Yunyi Shen

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Education

2022 – **Massachusetts Institute of Technology**, Cambridge, MA, United States
PhD, Computer Science

2019 – 2021 **University of Wisconsin-Madison**, Madison, WI, United States
MSc, Statistics

2018 – 2021 **University of Wisconsin-Madison**, Madison, WI, United States
MSc, Wildlife Ecology

2014 – 2018 **Peking University**, Beijing, China
BSc, Integrated Science/Physics & Biology

Publications and Preprints

Working papers

Yunyi Shen* , Erik R. Olson, and Timothy R. Van Deelen. Frontier meets boundary: density dependent and spatial expansion of gray wolf (*Canis lupus*) population in Wisconsin. *in prep*, 2022+

Elyse C. Mallinger, Katy R. Goodwin, Alan Kirschbaum, **Yunyi Shen**, and Erik R. Olson. Species-specific responses to white-nose syndrome in the great lakes region. *submitted*, 2022+

Preprints

Yunyi Shen and Sameer K. Deshpande. On the posterior contraction of the multivariate spike-and-slab LASSO. *arXiv preprint arXiv:2209.04389*, 2022

Yunyi Shen, Claudia Solís-Lemus, and Sameer K. Deshpande. Sparse Gaussian chain graphs with the spike-and-slab LASSO: Algorithms and asymptotics. *arXiv preprint arXiv:2207.07020 (under review)*, 2022

Yunyi Shen and Claudia Solís-Lemus. The effect of the prior and the experimental design on the inference of the precision matrix in Gaussian chain graph models. *arXiv preprint arXiv:2107.01306 (revision under review)*, 2021

Yunyi Shen and Claudia Solís-Lemus. Bayesian chain graph LASSO models to learn sparse microbial networks with predictors. *arXiv preprint arXiv:2012.08397 (revision under review)*, 2020

Peer reviewed

Journals & Conferences

Yunyi Shen, Mingzhang Liu, Dajun Wang, Xiaoli Shen, and Sheng Li. Using an integrative mapping approach to identify the distribution range and conservation needs of a large threatened mammal, the Asiatic black bear, in China. *Global Ecology and Conservation*, 31:e01831, 2021

Yunyi Shen* , Erik R Olson, and Timothy R Van Deelen. Spatially explicit modeling of community occupancy using Markov random field models with imperfect observation: Mesocarnivores in Apostle Islands National Lakeshore. *Ecological Modelling*, 459:109712, 2021

Jianping Yu, **Yunyi Shen**, Xiaoyou Song, Xiaonan Chen, Sheng Li, and Xiaoli Shen. Evaluating the effectiveness of functional zones for black muntjac (*Muntiacus crinifrons*) protection in Qianjiangyuan National Park pilot site. *Biodiversity Science*, 27(1):5, 2019

Workshops

Yunyi Shen, Lorenzo Masoero, Joshua Schraiber, and Tamara Broderick. Double trouble: Predicting new variant counts across two heterogeneous populations. *Learning Meaningful Representation of Life (LMLR) workshop at NeurIPS*, 2022

Awards and Honor

2020 Finalist of Janice Lee Fenske Memorial Award of The Wildlife Society (TWS)

2019 Conservation Leader for Tomorrow (CLfT) Scholarship

2017 Peking University Annual Award in Social Works

Grants Funded

Co-PI

2024 NPS PMIS 322581,U.S. National Park Services (pending final approval), PI: Timothy Van Deelen (UW-Madison)

Co-Investigator

2020-2022 Hatch 142 Formula Fund 1023699, U.S. Department of Agriculture, PI: Claudia Solís-Lemus (UW-Madison)

2021-2023 DSI Catalyst Fund, University of Toronto, PI: Gwendolyn Eadie (U of Toronto)

Travel awards

2023 BayesComp-2023 travel award

Invited Talks

08/2022 "Conditional probabilities in some multispecies models", Merging statistical theory and analyses at the interface of microbial and "macrobial" ecology workshop. (NSF-funded) Concordia University, Montréal, Canada.

05/2022 "Stellar flare detection using HMM combined with Gaussian process", Stellar Stats Workshop, David A. Dunlap Department of Astronomy and Astrophysics, University of Toronto, Toronto, Canada.

05/2022 "Use cases of high throughput computing in statistical ecology and astronomy", HTCondor week, Center of high throughput computing, UW-Madison, Madison, WI

03/2022 "HMMs in astronomy", JSC 270/370 Seminar, Department of Statistical Science, University of Toronto, Toronto, Canada.

Selected Conference Talks

Yunyi Shen, Fan Fan, Sheng Li, and Claudia Solís-Lemus. Direct (conditional) and net (marginal) effects of environmental predictors in multivariate normal and autologistic models for multispecies modeling. 2022 International Statistical Ecology Conference, 2022

Yunyi Shen, Dwayne Etter, and Timothy Van Deelen. Age structure effects and population control in urban/suburban white-tailed deer, Chicago, IL 1992-2006. 2020 Midwest Fish and Wildlife Conference, 2020

Dwayne Etter, Timothy R Van Deelen, John Humphreys, Gary Roloff, and **Yunyi Shen**. Managing white-tailed deer under an evolving paradigm: Effects of density-dependence. In *American Fisheries Society & The Wildlife Society 2019 Joint Annual Conference*. AFS, 2019

Software

R packages `mSSL`: Collection of multivariate Spike-and-Slab regression models, GitHub

`CARlasso`: Conditional autoregressive LASSO and extensions, CRAN

`linconGaussR`: Sampling multivariate Gaussian under linear constraint, CRAN

`robustcov`: Collection of robust precision estimation, CRAN

Stan `CeleriteQFD`: Stellar flare detection using Gaussian process combined with HMM, GitHub

Teaching

2023 Spring 6.7830 (Bayesian Modeling and Inference) TA, MIT

2018-2019 Chemistry 103-104 TA, UW-Madison

2016-2017 Evolution of Human Intelligence TA, Peking University

Services

Reviewing

Ecology Ecosphere (1), Biodiversity & Conservation (2), Biological Conservation (2)

Statistics AISTATS-2023 (3), Annals of Applied Statistics (1)

Departmental

EECS Graduate Student Association executive board, 2023

Other

Consulting Statistical consulting, Qianjiangyuan National Park, Zhejiang, China, 2019-2020

Statistical and data management consulting, Corcovado and Piedras Blancas National Parks, Costa Rica, 2022 (in collaboration with Northland College & UW-Madison, WI, USA)

Outreach

2021 PBS WI meet the lab "data decoder" program, as "data scientist", see website

2018 Peking University Biology Museum, as docent

2016 *Bo Wo*, Chinese National Geography Magazine, as editor