

# ALEX TACESCU

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🌐 www.alextac.com

## QUALIFICATION SUMMARY

Robotics engineer with extensive experience developing complex software simulations in robotics and aerospace industries and writing software for embedded platforms.

## TECHNICAL SKILLS

**Robotics:** Software Development, Mechanical Design, Electrical Design, Agile Project Management (SCRUM)

**Programming:** C++ [6 years], Python [7 years], Robot Operating System [6 years], Java [11 years], SQL [1 year], PointCloudLibrary [2 years], Docker [5 years], and Git [9 years]

**3D CAD:** Design and Simulation in Autodesk Inventor [11 years], Dassault SolidWorks [8 years], PTC Creo Parametric (ProE) [1 year]

**Rapid Prototyping:** FDM & SLA 3D Printers, Laser/WaterJet Cutting

**Embedded Systems Programming:** Raspberry Pi, BeagleBone Black/Blue, NVIDIA Jetson, RTOS (ChibiOS) on STM32 and ESP32, Real-Time Linux Kernel with device trees

**Other Software Experience:** Linux (Debian, Ubuntu, RedHat, ArchLinux, etc), MATLAB, Adobe Creative Suite (Photoshop & Premiere), KiCAD

## EDUCATION

M.S./B.S. in Robotics Engineering **Worcester Polytechnic Institute**

Graduation: May 2021

GPA: 3.6 (M.S.) & 3.4 (B.S.)

## WORK EXPERIENCE

References Available upon Request

Falcon Flight Software Operations Engineer **SpaceX**

📅 June 2021 - Current

📍 Los Angeles, CA



- Responsible Engineer for several high profile missions including DART (Double Asteroid Redirection Test), Crew4, Axiom1, and Inspiration4.
- Falcon Simulation Lead - responsible for Falcon simulation using a custom in-house dynamics simulator. This includes developing new features, debugging breaking issues, and improving performance. Directly responsible for a 30% performance improvement.
- Responsible for migrating company HITL/HIL (Hardware in the Loop) simulation servers to new operating system as well as modernizing HITL software solutions.

Advanced Robotics R&D Internship **Amazon Robotics**

📅 May 2020 - August 2020 📍 Boston, MA



- Analyzed robot arm workcell faults and collected data to SQL database to display it to dashboards using Apache Superset. Presented patterns and solutions and collaborated with leadership team in decision making.
- Designed and deployed workcell fault diagnosis and mitigation systems, reducing downtime by 60% (initial tests).
- Developed vision system + path planning system for FANUC robots to recover from workcell faults by picking up dropped products.

## Advanced Robotics R&D Co-Op **Amazon Robotics**

📅 Aug 2019 - Dec 2019    📍 Boston, MA



- Automated 3D Packing using a vision-guided Universal Robotics arm in Python and C++.
- Developed perception algorithms using 3D cameras and the PointCloudLibrary.

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## Powertrain Integration Engineering Internship **Tesla**

📅 Summer 2019    📍 Palo Alto, CA



- Designed and deployed new automated platform that reports reoccurring issues using anonymous fleet analytics for over 600,000 cars.
- System was utilized by Tesla powertrain software developers to identify and debug several user-facing issues.
- Developed in Python in Jupyter Lab using PySpark and SQL to pull and analyze fleet data. Created user interface and dashboards using Apache Superset, automated by Apache Airflow.

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## Powertrain Integration Engineering Internship **Tesla**

📅 Summer 2018    📍 Palo Alto, CA



- Responsible for troubleshooting battery thermal system issues and developing test stands for Model S/X, Model 3, Semi-Truck, and other products.
- Developed software components for testing, collecting data over CAN networks.
- Discovered and fixed 3 issues in critical systems such as the battery and powertrain thermal system and the high voltage system.
- Identified a problem and implemented a change in 2 assembly cells that increased Model 3 end-of-line production by 45%.

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## Student Assistant **Worcester Polytechnic Institute**

📅 Aug 2018 – Current    📍 Worcester, MA



- Student Teaching Assistant for WPI's Junior year Robotics classes (RBE 3001 & 3002) focusing on robotic manipulation, dynamics, machine vision, path-planning, & other advanced concepts.

