

Darin Tsui

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Education

Georgia Institute of Technology, Ph.D. in Electrical and Computer Engineering Aug 2023 – May 2028

- Honors and Awards: NSF GRFP, Steve W. Chaddick Research Fellowship, CREATION Teaching Award, Outstanding Capstone Project Award (Mentor), President's Fellowship.
- Advisor: Amirali Aghazadeh.

University of California San Diego, B.S. in Bioengineering Sep 2019 – Jun 2023

- Honors and Awards: Anushka Michailova Memorial Bioengineering Award, ISPS Conference Scholarship Award.

Selected Publications

Darin Tsui, Kunal Talreja, Daniel Saeedi, and Amirali Aghazadeh. Protein circuit tracing via cross-layer transcoders. In *International Conference on Machine Learning (ICML)*, 2026.

Zain Shabeeb*, Daniel Saeedi*, **Darin Tsui***, Vida Jamali, and Amirali Aghazadeh. cryoSENSE: Compressive sensing enables high-throughput microscopy with sparse and generative priors on the protein cryo-EM image manifold. In *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2026.

Darin Tsui, Aryan Musharaf, Justin S. Kang, Yigit E. Erginbas, and Amirali Aghazadeh. SHAP zero explains biological sequence models with near-zero marginal cost for future queries. In *Conference on Neural Information Processing Systems (NeurIPS)*, 2025.

Thomas A. Walton, **Darin Tsui**, Aryan Musharaf, and Amirali Aghazadeh. SpecMER: Fast protein generation with K-mer guided speculative decoding. In *NeurIPS (Spotlight)*, 2025.

Experience

Generate:Biomedicines, Machine Learning Intern – Somerville, MA Jun 2026 – Aug 2026 (Exp)

- Research in protein structure and cryo-EM structure determination.

AI ML and Information Research Group, Georgia Tech – Atlanta, GA Jun 2023 – Present

- Leveraged *mechanistic interpretability* frameworks, such as cross-layer transcoders and sparse autoencoders, for circuit discovery, protein design, and extracting biological mechanisms from protein language models.
- Extracted higher-order interactions in models 1000-fold quicker than state-of-the-art methods by developing algorithms at the intersection of *signal processing*, *coding theory*, *combinatorics*, and *interpretability*.
- Developed principled *generative models* for high-throughput cryo-electron microscopy (cryo-EM), autoregressive protein generation, and variant effect prediction.

Data Engineering Intern, Surgalign – San Diego, CA Jan 2023 – Aug 2023

- Interned at Surgalign, a small medical device company focused on developing AI solutions in spinal surgery (now acquired by Xtant Medical and Augmetics).
- Designed an internal MRI image processing application using Python that reduced preprocessing time.
- Assisted in developing ground truth dataset of imaging data and validated deep learning models against surgeon-generated data using Sørensen-Dice coefficient statistical testing.

Leadership

Reviewer: 2026 ICML, NeurIPS, CVPR, ECCV, ICLR GEM; 2025 NeurIPS AI4Science; 2024 ICLR GEM.

Bioengineering Day Chair, Georgia Tech – Atlanta, GA Jan 2025 – Present

- Co-organized Bioengineering Day, a symposium highlighting interdisciplinary research with over 100 attendees.
- Coordinated logistics, speaker outreach, and scheduling for faculty and alumni talks, award presentations, and a rapid-fire thesis competition.