AmirHossein Yavari

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Education

University of Oklahoma *Ph.D. Student in Biomedical Engineering* *Sep 2024 – Present*

Advisor: Dr. Farnaz Zamani Esfahlani

Sharif University of Technology *Bachelor of Science in Mathematics* *Sep 2017 – May 2023*

Research Interests

I am interested in developing methods to characterize the latent geometric structures in high-dimensional neural activity, enabling principled comparisons of computational strategies across different brains and models.

Manuscripts

[1] *(In Preparation)* **A. Yavari**, F. Zamani Esfahlani. "Beyond Activation Alignment: The Geometry of Neural Sensitivity."

[2] *(In Preparation)* **A. Yavari**, J. Faskowitz, R. Betzel, F. Zamani Esfahlani. "Dynamics of Cortico-Subcortical Interactions in Functional Brain Networks."

Conference Presentations

[1] **A. Yavari**, J. Faskowitz, R. Betzel, F. Zamani Esfahlani. "Dynamics of Cortico-Subcortical Interactions in Functional Brain Networks." *Society for Neuroscience (SfN) Annual Meeting, San Diego, CA, November 2025.*

Research Experience

University of Oklahoma *Research Assistant* *Sep 2024 – Present*

Geometric Model Comparison: Developing metrics to compare representation geometry across architectures and distinguish behavioral from mechanistic similarity; building scalable analysis workflows in **JAX** on TPU.
Functional Connectivity & State-Space Modeling: Applying network science methods to large-scale neuroimaging data (HCP), including state-space clustering to identify latent regimes and permutation-based null models to isolate temporal coupling structure.

Teaching Experience

University of Oklahoma *Teaching Assistant* *Spring 2026 – Present*

BME Design II (Capstone Design): Evaluating design documentation; coaching teams through requirements, risk, prototyping, and final reviews.

Skills

Frameworks & Languages: JAX, PyTorch, Python, TensorFlow, R, MATLAB, Git.
Mathematical: Differential Geometry, Statistical Analysis, Graph Theory, Linear Algebra.

Honors & Awards

2025 GCoE Graduate Student Travel Award.
2025 Third place, American Airlines Operation Research Hackathon.
2021 Best Poster Award, Eastern European Machine Learning (EEML) Summer School.

Relevant Coursework

Neuroscience: Behavioral Neurobiology, Neurobiology of Disease, Neural Data Science.

Mathematics & CS: Functional Analysis, Real Analysis, Topology, Network Optimization, Probability & Statistics, Theory of Computation.