John Tipton

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Employment

University of Arkansas	Department of Mathematical Sciences
Assistant Professor	2017–present
Colorado State University	Department of Statistics
Postdoctoral Researcher	2016–2017
Graduate Research Assistant	2009-2016

Education

Colorado State University, Ph.D. Statistics	2016
Colorado State University, M.S. Statistics	2011
Colorado State University, B.S. Mathematics and Zoology	2005

Assignment

Assigned to 40% teaching, 40% research, and 20% service. My full teaching load is 2 courses per semester including development of new course materials. My research is focused on applied statistics and methodological statistics research with an emphasis on spatial, paleoclimate, and environmental applications.

Publications

Published and in Review

[15] John Tipton, Glenn Sharman, and Sam Johnstone (2020+). Estimation of Sediment Mixing Distributions with Uncertainty Quantification using Bayesian Nonparametric Modeling. In revision. [R code on gitHub]

[14] Ann Raiho, Michael Dietze, Andria Dawson, Christine R. Rollinson, John Tipton, and Jason McLachlan. (2020+). Towards understanding predictability in ecology: A forest gap model case study. Global Change Biology. In review. [bioRxiv]

[13] Manuel Chevalier et. al (2020). Pollen-based climate reconstruction techniques for late Quaternary studies. Earth-Science Reviews. [paper]

[12] John Tipton, Mevin Hooten, Connor Nolan, Bob Booth, and Jason McLachlan (2019). Predicting unobserved climate from compositional data using multivariate Gaussian process inverse prediction. The Annals of Applied Statistics. Vol 13, No. 4, pp. 2363-2388. [paper][arXiv preprint][R code on gitHub

[11] Connor Nolan, John Tipton, Robert K. Booth, Mevin B. Hooten, and Stephen T. Jackson (2019). Comparing and improving methods for reconstructing water table depth from testate amoebae. The Holocene. [paper][R code on gitHub]

[10] Connor Nolan et. al. (2018) Past and future global transformation of terrestrial ecosystems under climate change. Science. Volume 361, Issue 6405, August 31, pp. 920-923. [paper]

[9] Erin Belval, Yu Wei, David Calkin, Crystal Stonesifer, Matt Thompson and John Tipton (2017). Studying interregional wildland engine assignments for large fire suppression. International Journal of Wildland Fire. [paper]

[8] John Tipton, Mevin Hooten, and Simon Goring (2017). Reconstruction of spatio-temporal temperature processes from sparse historical records using probabilistic principal component regression. Advances in Statistical Climatology, Meteorology and Oceanography. [pdf] [R code on gitHub]

[7] Trevor Hefley, Kristin Broms, Brian Brost, Frances Buderman, Shannon Kay, Henry Scharf, John Tipton, Perry Williams, and Mevin Hooten (2017). The basis function approach to modeling dependent ecological data. Ecology. [pdf] [R code S3, S4, & S5]

[6] John Tipton, Mevin Hooten, Neil Pederson, Martin Tingley and Daniel Bishop (2016). Reconstruction of late Holocene climate based on tree growth and mechanistic hierarchical models. Environmetrics, 27(1):42-54. [pdf] [R code on gitHub]

[5] Douglas Silver, Brett Johnson, William Pate, Kyle Christianson, John Tipton, James Sherwood, Brian Smith, Yun Hao, and Patrick Martinez (2016). Effect of net size on estimates of abundance, size/age, and sex of Mysis diluviana. Journal of Great Lakes Research, Volume 42, Issue 3, June 2016 [paper] [R code on gitHub]

[4] John Tipton, Jean Opsomer, and Gretchen Moisen (2013). Properties of endogenous post-stratified estimation using remote sensing data. Remote Sensing of Environment, 139:130-137. [pdf]

[3] John Tipton, Gretchen Moisen, Paul Patterson, and Thomas Jackson (2012). Sampling intensity and normalization: Exploring cost-driving factors in nationwide mapping of tree canopy cover. In: McWilliams, Will and Roesch, Frank, (compilers). 2010 Forest Inventory and Analysis (FIA) Symposium. [pdf]

[2] Thomas Jackson, Gretchen Moisen, Paul Patterson and John Tipton (2012). Repeatability in photo-interpretation of tree canopy cover and its effect on predictive mapping. In:McWilliams, Will and Roesch, Frank, (compilers). 2010 Forest Inventory and Analysis (FIA) Symposium. [pdf]

[1] David Gammon, Myron Baker, and John Tipton (2005). Cultural divergence within novel song in the black-capped chickadee (Poecile atricapillus). The Auk, 122, 853-871. [paper]

In Preparation

John Tipton, Basil Davis, Manuel Chevalier, and Philipp Sommer. Spatio-temporal reconstruction of climate from pollen.

