Trevor Harris

Contact

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Research Interests

My overarching interests are in developing new statistical methodology for understanding complex scientific data, particularly in Climatology. Recent work focuses on probabilistic machine learning methods, such as Bayesian deep learning, Gaussian processes, and deep generative models, and studying their uncertainty quantification capabilities. I also work on robust functional data analysis methods for anomaly detection, changepoint detection, and spatiotemporal sequence comparisons.

Education

PhD Statistics 2016 – 2021
University of Illinois at Urbana-Champaign, Champaign, IL
Advisor: Dr. Bo Li
Thesis: *Functional Data Methods for Climatological Processes*

BS Mathematics 2010 – 2014
University of Florida, Gainesville, FL
Advisors: Dr. Murali Rao and Dr. Farid AitSahlia
Thesis: *Estimating an optimal stopping time policy for American options*

Research Experience

Assistant Professor, Department of Statistics 2021 – Present
Texas A&M University, College Station, TX

Research Assistant, Department of Statistics 2017 – 2021
University of Illinois, Champaign, IL
Advisor: Dr. Bo Li

Graduate Intern, Mission Algorithms R&S Summer 2018, 2019–2020
Sandia National Laboratories, Albuquerque, NM
Advisor: Dr. J. Derek Tucker

Teaching Experience

Instructor, Department of Statistics 2021 – Present
Texas A&M University, College Station, TX

–STAT 211: Principles of Statistics I
–STAT 438: Bayesian Statistics

Teaching Assistant, Department of Accounting 2017
University of Illinois, Champaign, IL

–ACCY 570: Data Analytics Foundations for Accountancy
–ACCY 571: Statistical Analyses for Accountancy

Teaching Assistant, Department of Statistics 2016 – 2017
University of Illinois, Champaign, IL

–STAT 400: Statistics and Probability I

Professional Experience

Assistant Professor, Department of Statistics 2021 – Present
Texas A&M University, College Station, TX

Product Modeling Analyst, Underwriting Research 2014 – 2016
GEICO, Washington D.C.

Awards and Honors

Horace W. Norton Prize for outstanding thesis research in Statistics	2021
Selected as one of nine students to represent the University of Illinois in the national competition for the Schmidt Science Fellows Program	2020
Selected to attend the NextProf Science Workshop (canceled due to Coronavirus)	2020
Honorable mention in the ICSA Midwest student poster competition	2019
UIUC Statistics Department's Leadership and Service award	2019
Awarded travel funding for the 2019 STATMOS Spatial Statistics Workshop	2019
UIUC List of Teachers Ranked as Excellent by Their Students	2016
Graduated *magna cum laude* at University of Florida	2014

Publications

Harris, T., Li, B., Ryan Sriver (2022) *Multi-model Ensemble Analysis with Neural Network Gaussian Processes*. In revision. Annals of Applied Statistics. arXiv.

Wang, M., **Harris, T.**, Li, B. (2022) *Bayesian Changepoint Estimation for Spatially Indexed Functional Time Series*. Journal of Agricultural, Biological, and Environmental Sciences. arXiv.

Carmody, D., Mazzarello, M., Santi, P., **Harris, T.**, Lehmann, S., Abbiasov, T., Dunbar, R., Ratti, C. (2022) *The effect of co-location on human communication networks*. Nature Computational Science. arXiv.

Harris, T., Li, B., Tucker, J. D. (2021) *Scalable Multiple Change Point Detection for Functional Data Sequences*. Environmetrics. arXiv.

Harris, T., Li, B., Steiger, N., Smerdon, J., Tucker, J. D., Narisetty, N. (2020). *Evaluating Proxy Influence in Assimilated Paleoclimate Reconstructions – Testing the Exchangeability of Two Ensembles of Spatial Processes*. Journal of the American Statistical Association. Article.

Harris, T., Tucker, J. D., Li, B., Shand, L. (2020). *Elastic Depths for Detecting Shape Anomalies in Functional Data.* Technometrics. Article.

