

# JON J. ANDERSON

## OBJECTIVE

To leverage my knowledge and experience of robotic system development in order to create innovative, reliable, and cost effective hardware solutions to the most challenging robotics problems.

## EXPERIENCE

### PLANET LABS (Spacecraft Engineer)

*Jan 2015 – June 2016*

- Designed, tested, and productionized a deployable star camera with a vaned baffle to fit an existing volume on the Dove 3U Earth imaging CubeSat to enable improved attitude determination
- Responsible for the primary structural components that interface the main optical instrument to other components and subsystems on the Dove spacecraft
- Structured, built, and maintained top-level Solidworks assembly for the entire satellite and all of its components
- Organized a formal onsite ASME Y14.5 GD&T training, then worked with the team to incorporate GD&T to better control component and critical assembly tolerances
- Collaborated on process development including BOM structure, best practices, design review, and product release

### NATIONAL ROBOTICS ENGINEERING CENTER - LAB 37 (Intern)

*Jan 2014 – Dec 2014*

- Worked on a small team to rapidly develop reliable robotic hardware solutions for agricultural, defense, energy, medical, logistics, and industrial clients
- Designed boom-mounted multimodal sensor head with 14 elements, a self-restoring breakaway bumper, and other components for the Sensabot 2 inspection robot, which is designed to operate in harsh and hazardous environments on oil platforms and gas fields operated by Shell and the North Caspian Operation Company
- Designed, integrated, and fielded a prototype trailer-mounted robotic gantry for removing strawberry plant blossoms at a large commercial nursery in California
- Designed support equipment including a battery module, fluid cooling system, and sheet metal sunshade for a Humvee-mounted advanced mapping sensor

### PLANET LABS (Intern, Spacecraft Assembly and Testing)

*Sept 2013 – Dec 2013*

- Integrated, tested, and delivered the world's largest constellation of earth-observation satellites (28 satellites)
- Designed mechanical components and processes for the next generation of earth-imaging satellites to incorporate new features and improve manufacturability
- Performed environmental testing for satellite and components according to multiple launch vehicle specifications

### SPACEX (Process Engineer)

*Jan 2013 – Sept 2013*

- Worked with design engineers to develop Dragon structural integration processes and visual work instructions that reduced build time by over 50% while simultaneously reducing the number of defects per capsule
- Concurrently managed and prioritized structural integration for 3 Dragon capsules at varying levels of completion
- Worked with design engineers to develop solutions for repairing and validating manufacturing anomalies
- Designed both tooling and flight components for Dragon using NX/Teamcenter

### ASTROBOTIC (Intern, Robotics Engineer)

*June 2012 – Dec 2012*

- Designed, integrated, and fielded the Polaris rover, a prototype lunar rover for in-situ resource utilization, for a NASA Phase II SBIR award
- Led development of Polaris subassemblies including wheel actuators that consist of frameless brushless motors, harmonic drive component sets, optical encoders, and many CNC machined components
- Evaluated system performance through field testing and developed recommendations for future improvements

### HOLOGIC – DIAGNOSTICS (Intern, Product Dev. Engineer)

*June 2009 – May 2012*

- Designed mechanical components for automated diagnostic instruments with a focus on improving reliability and reducing cost for medium volume production
- Designed and performed reliability tests, including a machine vision system implemented using OpenCV to measure the positional deviation of a gripped diagnostic vial
- Prototyped new diagnostic media handling techniques using a customized programmable SCARA robot arm

## EDUCATION

### CARNEGIE MELLON UNIVERSITY

*May 2012 – Dec 2014*

*MS Robotics - Robotics Institute, GPA 3.83/4.33*

*Advisor: William "Red" Whittaker*

*Thesis: Actuating Planetary Rover Wheels*

## **WORCESTER POLYTECHNIC INSTITUTE**

*BS Robotics Engineering, BS Mechanical Engineering, GPA: 3.82/4.00*  
Honor Societies: Pi Tau Sigma, Tau Beta Pi, Sigma Xi, Rho Beta Epsilon

*Aug 2008 – May 2012*

### **PROJECTS**

#### **PROTOFLIGHT LUNAR ROVER FOR GOOGLE LUNAR X-PRIZE**

*Jan 2014 – Dec 2014*

- Served as the chief engineer for the Carnegie Mellon's Google Lunar X-Prize rover development that won the Milestone Mobility prize worth \$500,000
- Led design and test activities to validate the rover's ability to withstand lunar mission environments including challenging terrain, thermal, vacuum, vibration, and radiation
- Designed, built, and evaluated wheel actuators to propel the rover over any encountered terrain at mid-latitude lunar destinations
- Responsible for protoflight rover architecture and configuration; rapid development and fielding of a mobility prototype; design, fabrication, and qualification of protoflight wheel motors; design, fabrication, and testing of rover-lander deployment mechanism

#### **ORYX 2.0: A PLANETARY EXPLORATION MOBILITY PLATFORM**

*Aug 2011 – May 2012*

- Led a team of students to design and realize a rover research platform suitable for use in harsh earth environments to evaluate future planetary exploration technologies
- Conducted extensive field-testing to validate the design, which included winning NASA/NIA's RASC-AL Robo-Ops Competition for the second straight year
- Won 2012 ASME Undergraduate Student Mechanisms and Robot Design Competition
- Awarded the WPI Provost's award for both ME and Robotics departments

#### **NASA/NIA RASC-AL ROBO-OPS CHALLENGE**

*March 2011 – May 2011*

- Led a team of students to win a long-range tele-operated sample return rover competition
- Served as lead engineer; designed the rover using Solidworks; manufactured parts in WPI's shops; sourced COTS electronic components; integrated rover drivetrain, sample acquisition, electronics, and computing components
- Traveled to NASA JSC and Desert RATS to demonstrate to NASA engineers and staff

#### **CREATING AN AEROPONIC GARDEN IN BANGKOK, THAILAND**

*Jan 2011 – March 2011*

- Proposed and developed an aeroponic garden with Thai university students that best suited the needs of a Bangkok primary school's agricultural curriculum

### **SKILLS**

**ENGINEERING:** Mechanical component design including sheet metal, electromechanical system design, design for manufacture, design for assembly, fabrication including CNC milling, turning, investment casting, sheet metal, and waterjet, assembly of robotic systems including wiring, PCB layout and population, rapid prototyping, hardware testing automation

**SOFTWARE:** SolidWorks, MATLAB, NX/Teamcenter, Python, Eagle, C/C++ (incl. embedded), Java, ROS, OpenCV, LabVIEW, Scheme, Maple, Linux, SketchUp, Pro Tools, MS Office

### **PUBLICATIONS**

"Kinematic Control of a Planetary Exploration Rover over Rough Terrain," T. Carlone, J. Anderson, J. Amato, V. Dimitrov, T. Padir. IEEE SMC 2013. Manchester, England.

"Design and Experimental Validation of a Mobile Robot Platform for Analog Planetary Exploration," J. Amato, J. Anderson, T. Carlone, M. Fagan, K. Stafford, T. Padir. IEEE IECON 2012. Montreal, Quebec.

"Modular drive system for a planetary exploration mobility platform," J. Amato, J. Anderson, T. Carlone, M. Fagan, K. Stafford, T. Padir. IEEE TePRA 2012. Woburn, Massachusetts.

### **ACTIVITIES**

Eagle Scout (2007), PADI Open Water Scuba Diver, Team member of FIRST Team 159 (2007 & 2008 Student, 2009 Mentor), NASA Sample Return Rover Centennial Challenge Judge (2013 & 2014)