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## PROJECTS

For more, please visit [alextac.com/projects](http://alextac.com/projects)

**2015-Current: Project Maverick / MavDrive** is an award-winning omni-directional robotic system that provides mobility for people with walking disabilities. The drive system allows the user to move in any direction using 4 steering and 4 driving electronically synchronized motors, creating the same degrees of motion as an able person. It was designed, built, and programmed as a personal project, initially with Java and then converted to ROS (C++ & Python). The drive system is currently being further developed with RTOS microcontrollers and distributed computing. To learn more, please visit [pmaverick.com](http://pmaverick.com)

**2020-2021: WPI Exoskeleton** is a research project with the goal to design an exoskeleton to help paraplegic patients' physical rehabilitation through exercise and bone loading. I developed a customizable bio-mechanical knee joint to follow the flexion and extension patterns of the human knee with the help of magnetic resonance imaging (MRI) as my Masters thesis. This project was done as a part of WPI's Automation and Interventional Medicine (AIM) robotics research laboratory. Published 3 papers, 2 as primary author.

**2018-2019: SmallKat Major Qualifying Project** is a quadrupedal robotic platform designed for research and development of multipedal robotic systems. SmallKat is 3D printed, open source, and contains fully custom electronics. I developed the high-level software, including footstep planning, path planning, forward/inverse kinematics, machine vision, and networking systems for off-platform debugging for my Major Qualifying Project (MQP) with 2 other students. To learn more, please visit [alextac.com/smallkat](http://alextac.com/smallkat)

**2017-2018: Poverty Stoplight Interactive Qualifying Project** is an Android application for social workers in Paraguay to better help people in poverty. The application was designed for Fundación Paraguay and Poverty Stoplight and consisted of developing a REST API and an Android Java application capable of syncing sensitive family data with a secure server. To learn more, please visit [alextac.com/stoplight-iqp](http://alextac.com/stoplight-iqp)

**2016-17: NASA Space Robotics Challenge** is a competition to develop software for NASA's humanoid robot Valkyrie. Developed footstep motion planning, optimized cycle-speed, and tested in ROS, C++, and Python with Gazebo as a member of the WPI Humanoid Robotics Lab. To learn more, please visit [alextac.com/src](http://alextac.com/src)

**2017: Project Drogo** is a wearable embedded system accompanied by a smart-phone app designed to assist elderly people through post-hip surgery recovery. It combines 2 goals of post-surgery medicine: preventing prohibited motions and guiding the user through physical therapy and rehab. Developed on a team of 4 students as a part of the hackathon Health Hacks RI, where it received 1st place. To learn more, please visit [alextac.com/drogo](http://alextac.com/drogo)

**2012-16: FIRST FRC Robotics Team 2761** 4 cumulative seasons with the team. Designed, built, programmed, and tested 5 full-size robots. To learn more, please visit [alextac.com/frc](http://alextac.com/frc)

## **AWARDS/PUBLICATIONS**      For an updated list, please visit [www.alextac.com/awards](http://www.alextac.com/awards)

**2021** Design of a Personalized Bio-Mechanical Knee Orthosis Paper in ASME International Mechanical Engineering Congress and Exposition Conference Publication (primary author)

**2021** Open source Vicon Toolkit for Motion Capture and Gait Analysis journal publication

**2021** Development of a Bio-Mechanical Actuated Knee Orthosis for Exoskeletons Thesis

**2019** SmallKat Major Qualifying Project (MQP) Honorable Mention (2nd best capstone project in Robotics Engineering Department)

**2018** Inducted in Rho Beta Epsilon Robotics Engineering Honor Society

**2017** 1st Place at HealthHacksRI at the University of Rhode Island for Project Drogo

**2017** NASA Space Robotics Challenge Team Finalist

**2016** 2nd Place at the Intel International Science and Engineering Fair (ISEF) in the category of Applied Mechanics

**2016** Google International Science Fair Regional Finalist (top 100 in the world)

**2016** International Council on Systems Engineering (INCOSE) Award for "best interdisciplinary project that can produce technologically appropriate solution that meet societal needs" at ISEF

**2016** GE Fallonventions Award and participation on NBC's Tonight Show starring Jimmy Fallon (aired on April 11, 2016). [See it here](#)

**2015 & 2016** Sweepstakes Award winner (1st place overall) and 1st place in Engineering at the Central California Science, Math, and Engineering Fair

**2015** Institute of Electrical and Electronics Engineers President's Scholarship Award at Intel Science and Engineering Fair for "an outstanding project demonstrating an understanding of electrical engineering, electronics engineering, and computer science."

**2015** 1st place in the category of Applied Mechanics at the California State Science Fair