Howard Xiao

CONTACT INFORMATION

Room 241, David Packard Electrical Engineering
350 Jane Stanford Way, Stanford, CA 94305

E-mail: howardx@stanford.edu
Website: https://howardxiao.ca/

SUMMARY

I am a first-year PhD student at Stanford Computational Imaging Lab, advised by Prof. Gordon Wetzstein. Previously, I was an undergraduate researcher at the Toronto Computational Imaging Group (TCIG), working under Prof. Kyros Kutulakos and Prof. David Lindell. My current research focuses on designing next-generation imaging systems with unseen capabilities.

EDUCATION

PhD, Electrical Engineering (Ongoing)
Stanford University, Stanford, CA, United States
Advisor: Prof. Gordon Wetzstein

Honours Bachelor of Science (Conferred June 2025)
University of Toronto, Toronto, ON, Canada
Computer Science Specialist and Mathematics Specialist, GPA: 3.86/4.00

PUBLICATIONS

[1] Sotiris Nousias*, Mian Wei*, Howard Xiao, Maxx Wu, Shahmeer Athar, Kevin J Wang, Anagh Malik, David A. Barmherzig, David B. Lindell, Kyros Kutulakos
Opportunistic Single-Photon Time of Flight
IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2025 (oral presentation)

[2] Howard Xiao, Anton Izosimov, Boris Khesin
Broken Virasoro Groupoid
In preparation.

RESEARCH EXPERIENCE

[1] *Ultra-wideband Single-photon Imaging* — September 2023 – Now
Supervisor: Prof. Kyros Kutulakos, Prof. David Lindell
Focusing on developing mathematical and signal processing techniques inspired by ultra-wideband Fourier probing to enhance tasks like LiDAR, velocity and distance measurement, and passive imaging, pushing the limits of modern single-photon detectors.

[2] *Broken Virasoro Groupoid* — September 2023 – June 2025
Supervisor: Prof. Boris Khesin
Conducting research to understand the structure of central extensions of the Virasoro groupoid and algebroid, classify their cocycles and co-adjoint actions, as well as to study the corresponding equations in mathematical physics.

[3] *Rate of Convergence in Steiner Symmetrizations* — August 2023 – April 2024
Supervisor: Prof. Almut Burchard
During this one-year research course, we explored transformations of convex and non-convex bodies under Steiner symmetrizations, and the rate of convergence of Steiner symmetrizations on different bodies.

AWARDS

[1] *Undergraduate Student Research Awards (USRA) – Natural Sciences and Engineering Research Council of Canada (NSERC),* May 2024 – August 2024
Supervisor: Prof. Kyros Kutulakos, Prof. David Lindell
Project title: *Ultra-wideband Single-photon 3D Imaging*
Amount: $7500

[2] *Undergraduates Student Research Awards (USRA) – Natural Sciences and Engineering Research Council of Canada (NSERC),* May 2024 – August 2024 (Declined offer)

Supervisor: Prof. Boris Khesin
Project title: *Groupoids in Mathematical Physics*
Amount: $7500

[3] *2022 and 2023 Innis College Exceptional Achievement Award – Innis College, University of Toronto*
Amount: $400

[4] *2021, 2022 and 2023 Dean's List Scholar – Faculty of Arts & Science, University of Toronto*

[5] *University of Toronto In-course Scholarship,* September 2021
Amount: $1500

[6] *University of Toronto Scholars Program,* September 2020
Amount: $7500

TALKS

Canadian Undergraduate Mathematics Conference (CUMC) — June 2023
Talk title: *Learning the Math Language: Gaining Intuition Behind Analysis*
Video link here

TEACHING

Teaching Assistant, Mathematics Department, University of Toronto, Toronto, ON — January 2024 – April 2025

For three semesters, I worked as a teaching assistant for first-year advanced linear algebra courses at University of Toronto. My responsibilities included leading weekly two-hour tutorials, creating problems and solutions, designing make-up exams, grading assignments, and invigilating exams.

EMPLOYMENT

Software Developer Intern, Bell Canada, Mississauga, ON — May 2023 – May 2024

During the 12-month internship, I utilized Python, Ruby, SQL, as well as Ollama and Langchain framework to fine-tune open-sourced large language model into internal document retrieval and code generator tools. I also initiated various projects related to generative AI in daily work tasks.

COMMUNITY ENGAGEMENT

Activity Manager, Brighten A Day Toronto, Toronto, ON — September 2021 – April 2023

As the activity manager, I organized fundraising events, including food sales at the University of Toronto, with raised funds going to support five local nursing homes. Additionally, I coordinated a Christmas card writing event that connected students with seniors in long-term care homes, fostering a sense of community and connection.