William L. Spies II

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SKILLS AND TOOLS

ROS 1 / 2	OMPL, Boost, Eigen	Google Test / Bench	Atlassian & MS Office Suite	Project Planning
C++ 17/20	OpenCV, PCL, CUDA	PLC Programming	ANSI/RIA R15.06	Budget & Labor Estimation
Python 3	Git, CMake, Docker	Robot Programming	ISO 13849, ISO 26262, NFPA 70E	Leadership Development

EXPERIENCE

True Anomaly : Centennial, CO   September 2023 – September 2024
Lead Engineer, Simulation Platform

- Led four engineers in the development of astrodynamic software for modeling and simulation of **JACKAL** autonomous orbital vehicles.
- Authored logic for communications modeling, analysis of vehicle state uncertainty, and the persistent object management system for the **Mosaic** software product in C++20 and Python.
- Maintained APIs for Python and Elixir libraries (through NIF utilization of C-like APIs) for downstream Mosaic users.
- Liason to project planners to prioritize feature requests, triage bugs, and steer development efforts to achieve long-term strategic objectives.

Fenris Robotics, LLC. : Denver, CO   September 2022 – Present
Founder, Contractor

- Started my own robotics consulting LLC, providing contracting services to enterprises with robotic development challenges.
- **Chembotix, LLC.**   June 2023 – September 2023
  - First engineer contracted for stealth-mode chemistry robotics startup, where I wrote the system architecture for **Autosynth,** an autonomous chemical fabrication robotic cell.
  - Wrote the drivers, state machine, telemetry capture logic, motion planning and offline simulation code for the prototype cell, integrating with an already-present **VEX Robotics** controller and peripheral devices.
- **Viam, Inc.**   September 2022 – May 2023
  - Wrote integration with the **Open Motion Planning Library** (OMPL) to supplement internal motion planning algorithms via C++ APIs.
  - Authored tutorials on setup, configuration, and use of the Motion service aimed at users of the Robot Development Kit (RDK).
  - Leveraged **MuJuCo** for validation of robotic descriptions, kinematic and dynamic behavior, and joint limit and collision checks.

Outrider Technologies, Inc. : Golden, CO   March 2019 – August 2022
Senior Software Engineer, Robotics

- Managed collaboration between **TrailerConnect** (TC) and Computer Vision and Machine Learning (CVML) departments.
- Authored and supported C++ software interfaces to industrial-grade Ethernet/IP digital I/O modules and pneumatic manifolds.
- Responsible for continued improvement of TC perception software, interfaces, and tooling in C++ and Python.
- Responsible for performance analysis of advanced mechanical prototypes and generating corrective design recommendations.

Robotics Software Engineer

- Authored code in C++ and Python (ROS 1) for TC Obstacle Detection / Obstacle Avoidance (ODOA), hardware interface, perception, manipulation, simulation, configuration management systems, and finite state machines.
- Responsible for commissioning of **Yaskawa** GP7 robotic arms, Intel **RealSense** cameras, SICK safety laser scanners, embedded VersaLogic computers, and other electronic devices.
- Prepared Machine Safety Risk Assessment (compliant with ANSI/RIA R15.06) on the complete TC robotic system.

Northwestern University : Evanston, IL
Research Scientist - Computational Photography Lab (CPL)   June 2018 – December 2018

- Spearheaded joint effort with NU ACCESS to leverage Python, WebRTC, and consumer-grade Android tablets for 3D surface scanning using structured light projection and deflectometry. (**US Patent 11,336,883**) (**Optics Express 28, 9027-9038 (2020)**)
- Spearheaded effort with Dr. Florian Willomitzer to adapt Flying Triangulation (**arxiv:1305.4168**) from MATLAB source code to C++17.

Master of Science, Robotics 🎓   September 2017 - September 2018

- Focused on robotic applications of computer vision (e.g. visual odometry, 3D reconstruction, camera calibration, pose estimation).
- Focused on embedded systems programming in modern C++ (11/17) and Python, including heavy usage of ROS 1.
- Focused on implementing kinematic and dynamic control of 6-DoF robotic systems and mobile manipulators.

ATS Automation : Lewis Center, OH   June 2012 – August 2017
Systems Project Engineer; Laser Safety Officer
Systems Software Engineer; Laser Safety Officer
Electrical Design Engineer