Eva Yi Xie

Oakdale, NY 11769
347-605-8025 xieyi@mit.edu linkedin.com/in/eva-yi-xie1128/ minzsiure.github.io

EDUCATION

Massachusetts Institute Of Technology **Sep. 2020 - Expected May 2024**
Bachelor of Science in Mathematics and in Computer Science (double majors) *GPA: 4.9/5.0*

RESEARCH EXPERIENCE

Fiete Lab at MIT McGovern Institute **September 2023 – Current**
Undergraduate Researcher (PI: Ila Fiete) *Cambridge, MA*
- Build multi-regional neural circuits to study evidence accumulation and decision-making w/ Princeton experimentalists.

Poggio Lab at MIT CBMM **January 2022 – Current**
Undergraduate Researcher (PI: Tomaso Poggio) *Cambridge, MA*
- Investigate empirically and theoretically that compositional sparsity is the key principle underlying machine learning.
- Develop theories in learning & memory w/ biologically plausible Assembly Calculus, in collab w/ experimentalists.

Madry Lab at MIT CSAIL **September 2022 – June 2023**
Undergraduate Researcher (PI: Aleksander Madry, SuperUROP Mason Scholar) *Cambridge, MA*
- Develop effective *and* computationally tractable data selection method at large scale for Language Models.
- Demystify causal relationship of concept-based interpretability in Network Dissection for constructing aligned models.
- Investigate the use of image generative models in identifying subpopulation-based ML model failure.

Biomechatronics Group at MIT Media Lab **February 2021 – January 2022**
Undergraduate Researcher (PI: Hugh Herr) *Cambridge, MA*
- Designed and fabricated electronic and software tools for optically-modulated prosthetic for amputees & stroke patients.
- Secured NDA approval for rodent experimentations, contributing to implanting optogenetic stimulation hardware and conducting experiments for the development of a closed-loop controller system for motion restoration.

MIT Computational Reactor Physics Group **August 2020 – January 2021**
Undergraduate Researcher (PI: Benoit Forget) *Cambridge, MA*
- Created open-source fast nuclear reactor geometry template for OpenMC global community. [linked]

Andolfatto Lab at Columbia University **June 2019 – November 2019**
Genomics Research Assistant (PI: Peter Andolfatto) *Manhattan, NY*
- Exposed 30 Drosophila M. strains to cardenolides and improved previous protocal to save half of the assay budget.
- Identified 4 SNPs with potentials to improve Cardiovascular Disease treatments thro Genetic Association Studies in R.

INDUSTRY EXPERIENCE

IBM Research **May 2023 – September 2023**
Machine Learning Research Intern (Advisor: Jie Chen) *Cambridge, MA*
- Developed gTDR: open-source advanced graph-based ML toolkit for temporal, dynamic & relational data.
- Research the use of transformer architecture in GNN to facilitate a foundation model.

Microsoft AI Development Acceleration Program (MAIDAP) **January 2023**
Machine Learning Intern *Microsoft R&D Center, MA*
- Worked end-to-end on a computer vision based product for waste categorization with precision and low latency.
- Developed relevant training pipelines from the ground up and enabled model deployment with interpretability tools (via collaboration w/ Azure Machine Learning team and MSR); deployed deliverables with half of the expected time.
- The project was highlighted in Microsoft's T&R newsletter.

Meta/Facebook **May 2022 - August 2022**
Full Stack Software Engineer Intern (Facebook App Monetization ENG) *Menlo Park, CA*
- Developed in-production features under a data-driven approach using Objective-C, PHP, Javascript, GraphQL, A/B testings to close top-line 20% connection gaps originated in new monetization initiatives among 60 million businesses.
- Pioneered and led cross-org mobile dev framework migration as the *first* engineer across the entire Facebook App org.
- Authored internal guidelines and wiki to teach senior engineers how to tackle dev migration; saved 50% research time.

Facebook **June 2021 – August 2021**
Facebook University Engineering Intern - IOS Track *Menlo Park, CA*
- Utilized Objective-C, data querying, database cacheing, REST APIs & SDKs, and XCode in IOS App development.
- Designed, wire-framed, developed, tested, & demoed an original IOS mobile app. github.com/minzsiure/Foodie

