Marvin L. Smith

CONTACT INFORMATION

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WORK EXPERIENCE

Senior Principal Software Engineer, Launch and Missile Defense Systems
Northrop Grumman Corporation, Boulder, CO
January 2023 - Present

- **Software Engineering Architect - FORGE, 2023 - Present**
  - Software team lead on the Future Operationally Resilient Ground Evolution (FORGE) program. Responsible for the execution and delivery of the "Sensor-Specific-Processing" capability which seeks to incorporate existing legacy SBIRS-based Missile Warning satellites into the new DoD common Command-and-Control infrastructure.
  - Currently performing analysis of software and hardware requirements to help constrain the amount of compute hardware required to fulfill program needs.

Principal Software Engineer, ISR, Aviation, and Security (IAS) Division
Sierra Nevada Corporation, Englewood, CO
January 2012 - January 2023

- **Systems Engineering, Integration, and Test (SEIT) Lead, 2021 - Present**
  - Long-Wave IR, Wide-Area Motion-Imagery (WAMI) Platform.
  - Lead a team of 10+ Systems Engineers, Scientists, and Program Coordinators.
  - Responsible for the integration, testing, and fielding of the platform.
    - Developed the test plan and test procedures to verify system and subsystem requirements.
    - Coordinated and led flight test activities to ensure program requirements were satisfied and customer objectives are met.
  - Responsible for the development, tracking, and maintenance of all requirements.
  - I wrote a significant amount of code, as well as trained other non-SW engineers to write code. This was done to help the Systems Engineering team to more efficiently perform analysis, increasingly automate testing, and to satisfy program objectives with more rigor.
- **Lead Developer, 2016 - 2021**
- **Software Engineer, 2012 - 2016**
  - Led the Image-Processing software team on the Gorgon-Stare Wide-Area Surveillance System.
  - Designed and implemented ortho-image rendering algorithms for use on airborne systems as well as HPC clusters.
  - Developed camera calibration process using feature detection and optimization algorithms.
  - Developed significant quantities of mathematical software with a heavy emphasis on Numerical Methods, Statistics, Linear Algebra, and Machine-Learning.
  - Designed and implemented image stabilization algorithms.
  - Implemented or utilized many Image-Processing algorithms. Examples include Fourier transforms, Sharpening/Smoothing/Enhancement operations, Segmentation, and Inpainting.
  - Created GIS data (still imagery, motion imagery, vector data) in formats such as Pixia NUI, NITF, KML, MPEG/H264, Shapefiles, etc.
  - Assisted in the development of new camera models for multi-camera sensors.

- Designed, written, and traced system and software requirements. I've helped create and modify requirements to fulfill customer needs against technical constraints.
- Significant test experience. I've written test plans, test cards, and mapped test activities against system requirements. I can summarize a complex activity such as measuring Ground-Location-Accuracy (GLA) of an ortho-image into a process which test personnel can replicate and sign-off on.
- I configured and deployed a significant portion of the initial Continuous-Integration, unit-test, and deployment infrastructure required by our team.
- Assisted with development of OS security hardening procedures and ensured compliance with DoD Security Technical Implementation Guides (STIGs) for Windows and Linux systems.

- Primary fields of expertise are in remote sensing and high-performance computing.
- I have an active DOD security clearance.

Staff Sergeant, Nevada Air National Guard,
Guidance and Control Shop, Avionics Flight, 152 MXS, Nevada Air National Guard
August 2006 - August 2012

- Instrumentation and Flight Controls Journeyman (2A553B).
- Maintenance and repair of USAF C-130 Guidance and Control Systems. Systems include Engine Instrumentation, Autopilot, Fuel Quantity, Digital Flight Data Recorder, and Flight Director.
- Operation Enduring Freedom Deployment, Bagram AB, Afghanistan
  August 2009 - December 2009
- Operation Iraqi Freedom Deployment, Talil AB, Iraq
  October 2007 - January 2008

Intern, Intelligent Robotics Group, NASA Ames Research Center,
Mountain View, CA

- June 2011 - August 2011

  Developed a crater detection algorithm for use in planetary surface characterization and terrain reconstruction. Primary use is for the alignment of LIDAR data from the LRO Satellite to images taken from the Apollo 15 and 17 missions.
- June 2010 - August 2010

  Developed algorithms for the open-source NASA Vision Workbench library which removes outliers from stereo reconstructions of the lunar surface.

Undergraduate Assistant, Computer Vision Lab,
Department of Computer Science and Engineering, University of Nevada, Reno
August 2010 - May 2011, August 2011 - January 2012

- Teaching Assistant
  - CS 302, Data Structures: CS 474, Image Processing: CS 485, Computer Vision

Technical Skills

- **Programming Languages**: C++, Python, Matlab, LaTeX, PowerShell, and Bash.
- **Software Experience**:
  - Image Processing : OpenCV, Matlab, NASA Vision Workbench, scikit

- GIS APIs : GDAL, ArcGIS, GeoServer, libLAS (lidar), GeographicLib (EGM96/geoid APIs), some ArcPy
- Distributed Computing : MPI, IBVerbs, libRDMA, and BSD Sockets
- Scientific APIs: Eigen, Ceres, GMP, NumPy/SciPy, and Pandas

- **Open-Source Projects Contributed:**
  - OpenCV
    - Wrote the update to the imgcodec API to allow using GDAL to load GIS raster format.
  - NASA Vision Workbench
    - Wrote underlying implementations of the Hough transform, Integral-Image, and other common CV methods.
- **System Administration**: Configuration Management deployment (git, svn, Artifactory), constructing software build systems (Jenkins), and some networking to setup software labs.

Publications

- Technical Reviewer
  Prateek Joshi, "OpenCV with Python By Example", Packt Publishing, October 2015, link
- Technical Reviewer
  Garcia, Aranda, Suarez, Tercero, "Learning Image Processing with OpenCV", Packt Publishing, March 2015, link
- Marvin Smith, Ara Nefian, "Outlier removal in stereo reconstructions of orbital images", International Symposium on Visual Computing, 2010.

Education

University of Nevada, Reno, Reno, NV

Bachelors of Science, Computer Science (Graduated: May 2012)

- UNR GPA: *3.65*, CS GPA: *3.6*
- Adviser: Dr. George Bebis
- Areas of Interest: Computer Vision, Image Processing
- Specialized Undergraduate Courses: Computer Vision, Advanced Computer Vision, Artificial Intelligence, Simulation Physics, and Image Processing.
- Graduate Courses Completed: Machine Learning, Computer Graphics, Patent Law (Business School).

Nevada Air National Guard 152 Maintenance Squadron, 152 Air Wing, Reno, NV

2A553B, Instrumentation and Flight Controls Journeyman

- Instrumentation and Flight Controls Craftsman Course
- Airman Leadership School, Correspondance, May 2011
- Instrumentation and Flight Controls Apprentice School,
  Sheppard Air Force Base, TX, June 2007
- Electronic Principles School,
  Keesler Air Force Base, MS, January 2007
- Basic Military Training,
  Lackland Air Force Base, TX, November 2006

Volunteering

Coach, Codebusters First Tech Challenge Robotics Team
Boys and Girls Club of Truckee Meadows
May 2016 - February 2020

Mentor, Boys and Girls Club of Truckee Meadows
March 2015 - May 2016

References Available Upon Request