Benjamin Hinchliff

Computer Scientist Specializing in Computer Vision, Simulation, and Space Robotics

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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

WORK 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

- Continued to work on M2020 (Perseverance) Rover Simulation Software (RSVP Suite)
- 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

- Assisted development of Deep Learning "Gems" identification models based on BERT

REPRESENTATIVE PROJECTS

Full (uncurated) list at benjaminhinchliff.com/projects

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

- 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 BalatroBot Experiments | PyTorch

- Experiments with building a 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 mod
- Learned simple hand combinations and performed moderately better than baseline

SKILLS

Programming

- Arduino C++ & MicroPython - microcontroller programming
- Simulation and kinematics modeling Fundamentals
- Computer Science Fundamentals - e.g. Data Structures, Algorithms, Theory
- C, C++, Python, Haskell - Comfortable with a broad range of languages
- Web Development - JavaScript, React, Vue, Svelte, and jQuery

Tools/Others

- Scripting (Bash, Python), git, CI/CD (GitHub Actions & Jenkins), Linux/Unix, LaTeX, (n)vim, VS(Code)