Ziqi Shen

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Cognitive and Psychological Sciences, Computer Science

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Research Interests

Brain–computer interfaces; speech decoding and, in the longer term, memory decoding methods; representational geometry of neural population activity; machine learning for neural and biomedical data.

Education

2023–2027 **Brown University**, Providence, RI
Sc.B. Cognitive Neuroscience, Sc.B. Computer Science — GPA 3.83

2020–2023 **Shanghai Pinghe School**, Shanghai, China
International Baccalaureate Diploma — 44/45

Research Experience

2025–present **BrainGate — Brown University**, Providence, RI
Research Assistant (PI: Leigh Hochberg)

- Honors thesis: testing whether the premotor/primary motor cortices encode bimanual cooperative context independent of kinematics.
- Independent feature-extraction study: analyzed intracortical population activity from a C4 SCI participant across 10 multisensory conditions (combination of motor control, proprioceptive feedback, vision); compared spike-band power and threshold crossings, finding spike-band power significantly more reliable and some sensory pairings indistinguishable at the population level.
- Built a Unity-based environment for real-time neural control of a soft robotic arm by participants with tetraplegia; refactored a 1,600-line codebase and expanded the degrees of freedom available for assistive movement.

2024–present **Favila Memory Lab — Brown University**, Providence, RI
Research Assistant (PI: Serra E. Favila)

- Validated Shepard's Universal Law of Generalization using human fMRI responses to the THINGS image set and by comparing representational geometry between fMRI data and deep neural network embeddings.
- Analyzed eye-tracking data from the learning phase of a memory experiment to examine the development of visual attention.

Summer 2026 **Predictive Science Lab — Purdue University**, West Lafayette, IN
SURF Fellow (PI: Ilias Bilionis)

- Developing an optimal-transport loss as a tool for medical-imaging inverse problems, including joint MRI registration and segmentation.

Summer 2024 **Center for Computation & Visualization — Brown University**, Providence, RI
Data Science Intern

- Trained a YOLO-based computer-vision pipeline to detect astrocytes in a 1,200-image microscopy dataset (79% accuracy); built Dockerized TensorFlow workflows on Brown's OSCAR high-performance computing cluster.

Honors & Awards

2026 Summer Undergraduate Research Fellowship (SURF), Purdue University

2025 Undergraduate Teaching and Research Award (UTRA), Brown University

Manuscripts in Progress

Dey, A., Shen, Z., Bilionis, I. *A Neural Optimal Transport Loss for Biomedical Multimodal Distribution-to-Atlas Alignment.* (In preparation)

Shen, Z., Carstensen, D., Favila, S. *Shepard's Universal Law of Generalization in Human Visual Cortex: fMRI Evidence and Representational Alignment with Deep Neural Networks.* (In preparation)

Publications

Shen, Z. (2023). Efficacy of Sports Interventions for Children with Autism Spectrum Disorder and Promising Targets : A Review. *Journal of Student Research*, 12(1). https://doi.org/10.47611/jsrhs.v12i1.3894

Presentations

Shen, Z. (2026, July). *Diffeomorphic Neural Optimal Transport for Agentic MRI Joint Registration and Segmentation* [Poster presentation, forthcoming]. Purdue Summer Undergraduate Research Symposium, West Lafayette, IN.

Shen, Z. (2025, August). *Towards Restoring Upper Limb Movement for Individuals with Paralysis using a Posture-tracking Unity Game* [Poster presentation]. Brown University Summer Research Symposium, Providence, RI.

Leadership, Service, & Extracurriculars

2025–present **Meiklejohn Peer Advisor**, Brown University
Advise six students in every class on course and concentration choices.
Organize advising events and socials.

2023–present **Captain, Brown University Badminton Club**
Ranked Top 30 in the United States.
Coach team practices and organize recruitment.