

Benjamin Hinchliff

Computer Scientist Specializing in Machine Learning, Computer Vision, and Space Robotics

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SUMMARY

Computer Scientist specializing in Machine Learning, Computer Vision, and Space Robotics, with hands-on experience developing rover operations software and ML systems at NASA Jet Propulsion Laboratory. Diverse experience including rover simulation, stereo vision, telemetry systems, and generative models. Strong fundamentals in systems programming and software development for research.

SKILLS

- Machine Learning - PyTorch, TensorFlow, Custom Frameworks
- Embedded programming - Arduino C++, MicroPython, FreeRTOS, OS Development
- Simulation and kinematics modeling Fundamentals
- Computer Science Fundamentals - e.g. Data Structures, Algorithms, Theory
- Broad range of languages - e.g. C, C++, Rust, Python, Haskell
- GUI Development Skills - e.g. Qt, Web, React, Vue, Svelte, and jQuery

EXPERIENCE

Caltech | NASA Jet Propulsion Laboratory Intern (Full Time) Jun – Sept 2025

- Developed RSVPLite telemetry backend to allow storage of Mars Sample Return mission telemetry in arbitrary databases, such as TimescaleDB or SQLite
- Created experimental machine learning model for Perseverance rover slippage from overhead imagery and rover tilt data

ANRE Technologies | NASA Jet Propulsion Laboratory Intern (Full Time) Jun – Sept 2024

- Developed custom stereo processing pipeline to experiment with usage of more advanced stereo matching algorithms in rover operations
- Added optional [Looking Glass](#) support to enhance stereo viewer (QARD)

ANRE Technologies | NASA Jet Propulsion Laboratory Intern (Part Time) Oct 2023 – Jun 2024

- Performed large scale codebase refactor to migrate from Qt4 signal connection semantics to Qt5, enhancing compile time error checks

Caltech | NASA Jet Propulsion Laboratory Intern (Full Time) Jun – Sept 2023

- Worked to Develop and Maintain Mars rover Simulation Software (RSVP Suite)
- Ported simulation software from RedHat Enterprise Linux (RHEL) 7 to RHEL 8
- Fixed major issues including crashing bugs, logic bugs, data format incompatibilities, and more
- Developed new terrain searching features

Versational | Full-stack Software Developer Jun – Sept 2021

- Developer on deep learning conversational "Gems" identification models based on BERT

EDUCATION

California Polytechnic State University, San Luis Obispo | M.S. Computer Science Dec 2025

Thesis: [MarsAnywhere: Dataset and Cross-view Diffusion Model for Satellite-to-Ground View Synthesis with Mars Data](#)

California Polytechnic State University, San Luis Obispo | B.S. Computer Science Jun 2024

GPA 3.88 / 4.00 — Summa Cum Laude, President's Honors List

PROJECTS

Full (uncurated) list at benjaminhinchliff.com/projects

MarsAnywhere: Diffusion for Satellite-to-Ground View Synthesis for Mars | PyTorch, SpicyPy

- Diffusion based machine learning model for synthesis of ground view mars imagery from satellite overhead imagery
- Dataset curated and processed from HiRISE Mars orbiter overhead imagery and Perseverance rover ground imagery
- Controlnet model based on Stable Diffusion 2.1 with overhead imagery projected as viewed from the ground as input
- Able to produce realistic ground view imagery for the Jezero crater region of Mars (where the Perseverance rover is)

BanjOS | C11, x86_64 Asm, GRUB Bootloader

- Minimal x86_64 operating system written from scratch targeting the QEMU emulator
- Supports features including: VGA console output, interrupts & interrupt driven keyboard & serial drivers, dynamic memory allocation with on-demand paging (physical, virtual, & kmalloc), cooperative multitasking, and Ext2 file reading

Reinforcement Learning Balatro Agent | PyTorch

- Prototype reinforcement learning agent for Balatro
- Based on an extended version Balatrobot botting framework for the Balatro game
- Communicates with a Pytorch model over websockets to send commands to Balatro
- Learned simple hand combinations and performed moderately better than baseline