

Christopher Moriarty

Senior Scientific Software Engineer

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EXPERIENCE

Moriarty Engineering LLC, Boston MA - Owner/Contractor

January 2025 - Current

SAM.gov registered LLC I created to explore my own technical projects as well as continue to collaborate with scientific and research projects..

- Part-time contract with the MPC (below) to continue building remote backup/failover site.
- Created the webcomic absolutelyderivative.com using Svelte and deployed using pm2 and NGINX as a reverse proxy.
- Developed an MBTA transit sign called “My Stop” using circuitpython on an EPS32 and LED matrix display.
- Built a [map web application](#) using Python and Streamlit for finding bands at the 2025 Somerville Porchfest.
- Built a small cross platform game using Godot called [P.O.N.G.](#)
- “De-googled” my family and friends by building out a self hosted set of reliable open source alternatives.

Smithsonian Astrophysical Observatory, Cambridge MA - Computer Engineer GS-14

Technical Manager of the Minor Planet Center (MPC)

September 2021 - January 2025

Team responsible for calculating orbits and serving as the global clearinghouse for all observations of asteroids, comets, and other solar system bodies, and plays a central operational role within NASA's Planetary Defense program.

- Designed a parallel orbit-fitting pipeline using RabbitMQ and containerized OrbFit workers on Docker Swarm.
- Built public data-visualization apps and high-performance APIs (Flask) backed by a replicated PostgreSQL cluster.
- Reworked Dev/Ops workflows and implemented Jira Service Desk/Software, greatly reducing meeting overhead.
- Consolidated codebases into a GitHub mono-repo and implemented feature branching, code reviews, unit tests.
- Engineered an on-prem SAN with 10Gb iSCSI multipathing and Dell PowerVault arrays, including a remote backup site.
- Implemented an open-source virtualization stack (XCP-ng + Xen Orchestra) and migrated legacy systems to VMs/containers with automated backups.
- Implemented a Prometheus/Grafana monitoring stack to enable a dedicated operations role.
- Delivered biannual reports to the MPC User Group and NASA Planetary Defense with increasingly positive feedback.
- Hired and managed a team of three junior/mid-level engineers.
- Mentored an intern who built a Near-Earth Object classifier using TensorFlow.

Lead Software Engineer for the Submillimeter Array (SMA)

September 2018 - September 2021

Eight-telescope interferometric observatory atop Maunakea that probes the coldest and most distant structures in the universe, and, as a key node in the Event Horizon Telescope, helped produce the world's first images of black holes.

- Brought project management and software engineering best practices to the entire team.
- Conducted formal software engineering training for Python, Unit Testing, and Version Control to both the science staff in Cambridge, MA and the summit staff in Hilo, HI.
- Led networking and software improvements for the FPGA-based SWARM data correlator.
- Fixed and automated VLBI software, greatly improving Event Horizon Telescope campaigns.
- Developed Python API for a Redis based messaging system.
- Maintenance and feature development of legacy C applications deployed to LynxOS (RTOS)
- Developed bridge between legacy operator communications with Slack (2op2slack)
- Co-organized observatory wide multi-day operations review.
- Started the CfA Software Engineering Steering Committee, and served as the chair.

Space Telescope Science Institute, Baltimore MD - Senior Systems Software Engineer

Lead Software Engineer of Makidon Optics Lab

January 2017 - August 2018

The Makidon Optics Lab is a state-of-the-art optical testing and instrumentation facility developing the technology for the coronograph (HiCAT) of NASA's next flagship space telescope—an instrument designed to capture the first direct images of Earth-like exoplanets.

- Developed an object-oriented Python monitor and control library for HiCAT, including environmental sensing and safe shutdown/recovery, enabling remote operations.
- Developed a real-time data pipeline with background subtraction, bad pixel correction, image registration (cross correlation), and standard fits metadata for archiving.
- Brought software engineering practices to a science research team (Git, Jira, object-oriented code, feature branching, unit tests, continuous integration).
- Co-I for successful NASA TDEM proposal, using results obtained with my updated software.

Senior Systems Software Engineer - Astronomer's Proposal Tool (APT)

August 2012 - January 2017

Integrated software suite used by scientists to design, validate, and submit observing programs for both the Hubble and James Webb Space Telescopes.

