

# Mohit Kulkarni

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## EDUCATION

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<b>Harvard University</b> <i>Masters Thesis, Applied Mathematics</i>	2024 – 2025
<b>ETH Zurich and University of Zurich</b> <i>M.Sc, Neural Systems and Computation</i>	2023 – 2025
<b>Indian Institute of Technology, Kanpur</b> <i>B.S, Mathematics and Scientific Computing. Minor in Machine Learning</i>	2019 – 2023

## PUBLICATIONS

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**Kulkarni, M.\***, Chaudhry, H.\*, Pehlevan, C. (Under Review). “Test-time scaling meets associative memory: Challenges in subquadratic models.”

Daie, K., Rozsa, M., Humpreys, P., Lillicrap, T.P., Clopath, C., Grabska-Barwinska, A., Kinsey, L., **Kulkarni, M.**, Botvinick, M.M., Svoboda, K. “Optical brain computer interface for measuring circuit plasticity during learning.”


## EXPERIENCE

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<b>Teaching Fellow, SEAS, Harvard University</b>	2025 – Present
<b>Research Fellow, SEAS, Harvard University</b> Prof. Cengiz Pehlevan	2024 – Present
– Explored efficiency versus reasoning trade-offs in linear attention and hybrid architectures. Pre-trained, fine-tuned and scaled inference for sub-quadratic models of size 1B, 3B, and 7B using <code>flash-linear-attention</code> and <code>vLLM</code> .	
<b>Research Assistant, Allen Institute for Neural Dynamics</b>	2020 – 2023
Dr. Karel Svoboda, Dr. Kayvon Daie	
– Built a scalable and efficient data analysis pipeline on GCP using <code>DataJoint</code> . Developed RNN models to understand learning in biological and artificial networks, comparing model predictions with experimental 2-Photon recordings.	
<b>Visiting Researcher, Imperial College London</b>	2021
Prof. Dan Goodman and Dr. Friedemann Zenke (FMI, Basel)	
– Created <code>SNUFA100</code> and <code>SNUFA100_sentence</code> datasets for evaluating Spiking Neural Networks; implemented baseline with surrogate gradient descent.	

## SELECTED PROJECTS

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<b>GPU-accelerated Terminal Emulator</b>   <i>Personal Project</i>	<a href="#">GITHUB</a> 
– Developed a C++/OpenGL based terminal emulator with support for colors, advanced text rendering (ANSI X3.64) and ligatures; now integrating LLM function calling for seamless in-terminal AI capabilities.	
<b>Sign Language Segmentation</b>   <i>Course Project, NLP</i>	
– Generated features from videos using I3D, combined them with subtitle features, and passed them through an MS-TCN model. Achieved an F1 score of 32%, state of the art for temporal segmentation of Indian sign language.	

## HONORS AND AWARDS

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<b>Heyning-Roelli Foundation Scholarship</b>   For Masters Thesis at Harvard	2024
<b>Brain Computation and Learning Workshop Travel Grant</b>   IISc Bangalore	2023
<b>Cosyne 2022, Undergraduate Travel Grant</b>   Lisbon, Portugal	2022
<b>INSPIRE Scholarship</b>   Awarded throughout Bachelors	2019 – 2023
<b>All India Rank 637</b>   JEE Advanced	2019

## SKILLS

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**Programming** | Python, C++, C, CUDA C  
**Tools** | PyTorch, vLLM, OpenRLHF, DeepSpeed, Ray