

# Tyler King

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## contact

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github.com/tylertking

## education

**Cornell University**, Ithaca, NY  
B.S. in Computer Science  
GPA: 4.10/4.30

Aug 2021 – present


## coursework

\* = in progress

Natural Language Processing*	Machine Learning	Linear Algebra
Computer Systems*	Discrete Math	Differential Equations
OOP and Data Structures	Probability and Statistics*	Multivariable Calculus

## publications

**An Experimental Method for Studying Complex Choices** (HCHI 2022)  
*Nikolos Gurney, Tyler King, and John H. Miller*

**Generalizing Minimum Path Star Topology Algorithms**  (arXiv 2021)  
*Tyler King and Michael Soltys*

## experience

**USC Institute for Creative Technologies**, Los Angeles, CA  
*REU Intern*

May 2022 – August 2022

- Converted human decisions metadata into image and graph formulations and preprocessed instances
- Benchmarked deep learning architectures to achieve 59% testing accuracy on noisy human decisions
- Developed a novel median batch normalization technique to stabilize noisy input data

**McMahon Lab**, Ithaca, NY  
*Research Intern*

January 2022 – present

- Created Python pipeline for analog optimization based on the simulated coherent Ising machine
- Deployed coherent Ising machine hyperparameter tuning on wandb with Bayesian optimization Hyperband; achieved best performance of 99.9958% on 1 year vehicle routing problems
- Modeled vehicle routing instances to make inferences on large-scale realistic systems

**Cislunar Explorers**, Ithaca, NY  
*Software Engineering Intern*

September 2021 – May 2022

- Developed computer vision pipeline to detect heavenly bodies (sun, moon, Earth) from a 6U satellite
- Implemented robust Python unit tests for satellite dynamics modeling to achieve >80% coverage
- Derived unscented Kalman filter equations for satellite attitude and trajectory estimation using  $\text{\LaTeX}$ ; added structured noise into unscented Kalman filter to account for image pixelation

**Notre Dame Nanophotonics**, Notre Dame, Indiana  
*Research Intern*

May 2021 – September 2021

- Benchmarked quantum circuits and processors using IBM's Quantum hardware
- Conducted error analysis on various implementations of Grover's (quantum search) algorithm via hardware (*ibmq\_lima*) and noisy simulations (*qasm\_sim*)
- Leveraged MATLAB and Matplotlib to model results and cross-validate statistical significance

## projects

**Hazardeous Asteroid Detection**

April 2022 – May 2022

- Used Google Colab to benchmark various machine learning models for hazardeous classification of 4600+ asteroids; achieved a best performance of 99.68% with decision tree classification
- Utilized correlation matrices and various normalization techniques to preprocess data

**iQuHACK Hackathon**

January 2022

- Created mini-game that involved rotating 2-qubit statevectors into correct positions
- Deployed code on Microsoft Azure with IonQ's quantum computer using Qiskit as an SDK
- Leveraged deep Q reinforcement learning to train a bot and implement versus mode

**Optimized A\* Pathfinding**

March 2021 – May 2021

- Theorized a novel approach to A\* pathfinding by using greedy predrawn paths
- Achieved 6-fold speedup with comparable performance to classical A\* pathfinding heuristics
- Developed pygame GUI to allow user interaction and visualize pathing

## languages & technologies

Python, Java, Julia, R, MATLAB, Ruby, C  
PyTorch, Tensorflow, Keras, Git/GitHub, Jupyter, Conda, Sklearn, Pandas, NumPy, Matplotlib, Seaborn, Networkx, Qiskit, Azure, Sphinx, Jira, Excel, Linux,  $\text{\LaTeX}$