

# Christopher Moriarty

## Senior Science Software Engineer

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## EXPERIENCE

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

#### Technical Manager of the Minor Planet Center

September 2021 - April 2025

- Designed and built a traditional SAN using 10Gb iSCSI multipathing and Dell Powervault storage devices, to provide the team with an affordable, scalable and reliable on-premise hardware infrastructure (including a second backup site) to meet upcoming requirements for data processing.
- Implemented an open source virtualization platform using XCP-ng and Xen Orchestra, and migrated legacy software systems into VMs and containers, leveraging the built-in backup functionality of Xen Orchestra and the Dell Powervault.
- Designed and built a monitoring system based on Prometheus and Grafana with the vision to allow for a new “operator” role at the MPC, to free up senior science staff from being responsible for all technical issues our users have.
- Architect of the next generation parallelized orbit fitting data pipeline leveraging RabbitMQ and containerized “Orbfit” workers using Docker Swarm.
- Developed a containerized framework for hosting public facing data visualization web applications, and Python APIs using Flask, with fast access to a replicated operational PostgreSQL database.
- Reorganized management of the team by dividing operations and software development into separate workflows, leveraging Jira Service Desk and Jira Software Cloud.
- Wrangled many disparate code projects into a structured mono-repository, building a software development process around feature branching and pull requests using Github.
- Hired and directly managed three junior/mid-level software engineers
- Mentored an intern to develop a Near Earth Object classifier using TensorFlow.

#### Lead Software Engineer for the Submillimeter Array

September 2018 - September 2021

- Brought project management and software engineering best practices to the entire team.
- Persuaded team to adopt Google Calendar, Slack, Google Team Drive, and Github.
- Architect of networking and software improvements for the SWARM data correlator.
- Fixed and automated VLBI software, greatly improving Event Horizon Telescope campaigns.
- Developed Python API for a Redis based messaging system.
- 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

- 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 Software Engineer for APT - Astronomer's Proposal Tool***

August 2012 - January 2017

- 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 the new JWST instruments, and coordinate updates to downstream systems.
- NASA award for feature allowing HST users to check for bright objects for moving targets.
- 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***

- 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

#### ***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, PostgreSQL, Java, JUnit, C, C++, C#, Mathematica, GWT, Ext-JS, JSF, XML, ANT, CircuitPython
- **Frameworks:** Prometheus, Grafana, RabbitMQ, Streamlit
- **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 Storage, VMWare, NGINX, Apache, Docker, Systemd, Bash, VLANs, Arista, Dell and Cisco Switches, Linux/Mac/Windows administration.
- **Hosted Trainings:** Python, conda, Git, Github, pytest, Issue Tracking, Software Carpentries.