievals for visible/shortwave infrared remote sensing via gaussian process priors", *Remote Sensing*, vol. 14, no. 9, p. 2183, 2022.
- [3] J. Hobbs, M. Katzfuss, D. Zilber, J. Brynjarsdóttir, A. Mondal, and V. Berrocal, "Spatial retrievals of atmospheric carbon dioxide from satellite observations", *Remote Sensing*, vol. 13, no. 4, p. 571, 2021.
- [4] M. Katzfuss, J. Guinness, W. Gong, and D. Zilber, "Vecchia approximations of Gaussian-process predictions", Journal of Agricultural, Biological, and Environmental Statistics, vol. 25, no. 3, pp. 383–414, 2020.
- [5] D. Zilber and M. Katzfuss, "Vecchia-laplace approximations of generalized gaussian processes for big non-gaussian spatial data", *Computational Statistics & Data Analysis*, p. 107081, 2020.

ACTIVE RESEARCH PROJECTS

Bayesian Gene Set Benchmark Dose Estimation

Joint work with Matt Wheeler

- Compute a benchmark dose for gene sets corresponding to hallmark pathways for various chemicals and tissues using an approximated exact test.
- Fit dose responses with a semi-parametric Bayesian model that accounts for gene expression correlations with a sparse latent factor model.

Biological Additivity Informed Mixture Responses

Joint work with Shanshan Zhao

- Using concepts from toxicology, we are developing a model to predict marginal effects of chemicals given joint responses.

EXPERIENCE

National Institute of Environmental Health Sciences (NIEHS)

Staff Scientist, Applied Statistics Group

- Analyze epidemiological data to quantify risks due to chemical exposures.
- Develop novel models to discover marginal chemical effects given mixture responses.
- Apply deep learning methods to improve power when predicting chemical effects in mixtures.

National Institute of Environmental Health Sciences (NIEHS)

Postdoctoral Fellow, Spatial-temporal Health Analytics Group

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Sept 2021 - June 2024

In Progress

Under Review

July 2024 - Present

Durham, NC

Durham, NC

- Developed physics-informed Bayesian models that learn a multi-omic regulatory network using a combination of advanced techniques including adaptive gradient matching and scale mixture priors.
- Created new and improved methodologies to predict benchmark doses of toxic chemicals across genes and dose responses for complex mixtures.
- Modeled geospatial correlations in complex and partially censored pollution measurements to produce data products for exposure predictions

Department of Statistics, TAMU

Non-research Highlights

- Led a group of three junior PhD students in client relations and statistical analysis of a complex agricultural data set
- Added non-Gaussian modeling support to the R package GPVecchia for big spatial data analysis: https://CRAN.R-project.org/package=GPvecchia
- Advanced imaging spectroscopy software "ISOFIT" developed at NASA JPL by modeling spatial correlations
- Gave seminar and conference talks to groups of 10-75 on research and topics of interest such as quantum computing
- Co-founded "StatCafe," a weekly student-led seminar for both academic and non-academic subjects

Dematic Reddwerks Corporation

Operations Research Analyst

- Developed algorithms and metrics to optimize industrial processes such as job scheduling and material flow
- Studied real and simulation-based data sets up to 10 GB for statistical profiling and cost studies
- Wrote production Java code to optimally schedule material flow through conveyors
- Presented findings to senior management and non-technical audiences; promoted to Principle in 2015

Xilinx Incorporated

Revenue Forecasting Intern

 Conducted independent open-ended research to find signals that predict monthly revenue change using tools such as independent component analysis and power-law network models

TEACHING

Department of Statistics, TAMU

Lecturer, Principles of Statistics II (STAT212)

Undergraduate course covering linear regression, model selection, ANOVA, categorical data analysis, and non-parametric methods

Skills

- Programming Languages: R, Python, SQL, and Java.
- Statistical and Machine Learning: Bayesian nonparametric hierarchical models, big spatial data, deep neural networks, variational inference, MCMC, wavelets, kernel and spectral methods, low rank/nearest neighbor/random projection approximations, sparsity and scale mixture priors
- Spoken Languages: English (native), Russian (conversational)
- Other Interests and hobbies: Finance and investing, quantum probability and computing, sustainability and preparedness, community strengthening, hiking, retro games, healthy living

Scholarships and Awards

- Dr. Anant Kshirsager Graduate Fellowship Award, Texas A&M University
- Student Paper Award for [5], JSM Computing and Graphics Section

College Station, TX

May to June, 2020

College Station, TX 2016 –2021

> San Jose, CA March –June, 2012

Austin, TX

July 2012 - July 2016

tools such as

August 2020–May 2021 July 2019