David M. Zoltowski

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—— Postdoctoral Employment

Stanford University 2022-present
Postdoctoral Fellow in Statistics
Wu Tsai Neuroscience Institute Interdisciplinary Scholar
Advised by Professor Scott Linderman and Dr. David Sussillo

—— Education

Princeton University 2017-2022
Ph.D. in Neuroscience
Graduate Certificate in Statistics & Machine Learning
Advised by Professor Jonathan Pillow

University of Cambridge 2015-2016
M.Phil. in Engineering
Churchill Scholar
Advised by Professor Máté Lengyel

Michigan State University 2011-2015
B.S. in Electrical Engineering
Board of Trustees' Award for Top Graduating GPA

—— Predoctoral Employment

Facebook Reality Labs 2020
Research Intern
Developed non-invasive, EMG-based neural interfaces

Princeton University 2016-2017
Research Assistant to Prof. Jonathan Pillow
Developed latent variable models of neural spike train dynamics during sensory decision-making

—— Publications

Amber Hu, **David Zoltowski**, Aditya Nair, David Anderson, Lea Duncker, and Scott Linderman. "Modeling Latent Neural Dynamics with Gaussian Process Switching Linear Dynamical Systems." *arXiv:2408.03330* (2024). To appear in *Advances in Neural Information Processing Systems* (2024).

Julia C Costacurta, Shaunak Bhandarkar, **David Zoltowski**, and Scott W Linderman. "Structured flexibility in recurrent neural networks via neuromodulation." *bioRxiv 2024.07.26.605315* (2024). To appear in *Advances in Neural Information Processing Systems* (2024).

Orren Karniol-Tambour, **David Zoltowski**, E. Mika Diamanti, Lucas Pinto, David W. Tank, Carlos W. Brody, and Jonathan W. Pillow. "Modeling state-dependent communication between brain regions with switching nonlinear dynamical systems." *International Conference on Learning Representations* (2024).

Bukwich, Michael, Malcolm G. Campbell, **David Zoltowski**, Lyle Kingsbury, Momchil S. Tomov, Joshua Stern, HyungGoo R. Kim, Jan Drugowitsch, Scott W. Linderman, and Naoshige Uchida. "Competitive integration of time and reward explains value-sensitive foraging decisions and frontal cortex ramping dynamics." *bioRxiv* (2023).

David Zoltowski, Diana Cai, and Ryan P. Adams. "Slice Sampling Reparameterization Gradients." *Advances in Neural Information Processing Systems* (2021).

Felix Pei, Joel Ye, **David Zoltowski**, Anqi Wu, Raeed H. Chowdhury, Hansem Sohn, *Benchmark Track* Joseph E. O'Doherty et al. "Neural Latents Benchmark '21: Evaluating latent variable models of neural population activity." In *Thirty-fifth Conference on Neural Information Processing Systems Datasets and Benchmarks Track (Round 2)*. 2021.

Stephen Keeley, **David Zoltowski**, Mikio Aoi, and Jonathan Pillow. "Modeling statistical dependencies in multi-region spike train data." *Current Opinion in Neurobiology* 65 (2020): 194-202.

David Zoltowski, Jonathan Pillow, and Scott Linderman. "A general recurrent state space framework for modeling neural dynamics during decision-making." *International Conference on Machine Learning. PMLR,* 2020.

Stephen Keeley, **David Zoltowski**, Yiyi Yu, Spencer Smith, and Jonathan Pillow. "Efficient non-conjugate Gaussian process factor models for spike count data using polynomial approximations." *International Conference on Machine Learning, pp. 5177-5186. PMLR,* 2020.

David Zoltowski, Kenneth Latimer, Jacob Yates, Alexander Huk, and Jonathan Pillow. "Discrete stepping and nonlinear ramping dynamics underlie spiking responses of LIP neurons during decision-making." *Neuron,* 2019.

David Zoltowski and Jonathan Pillow. "Scaling the Poisson GLM to massive neural datasets." *Advances in Neural Information Processing Systems* (2018).

Arash Mahyari, **David Zoltowski**, Edward Bernat, and Selin Aviyente. "A tensor decomposition based approach for detecting dynamic network states from EEG." *IEEE Transactions on Biomedical Engineering*, 2017.

David Zoltowski and Selin Aviyente. "Low-rank tensor decomposition based dynamic network tracking." *In 2014 IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, pp. 468-472. IEEE, 2014.

David Zoltowski, Edward Bernat, and Selin Aviyente. "A Graph Theoretic Approach to Dynamic Functional Connectivity Tracking and Network State Identification." *Proceedings of the 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, 2014.

David Zoltowski, Neil Dhingra, Fu Lin, and Mihailo Jovanovic. "Sparsity-promoting optimal control of spatially-invariant systems." *Proceedings of the 2014 American Control Conference*, 2014.

—— Invited Talks

Cosyne Workshop on Reconstructing Dynamical Systems from Neural Data 2024
Reverse engineering entorhinal dynamics during spontaneous remapping using LFADS-JSLDS

Asilomar Conference on Signals, Systems, and Computers 2023
Reverse engineering nonlinear dynamics of neural spiking activity

Society for Neuroscience, Neuronal Mechanisms of Decision Making Nanosymposium 2022
A general framework for modeling neural dynamics during decision-making with extensions to neural populations

NeuroDataReHack Hackathon, Allen Institute 2022
SSM: state space modeling for neural data

—— Honors and Awards

Wu Tsai Interdisciplinary Scholar	2023-2025
Appointment to NIH T32 Training Grant in Quantitative Neuroscience (*Princeton*)	2018-2020
McDonnell Fellows in Neuroscience (*Princeton University*)	2018
Churchill Scholarship	2015
Michigan State University Board of Trustees' Award (*top graduating GPA*)	2015
Tau Beta Pi Laureate Award (*one of five awarded in USA*)	2015
Capital-One NCAA Academic All-American, Second Team	2015

—— Academic Service

Reviewer for *NeurIPS* (2019 top 400 reviewer, 2022, 2023, 2024)

Reviewer for *Cosyne* (2022)
Reviewer for *ICML* (2022, top 10% of reviewers)
Reviewer for *AISTATS* (2020, 2021)

—— Teaching

From Molecules to Systems to Behavior (NEU 502A, Princeton), Assistant in Instruction	2019
Mathematical Tools for Neuroscience (NEU 314, Princeton), Assistant in Instruction	2018