

# Trevor M. Decker

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U.S. Citizen

## Employment History

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### Robotics Engineer, Apple Special Projects Group (2016 - Present)

- Created bundle adjustment and SLAM pipelines for high definition map creation
- Developed a patent pending high fidelity rolling shutter LiDAR simulation
- Created low cost multimodal modular distributed embedded traffic monitoring system
- Mentored team intern on reinforcement learning project

### Research Assistant, CMU Field Robotics Center (2011 - 2016)

- Assisted with software and hardware maintenance/development of 10+ robots
- Built multi-robot co-localization algorithms in low infrastructure environment
- Developed Kalman filter and EKF for sensor fusion
- Added vision system to robot to allow for automated initialization

### Intern, Amazon Prime Air (Summer 2015)

- Worked on computer vision and a real time embedded system for sensors team
- Team is applying for multiple patents based on my work on the project
- Completed internship project early, helped another intern finish a second project

### Intern, Volkswagen Electronics Research Laboratory (Summer 2014)

- Developed scalable architecture for sensor extrinsic calibration verification
- Upgraded legacy code to work with new system interface
- Participated in and helped organize computer vision reading group

### Introduction to robotics TA (Spring 2013 - 2016)

- 2016 lead teaching assistant, managed team of 12 TAs, wrote exams
- Designed new Bayes filter localization lab, robots solve the lost robot problem
- Taught localization/state estimation lecture for professor

## Education and Relevant Classes

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### Carnegie Mellon University (CMU), Pittsburgh, PA

- Masters of Science in Electrical Computer Engineering (ECE) (May 2016)
- Bachelors of Science in ECE with minors in Computer Science, Robotics, and Business Administration (2015)

### Robot Kinematics Dynamics and Controls

- Created Kalman filter for vision system parameter estimation

### Mechatronic Design

- Won "Coolest Robot" award for skyscraper window cleaner

### Statistical Techniques in Robotics

- Used Reinforcement learning for AI to play Mario Kart clone

### Parallel Computer Architecture and Programming

- Developed Vision system for GPU based road segmentation

### Real Time Embedded Systems

- Designed working RTOS with priority inversion

### Computer Vision

- Designed optical text recognition system

### Embedded Controls

- Programmed stable inverted pendulum

### Distributed Embedded Systems

- Developed safety critical elevator control system

## Activities

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### Robotic Buggy (2013 - 2016)

- Creating a robot which can autonomously compete in a gravity race at CMU
- Lead Software Team (manage 8+ people) Responsible for all software and firmware
- Developed a scalable real time architecture for mapping, path planning, and localization
- Wrote motion model and observation model for GPS, IMU, encoders, cameras, ...
- Built computer vision road lane and building feature detectors to help extract robot's state

### Mentor, Girls Of Steel FIRST Robotics Team 3504 (2011 - 2013)

- Mentored CMU sponsored robotics team of 40+ high school girls
- Co-taught Java programming course for students
- Acted as a Resident Assistant for 30 visiting Chinese students during a 2 week camp (2013)

### Apex Buggy Team (2011 - 2016)

- Relay race at CMU with human driven carbon fiber carts built by students
- Co-founded team as a freshman (now has 40+ members), was an active member for 5 years

## Distinctions

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- 1st place Apple maps emerging technology reinforcement learning challenge 2017
- Computer technician: diagnosed and repaired computers for 650+ students (2009 - 2011)
- Black Belt, Tang Soo Do Karate

### Programming

Matlab ★★★★★

C ★★★★★

C++ ★★★★★

Java ★★★★★

Python ★★★★★

HTML ★★★★★

PHP ★★★★★

JavaScript ★★★★★

SML ★★★★★

LaTeX ★★★★★

### Libraries

ROS ★★★★★

Free RTOS ★★★★★

OpenCV ★★★★★

PCL ★★★★★

TensorFlow ★★★★★

G2o ★★★★★

### Software

linux ★★★★★

Adobe Premiere ★★★★★

SolidWorks ★★★★★

### Mechanical

Mill ★★★★★

Lathe ★★★★★

3d printer ★★★★★

Laser cutter ★★★★★

Carbon Fiber ★★★★★