Kevin Y. Wu

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Education

University of Chicago Sept. 2020 - June 2024
B.S., Computational and Applied Mathematics
Summa Cum Laude
GPA: 3.95/4.00

University of Chicago Sept. 2023 - June 2024
M.S., Computer Science
4-Year Joint Degree
GPA: 3.87/4.00

Experience

MathWorks Sept. 2024 - Present
Software Engineer, Engineering Development Group

- Integrating the Flexible Collision Library (FCL) in C++ into MATLAB. Updating MATLAB's existing inverse kinematics (IK) solvers to include a constraint based on penetration depth for collision-free IK.
- Developing a user-facing collision-free inverse kinematics example.

Robotic Intelligence through Perception Lab Mar. 2024 - Present
Advisor: Prof. Matthew Walter

- Worked on PROGRESSOR, a self-supervised reward model capable of learning goal-conditioned task rewards from videos. Benchmarked the reward function using the DrQ-v2 reinforcement learning (RL) algorithm in the Metaworld environment, and tested it on real-robot tasks via reward-weighted behavioral cloning (BC) using Action Chunking Transformers (ACT).
- Led a six-week robotic manipulation course, teaching high school students to build a low-cost 5-DOF arm and program it to play tic-tac-toe. Covered Python, forward/inverse kinematics, computer vision, and robot learning.
- Implemented two teleoperation systems for a UR5 robot with Leap Motion hand-tracking and Meta Quest 3. Exhibited at the Museum of Science in Chicago and enabled lab members to efficiently collect demonstrations for imitation learning.
- Designed and built a fully-programmable 4-DOF robotic arm module for Duckietown, a company offering small autonomous vehicles for education and research.

Zero Knowledge Discovery Lab Nov. 2021 - July 2024
Advisor: Prof. Ishanu Chattopadhyay

- Developed EMERGENET, a framework built on conditional inference trees to capture long-range structural dependencies in viral genomes with only sequence data.
- Introduced *E-distance* metric quantifying mutation probabilities between viral strains to assess the emergence risk of animal Influenza A strains.
- Validated EMERGENET on $\sim 220k$ sequences from 2003 - 2023, outperforming WHO vaccine recommendations for H1N1/H3N2 in 81% of seasons.
- EMERGENET predicted risk scores correlate ($R = 0.721, p = 10^{-4}$) with the CDC's expert-evaluated IRAT (Influenza Risk Assessment Tool) scores.

MathWorks June 2023 - Aug. 2023
Software Engineer Intern, Deep Learning Compression Team

- Developed a neural network to classify ECG signals from a wearable device.
- Applied model quantization to reduce memory footprint for embedded systems.
- Implemented and trained Neural ODE (NODE) and Deep Equilibrium (DEQ) models to benchmark performance against Residual Network (ResNet).

MathWorks June 2022 - Sept. 2022
Software Engineer Intern, Install & Licensing Team

- Built automated tests in Java JUnit and MATLAB for new license borrowing functions and user interface, achieving 100% code coverage.
- Built Python performance tests to profile MATLAB startup speed, identifying critical bugs and optimization opportunities.

University of Chicago Department of Mathematics June 2021 - Aug. 2021
REU Student

- Wrote an expository paper on the chip-firing game and its use in proving the graph-theoretic analogue of the Riemann-Roch theorem.
- Solved problems and attended talks on combinatorics, geometry, and analysis.

Papers

PROGRESSOR: A Perceptually Guided Reward Estimator with Self-Supervised Online Refinement
Tewodros W. Ayalew, Xiao Zhang, **Kevin Yuanbo Wu**, Tianchong Jiang, Michael Maire, and Matthew R. Walter
Under review, Conference on Computer Vision and Pattern Recognition (CVPR), 2025

EMERGENET: A Digital Twin of Sequence Evolution for Scalable Emergence Risk Assessment of Animal Influenza A Strains
Kevin Yuanbo Wu, Jin Li, Aaron Esser-Kahn, and Ishanu Chattopadhyay
Under review, Science Advances, 2024
code | website

Riemman-Roch through the Dollar Game
Kevin Yuanbo Wu
University of Chicago Mathematics REU, 2021
paper

Awards

Enrico Fermi Scholar - Top 5% of Physical Sciences Division 2024
Dean's List - Awarded each year of undergrad 2024
Phi Beta Kappa - Elected junior year 2023
Robert Maynard Hutchins Scholar - Top 10% of class 2022
Hack@Brown Wolfram Award - Top 25 projects 2021
LEGO Design Award - Model displayed at LEGOLAND 2020

Skills

Technical Languages: Python, MATLAB, C++, SQL, LaTeX
Frameworks: PyTorch, Sklearn, NumPy, Pandas, OpenCV, MuJoCo
Tools: Unix/Linux, Git, Docker, Bash
Spoken Languages: English (native), Mandarin (native)
Hobbies: LEGO (channel), guitar, soccer, basketball, reading