

Siming He

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EDUCATION

The University of Pennsylvania | School of Engineering and Applied Science, The Wharton School May 2024

Candidate for Bachelor of Science in Engineering (Computer and Information Science with Mathematics Minor)

Candidate for Bachelor of Science in Economics (Statistics)

Cumulative GPA: 3.92 / 4.0 Major GPA: 3.95 / 4.0

*Relevant Courses (courses with * are graduate-level courses):* Learning in Robotics*, Convex Optimization*, Computer Vision*, Deep Learning*, Probability Theory*, Machine Learning*, Graph Neural Network*, Advanced Linear Algebra*, Bayesian Statistics, Mathematical Statistics, Statistical Inference, Real Analysis, Algorithm, Probability, Information Theory

TECHNICAL SKILLS

- **Software:** Python (PyTorch, Scikit-learn, NumPy, Pandas, SciPy, Matplotlib), C++ (OpenCV, Eigen), ROS, Spark, AWS
- **Machine Learning:** CNNs, RNN, VAE, Reinforcement Learning, Transfer Learning, Neural ODE, Conformal Prediction
- **Robotics:** SLAM (ORB-SLAM3, VINS, Kimera, Voxelblox, GTSAM), RRT and A* Planning, PID Control, Kalman Filters

RESEARCH EXPERIENCE

Vijay Kumar Lab, *Research Assistant* | Philadelphia, U.S. January 2023 – Present

- Improve visual-inertial odometry accuracy and robustness on a new drone platform with RealSense D435i and PX4 IMU
- Gather Penn Campus Point Cloud using Lidar for geometric and semantic mapping research

Wharton Summer Program for Undergraduate Research, *Researcher (Paper)* | Philadelphia, U.S. May 2022 – August 2022

- Worked with Prof. Pratik Chaudhari on Active SLAM with a self-build Quadrotor with RealSense D435i
- Used Kimera for state estimation and gained volumetric data (truncated signed distance field) of rooms by Voxelblox
- Designed a path-planning algorithm that maximizes the mutual information between the map and observations
- Implemented fast voxel traversal algorithm for ray tracing and efficient ray-box intersection algorithm

Fang-Yen Laboratory, *Research Assistant (Paper)* | Philadelphia, U.S. September 2021 – January 2022

- Collaborated with Zihao Li in the development of an automated arm robot that can perform experiments on C. Elegans
- Applied computer vision algorithms to move a robot arm to the location of targeted Petri dishes, detect and decode barcode on the Petri dishes with 100% testing accuracy, and do automatic lens calibration to focus on worms

Penn Undergraduate Research Mentoring Program, *Research Assistant (Video)* | Remote May 2021 – August 2021

- Implemented convolutional neural network using PyTorch and used objects detection algorithms such as YOLO
- Implemented Dijkstra's algorithm and RRT algorithm and PID controller

Tsinghua University, *Research Assistant (Paper)* | Beijing, China January 2021 – March 2021

- Contributed to a Heterogeneous Graph Neural Network Benchmark by thoroughly evaluating 3 existing papers
- Presented the experiment results in a paper published at the 2021 Conference on Knowledge Discovery and Data Mining

Sign Language Translator, *Researcher (Paper)* | St. Catharines, Canada January 2019 – December 2019

- Developed an LSTM network that translates sign language videos into text with 93.66 percent accuracy

OTHER EXPERIENCE

Penn Center for Undergraduate Research & Fellowships, *Peer Research Advisor* | Philadelphia, U.S. October 2022 – Present

- Provide consultation for undergraduate researchers regarding research opportunities, faculty mentors, and research grants
- Mentor 10 1st and 2nd year students who are interested in doing computer science, robotics, statistics research
- Design and hold Python Programming for Research Workshop to introduce python and common packages

Robust Transfer Learning with Minimal Spurious Features, *Project* | Philadelphia, U.S. October 2022 – December 2022

- Shown task interpolation-based transfer algorithm can prevent the transfer of spurious features

Conformal Risk Control in Generalist Cellular Segmentation, *Project* | Philadelphia, U.S. October 2022 – December 2022

- Implemented conformal risk control on cellular segmentation task and shown semantic segmentation FNR is controlled

CIS 520 Machine Learning, *Teaching Assistant* | Philadelphia, U.S. August 2022 – December 2022

- Led weekly recitations of 22 students and taught machine learning concepts; designed homework and exam problems
- Held office hours weekly to help students on understanding course materials and homework problems

INTERESTS

- Swimming (The Second Level Athlete in China), Soccer & Tennis (high school varsity team), Cooking, Reading