

Adrian Ayala

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Summary

CU Boulder graduate (B.S. Astrophysical and Planetary Science, Quantum Engineering minor, May 2026) continuing with B.S. Physics (expected May 2027) and B.S. Earth Sciences (expected 2028). Hands-on learner focused on energy and critical minerals; seeking Summer 2027 internships in geothermal energy, metallurgy / rare-earth refining, and mining / earth resources.

Education

University of Colorado Boulder — Boulder, CO

B.S., Astrophysical and Planetary Science; Minor in Quantum Engineering — 2021 – May 2026 (completed)

B.S., Physics — expected May 2027 | **B.S., Earth Sciences** — expected 2028

- **Materials Science (ASEN 1022, Summer 2024):** crystal structure and Miller indices; phase diagrams (solidus and liquidus lines).
- Relevant coursework: Experimental Physics 1 & 2; Electronics for the Physical Sciences (PHYS 3330); Observation & Instrumentation I (ASTR 3510); Scientific Programming; Electricity & Magnetism; Quantum Mechanics; Differential Equations; Linear Algebra; Statistics.
- Completed Summer 2026: Exploring Earth (GEOL 1010); General Chemistry 1 with Lab (CHEM 1113/1114; spectroscopy sparked an interest in ore and alloy assay). Current, Fall 2026: Earth Materials (ERTH 2005); Planet Earth (ERTH 2001); Intro to Earth Science Lab; Astronomical Instrumentation.

Technical Projects

Satellite-to-Ground Line-of-Sight Geometry — Xairos (industry-sponsored team project)

- Owned the first stage: wrote Python code in ECEF (Earth-centered, Earth-fixed) coordinates that placed an orbiting satellite and a ground node, traced the line of sight between them, and calculated the angles used to set polarization orientation.
- Derived the satellite geometry by hand over winter break; presented results at the CU Senior Engineering Expo to 100+ people.
- Led client communication with Xairos as team liaison and documented all team meetings.

Flux-to-Albedo Model — Observation & Instrumentation I (ASTR 3510)

- Built a geometric-albedo pipeline: dark/bias/flat calibration, aperture photometry, and flux ratio to the Sun.
- Tested on 16 Psyche, the model returned rocky vs. a true albedo of ~0.15 (metallic), showing the limits of a 3-category model with a small training set.

Impact-Crater Saturation Simulation — Python / Jupyter

- Modeled surface change over time from cratering rates, starting with a no-atmosphere 2D model of crater diameter and impact frequency.
- In a later v2, added erosion of old craters, an atmosphere cutoff for small impactors, and true crater visibility.

Photodiode Heartbeat Monitor — Electronics for the Physical Sciences (PHYS 3330), team project

- Collaborated on a team photodiode circuit reading a finger pulse via an Arduino UNO, helping isolate signal noise to find the pulse.

Hands-On Builds — 3D Printers (high school) and Arduino Car (NYU Summer Robotics Course)

- Set up and ran two 3D printers; took apart the nozzle and cooling fans, then printed and installed replacement parts.
- Diagnosed bed-leveling, warping, and heating problems and traced part of the cause to the room the printers were in.
- Wired and assembled an Arduino-powered remote-control car with side-to-side steering (ran on provided starter code).

Experience

Student Employee — Dining & Housing | University of Colorado Boulder | Sep–Dec 2022

- Operated cooking and cleaning stations on a fixed part-time schedule during the academic semester.

Skills & Activities

- **Programming & tools:** Python, C++, Jupyter; Microsoft Office and Google Suite; AI agents for research and data analysis
- **Hardware & shop:** soldering, Arduino wiring, 3D printer setup, repair, and troubleshooting
- **Languages:** Bilingual English and Spanish
- **Additional:** Valid driver's license