Yuan Zhao

Research Scientist
Machine Learning Core
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Experience

- **Research Scientist** — Aug 2021–present
  Machine Learning Core, NIMH — *Bethesda, MD*
- **Postdoctoral Associate** — Aug 2016–Aug 2021
  The Research Foundation for SUNY — *Stony Brook, NY*

Education

- **Stony Brook University** — **Stony Brook, NY**
  Ph.D., Applied Mathematics and Statistics — *2016*
  Advisors: Dr. Hongshik Ahn and Dr. Il Memming Park
- **The George Washington University** — **Washington, DC**
  M.S., Statistics — *2012*
- **Beihang University** — **Beijing, China**
  M.E., Computer Science — *2009*
- **China University of Mining and Technology** — **Xuzhou, China**
  B.E., Computer Science — *2005*

Selected Publications

Papers[1]

[1] Ido Maor, Ilana Ascher, Yuan Zhao, Yuji Takahashi, Evan Hart, Francisco Pereira, Geoffrey Schoenbaum. *Persistent representation of a prior schema in the orbitofrontal cortex facilitates learning of a conflicting schema.* Nature Communications (in press), 2025.

[2] Rajtarun Madangopal, Yuan Zhao, ... *Distinct prelimbic cortex ensembles encode response execution and inhibition.* PNAS, 2025.

[1]* Equal contribution

[3] Ana R. Inácio, Ka Chun Lam, Yuan Zhao, Francisco Pereira, Charles R. Gerfen, Soohyun Lee. *Brain-wide presynaptic networks of functionally distinct cortical neurons.* Nature, 2025.

[4] Matthew Dowling, Yuan Zhao, Il Memming Park. *eXponential FAmily Dynamical Systems (XFADS): Large-scale nonlinear Gaussian state-space modeling*. Advances in Neural Information Processing Systems 37 (NeurIPS), 2024.

[5] Vermani, A., Dowling, M., Jeon, H., Jordan, I., Nassar, J., Bernaerts, Y., Zhao, Y., Vaerenbergh, S.V. and Park, I.M. *Real-time machine learning strategies for a new kind of neuroscience experiments.* European Signal Processing Conference. Lyon, France, 2024.

[6] Matthew Dowling, Yuan Zhao, Il Memming Park. *Linear time GPs for inferring latent trajectories from neural spike trains.* The Fortieth International Conference on Machine Learning (ICML), 2023.

[7] Matthew Dowling, Yuan Zhao, Il Memming Park. *Real-time variational method for learning neural trajectory and its dynamics.* The Eleventh International Conference on Learning Representations (ICLR), 2023. (top 25%, spotlight)

[8] Aaron J. Levi*, Yuan Zhao*, Il Memming Park, Alex C. Huk. *Sensory and choice responses in MT distinct from motion encoding.* Journal of Neuroscience, 2023. (featured)

[9] Yuan Zhao*, Josue Nassar*, Ian Jordan and Il Memming Park. *Streaming Variational Monte Carlo.* IEEE Transactions on Pattern Analysis and Machine Intelligence, 2022.

[10] Diego M. Arribas, Yuan Zhao and Il Memming Park. *Rescuing neural spike train models from bad MLE.* Advances in Neural Information Processing Systems 33 pre-proceedings (NeurIPS), 2020.

[11] Yuan Zhao and Il Memming Park. *Variational online learning of neural dynamics.* Frontiers In Computational Neuroscience, 2020.

[12] Yuan Zhao, Jacob Yates, Aaron Levi, Alex Huk and Il Memming Park. *Stimulus-choice (mis)alignment in primate MT cortex.* PLOS Computational Biology, 2020.

[13] J. Nassar, S. Linderman, Yuan Zhao, M. Bugallo and I. M. Park. *Learning structured neural dynamics from single trial population recording.* 52nd Asilomar Conference on Signals, Systems and Computers, 2018.

[14] K. Esfahany, I. Siergiej, Yuan Zhao and I. M. Park. *Organization of neural population code in mouse visual system.* eNeuro, Society for Neuroscience, 2018.

[15] Yuan Zhao and Il Memming Park. *Variational latent Gaussian process for recovering single-trial dynamics from population spike trains.* Neural Computation, 29(5), May 2017.

[16] Yuan Zhao and Il Memming Park. *Interpretable nonlinear dynamic modeling of neural trajectories.* Advances in Neural Information Processing Systems 29 (NIPS), 2016.

Conference Abstracts

[1] Siyu Wang, Yuan Zhao, Ramon Bartolo, Francisco Pereira, Bruno Averbeck. *Dynamical changes of attractor landscapes during reinforcement learning in macaque prefrontal cortex.*. Computational and Systems Neuroscience (COSYNE), 2024.

[2] Yuan Zhao, Josue Nassar and Il Memming Park. *Real-time discovery of effective dynamics from streaming noisy neural observations.* Computational and Systems Neuroscience (COSYNE), 2020.

[3] Josue Nassar, Scott Linderman, Yuan Zhao, M´onica Bugallo and Il Memming Park. *Learning structured neural dynamics from single trial population recording.* 52nd Asilomar Conference on Signals, Systems and Computers, 2018.

[4] Kathleen Esfahany, Isabel Siergiej, Yuan Zhao and Il Memming Park. *Organization of neural population code in mouse visual system.* Computational and Systems Neuroscience (COSYNE), 2018.

[5] Yuan Zhao and Il Memming Park. *Accessing neural states in real time: recursive variational bayesian dual estimation.* Computational and Systems Neuroscience (COSYNE), 2018.

[6] Yuan Zhao, Jacob Yates and Il Memming Park. *Low-dimensional state-space trajectory of choice at the population level in area MT.* Computational and Systems Neuroscience (COSYNE), 2017.

[7] Yuan Zhao and Il Memming Park. *Gotta inferem all: dynamical features from neural trajectories.* Computational and Systems Neuroscience (COSYNE), 2017.

[8] Yuan Zhao and Il Memming Park. *Inferring low-dimensional network dynamics with variational latent Gaussian process.* Organization for Computational Neuroscience (CNS), 2016.

[9] Yuan Zhao and Il Memming Park. *Variational inference of latent Gaussian neural dynamics.* International Conference on Machine Learning (ICML) Workshop on Computational Biology, 2016.

Reviewed Journals and Conferences

- IEEE Transactions on Signal Processing
- Neurons, Behavior, Data analysis, and Theory

- Transactions on Machine Learning Research
- Scientific Reports
- Communications in Statistics – Theory and Methods
- Communications in Statistics – Simulation and Computation
- STAR Protocols, Cell Press

- Computational and Systems Neuroscience (Cosyne)
- Neural Information Processing Systems (NeurIPS)
- International Conference on Learning Representations (ICLR)
- International Conference on Machine Learning (ICML)

Talks

- AMS Spring Eastern Sectional Meeting — Washington DC, 2024
  Reverse-engineer the neural computation underlying population dynamics
- Neuromatch 3.0 — 2020
  Noncorrupting decision-making feedback to area MT
- ICML Workshop on Computational Biology — New York, 2016
  Variational inference of latent Gaussian neural dynamics

Teaching

- NEU 501: Introduction to Neuroscience Research — Stony Brook University, 2020

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