Joshua Max Manela

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EDUCATION

Michigan Technological University
Fall 2011 - Spring 2016

Graduated Magna Cum Laude BS Computer Engineering with a Minor in Computer Science, GPA: 3.74

WORK EXPERIENCE

Staff Software Engineer, Perception, Waymo LLC (Formerly the Google Self-Driving Car Project)
January 2021 - Present

➢ Responsible for the development, integration, and maintenance of novel sensor fusion algorithms.
➢ Publish with the research team to push the state-of-the-art in long range sensor fusion.
➢ Lead the freeway radar perceptio working group composed of hardware, software, and systems engineers.
➢ Tech lead for long-range stereo-radar sensor fusion algorithm development.

Senior Software Engineer, Special Projects (Perception), Argo AI
March 2017 - January 2021

➢ Lead all aspects of the development and deployment of shipping a deep lidar object detection model.
➢ Designed, implemented, and integrated a deep stereo algorithm published at CVPR. (See Publications)
➢ Optimized a deep image segmentation system to run in real time and in production.
➢ Implemented hardware-level camera and lidar drivers which cross all levels of the stack.
➢ Designed and implemented a Gaussian Process based ground surface segmentation with cm-level precision.
➢ Optimized C++17 computer vision primitives to run faster than existing libraries.

Software Engineer, Machine Learning and Prediction, Uber Advanced Technology Group (ATG)
May 2016 - March 2017

➢ Worked with the motion planning team to develop deep-learning based controls algorithms.
➢ Wrote real-time visualizations for on-car debugging of our models.
➢ Architected onboard software architecture for long-horizon actor prediction.

Hardware Validation Engineering Intern, Facebook
Summer of 2015

➢ Wrote custom libraries to interface with the switches and run various network and stress tests.
➢ Designed and custom test harnesses for our custom network switches.
➢ Optimized network switch placement in Facebook data centers.

Software Development Engineering Intern, Amazon
August 2014 - November 2014

➢ Thorough preparation of software design with rigorous agile-centered design evaluations.
➢ Implemented RESTful APIs interfacing with a NoSQL database.
➢ Designed a service that validates security certificates between microservices across the Amazon stack.

Software and Controls Engineering Co-op, Mercury Marine
January 2013 - August 2013
➢ Extensively used MatLab and Simulink to write Engine Controller Unit (ECU) code.
➢ Soldered, crimped, designed, and built engine harness for production and test designs.
➢ Wrote CAN, RFID, and IO libraries in C for an ATMEL AT90CAN128 processor for engine security firmware.

Simulation Engineering Intern, Applied Manufacturing Technologies
Summer 2012
➢ Laid out and simulated industrial robot performance using the Delmia I-GRIP CAD/Sim Package.
➢ Collaborated with other Simulation Engineers and wrote macros to improve CAD and simulation speed.

Lead Instructor, The Robot Garage

Summer 2011, 2012

➢ Wrote K-12 curriculum and led robotics classes and camps for the robot garage.
➢ Focused on the integration of mechanical and software design.
➢ Created the "Sumo Bot" stand-alone customizable robotics system still in use today.

Software Engineer, User Friendly EMR (Electronic Medical Record)

August 2013 - April 2014

➢ Developed various modules for an Electronic Medical Record system with the intent of organizing patient data.
➢ Designed a module to store employee signatures and credit card information in a mySQL database.

ACADEMIC EXPERIENCE

Undergraduate Researcher, Michigan Technological University

September 2013 - April 2016

➢ Designed and fabricated peripheral hardware kit for a robotic quadcopter to survey highways and bridges.
➢ Reconstructed a real-life bridge after having been flown over by a drone SLAM algorithm.
➢ Researched PSO (Particle Swarm Optimization) variants and published a novel meta-optimization for PSO.

Learning Center Coach, Michigan Technological University

May 2015 - May 2016

➢ Tutored students in both the Electrical Engineering and the Computer Science learning centers.
➢ Taught and tutored students in several classes including, Intro to Circuits I & II, Signal Processing, Electronics, Linear Systems, Intro to Computer Science, Data Structures, Discrete Structures, Data Structures, and any other course on the undergraduate catalog in either the ECE or CS departments.

Student Research Assistant, University of Miami

Summer of 2010

➢ Participated and helped analyze information for heart-rate and stress testing.
➢ Wrote software to analyze the radial dimensions of arteries from an ultrasound machine.

Patents and Publications

Hwang, J. J., Kretzschmar, H., **Manela, J**., Rafferty, S., Armstrong-Crews, N.: CramNet: Camera-Radar Fusion with Ray-Constrained Cross-Attention for Robust 3D Object Detection. In: ECCV (2022)

Methods and systems for constructing map data using poisson surface reconstruction
HU Xiaoyan, M Happold, **JM Manela**, G Hotson - US Patent App. 16/722,641, 2021

G. Yang, **J. Manela**, M. Happold, D. Ramanan. Hierarchical Deep Stereo for High Res Imagery. Computer Vision and Pattern Recognition Conference 2019 (CVPR)

J. Manela and T.C. Havens. Histogram particle swarm optimization (HistPSO): evolving non-parametric acceleration distributions. IEEE Conf. Evolutionary Computation

H. Deilamsalehy, **J. Manela**, and T.C. Havens. Heterogeneous Multi-Sensor Fusion for Mobile Platform 3D Pose Estimation. ASME Journal of Dynamic Systems, Measurement and Control

Volunteer Work

FIRST Robotics Mentor, FIRST Robotics Teams 27, 2194, and 2586

2011 - 2015

➢ Mentored three different high-school and two different middle school robotics teams.
➢ Taught students the basics of engineering design, application, and programming.
➢ Helped students create presentations and organize events to promote their team and gain funding.