

# Brian H. Wang

PH.D. CANDIDATE IN AEROSPACE ENGINEERING · CORNELL UNIVERSITY AUTONOMOUS SYSTEMS LAB

Cornell University · 560 Upson Hall, Ithaca, NY 14850

☎ 917-572-1336 | ✉ bhw45@cornell.edu | 🏠 brian-h-wang.github.io | 📺 brian-h-wang

## Education

### Cornell University

Ithaca, NY

PH.D. IN AEROSPACE ENGINEERING

August 2016 - Present

Expected graduation in Fall 2021

Advisor: Professor Mark Campbell

Thesis Committee: Profs. Mark Campbell, Kilian Q. Weinberger, and Silvia Ferrari

GPA: 4.09

Selected Coursework: Autonomous Mobile Robots, Human-Robot Interaction, Intelligent Sensor Planning and Control, Intermediate Dynamics and Vibrations, Machine Learning for Intelligent Systems

### Cornell University

Ithaca, NY

M.ENG. IN AEROSPACE ENGINEERING

August 2015 - May 2016

Advisor: Professor Mason Peck

Thesis Title: Optical Attitude Determination for Autonomous Spacecraft

GPA: 3.45

Selected Coursework: Feedback Control Systems, Multivariable Control Theory, Robotic Manipulation

### Cornell University

Ithaca, NY

B.A. IN COMPUTER SCIENCE

August 2011 - May 2015

GPA: 3.60

Selected Coursework: Object-Oriented Programming and Data Structures, Systems Programming, Dynamics

## Research Experience

### Autonomous Systems Lab

Ithaca, NY

PH.D. RESEARCHER

September 2016 - Present

- Research projects include vision- and lidar-based robotic perception, probabilistic tracking and estimation, and navigation in unstructured and uncertain environments.
- Conduct laboratory experiments using Clearpath Jackal mobile robots, Robot Operating System (ROS) software, and a Vicon motion capture system.

### Draper Laboratory

Cambridge, MA

PH.D. STUDENT INTERN

July 2019 - October 2019

- Supervisor: Dr. Gian Luca Mariottini
- Graduate student intern in the Perception & Autonomy group.
- Designed and implemented system architecture for autonomous vision-based navigation on resource-constrained quadrotor drones.
- Performed flight tests on a Parrot Bebop 2 drone.

### NASA Langley Research Center

Hampton, VA

ENGINEERING INTERN

June 2015 - August 2015

- Supervisor: Dr. James Warner
- Worked alongside NASA Langley scientists in developing ScIFEN (SCalable Implementation of Finite Elements at NASA), a free-to-use finite element analysis program optimized for massively multicore supercomputers.
- Designed and implemented the graphical user interface for ScIFEN in the Python programming language, improving the usability of the program and facilitating its adoption by NASA researchers.

### Cornell University Cislunar Explorer CubeSat

Ithaca, NY

ATTITUDE DETERMINATION AND CONTROL SUBSYSTEM TEAM

June 2014 - May 2016

- Assisted with implementation of a computer-vision based attitude determination system on a Raspberry Pi computer board, enabling deep-space operations for a miniaturized, low cost lunar satellite which is scheduled to launch on the NASA Orion spacecraft.

# Publications

---

## JOURNAL PAPERS

- **Wang, B. H.**, Chao, W., Wang, Y., Hariharan, B., Weinberger, K. Q., and Campbell, M. “LDLS: 3-D Object Segmentation Through Label Diffusion From 2-D Images.” *IEEE Robotics and Automation Letters*, vol. 4, no. 3, pp. 2902-2909, July 2019. *Presented at the 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) in Macau, China.*

