







# Tyler King

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education	<b>Cornell University</b> , Ithaca, NY B.S. in Computer Science GPA: 4.08/4.30 Aug 2021 – present		
coursework * = in progress	Algorithms Information Networks OOP and Data Structures	Machine Learning Discrete Math Probability and Statistics	Computer Systems Linear Algebra Multivariable Calculus
publications	<b>Experimental Method for Studying Optimal Human Decisions</b>  (HCHI 2022) <i>Nikolos Gurney, <b>Tyler King</b>, and John H. Miller</i> <b>Generalizing Minimum Path Star Topology Algorithms</b>  (arXiv 2021) <i><b>Tyler King</b> and Michael Soltys</i>		
experience	<b>NTT</b> , Ithaca, NY <i>Research Intern</i> May 2023 – present <ul style="list-style-type: none"><li>Working under Tatsuhiro Onodera on simulating/benchmarking coupled oscillator neural networks</li><li>Developed Neural ODEs based on dynamical systems of coupled oscillators; these simulations are trained before the weights are implemented in a physical system of coupled oscillators</li><li>Developed a sparsification method based on <math>\ell_1</math> regularization for oscillator neural networks</li></ul> <b>ExxonMobil</b> , Remote <i>Research Intern</i> March 2022 – present <ul style="list-style-type: none"><li>Mentored by Dimitar Trenev and Stuart Harwood; working on non-classical computing approaches for maritime inventory routing problems</li><li>Obtained a two order-of-magnitude improvement using a simulated coherent Ising machine over classical computing approaches on vehicle routing problems with time windows up to 100 nodes</li><li>Developed unit tests in Python to assert runtime and accuracy of simulated coherent Ising machine</li></ul> <b>USC Institute for Creative Technologies</b> , Los Angeles, CA <i>REU Intern</i> May 2022 – August 2022 <ul style="list-style-type: none"><li>Developed an experimental method to track human optimization in nonlinear environments</li><li>Converted human decision metadata into image and graph formulations and preprocessed instances; leveraged deep neural networks to classify human vs partial AI decisions in varied landscapes</li><li>Current work on detecting AI assistance in abstract tasks is under review at ECAI 2023</li></ul> <b>Cislunar Explorers</b> , Ithaca, NY <i>Software Engineering Intern</i> September 2021 – May 2022 <ul style="list-style-type: none"><li>Implemented robust Python unit tests for satellite dynamics modeling to achieve &gt;80% coverage</li><li>Derived unscented Kalman filter equations for satellite attitude and trajectory estimation; added structured noise into unscented Kalman filter dynamics to account for image pixelation</li><li>Modeled satellite dynamics given initial velocity/position and gravitational pull of heavenly bodies</li></ul>		
projects	<b>Coherent Ising Machine Optimizer</b> July 2022 – November 2022 <ul style="list-style-type: none"><li>Helped develop <a href="#">cim-optimizer</a> as a part of a ten million dollar NSF grant #1918549</li><li>Built up the Bayesian optimization Hyperband and random hyperparameter optimization suite for three variations of the coherent Ising machine that vary initial conditions of simulated dynamics</li><li>Confirmed accuracy of external field coherent Ising machine by implemented dynamics from original amplitude heterogeneity correction paper in PyTorch and analyzing runtime and performance</li><li>Wrote example usages of cim-optimizer in Jupyter Notebooks and integrated full documentation with Sphinx. All documentation was hosted on readthedocs and integrated as a pip package via PyPI</li></ul> <b>Optimized A* Pathfinding</b> March 2021 – May 2021 <ul style="list-style-type: none"><li>Theorized a novel approach to A* pathfinding by using greedy predrawn paths</li><li>Achieved 6-fold speedup with comparable performance to classical A* pathfinding heuristics</li><li>Developed pygame GUI to allow user interaction and visualize pathing</li></ul>		
languages & technologies	Python, Julia, Java, R, MATLAB, C PyTorch, Tensorflow, Keras, Git/GitHub, Jupyter, Conda, Sklearn, Pandas, NumPy, Matplotlib, Seaborn, Networkx, Qiskit, Azure, Sphinx, Jira, Excel, Linux, L <sup>A</sup> T <sub>E</sub> X		