Harris, T., Li, B. (2019). *Kriging.* Wiley Statsref: Statistics Reference Online, John Wiley & Sons Ltd. Article.

Funding

Sandia National Laboratories LDRD for "Deep learning-based spatio-temporal estimate of greenhouse gas emissions using satellite data". $15k.

Software

fmci: R package for functional change point detection with the multiple changepoint isolation method Github.

elasticdepth: R package for computing elastic depths and identifying shape outliers. Github.

kstat: R package for the Kolmogorov-Depth statistic for testing if two functional distribution are different. Github.

extdepth: R package for computing the extremal depths for functional data. Github.

Conference Presentations

Variational target encoding for climate model integration, JSM Seattle, July 2021

Elastic depths for identifying shape anomalies in functional data, ISI WSC Virtual, July 2021

Variational target encoding for climate model integration, AGU Fall Meeting, San Francisco, Dec 2020

Variational target encoding for climate model integration, CISL Climate Informatics, Oxford, Sept 2020

Fast functional change point detection with total variation denoising, JSM, Philadelphia, July 2020

Evaluating proxy influence in assimilated paleoclimate reconstructions, ENAR 2020 Spring Meeting, Nashville, Mar 2020

Evaluating proxy influence in assimilated paleoclimate reconstructions, AGU Fall Meeting, San Francisco, Dec 2019

Evaluating proxy influence in paleoclimate reconstructions, ICSA Midwest Chapter Meeting, Chicago, Oct 2019

Elastic depths for identifying shape anomalies in functional data, 62nd World Statistical Congress, Kuala Lumpur, Aug 2019

Evaluating proxy influence in paleoclimate reconstructions, JSM, Denver, Aug 2019

Evaluating proxy influence in data assimilation algorithms, Bohrer Workshop (UIUC), Champaign, Nov 2018

Evaluating proxy influence in data assimilation based climate field, CISL Climate Informatics (NCAR), Boulder, Sept 2018

Evaluating proxy Influence and reconstruction skill in data assimilation based climate field reconstructions using extremal depth, Joint Statistical Meeting, Vancouver, July 2018

Other Presentations

Functional change point detection with non-negative matrix factorization, MARTIAN's Symposium, Sandia National Labs, July 2019

An introduction to non-negative matrix factorization, Intern Symposium, Sandia National Labs, June 2019

Identifying phase and amplitude extremes in functional data with elastic depth, Statistics Graduate Student Seminar (UIUC), Champaign, Mar 2019

Testing the exchangeability of two spatiotemporal processes with applications to data assimilation, Illinois Climate Seminar (UIUC), Champaign, Mar 2019

Identifying phase and amplitude extremes in functional Data with elastic depth, Sandia/UIUC Tech Talks (UIUC), Champaign, Sept 2018

Elastic depth for amplitude and phase in functional data, MARTIAN's Symposium, Sandia National Lab, July 2018

Elastic functional principal component regression, Intern Symposium, Sandia National Lab, July 2018

Professional Activities

Judge: TAMU Datathon 2021, Student Research Week 2022
Reviewer: Journal of the American Statistical Association, Journal of Multivariate Analysis, Technometrics, Climate Informatics, Statistical Methods & Applications, Stat, Journal of Climate, Climate of the Past, Journal of Machine Learning Reseach
Membership:

- American Statistical Association (2016–Present),
- Institute of Mathematical Statistics (2019–Present),
- American Geophysical Union (2019–Present),
- International Chinese Statistical Association (2019–Present)

Service

Member: Grant Opportunities, Library & Web Site/Social Media committee	2021 – Present
Founding member: PhD Student Seminar series at UIUC	2018 – 2021
Founding member: Statistics Graduate Student Organization at UIUC	2017 – 2021
President: Statistics in the Community at UIUC	2017 – 2018

Tech

Programming: R, Python, SAS, SQL, C++/Rcpp, VBA, Bash
Misc: Linux, Git, Docker, LaTeX