

# Benjamin M. Gatten

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## Education

### University of California, Davis

Master of Science: Mechanical Engineering, Class of 2020, GPA: 3.9  
*Dean Karnopp Fellowship, George W. Pierce Scholarship*

### University of California, Davis

Bachelor of Science: Mechanical Engineering, Class of 2018, GPA: 3.86

## Languages, Libraries, & Tools

C++	Python	Bash
Ceres	Numpy	ROS
Eigen	Pytorch	GIT
PCL	Scikit	JIRA
g2o	CUDA	Linux

## EXPERIENCE

### Monarch Tractor/Principal SLAM Engineer

Livermore, CA | June 2020 – Present

#### Accomplishments & Responsibilities:

- SLAM team lead - Manage 5 employees across Europe and Asia to develop state of the art algorithms.
- Productized 6 projects in state estimation, sensor fusion, path tracking, and path planning.
- Instrumental in securing hundreds of millions in Series A and B funding through customer demos.
- As employee number 12, helped Monarch Tractor grow to into a global company with over 200 employees.

#### Projects:

- Wrote highly optimized C++ code for Stereo Visual Odometry. Leveraged SOC capabilities on distributed edge devices which resulted in over a 150% speedup compared to single-threaded CPU and enabled real-time performance.
- Developed graph-based optimization using g2o to perform localization within GPS-denied environments.
- Increased ease of deployment for autonomy features by auto-generating farm maps from driving data. Used image segmentation to determine key farm features for both autonomy and agronomy.
- Built a PID steering controller for Monarch's ADAS vision-based crop following system resulting in increased stability at higher speeds, sloped hillsides, and high-slip conditions.
- Created an advanced filtering technique for low-cost IMU sensors that resulted in a patent. Many tractors have no active suspension which results in acceleration magnitudes much larger than those seen in urban driving environments. This method dynamically updates covariance matrices for orientation based on IMU jerk.
- Solved steering misalignment issues that were blocking autonomy adoption and creating costly field service trips. Developed a novel on-the-fly steer calibration method to automatically compensate for steering drift and alignment changes. This same algorithm is also used to monitor steering fault detections and prevent catastrophic failure.

### Monarch Tractor/Intern

Livermore, CA | February 2020 – June 2020

#### Projects:

- Implemented and tuned covariances for an Extended Kalman Filter that fused wheel odometry, GPS data, and IMU data.
- Wrote software to benchmark performance of various IMU, GPS, and camera sensors. This data was used in determining the final hardware stack for our production validation tractors.

### Graduate Student Researcher

UC Davis, College of Engineering | Bioautomation Lab | Davis, CA | August 2018 – June 2020

- Implemented sensor fusion for an autonomous strawberry harvesting robot with wheel odometry, IMU, and GPS.
- Implemented a pure pursuit path tracking algorithm to follow global trajectories.
- Created a method for quantifying a vehicle's steering performance using Euler spirals.

### Lead Teaching Assistant

UC Davis, College of Engineering | Davis, CA | December 2018 – June 2020

Wrote and graded test material for Senior Design, Mechanical Design, and Statistics. Led weekly review sessions, tutoring, and office hours for hundreds of students.

## PATENTS & PUBLICATIONS

### United States Patent: Rear Axle Center Locating

Ben Gatten | Patent No: US115432246B1 | Livermore, CA | January 3, 2023

### Patent Pending: Vehicle Row Follow System

Ben Gatten | Application No: 17490849 | Livermore, CA | September 30, 2021

### Patent Filing: Automatic Steering Calibration

Ben Gatten | Livermore, CA | July 2023

### Masters Thesis | UC Davis, College of Engineering

Ben Gatten | Davis, CA | June 2020

Investigation of Pure Pursuit Controller Performance using Euler Curves, and Application in Robot-aided Strawberry Harvesting