Arnauld Martinez

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Education

California Institute of Technology, B.S. in Computer Science, ML track — Sep 2022 – Jun 2026

- GPA: 4.1/4.0
- **Coursework:** Learning Systems, Data Mining, Algorithms, Theory of Computation, Differential Equations, Classic and Quantum Mechanics, Probability and Inferential Statistics, Operating Systems
- **Languages:** Python, Java, OCaml, C, C++, Assembly

Experience

Software Engineering Intern, SpaceX – Redmond, WA — Jun 2025 – Sep 2025

- Upgraded Starlink's Ku antenna planning algorithm in C++ to enable beam service when satellites are rolled, burning, or orbit-transferring.
- Built a planning algorithm for parabolic antennas to reduce floor power consumption while maintaining consistent ground contact.
- These algorithms are currently running onboard all Starlink satellites, reducing energy consumption by 37%.

Guidance, Navigation, and Control Intern, SpaceX – Redmond, WA — Jun 2024 – Sep 2024

- Built a physics simulation in C++ to capture and propagate the physical state of Starlink satellites. Verified the simulation's accuracy against real-time telemetry data.
- Developed models for on-board battery and antenna states, with the ability to bootstrap to a future time and simulate numerous failure modes.
- The engine is currently being used by SpaceX to test satellite vehicle updates on the ground before deploying it into production.

Control and Dynamics Research Fellow, Caltech – Pasadena, CA — Jun 2023 – Aug 2023

- Worked under Professor Soon-Jo Chung to build a physics simulation modeling spacecraft kinematics and actuator systems as Markov Decision Problems.
- Integrated the physics engine into existing fault detection algorithms to isolate faulty reaction wheels and sensors onboard spacecraft.
- Developed a neural network to convert RGB images from the spacecraft's cameras to infrared images, capable of removing hot pixels and solar glare.

Projects

Autonomous F1 Car — [link]

- Designed and built a Soft Actor-Critic network to control an F1 car and optimize its path on an untrained track in Python.
- Current implementation can complete a modified version of the Spanish Grand Prix in 1:15:490, while Lando Norris (Mclaren F1 driver) holds the record at 1:11:383.

Robot Arm for Chess — [link]

- Built a custom robot arm capable of playing chess against a user in real-time.
- Developed a machine learning model to capture and serialize the state of the chess board using an on-board camera. Integrated a 3200-rated chess engine and processed state information using ROS2.

Project Global — 2020

- Designed and 3D-printed over 6,000 face shields for frontline workers during the Coronavirus pandemic.
- Organized a free math tutoring program throughout Southern California to reach students who could not afford tutors.

Honors + Awards

- **Secretary of Lloyd Undergraduate House**: Lead house events, create/manage house website, represent undergraduate students before Caltech administration.
- **US National Chemistry Olympiad Qualifier:** Scored in the top 1,000 out of 20,000+ students.
- **American Invitational Math Exam Qualifier:** Scored in the top 2.5% out of 300,000+ students.