Wing Lam Nicole Chan

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EDUCATION

Carnegie Mellon University **Aug 2024 - Current**
Ph.D. in Robotics

Massachusetts Institute of Technology **Sept 2020 - May 2024**
B.S. in Aerospace Engineering, Minor in Computer Science GPA: 4.7/5.0

RESEARCH EXPERIENCE

Carnegie Mellon University | Resilient Intelligent Systems Lab **Sept 2024 - Current**
Graduate Student Researcher - Advisor: Dr. Wennie Tabib

- Characterize current work with state of the art work such as ORB-SLAM3 and VINS-Mono
- Assist with quadrotor flight tests of autonomous visual-inertial state estimation software

Massachusetts Institute of Technology | Aerospace Controls Lab **Jan 2023 - Jan 2024**
Undergraduate Researcher - Advisor: Prof. Jonathan How

- Design, build, repair, and fly drones in large Highbay flight space (80 ft x 40 ft x 25 ft) with VICON motion capture systems
- Perform flight tests for remote localization and frame alignment using multiple agents with obstacles and objects for recognition
- Collect flight test data using ROS and make configuration changes in hardware as needed
- Add and test VIO capabilities on new generation of drones by designing new hardware components for calibration and integrating new visual input data source with existing on-board computer algorithm

Imperial College London | Computational Astrodynamics Group **Jul 2023 - Sept 2023**
Summer Undergraduate Researcher - Advisor: Dr. Davide Amato

- Developed an orbit propagation package in Julia for VLEO, focusing on the effects of various perturbations from aspherical Earth gravity, atmospheric drag and solar radiation pressure
- Performed literature research into various relevant perturbation forces experienced by spacecrafts in VLEO/LEO
- Implemented widely-used and high-fidelity atmospheric models such as Jacchia-Roberts and NRLMSISE-00 in atmospheric density estimations
- Verified propagation results against general perturbation trends and with OREKIT, an open-source orbital propagator in Java
- Designed package to for ease of future integration and development by including areas for user input and providing comprehensive documentation in final report and on Github

PUBLICATIONS

Victoria M. O'Leary, George C. Lordos, Madelyn Hoying, Yousif AlSadah, Liliana Arias, Ignacio Arzuaga Garcia, H Azzouz, John Beilstein, **Wing Lam Chan**, Ezra Eyre, Dane Gleason, Meltem Ikinci, Divya Krishnan, Yuying Lin, Estelle Martin, Lanie G. McKinney, Duncan Miller, Cormac O'Neill, Omar Orozco, Palak B. Patel, Elizabeth Romero, Francisco Sepulveda, David Villegas, Alisa N. Webb, Kir Latyshev, Chloe Gentgen, Alexandros C. Lordos, Olivier L. De Weck and Jeffrey A. Hoffman. "Pale Red Dot: a Large, Robust Architecture for Human Settlements on Mars," AIAA 2023-4776. ASCEND 2023. October 2023.

AWARDS

NASA RASC-AL Homesteading Mars Best in Theme & First Place Overall **2023**

INDUSTRY EXPERIENCE

MIT Lincoln Laboratory | Group 38 **June 2024 - August 2024**
Aerospace Engineering Intern - Supervisor: Elisheva Shuter

- Modeled satellite trajectory and pointing using integration of MATLAB and STK 12
- Programmed access analysis tool to quantify performance of satellite pointing plans

TEAM PROJECTS

MIT Rocket Team **February 2022 - December 2023**

Phoenix Structures Subteam, Prometheus (Spaceport America Cup) Solid Propulsion Subteam

- Designed, manufactured, and tested parachutes and other recovery components for Phoenix rocket (successful launch in Jan 2023)
- Managed new team members' manufacturing as Responsible Engineer for Booster Cup and Avionics Panels
- Designed Spaceport competition rocket bell-shaped nozzles and sustainer grain geometry which were presented in Preliminary Design Review and Critical Design Review

16.405/6.4200 Robotics: Science and Systems **February 2023 - May 2023**

GNC and Test Engineer

Semester-long project on remote-controlled racecar to autonomously detect and follow walls and painted lines, plan optimal trajectory between given start and end markers, follow the planned trajectory, and traverse one lap of racetrack within the lane markers.

- Developed safety and PID controllers for vehicle steering commands to follow the computed or given trajectory
- Worked with software engineers to communicate algorithm design choices with course staff in regular presentations and written reports
- Performed thorough drive tests and collected simulation and real-life data

16.83 Space Systems Engineering **September 2023 - December 2023**

Systems Engineer

- Performed trade studies of feasible space exploration missions in brainstorming and project idea pitch phase
- Researched necessary instrumentation for detecting signs of life on board the orbiter
- Analyzed and mitigated possible risks in mission CONOPS for design review

NASA RASC-AL 2023 Homesteading Mars Challenge **September 2022 - June 2023**

Space Agriculture Subsystem Engineer

Designed the food production system to provide abundant and diverse food choices for the crew with inspirations from current growing methods on Earth and maximized manufacturability to emphasize Earth-independence.

- Researched and designed suitable space agricultural system for long-term missions
- Compiled nutritional data of crops and animal products for a well-rounded crew diet
- Consulted manufacturing and life support teams to refine system design surrounding plant habitat, its integration to the crew habitat structure, and long-term human/machine interactions and maintenance feasibility
- Contributed to RASC-AL conference deliverables, led Q&A sessions to judges on Agriculture and Crew Daily Wellbeing Subsystems

SERVICE & EXTRACURRICULARS

MIT Women's Technology Program **June 2022 - August 2022**

Electrical Engineering Tutor/Teaching Assistant (Remote)

- Taught a remote Electrical Engineering course to a group of female-identifying high-school students through hands-on classes and team-based projects
- Prepared teaching materials, laboratory procedures, and homework assignments centered around hands-on learning and testing with electrical circuits
- Facilitated lecture-time lab assignments in small groups of students in remote meeting rooms and troubleshot students' circuit building and data collection through interactive 1-on-1 problem solving
- Led discussions surrounding lecture material and student confusions in weekly office hour sessions

MIT Edgerton Center **February 2022 - June 2022**

Teaching Assistant

- Assisted in teaching K-12 students about electrical engineering, physics, and biology through hands-on building projects and interactive walkthroughs
- Planned new lesson content with graduate students for educating students on engineering processes like design, build, test, and redesign
- Organized class materials before and after class, including preparing kits to be sent to school for remote lessons