Brian H. Wang

Ph.D. Candidate in Aerospace Engineering · Cornell University Autonomous Systems Lab

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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 schedule 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

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*

- As president, led weekly practices and oversaw administration of one of Cornell's most popular club sport teams, with over 50 members training in Olympic-style taekwondo and competing in intercollegiate tournaments.

Teaching

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.

CS 3410: Systems Programming *Ithaca, NY*

Teaching Assistant *January 2015 - May 2016*

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

Technical Skills

Software

- **Programming languages:** Experienced with Python, MATLAB. Familiar with C, C++, Java.
- **Software tools:** Robot Operating System (ROS), NumPy, Numba, OpenCV, Git, Linux.

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.