

# Mozes Jacobs

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## EDUCATION

- **Harvard University** 2023 - 2028 (expected)  
*Ph.D. Computer Science* | *Advised by Prof. Demba Ba* | *Kempner Institute Graduate Fellowship* Cambridge, MA
- **University of Washington** 2018 - 2022  
*B.S. Computer Science* | *Advised by Prof. Rajesh Rao* | *GPA: 3.99 / 4.00* Seattle, WA

## PUBLICATIONS

- [1.] **Jacobs M.**, Budzinski RC., Muller L., Ba D., Keller TA. (2025). **Traveling Waves Integrate Spatial Information Through Time**. *CCN 2025*.
- [2.] **Jacobs M.**, Budzinski RC., Muller L., Ba D., Keller TA. (2025). **Traveling Waves Integrate Spatial Information Intro Spectral Representations**. *ICLR 2025 Re-Align Workshop*.

## PREPRINTS

- [1.] **Jacobs M.\***, Fel T.\*, Hakim R.\*, Brondetta A., Ba D., Keller TA. (2025). **Block-Recurrent Dynamics in ViTs**. *Under review at ICLR 2026*.
- [2.] **Jacobs M.**, Brunton BW., Brunton SL., Kutz JN., Raut RV. (2023). **HyperSINDY: Deep Generative Modeling of Nonlinear Stochastic Governing Equations**. *Preprint on arXiv*.

## INVITED TALKS

- [1.] **Traveling Waves Integrate Spatial Information Through Time**. Neural Computations: Dynamics Across Space, Time, and Task - CCN. August 15, 2025.
- [2.] **Can Your Neurons Hear the Shape of an Object?** Frontiers in NeuroAI Symposium - Kempner Institute. June 6, 2025.

## PROFESSIONAL EXPERIENCE

- **Kempner Institute and CRISP Group** 2023 - Present  
*Graduate Research Fellow* | *Advisor: Demba Ba* | *Collaborators: Thomas Fel, T. Andy Keller* Cambridge, MA
  - **Foundation Models (Interpretability / Compression)** Distilled DINOv2 into 2 recurrent blocks (84% size reduction), recovering 94% of DINOv2 ImageNet-1k linear probe accuracy. Extensive experience training and studying large transformer-based vision models such as DINOv2.
  - **Computational Models of Traveling Waves** Designed convolutional recurrent models that produce traveling waves for global spatial information integration, outperforming U-Nets of comparable sizes on visual semantic segmentation tasks.
- **Allen Institute | AI Institute in Dynamic Systems** 2022 - 2023  
*Shanahan Foundation Predoctoral Fellow* | *Advisors: J. Nathan Kutz, Steve Brunton, Ryan Raut* Seattle, WA
  - **HyperSINDY** Developed *HyperSINDY*, a probabilistic framework for modeling stochastic dynamics via a deep generative model of sparse governing equations. *HyperSINDY* takes advantage of hypernetworks and amortized variational inference to provide uncertainty quantification for stochastic dynamical systems.
- **Neural Systems Lab** 2019 - 2022  
*Undergraduate Research Assistant* | *Advisor: Rajesh Rao* Seattle, WA
  - **Gradient Origin Predictive Coding** Developed *Gradient Origin Predictive Coding* for next-frame prediction and video generation by merging predictive coding theories of cortical function from neuroscience and Bayesian approaches to deep learning.
- **Noble Lab** 2020 - 2022  
*Undergraduate Research Assistant* | *Advisor: Bill Noble* Seattle, WA
  - **PASTIS Optimization and Logging** Helped develop *PASTIS*, a Poisson-based algorithm that infers 3-D chromatin structures from Hi-C contact maps. Created workflow scripts and reduced memory cost of the PASTIS algorithm.

## AWARDS

- **Kempner Institute Graduate Fellowship** 2023 - Present
- **Shanahan Foundation Predoctoral Fellowship** 2022
- **Burkhardt Family Endowed Scholarship** 2020, 2021
- **Gary A. Kildall Endowed Scholarship** 2019
- **Boeing Scholarship** 2018

## SKILLS

- **Technical Skills** Python | PyTorch | scikit-learn | HuggingFace | Java
- **Relevant Coursework** Intro to Probability | Machine Learning | Big Data Systems | HCI | Geometric Machine Learning