# JOE GIBSON

## Computer Engineer

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## Overview

Computer engineer with over 10 years of experience specializing in critical embedded flight software, computer vision and pose algorithm optimization, and software quality/reliability.

## Skills

- Programming languages: **C**, **C++**, **Python**, and **Bash**
- Optimization of image processing, computer vision, and pose estimation algorithms
- Hybrid computing systems and interfacing with FPGAs for hardware acceleration of math/algorithms
- In-space Servicing, Assembly, and Manufacturing (ISAM), space systems, radiation tolerant design, and sub-orbital telescopes
- Linux and real time operating systems (VxWorks) on x86, PowerPC, and MicroBlaze platforms
- NASA Core Flight System (cFS) and OSAL
- Systems programming and Unix terminal (make, gdb, ssh, etc.)
- **Git** version control, coding standards, static analysis (CodeSonar), process control, Docker, and CI/CD (GitLab, Jenkins, etc.)
- Documentation with Doxygen, Markdown, and LaTeX
- Basic knowledge of VHDL, Perl, Awk, Sed, HTML, CSS, PHP, and JavaScript
- Basic knowledge of circuit analysis, PCB layout, astrophysics/cosmology, and particle physics
- Fluent in **English** and **Spanish**, intermediate in **French**, beginner in Russian and German

## Experience

**NASA Goddard Space Flight Center**                                **Greenbelt, MD**

**Principal Flight Software Engineer (Code 480) [Intuitive Machines]**      **Jan 2016 - Dec 2024**

- OSAM-1 robotic servicing mission to autonomously grapple and refuel a US gov client satellite
- Developed mission critical flight software in C and C++ on PowerPC and x86 architectures
- Designed software for VxWorks real time operating system and Linux using cFE/cFS framework
- Optimized and implemented various image processing, computer vision, and pose algorithms for autonomous spacecraft rendezvous and robot arm grapple
- Interfaced with Xilinx FPGA cores for hardware acceleration of image processing code
- Transformed non-flight computer vision and pose estimation algorithms into flight-ready code
- Improved code quality and reliability by performing code reviews, leveraging static analysis tools (CodeSonar), and unit/regression testing (UT-Assert, gtest)
- Developed tools in Python and Bash for data analysis/plotting, image conversion, and latency analysis using libraries such as pandas, numpy, bokeh, etc.
- Created command and telemetry specifications and operated ground system (ASIST and COSMOS)
- Wrote and maintained official HFCS C/C++ Flight Coding Standards
- Presented technical information to reviewers at critical subsystem reviews (PDR, CDR, etc.)
- Collaborated with other teams to solve complex problems in an interdisciplinary environment
- Experience at multiple high-profile test campaigns with flight hardware (avionics, robotic arms, sensor, etc.) and ground support equipment
- Led intern program including writing position descriptions, interviewing, and mentoring

**CERN (European Center for Nuclear Research)**                    **Geneva, Switzerland**

**Research Assistant**                                                **Aug 2014 - Jan 2015**

- ATLAS Experiment at the Large Hadron Collider
- Research assistant to Dr. Tancredi Carli (quantum chromodynamics, proton-proton collisions)
- Developed scientific analysis software in C++ and Python on SLC6 (Scientific Linux CERN 6)
- Co-developed the C++ program Spectrum to plot experimental data, theory predictions, and PDF (Parton Density Function) convolutions
- Created file format for Spectrum to parse data, grid, and PDF configurations
- Interfaced with high-energy physics (HEP) libraries such as: ROOT, APPLgrid, LHAPDF, and FastJet QCD

**NASA Goddard Space Flight Center**                                 **Greenbelt, MD**

**Computer Engineering Co-op (Code 665)**                            **Jan 2014 - May 2014**

- BETTII project: high-altitude far-infrared balloon observatory for star formation and active galactic nuclei
- Interfaced with stellar image processing software in C and C++ in a Unix environment
- Developed StarTracker software for Star Cameras
- Interfaced between flight computer and FPGA with RS-422 shared buffer using C and LabVIEW

**L-3 Communications, Avionics Systems**                             **Grand Rapids, MI**

**Computer Engineering Co-op**                                        **May 2013 - Sep 2013**

- Designed software to configure and test avionics instruments
- Developed GUIs in C using LabWindows/CVI
- Tested units under environmental conditions and analyzed data

**Custom Electronics, Inc.**                                          **Grand Rapids, MI**

**Computer Engineering Co-op**                                        **Nov 2011 - May 2013**

- Programmed 8-bit Microchip microcontrollers in C using MPLAB X
- Wrote software for scientific instrumentation buoys
- Designed a series of eight electric guitar effect pedals
- Designed electrical schematics and PCBs in Altium Designer

## Education

**Grand Valley State University**

**B.S.E, Computer Engineering, 2015**

- GPA: 3.957
- ASEE CEED National Co-op Student of the Year 2014
- Academic Excellence Award in Computer Engineering 2015
- Oustanding Co-op Student 2015
- Oustanding Senior in Computer Engineering 2015