Zhenan Shao

+1 952 666 8925 ◇ zhenans2@illinois.edu ◇ shaox192.github.io
github: shaox192 ◇ Linkedin: zhenanshao

EDUCATION BACKGROUNDS

University of Illinois Urbana-Champaign August 2020 - expected Jan 2025
PhD, Psychology (Cognitive Neuroscience), Advisor: *Diane M. Beck* GPA: 4.0/4.0
Thesis: *A Deep Learning Approach to Evaluating Ventral Visual Stream Contributions to Human Visual Robustness.*

University of Illinois Urbana-Champaign January 2024 - May 2025
Master of Computer Science GPA: 3.94/4.0

University of Minnesota, Twin-Cities August 2016 - May 2020
Bachelor of Science, Psychology, Advisor: *Sheng He* GPA: 4.0/4.0
Minor: Statistics, Neuroscience

RESEARCH EXPERIENCES

Stanford Trustworthy AI Research (STAIR), Stanford June 2024 - August 2024
- Led human-inspired AI projects, including designing ViT and CNN architectures augmented with feedback connections from human neural activity to enhance their adversarial robustness.
- Developed generative models for simulating human brain activity while leveraging large-scale datasets, thus contributing to tools available to the neuroscience community.

Attention and Perception Lab, UIUC August 2020 - Present
- Led interdisciplinary projects combining deep learning with vision neuroscience to uncover mechanisms behind human object recognition invariance.
- Applied multivariate pattern analysis (MVPA) techniques, including RSA, SVM, and ICA, to neuroimaging data, advancing the theoretical framework of the human visual system as a generative model.

Vision and Attention Lab, UMN January 2019 - May 2020
- Developed and coded the experimental procedure in Matlab while configuring the necessary experimental equipment for optimal performance.
- Conducted comprehensive statistical analysis using R and Python on human behavioral data and designed advanced visualization of experimental results.

PUBLICATIONS AND PREPRINTS

[1] Beck, D. M., Center, E., **Shao, Z.** (2024). The Role of Real-world Statistical Regularities in Visual Perception. *Current Directions in Psychological Science*, 33(5), 317-324. https://doi.org/10.1177/09637214241268083.

[2] **Shao, Z.**, Ma, L., Li, B., Beck, D. M. (2024). *Leveraging the Human Ventral Visual Stream to Improve Neural Network Robustness.* arXiv, https://arxiv.org/abs/2405.02564

[3] **Shao, Z.**, Beck, D. M. (2024). Is Attention Necessary for the Representational Advantage of Good Exemplars over Bad Exemplars? *European Journal of Neuroscience, 59*(9), 2129-2415. https://doi.org/10.1111/ejn.16291

CONFERENCE PRESENTATIONS

[1] **Shao, Z.**, Zhou, Y., Beck, D. M., Human Visual Robustness Emerges from Manifold Disentanglement in the Ventral Visual Stream (2025). Oral Presentation at *Vision Science Society (VSS)*, St. Pete Beach, FL. [LINK]

[2] **Shao, Z.**, Ma, L., Li, B., Beck, D. M., Neural-guidance by the Human Ventral Visual Stream Improves Neural Network Robustness (2024). Oral Presentation at *Sandia National Laboratories Annual Machine Learning/Deep Learning (MLDL) Workshop*, Virtual. [LINK]

[3] **Shao, Z.**, Ma, L., Li, B., Beck, D. M., Increasing robustness of ventral visual cortex revealed by neurally-guided deep neural networks (2024). Poster presented at *Society for Neuroscience (SfN)*, Chicago, IL. [LINK]

[4] **Shao, Z.**, Ma, L., Li, B., Beck, D. M., Does Leveraging the Human Ventral Visual Stream Improve Neural Network Robustness? (2024). Oral Presentation at *Vision Science Society (VSS)*, St. Pete Beach, FL. [LINK]

[5] **Shao, Z.**, Beck, D. M. (2023). Is Attention Necessary for the Representational Advantage of Good Exemplars over Bad Exemplars? Poster presented at *Vision Science Society (VSS)*, St. Pete Beach, FL. [LINK]

[6] Yang, P-L., **Shao, Z.**, Beck, D. M. (2023). The similarity of CNN, behavioral, and PPA feature spaces. Poster presented at *Vision Science Society (VSS)*, St. Pete Beach, FL. [LINK]

[7] Castro, M., **Shao, Z.**, Engstrom, M., Teoh, J. Y., Quevedo, K. (2019). Neural correlates of maltreatment timing during self-processing in depressed adolescents. Poster presented at *Minnesota Supercomputing Institute (MSI) Research Exhibition*, Minneapolis, MN.

HONORS AND AWARDS

Dissertation Completion Fellowship 2025-2026
Graduate college, UIUC

FoVea Travel and Networking Award 2025
FoVea

Winner of Bio-informed AI Research Competition 2023
Beckman Institute, UIUC

Elsevier/Vision Research Travel Award 2023
The 23th Annual Meeting of the Vision Sciences Society (VSS2023)

Graduate College Conference Presentation Awards 2023-2025
Department of Psychology, UIUC

Illinois Distinguished Fellowship 2020-2023
Graduate College, UIUC

Graduate with high distinction 2020
University of Minnesota, Twin-Cities

Dean's List 2016-2020
University of Minnesota, Twin-Cities

Maroon Global Excellence Scholarship 2016-2020
University of Minnesota, Twin-Cities

SERVICES

Teaching Assistant	*Instructor* for PSYC 100, UIUC: Intro to Psychology (Fall 2022)
	PSYC 489, UIUC: Neural Network Modeling Lab (Spring 2022)
	PSYC 220, UIUC: Image of Mind (Spring 2025)
	PSYC 403, UIUC: Memory and Amnesia (Fall 2024)
	NSCI 2100, UMN: Human Neuroanatomy (Spring 2020)
Reviewer	Imaging Neuroscience
Outreach	Beckman Openhouse, UIUC (Spring 2024)
	Aurora Center for Advocacy and Education, UMN (2016-2020)

SKILLS

Programming Languages	Python, C/C++, CUDA, R, Matlab, Java, SPSS
ML Frameworks	Pytorch, TensorFlow
Database	MySQL, MongoDB, Neo4j