

# AmirHossein Yavari

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 GitHub • amirhosseinyavari.github.io

## EDUCATION

**University of Oklahoma** Ph.D. Student in Biomedical Engineering  
Advisor: Dr. Farnaz Zamani Esfahlani

Sep 2024 - Present

**Sharif University of Technology** Bachelor of Science in Mathematics

Sep 2017 - May 2023

## RESEARCH FOCUS

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 IN PREPARATION

- [1] **A. Yavari**, F. Zamani Esfahlani. "Beyond Activation Alignment: The Geometry of Neural Sensitivity." *(In Preparation)*.
- [2] **A. Yavari**, J. Faskowitz, R. Betzel, F. Zamani Esfahlani. "Dynamics of Cortico-Subcortical Interactions in Functional Brain Networks." *(In Preparation)*.

## 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

**Biomedical Engineering Department, University of Oklahoma** Graduate Researcher Sep 2024 – Present

- **Geometric Model Comparison:** Formulating metrics for analyzing the geometry of learned representations across architectures. Focused on distinguishing behavioral similarity from mechanistic similarity using differential- and information-geometric techniques. Built scalable large-model analysis workflows in **JAX** on TPU.
- **Neural Dynamics & State-Space Modeling:** Applied dynamical systems approaches to large-scale neuroimaging data (HCP).
  - Developed a **state-space clustering framework** to map high-dimensional time series into latent regimes of network integration and segregation.
  - Designed permutation-based null models to isolate the temporal coupling structures.

**University of Essex** Scientific Collaborator

Sep 2020 – Jun 2021

- Co-developed classifiers for Potentially Idiomatic Expressions (PIE), focusing on the distributional semantics of idiomatic intent.

## SKILLS

**Frameworks & Languages:** JAX, PyTorch, Python, TensorFlow, R, MATLAB, Git.  
**Mathematical:** Differential Geometry, Stochastic Processes, 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**

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

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