Kelly Heilman, Jason McLachlan, A. Carla Staver, John W.Williams, David Mladenoff, Simon Goring, Christopher J. Paciorek, and John Tipton. Loss of temperate savanna-forest bistability due to changes in land-use.

John Tipton, Basil Davis, Manuel Chevalir, and Philipp Sommer. Improving pollen reconstructions of climate using Polya-gamma data augmentation.

John Tipton. Making Bayesian spatio-temporal models conjugate through recursive Bayesian inference.

Presentations

Invited

2019 – November – Presentation - University of Arkansas Industrial Engineering INFORMS Seminar: Reducing the computational cost for Bayesian modeling of non-Gaussian, noisy spatio-temporal data

2019 – July – Poster - Institute of Mathematical Statistics New Researchers Conference: Spatio-temporal reconstruction of climate from pollen data

2019 – April – Presentation - University of Missouri Statistics Department: Spatio-temporal reconstruction of climate from pollen data

2018 – November – Presentation - University of Arkansas Department of Geosciences: Don't let your statistics ruin the science that you love

2018 – September – Presentation - Kansas State University Statistics Department: Spatio-temporal reconstruction of climate from pollen data

2018 – September – Presentation - University of Arkansas Statistics Seminar: Spatio-temporal reconstruction of climate from pollen data

2017 – August – Poster - ASA: Bayesian Multispecies Ecological Models for Paleoclimate Reconstruction Using Inverse Prediction

2015 – August – Presentation - ASA: ENVR Student Paper Award: Reconstruction of late Holocene climate based on tree growth and mechanistic hierarchical models

2015 – August – Poster - ASA STATMOS: Reconstruction of late Holocene climate based on tree growth and mechanistic hierarchical models

2014 – December – Presentation - American Geophysical Union: A statistical reconstruction of bivariate climate from tree ring measurements using scientifically motivated process models

Contributed

2019 – August – Presentation - ASA: Spatio-temporal reconstruction of climate from pollen data

2018 – August – Presentation - ASA: Modeling Sediment Mixing using Mixtures of Dirichlet Processes

2017 – August – Presentation - ASA: Reconstruction of Spatio-Temporal Temperature from Sparse Historical Records Using Robust Probabilistic Principal Component Regression

2017 – December – Poster: American Geophysical Union - co-author: Comparing and improving reconstruction methods for proxies based on compositional data

2017 – December – Presentation: American Geophysical Union - co-author: Inferring biogeochemistry past: a millennial-scale multimodel assimilation of multiple paleoecological proxies

2017 – December – Presentation: American Geophysical Union - co-author: Uncertainty and inference in the world of paleoecological data

2016 – August – Presentation - ASA: Inverting the Gaussian process: A Bayesian multispecies ecological model for paleoclimate reconstruction

2016 – August – Poster - ASA: Robust spatio-temporal reconstruction of temperature processes from sparse historical data

2014 – December – Poster - American Geophysical Union - co-author: Effects of European land use on contemporary tree-climate relationships in the northeastern United States: Implications for predictive models

2014 – August – Presentation - ASA: Reconstruction of historical climate using a reduced rank predictive process model

2012 – August – Presentation - ASA: Endogenous post-stratification using random forests

2012 – December – Presentation - Forest Inventory and Analysis Symposium: Properties of the endogenous post-stratified estimator using a random forest model

Funding

External

2019-2024 – National Science Foundation. Multidisciplinary Data Science Education to Prepare STEM Students for Data Science Careers Award: DUE 1930532 $1,000,000 (role: Senior Personnel)

Not Funded

Internal

2019-2022 – University of Arkansas Chancellor's Grant. Computational Capsule Neural Network Algorithms for Enabling Terahertz Detection of Breast Cancer. $53,197 (role: co-PI)

Teaching Experience

University of Arkansas

Responsible for course redesign and/or development for DASC 1104, DASC 2594, STAT 3003, STAT 4003, STAT 4043, STAT 5003 STAT 5383, and STAT 5413. Also a member of the data science curriculum development committee developing 54 new credit hours and a member of the data science advisory board. As a member of the data science curriculum committee, I created lesson and unit plans for DASC 1104 Programming Languages for Data Sciene, DASC 2594 Multivariable Math for Data Scientists, and DASC 3213 Statistical Learning