## CONFERENCE PAPERS

- **Wang, B. H.**, Diaz-Ruiz, C., Banfi, J., and Campbell, M. “Detecting and Mapping Trees in Unstructured Environments with a Stereo Camera and Pseudo-Lidar.” *International Conference on Robotics and Automation (ICRA)*, 2021.
- Wang, Y., Lai, Z., Huang, G., **Wang, B. H.**, van der Maaten, L., Campbell, M., and Weinberger, K. Q. “Anytime Stereo Image Depth Estimation on Mobile Devices”. *International Conference on Robotics and Automation (ICRA)*, 2019.
- **Wang, B. H.**, Wang, Y., Weinberger, K. Q., and Campbell, M. “Deep Person Re-identification for Probabilistic Data Association in Multiple Pedestrian Tracking”. *Arxiv preprint*.
- Gemerek, J. R., Ferrari, S., **Wang, B. H.**, and Campbell, M. “Video-guided Camera Control for Target Tracking and Following”. *IFAC Conference on Cyber-Physical and Human Systems*, 2018.

# Leadership and Service

---

## Reviewer

REVIEWED CONFERENCE PAPER SUBMISSIONS FOR:

- IEEE International Conference on Robotics and Automation (ICRA), 2021
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019

## Debates on the Future of Robotics Research

Online Event

ORGANIZING COMMITTEE (2019-2021), TECHNICAL CHAIR (2021)

September 2019 - June 2021

- Organized series of debates on the impacts and direction of robotics research, held as online workshops at ICRA 2020 and 2021.

## Cornell AI Driving Olympics Team

Ithaca, NY

CO-FOUNDER, PROJECT SUPERVISOR

September 2018 - May 2020

- Co-founded the AI Driving Olympics team within the Autonomous Systems Lab. The team consisted of undergraduate and Master’s students, who implemented autonomous driving algorithms such as navigation and lane-following on small mobile camera-equipped robots driving around a miniature model city.

## Sport Taekwondo at Cornell

Ithaca, NY

PRESIDENT (2014-2015), TREASURER (2013-2014)

August 2011 - May 2017

- Attained second-degree black belt; trained and competed in Olympic-style taekwondo in over 30 intercollegiate tournaments.
- As president, led practices and oversaw administration of one of Cornell’s most popular club sport teams, with over 50 members.

# Teaching and Mentorship

---

## Autonomous Systems Lab

Ithaca, NY

STUDENT MENTOR

August 2017 - May 2021

- Mentor for undergraduate and master’s student projects in the Autonomous Systems Lab, including:
  - 3-D object detection-based SLAM.
  - Aerial robot simulation in Unreal Engine.
  - Object detection, particle filter localization, and lane following for autonomous driving on miniature robotic cars.
  - Embedded system design for a stereo camera data collection sensor package.

## eCornell: Autonomous Mobile Robots

Ithaca, NY

COURSE CONTENT DEVELOPER

June 2020 - March 2021

- Developed slides, animations, and coursework on robotics algorithms, for an online version of Cornell’s Autonomous Mobile Robots course to be offered through the eCornell certificate program.

## MAE 5180: Autonomous Mobile Robots

Ithaca, NY

TEACHING ASSISTANT

January 2020 - May 2020

- Graduate-level course on algorithms for autonomous robots.
- Taught students fundamental robotics algorithms for localization, mapping, SLAM, and path planning.
- Led lab sessions, recitations, and office hours, and assisted with designing course materials.

- Core computer science class on computer architecture and the hardware-software interface.
- Led weekly recitations and office hours, and graded exams and programming projects.

## Skills

---

### TECHNICAL SKILLS: SOFTWARE

- **Programming languages:** Python, MATLAB, C++.
- **Software tools:** Robot Operating System (ROS), NumPy, Numba, OpenCV, StereoLabs ZED SDK, Git, Linux.

### TECHNICAL SKILLS: HARDWARE

- **Robot platforms:** Clearpath Robotics Jackal, Rethink Robotics Baxter, iRobot Create, Parrot Bebop 2.
- **Embedded systems:** Raspberry Pi, Arduino, Nvidia Jetson TX2 and Nano.
- **Sensors:** Stereolabs ZED camera, Velodyne VLP-16 lidar, Intel RealSense RGBD camera.

### LANGUAGES

- **English** (native speaker)
- **Korean** (conversant)
- **Mandarin Chinese** (basic knowledge)