- Led development of new features and maintenance of the Java based proposal tool for requesting time on the James Webb and Hubble Space Telescopes.
- Planned and led meetings with instrument scientists and systems engineers to collect requirements, and implement “templates” within APT for using JWST instruments, and coordinated updates to downstream systems.
- NASA award for a new feature allowing HST users to check for bright objects for moving targets, and also for successful implementation of JWST parallel observation feature.
- Completed a multi-system feature for duplication checking against the STScI MAST Archive.
- Maintained and updated an automated JUnit regression testing suite.
- Encouraged best practices (feature branching, code reviews and continuous integration)
- Responsible for shepherding releases; building code, packaging, deployment, notifying users, updating tracking system, and merging code.

Harmonia, Blacksburg VA - Software Engineer III

August 2010 - July 2012

Lead Software Engineer and AI Researcher for ABMA - Automated Battle Management Aid

Software research company which delivers innovative data, cloud, AI, cybersecurity, and software solutions to federal government and commercial clients to drive mission success and IT modernization.

- Led a Navy funded Phase II SBIR to obtain several new sources of funding.
- Developed an EXT-GWT app that integrated with C&C Navy systems to intelligently gather data and optimize military resources to recommend battle management plans.
- Reporting and documentation; technical whitepapers, proposals, and user manuals.
- Awarded a separate contract to turn my code into an SDK to standardize integration with the Navy's Command & Control Rapid Prototype Continuum.

Software Engineer for Predicting Traffic Patterns (C++, Neural Networks, FANN library)

- Applied neural networks to predict traffic related attributes about a simulated intersection

VIAVI (Formerly JDSU), Raleigh NC - Software Engineer I

September 2007 - July 2010

Global leader in providing network test, monitoring, and assurance solutions for communications service providers and enterprises,

Software Engineer for JBoss Portal for IPTV Monitoring

- Completed a multi-year software lifecycle gaining experience with requirements, design, development, testing, documentation, deployment, support, and customer interaction.
- Worked with a marketing and sales department to create formal requirements documents.

- Developed JSF (w/ RichFaces) portlets for JBoss Portal, which interfaced with network monitoring devices to display customized monitoring tools all with a similar look and feel.
- Formally trained for agile scrum and Jira.

Software Engineer for Network Monitoring Devices

- Added new alarm filters, and optimized PCR jitter calculation for an IPTV test device.
- Implemented an outward facing web-based XML API in C++.
- Feature updates and bug fixes for a MFC based GUI.
- Assisted development on a communication test suite in Java for Blackberry.
- Developed a control library in C for an RS-232 SPI device for switching femto-cell antennas.

EDUCATION

University of Central Florida, Orlando FL

- M.S. in Intelligent Systems GPA 3.9 May 2007
- B.S. in Computer Engineering GPA 3.1 May 2005
- M.S. Coursework: Neural Networks, High Speed Computer Architecture, Modeling Human Behavior, Expert Systems, Pattern Recognition, Multi-Agent Systems, Software Engineering.
- Master's Thesis - "Learning Human Behavior from Observation for Gaming Applications". Monitored Quake II human players to create non-player characters that behave more humanlike using C, C++, and multi-layer perceptron time-delay neural networks.

SKILLS

Coding: Python, conda, pytest, Java, JUnit, C, C++, C#, Mathematica, GWT, Ext-JS, JSF, XML, ANT, CircuitPython

Frameworks/Services: Prometheus, Grafana, RabbitMQ, Streamlit, PostgreSQL

Version Control/CI: Git, Mercurial, Github, Github Actions, Git Kraken, Forgejo, Jenkins

Project Mgmt: Jira, Trello, Open Project, Confluence, Jira Service Desk

IDEs: PyCharm, VSCode, Zed, Eclipse, Netbeans, Visual Studio, VI, VIM

Sys Admin: XCP-ng, Xen Orchestra, iSCSI, VMWare, NGINX, Apache, Docker, Systemd, Bash, VLANs, Arista/Dell/Cisco Switches, Linux/Mac/Windows administration.

Hosted Trainings: Python, conda, Git, Github, pytest, Issue Tracking, Software Carpentries.