Kevin Y. Wu

📍 Natick, MA | ✉ kevin.yuanbo@gmail.com | 🌐 kevinywu.github.io | ⬡ KevinyWu | 🎓 Google Scholar

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Education

University of Chicago   Sept. 2020 - June 2024
4-Year Joint BS/MS Degree
- B.S., Computational and Applied Mathematics
- M.S., Computer Science
- GPA: 3.95/4.00; *Summa Cum Laude*

Papers

* *denotes equal contribution.*

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
arXiv | code | website

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
arXiv | code | website

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

Experience

MathWorks   Sept. 2024 - Present
Software Engineer, Engineering Development Group
- Implementing continuous collision detection between convex shapes in C++ using the Gilbert–Johnson–Keerthi (GJK) algorithm and finding penetration depth using the Expanding Polytope Algorithm (EPA).
- Updating MATLAB's existing inverse kinematics (IK) solvers to include a constraint based on penetration depth for collision-free IK.

Robotic Intelligence through Perception Lab   Mar. 2024 - Present
Advisor: Prof. Matthew Walter
- Working on a project learning latent actions between consecutive frames of unlabeled human videos. Fine-tuning the latent-action prediction model on small-scale robot data to ground latent actions to real robot actions.
- Worked on PROGRESSOR, a self-supervised reward model capable of learning task rewards from unlabeled human videos. Benchmarked the reward function using the DrQ-v2 reinforcement learning (RL) algorithm in the Meta-World environment, and tested it on real-robot tasks via reward-weighted behavioral cloning (BC) using Action Chunking Transformers (ACT).
- Designed a six-week robotic manipulation course, teaching high school students to build a low-cost 5-DoF arm and program it to pick-and-place tic-tac-toe pieces. Covered Python, robot kinematics, computer vision.

- Implemented two teleoperation systems for a UR5 robot with Leap Motion hand-tracking camera and Meta Quest 3. Exhibited at the Museum of Science in Chicago and enabled efficient collection of task demonstrations.
- 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.

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, C++, MATLAB, 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