

Tyler King

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education

Cornell University, Ithaca, NY
B.S. in Computer Science, summa cum laude
Completed ECE PhD course requirements
GPA: 4.07 / 4.30

Aug 2021 – May 2025

research experience

McMahon Lab, Ithaca, NY

PI: Peter McMahon, Tatsuhiro Onodera (Cornell, NTT Research)

January 2022 – Present

- Simulated oscillator networks for 100,000+ node optimization problems with >99.995% accuracy
- Optimized code from native Python to PyTorch for a 15x speedup and end-to-end GPU support
- Trained coupled oscillator networks for image classification; achieved 99.4%+ accuracy on MNIST and state-of-the-art performance on CIFAR-10 (>80%) for physically plausible neural networks
- Developed a novel model pruning method for neural network regularization based on oscillator L_2 locality; reduced expected physical wiring costs 100-fold
- Contributed to grants from ExxonMobil (1-year grant) and NTT Research (summer PHI intern)

Computational Imaging Lab, Ithaca, NY

PI: Kristina Monakhova (Cornell)

September 2024 – August 2025

- Constructed synthetic Gaussian- and Poisson-noisy datasets from real images for benchmarking
- Leveraged asymmetric pinball loss to achieve state-of-the-art per-pixel uncertainty quantification
- Introduced reconstruction losses and evaluation pipelines to assess image reconstruction performance

Helbling Lab, Ithaca, NY

PI: Elizabeth F. Helbling (Cornell)

October 2024 – March 2025

- Introduced video segmentation algorithms to accurately track components of micro-scale robots
- Utilized Grounded SAM for initial segmentation and SAM 2 to track robot center of mass; converted positional information into kinematic data and visualized robot trajectories and accelerations

Social Simulation Lab, Playa Vista, CA

PI: Volkan Ustun, Nikolos Gurney (USC), NSF-funded REU

May 2022 – December 2023

- Ran MTurk experiments to evaluate the impact of complex decision making in humans
- Converted human decision metadata into image and graph formulations and introduced explore/exploit priors and multi-channel inputs to improve AI aid classification
- Benchmarked ML architectures to demonstrate better-than-chance prediction of AI aid usage

professional experience

Amazon Web Services, Santa Clara, CA

Software Development Engineer (ML)

Summer 2024, September 2025 - Present

- Prototyped multimodal VLM- and segmentation-based algorithms for an annotation model backend
- Added multi-threaded support and retry logic for model invocations to accelerate runtime 10x on terabyte-scale image datasets

Turion Space, Irvine, CA

Machine Learning Engineer Intern

January 2024 – May 2024

- Spearheaded space debris detection via on-satellite imaging using bit quantization and model compression, reducing memory overhead by 50x; included as a part of a \$400,000 Air Force grant
- Generated, processed, and cleaned 800 GB of synthetic satellite data, reducing model error by 88%

teaching experience

Cornell Teaching and Grading Assistant

August 2023 – May 2025

- Developed/graded assignments and staffed office hours for Machine Learning (Fall 2023, Spring 2024, Fall 2024), Deep Learning (Spring 2025), Dynamical Networks (Spring 2024, Spring 2025), and Graduate Linear Systems (Fall 2024)
- Maintained an average 5.0/5.0 rating across all 7 teaching assistant opportunities

MathCounts Tutor

August 2017 – May 2025

- August 2017 - April 2021: ran a middle-school-based tutoring program preparing students for regional and state-level MathCounts competitions; restarted program post-COVID and converted it to an online format; typeset problems and organized competitions
- April 2021 – May 2025: external advisor; supported tutors virtually and created practice problems

projects	AugNorm: Augmented Batch Normalization September 2023 – May 2024
	<ul style="list-style-type: none"> • Developed a normalization scheme in deep neural networks based on a generalized geometric median • Designed out-of-distribution tests where AugNorm outperforms BatchNorm in plug-and-play settings • Constructed a differentiable variant of AugNorm that removes manual hyperparameter tuning
	Coherent Ising Machine Optimizer July 2022 – May 2023
	<ul style="list-style-type: none"> • Helped develop cim-optimizer as part of a ten million dollar NSF grant #1918549; achieved up to 1,000 downloads/month during peak usage • Added GPU support via PyTorch and accelerated numerical simulations 10-fold • Integrated Bayesian optimization (Hyperband) and random search into a hyperparameter optimization suite for three coherent Ising machine variants, improving model error rates 3x • Confirmed accuracy of external field coherent Ising machine by implementing dynamics from original amplitude heterogeneity correction paper in PyTorch and analyzing runtime and performance
conferences	QUTCC: Quantile Uncertainty Training and Conformal Calibration for Imaging Inverse Problems  (under review ICLR 2026) <i>Cassandra Tong Ye, Shamus Li, Tyler King, Kristina Monakhova</i>
	Detecting AI Assistance in Abstract Complex Tasks  (HCI 2025) <i>Tyler King, Nikolos Gurney, John H. Miller, Volkan Ustun</i>
	Design of a Swimming Microrobot Powered by a Single Piezoelectric Bender (IROS 2025) <i>Cameron Urban, Tyler King, Rafael Gottlieb, Hang Gao, Elizabeth F. Helbling</i>
	Experimental Method for Studying Optimal Human Decisions  (HCI 2022) <i>Nikolos Gurney, Tyler King, and John H. Miller</i>
workshops	AugNorm: Differentiating the Generalized Geometric Median (NeurIPS OPT 2025) <i>Tyler King, Ser-Nam Lim</i>
	Conformal, Nonlinear Scaling Model for Uncertainty Prediction  (CVPR UnCV 2025) <i>Cassandra Ye, Tyler King, Kristina Monakhova</i>
talks	Physically Plausible Dynamical Systems for Machine Learning (CUAI 2024) <i>Tyler King</i>
	Statistical Inference for Experimental Studies of Complex Choices (USC ICT Symposium 2022) <i>Tyler King</i>
grants	CISE Travel Grant (\$1,200) July 2025 <i>National Science Foundation</i>
	ICT Research Experience for Undergraduates (\$7,650) May 2022 <i>National Science Foundation</i>
languages & technologies	Python, Julia, Java, R, C, C++, TypeScript/JavaScript, SQL PyTorch, TensorFlow, Keras, Weights & Biases (wandb), AWS, Git/GitHub, Jupyter, Conda, NumPy, Azure, Sphinx, Jira, Excel, Linux, Docker, CUDA, \LaTeX