

Theo Rode

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Work Experience

Caltech - Scientific Data Analyst

Nov 2023 - present

- Revamping ingestion of spectroscopy data from the TROPOMI satellite to extract global SIF (a photosynthesis proxy).
- Involves high-performance computing in Julia, applied linear algebra, and Linux server.

GrayMatter Robotics - AI Robotics Software Development Intern

Jun 2023 - Aug 2023

- Took lead on developing a novel RGB vision system in C++, utilizing OpenCV and PCL, which integrated with ROS.
- Developed algorithms for processing point clouds to allow for AI to perceive colored sections of objects as distinct.
- Collaborated extensively with the hardware team to build new custom hardware.
- Worked with the applications team to architect a custom calibration system to allow for interoperability between an external tracking system and a robotic arm for precise (mm scale) sanding.

Harvey Mudd College - Data Structures & Program Development (CSCI070) Teaching Assistant

Jan 2024 - present

- Collaborating with professors and other teaching assistants to provide weekly office hours.

Harvey Mudd College - Multivariable Calculus (MATH019) Teaching Assistant

Aug 2023 - Dec 2023

- Nominated by the head of the math department for a new role to write weekly exemplary solutions for the freshman multivariable calculus (MVC) class of over 200 students.
- Collaborated with professors and other TAs to provide detailed feedback to students.

Harvey Mudd College - Homework Hotline Tutor

Sep 2022 - Dec 2023

- Provide homework help through a free call-in tutoring service for kids from elementary to high school.

Projects

Automated Recovery of Dynamical Systems

Feb 2024 - present

- Explored machine learning techniques for automated nonlinear dynamics recovery from noisy data.
- Extended methods from modern research papers with active learning and robust parameter selection algorithms.

The Game of Gradients

Nov 2022 - Jan 2023

- Led a small team in creating a game in Rust that builds intuition for a gradient field.
- Designed a real-time gradient field simulation that updates live with user defined functions.
- Currently being used by my high school MVC teacher as a teaching tool for his MVC class.

Shark Attack Data Analysis

Nov 2022 - Dec 2022

- Formatted heavily inconsistent and non-standardized data on shark attacks.
- Analyzed data to extract patterns and compiled visual representations to effectively articulate trends using Julia.

Rust Spotify API Wrapper

Aug 2022 - present

- Developed an intuitive library structure as a wrapper for the Spotify Web API in Rust.
- Published as an open source library to Rust's Crates.io package marketplace.

Three Body Problem Simulation

Nov 2021 - Dec 2021

- Built a simulation engine for the Three Body problem, modeling the chaotic motion of three gravitational bodies.

Education

Harvey Mudd College

2022 - 2026

- Sophomore pursuing degrees in Computer Science and Math. Current GPA: 3.97.
- Current coursework: Dynamical Systems (MATH181), Abstract Algebra (MATH171), Probability & Statistics (MATH062), Microeconomics (ECON052), Film Music (MUS067), STEM & Social Impact: Climate Change (CORE079).
- Notable past coursework: Data Structures & Program Development (CSCI070), Mathematical Analysis (MATH131), Differential Equations (MATH082), Advanced Linear Algebra (MATH173), Discrete Math (MATH055), Principles & Practice: Computer Science (CSCI042), Engineering Systems (ENGR079).

The Nueva High School

2018 - 2022

- Notable coursework: Quantum Information and Computation, Algorithms, Computer Security, Computer Vision, Intro and Advanced Machine Learning, Graph Theory, Cryptocurrency.

Skills

- Programming languages: Rust, C++, Julia, Python, R, Racket, JavaScript, TypeScript, MATLAB, HTML, CSS
- Tools and Platforms: OpenCV, PCL (Point Cloud Library), git, Linux, ROS (Robot Operating System), TensorFlow, Pandas, Svelte, Tauri, Leptos, Yew, Unreal Engine, Bevy, React Native
- Skills in computer vision, data analytics, computer simulation, and machine learning.
- Strong leadership, teaching, and teamwork skills