DASC 1104 Programming Languages for Data Science (Fall 2020)
DASC 2594 Multivariable Math for Data Scientists (Spring 2021)
STAT 2303 Principles of Statistics (Fall 2017)
STAT 3003 Statistical Methods (Spring 2021)
STAT 5383 Time Series (Fall 2017)
STAT 4043 Survey Sampling (Spring 2018, Spring 2019)
STAT 4003 Statistical Methods (Fall 2018, Spring 2019, Fall 2019)
STAT 5003 Statistical Methods (Spring 2020, Fall 2020)
STAT 5413 Spatial Statistics (Spring 2020)

Colorado State University

Instructor

STAT 307 Intro to Biostatistics, three semesters

STAT 204 Business Statistics, two semesters

Teaching assistant

STAT 472 Statistical Consulting, one semester
STAT 301 Intro to Statistics Online, one semester
STAT 204 Business Statistics, one semester

Workshops

Building Capacity in Bayesian Modeling for Ecologists (NSF), 2 days	2014, 2016
Workshop on Parallel Computing, CU/CSU,	2015
R Workshop (CSU-CCFRWU), 1 day	2013, 2015

Service

2017-2020: Interdisciplinary committee for the creation of an undergraduate degree in data science
2019-present: Department of Mathematical Sciences undergraduate curriculum committee
2019-present: Data science undergraduate curriculum committee

Honors/Awards

University of Arkansas New Faculty Commendation for Teaching Commitment	2018
Colorado State University Statistics Department Poster Symposium - Best Poster	2016
American Statistical Association ENVR Student Paper Competition Award	2015
Thomas J. and Eileen C. Boardman Statistical Consulting Award	2014
American Statistical Association Student Travel Award	2014
American Statistical Association Wray Jackson Smith Award	2012

Software and Computing

R packages

R package BayesMRA – available on CRAN	2020
gitHub R package Bayescomposition	2019
gitHub R package stPollen	2019

Data Tutorials and Reproducibility

GitHub tutorial for: John Tipton, Mevin Hooten, Connor Nolan, Bob Booth, and Jason McLachlan. (2019) Predicting unobserved climate from compositional data using multivariate Gaussian process inverse prediction. *Annals of Applied Statistics*

GitHub tutorial for: Douglas Silver, Brett Johnson, William Pate, Kyle Christianson, John Tipton, James Sherwood, Brian Smith, Yun Hao, and Patrick Martinez. (2016). Effect of net size on estimates of abundance, size/age, and sex of *Mysis diluviana*. *Journal of Great Lakes Research*, Volume 42, Issue 3.

GitHub tutorial and R software for: John Tipton, Mevin Hooten, Neil Pederson, Martin Tingley and Daniel Bishop. (2016). Reconstruction of late Holocene climate based on tree growth and mechanistic hierarchical models. *Environmetrics*, 27(1):42-54.

Computing Expertise

R	LaTeX	python
C++	Linux	

Student Advising

Graduate Students (Current)

Jean Remy Habima (PhD-Mathematics), Adviser
Surya Lamichhane (PhD-Mathematics), Committee Member
Muhenned Abdulasalim (MS-STAN), Adviser
Thuy Scanlon (MS-STAN), Adviser
Ariel Mundo (PhD-Biomedical Engineer), Committee Member
Leah Bayer (PhD-Biology), Committee Member
Chang Liu (PhD-Environmental Dynamics), Proposal Committee Member

Graduate Students (Graduated)

Pauline Morin (MS-Food Science), Committee Member	2020
Seyed Tabari (MS-STAN), Committee Member	2020
Philipp Sommer (PhD-Geosciences, University of Lausanne), **Examiner**	2019
Ruizhe (Rachel) Yin (MS-STAN), **Committee Chair**	2019
Hua Zhong (MS-STAN), **Committee Chair**	2019
Michael Harris (MS-STAN), Committee Member	2019
Josh Price (MS-STAN), Committee Member	2019
Md Kamrul Hasan Khan (MS-STAN), Committee Member	2018
Kai Cui (MS-STAN), Committee Member	2018
Michael Ellis (MS-STAN), Committee Member	2018

Undergraduate Students

Abigail Rhodes (Honors)
Caleigh Christensen (Honors)
Brenna Frandson (Honors)

Manuscript Peer Review

Annals of Applied Statistics (4 times); Computational Statistics and Data Analysis (2 times); Environmental and Ecological Statistics (1 time); Journal of Agricultural, Biological, and Environmental Statistics (3 times); Journal of Geophysical Research - Biogeosciences (1 time); Ecological Applications (1 time); Freshwater Science (1 time); Climate of the Past (1 time); Chemical Geology (1 time); Arctic, Antarctic, and Alpine Research (1 time); Science (1 time); Nature Communications (1 time)