

Christopher Edward Chan

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EDUCATION

Cornell University, College of Engineering, Ithaca, NY

Master of Engineering, *Mechanical Engineering: Dynamics, Systems, & Robotics*, GPA 3.63 Aug 2020 – May 2022

Cornell University, College of Engineering, Ithaca, NY

Bachelor of Science, *Mechanical Engineering*, GPA 3.57

Aug 2016 – May 2020

Minor: Dyson Business Minor for Engineers; **Dean's List** (2016, 2018, 2019); **Cum Laude**

Universidad de Cantabria, Cornell-Cantabria Engineering Exchange, Santander, Spain

Jan 2019 – June 2019

Relevant Coursework: Multivariable Control Theory, Embedded Operating Systems, Autonomous Mobile Robots, Dynamics of Flight Vehicles, System Dynamics, Finite Element Analysis, Mechatronics, Object Oriented Programming, Design Effect Analysis (DFMEA), Fluid Mechanics, Heat Transfer, MATLAB, Mechanical Structures and Materials

PROFESSIONAL EXPERIENCE

Waymo, Mountain View, CA, *Integrated Systems Test Engineering, Motion Control*

Jan 2021 – Present

- Lead the sign-off of Jaguar I-Pace brakes, steering, and propulsion firmware with integration of autonomy stack
- Verify performance and fault-operable functionality (DVP) of brakes, steering, propulsion using a scripted Python environment (in-vehicle, HIL, software unit tests) for a Level 4, driverless vehicle
- Program and perform high-dynamic testing using scripted test course to evaluate control performance
- Write and execute automated tests to validate self-driving faulted behavior within a simulation suite
- Create testing infrastructure and analysis tooling using Python and C++

Waymo, Mountain View, CA, *Systems Engineering, Motion Control Intern*

June 2020 – Aug 2020

- Developed motion control functional decomposition for future platform-agnostic Level 4 autonomous vehicles
- Audited and automated system to link parent-child relationships of ~500 functional objectives into JIRA database
- Analyzed Jaguar I-Pace data logs from verification tests to evaluate lateral and longitudinal control performance

Lockheed Martin, Palmdale, CA, *Advanced Dev. Programs (Skunkworks) Engineering Intern*

June 2019 – Aug 2019

- Selected for "Tiger Team" to advance manufacturing and analysis of NASA X-59 Low-Boom Flight Demonstrator
- Designed lab tests & performed stress analysis via FEA to validate methods of machining & lifting composite skins
- Identified and presented "margin of safety" factors of 125 X-59 wing structural components for the NASA CDR
- Led 24 represented mechanics to lay-out the X-59 assembly floor to drive efficiency, safety, and FOD prevention
- Crafted a stress analysis training curriculum for incoming engineers with a focus on developing stress intuition

Lockheed Martin, Fort Worth, TX, *F-35 Manufacturing Engineering Intern*

May 2018 – Aug 2018

- Enabled post-delivery modification and retrofit of F-35 aircraft by designing 23 tools in CATIA V5
- Developed and manufactured 8 tools to remove F-35 pylon inserts using induction heating
- Proposed a tolerance analysis to save 400+ labor hours of pylon insert removals
- Created tooling kits to retrofit F-35 aircraft to bring a life-limited splice plate to full-service life

General Electric Aviation, Cincinnati, OH, *Product Management Engineering Intern*

May 2017 – Aug 2017

- Investigated engineering certification differences between variants of the CFM56-7B engine (used on Boeing 737)
- Recovered \$3M of hardware removed during flight-test through re-certification and resale
- Delivered an FAA service bulletin defining engine module interchangeability and a presentation to 600 operators

ACADEMIC PROJECTS

Autonomous Plane Autopilot, Master of Engineering Project

Fall 2020 – Spring 2022

- Designed, programmed, and integrated an autopilot system onto a RC glider to navigate between GPS waypoints
- Created a simulation framework using Python to simulate, analyze, and iterate the flight controller
- Optimized a Linear Quadratic Gaussian (LQG) for lateral control of the aircraft through test flights
- Implemented code on a real-time embedded architecture (Raspberry Pi, Arduino, Sensors, Actuators)

Fast Robots, Special Topics in ECE, [cec272.github.io/ece4960](https://github.com/cec272/ece4960)

Fall 2020

- Integrated Bayesian mapping and localization on an inexpensive architecture (RC car, single time of flight sensor)
- Utilized Bluetooth communication for offline navigation computation between microcontroller and Linux server
- Filtered and optimize sensor data and tuned PID control loop for motor control

Perfect Backboard, Design with Embedded Operating Systems, [cec272.github.io/perfect_shot_backboard](https://github.com/cec272/perfect_shot_backboard)

Fall 2020

- Created a 3-DoF actuated basketball backboard using a Raspberry Pi, camera, motors, & 3-D printed parts

- Implemented object recognition and tracking using OpenCV library, running on a Raspberry Pi

Probabilistic Autonomous Mobile Robot, Autonomous Mobile Robots

Spring 2020

- Developed localization, mapping, and navigation software on iRobot Create platform and simulated environment
- Utilized sensor fusion (Extended Kalman Filter, Particle Filter) to localize robot using Intel RealSense depth camera
- Implemented path planning and control algorithms (rapidly-exploring random trees, cell decomposition, potential field) to navigate robot to waypoints on obstacle-filled map

Cornell NASA Microgravity Project Team, Design & Manufacturing Team Lead (2019-2020)

Feb 2017 – May 2020

- Competed in the NASA Micro-G NExT competition and test in NASA's Neutral Buoyancy Laboratory
- Led 10-member design team to create an autonomous search & rescue vehicle for NASA's Orion spacecraft
- Designed the extraction mechanism of an automated underwater ice sampler for NASA's Europa moon lander
- Engaged in community outreach with local elementary schools to teach about space exploration and testing

LEADERSHIP EXPERIENCE

Cornell American Society of Mechanical Engineers (ASME), Corporate Chair

Sept 2017 – May 2018

Cornell American Institute of Aeronautics and Astronautics (AIAA), AIAA Liaison

Sept 2019 – May 2020

Boy Scouts, Eagle Scout, Senior Patrol Leader

May 2009 – Aug 2016

SKILLS & INTERESTS

Engineering	Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD), PATRAN, NASTRAN, ANSYS, Machining
Programming	C++, MATLAB, Simulink, Python, Java, Linux, Shell, 3-D CAD (CATIA V5, Fusion 360, Inventor, SolidWorks)
Professional	Microsoft Office (Word, Excel, PowerPoint), Excel VBA, Statistics, Adobe Creative Suite, Spanish (Int. B2)
Interests	Cornell Beekeeping Club, Cornell Photo Club, Cornell Club Water Polo, Cornell Club Ski, Swimming