MANUSCRIPTS & CURRENT PROJECTS

- (In preparation) **Xie, Y.**, Liu A., Fiete I. *Representation of Neural Populations for Outliers-Responding and Evidence Integration in A Dynamic Sensory Environment.*
- (In preparation) **Xie, Y.**, Rangamani, A., Poggio T. *Compositional Sparsity in Transformer Models.*
- **Xie, Y.**, Hwang J., Brody C., Tank D., Fiete I. (2023). *A Multi-region Brain Model to Shed Light on the Role of Hippocampus in Spatially Embedded Decision Tasks.* Submitted to COSYNE 2024.
- **Xie, Y.**, Rangamani, A., Miller E., Poggio T. (2023). *Synaptic Plasticity Explains the Creation and Convergence of Ensembles During Interhemispheric Transfer of Working Memory.* ICoN grant. SfN23. Prep for J. Neuroscience.
- **Xie, Y.***, Li, Y.*, Rangamani, A., Poggio T. (2023). *Skip Connections Increase the Capacity of Associative Memories in Variable Binding Mechanisms.* Under review for IEEE Transactions on Neural Networks and Learning Systems. [*Memo*]
  - To appear in NeurIPS Associative Memory & Hopfield Networks.
  - Presented to the 32nd Annual Computational Neurosciences Meeting (CNS*23), Leipzig, Germany.
  - Accepted to the Conference on Cognitive Computational Neuroscience (CCNeuro23), Oxford, UK.
- **Xie, Y.***, Engstrom, L.*, Madry A. (2023). *Is Network Dissection Confounded by the Spurious Correlation?* [*Abstract*]
- **Xie, Y.** and Rangamani, A. (2022). *Understanding the Role of Recurrent Connections in Assembly Calculus.* Center for Brains, Minds and Machines (CBMM) Memo 137 (working paper of the IEEE Trans paper). [*Memo*]

TALKS & PRESENTATIONS

- Incoming poster presentation at AMHN Workshop @NeurIPS 2023, New Orleans, LA, Dec 15 2023.
- Poster presentation at Society for Neuroscience Annual Meeting, *Synaptic Plasticity Explains the Creation and Convergence of Ensembles During Interhemispheric Transfer of Working Memory*, Washington DC, Nov 13 2023.
- Invited talk at MIT Theory of Distributed Systems Group, *Insights from Assembly Calculus: Its Structure & Application in Neuroscience*, Cambridge MA, Oct 27 2023.
- Poster presentation at MIT Advances in the Quest to Understand Intelligence [linked], *Capacity of Associative Memories and Models of Working Memory in Assembly Calculus*, Cambridge MA, Nov 4 2022.

TEACHING EXPERIENCE

- TA for 6.S191 Introduction to Deep Learning, Winter 2023. [course website]
- TA for 18.600 Probability & Random Variables, Spring 2022. Winner of 2022 MIT Department of Mathematics *Teaching and Learning Award*. Received teaching evaluations **7.0** out of **7.0** (overall).

LEADERSHIPS & SERVICES

- **Reviewer for Conference on Cognitive Computational Neuroscience (CCN)**, 2023.
- **MIT Undergraduate Judicial Review Board, Chair**, 2023-2024.
- **MIT Presidential Advisory Cabinet (PAC), Cabinet Member**, 2023-Current.
  - One of 3 undergrads selected to advise MIT President, Sally Kornbluth, with insight into the student experience and perspective on a broad range of topics. Interviewed candidates for MIT's new VP for DEI.
- **MIT Student Advisory Group for Engineering (SAGE), Advisor**, 2022-Current.
  - Provide Dean Anantha P. Chandrakasan with perspectives on education, engagement, & research.
- **MIT Student Advisory Group for EECS (USAGE), Advisor**, 2022-Current.
  - Meet weekly with EECS department leadership to advise on academic matters and student experience.
- **MIT TechX**
  - **Director**, 2022-2023. Oversee MIT's *largest* tech-related student org of over 100 organizers.
  - **Marketing Director**, 2021-2022. Oversee the publicity and community outreach of TechX.
  - **HackMIT Social Chair, organizer**, 2020-2021. Collaborated and developed HackPlayground to enable the first and largest online hackathon of 1500+ global hackers during COVID-19.
- **TeenHacks LI (501(c)3 non-profit), Director (2018-2020), Senior Advisor (2020-Current)**
  - Grew a local event to the largest 24-hour high school hackathon in Northeast, completely run by a team of 40 students (15 organizers in 2018), cumulatively hosted over 1,000 students for free.
  - Awarded as the Long Island Innovator of the Year and recognized by mainstream media such as Fox Business, Newsdays, Wall Street Journal, as well as governors like Congressman Suozzi, and Nassau County Executive.
- **United East Athletics Association (501(c)3 non-profit), Admin and Planner (2018-2020)**
  - Organize the summer education program with 32 enrichment classes including STEM classes, English literature, etc., with over 550 participants, including students from 5-14 years old and volunteers from various age groups.

SELECTIVE AWARDS

- D.E. Shaw Discovery Fellowship 2022: selected as one of 37 recipients across the country (one of two MIT recipients).
- MIT Department of Mathematics Teaching & Learning Award 2022: for skill and dedication to undergraduate teaching.
- Regeneron Science Talent Search Finalist 2020: awarded $25,000 scholarship and Minor Planet *#17245 YiXie*.