Zitong Wang

Email: zitongw71@gmail.com Website: https://zitongwang-dev.github.io/

EDUCATION

Carnegie Mellon University Pittsburgh, PA
M.S. in Biomedical Engineering 08/2021 - 05/2023
Fudan University Shanghai, China
B.E. in Electrical Engineering and Automation 09/2016 - 06/2020

PUBLICATIONS

Massot, C.*, Zhang, X.*, **Wang, Z.***, Rockwell, H., Papandreou, G., Yuille, A., & Lee, T.-S. (2023). Cue-Invariant Geometric Structure of the Population Codes in Macaque V1 and V2. *In preparation for PNAS*. (Preprint available on bioRxiv, 2023-12). * denotes co-first authorship.

Qian, Z., Cui, X., **Wang, Z.**, Zhou, G., Lin, R., Gu, E., & Tian, P. (2021). Characteristics of Underwater Lighting Based on White LEDs. *Optik, 245*, 167638.

CONFERENCE PRESENTATIONS

Wang, Z., & Herman, J. P. (2026). Strategic Reshaping of the Attentional Axis in Primate Superior Colliculus. *Abstract submitted to Computational and Systems Neuroscience (COSYNE) 2026*.

Wang, Z., Zhang, X., Massot, C., Rockwell, H., Papandreou, G., Yuille, A., & Lee, T.-S. (2025). Cue-Invariant Geometric Structure of the Population Codes in Macaque V1 and V2. *Poster presented at Computational and Systems Neuroscience (COSYNE) 2025*.

Wang, Z., & Herman, J. P. (2024). Beyond Behavioral Relevance: Primate Superior Colliculus Retains Visual Event Features in an Attention Task. *Poster presented at the Society for Neuroscience (SfN) Annual Meeting 2024*.

HONORS & AWARDS

COSYNE 2025 Best Poster Award, sponsored by *PRX Life*
COSYNE 2025 Presenters Travel Grant

RESEARCH

Population coding in primate superior colliculus 09/2023 – Present
Supervisor: **James P. Herman** University of Pittsburgh

Strategic reshaping of the attentional axis

- Investigated how the neural geometry of attention in the superior colliculus (SC) adapts to varying levels of task predictability.
- Discovered that the SC forms distinct, decodable preparatory neural states when task demands are predictable, but not when they are unpredictable.

- Demonstrated that the switch between preparatory states is not a simple gain modulation but a "fundamental geometric reconfiguration" of the SC's population code.
- Quantified this reconfiguration by analyzing the "attentional axis", revealing that the "attentional axis" dynamically reshapes—rotating to become orthogonal or even inverted—to create distinct representations tailored to specific task demands.

Population coding in primate early visual cortex 12/2021-Present
Supervisor: **Tai-Sing Lee** Carnegie Mellon University
Cue-invariant geometric structures in the V1 and V2 populations

- Investigated cue-invariant geometric structures in V1 and V2 population codes for representing 2D surface boundary concepts across different visual cues.
- Developed a cue-transfer decoding approach using Procrustes analysis to align population codes and quantify cue invariance.
- Demonstrated that cue-invariant structures are preserved across subpopulations within V1 and V2, between V1 and V2, and in pooling layers of AlexNet and VGG computational models.
- Showed that cue-transfer decoding accuracy scales with neural population size, highlighting the stability of the population code geometry.

Familiarity effects and noise correlation of the early visual cortex

- Performed neural decoding to evaluate the impact of familiarity training on stimulus discriminability and found improved decoding accuracy in the early-evoked visual response.
- Evaluated noise correlation of neuronal pairs before and after the familiarity training and found that familiarity training reduced the correlation in neuronal pairs with initially low correlation, while enhancing the correlation in pairs with high correlation.

GaN-based micro-LED and its applications 12/2018 - 05/2020
Supervisor: **Pengfei Tian** Fudan University
Properties of underwater white-light LEDs

- Designed the experiment flow and simulated the scattering particles in different regions of the ocean by adding different amounts of aluminum hydroxide solution.
- Measured spectral, illuminance, and color rendering parameters of white LEDs at varying distances in simulated turbid water.
- Evaluated the irradiation parameters with the change of irradiation distance and concentration of water particles.
- Calculated color rendering indices from measured spectral data.

RESEARCH INTERESTS AND SKILLS

Interests: Neural Population Geometry, Computational Vision, Machine Learning
Programming Languages: MATLAB, Python