

# USDA-NIFA-HSI Summer Program @ UC Merced

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<http://agtech.ucmerced.edu>

Summer 2019: USDA-NIFA-HIS Summer Program Interns:

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## Introduction

The USDA Summer Internship Program is given in the summers for students interested in learning how technology is used in agriculture. This internship is broken down into five weeks in which the students learn about the business side of AgTech, they get hands on experience at UC Merced's Mechatronics, Embedded Systems and Automation Lab, and visit local companies to see how technology is used today in agriculture. Professor's Fanis Tsoulouhas, YangQuan Chen, and Sun are helping students get more involved in the Agriculture Industry. The 4-year \$275,000 grant helps students like me with a 5-week internship to get exposure on AgTech and the Food Processing Industry.



## Week 1: Lectures on AgTech Economics

Monday: **Introduction to AgTech and the Food Processing Industry**

Tuesday: **Lecture on Innovation: Introduction to Innovation; Disruptive Innovation**

Discussed creating value for your product for the potential consumer, and how the company can capture value.

Wednesday: **Lecture on Entrepreneurship: Introduction to Entrepreneurship**  
Discussed what makes an entrepreneur successful, which we said they must be leaders, risk takers, etc.

Thursday: **Lecture on Financing New Ventures**  
Talked about ways to get money to finance your new venture and to get funds to start your business..

Friday: **Lecture on Innovative Access to Capital: Crowdfunding and Initial Coin Offering (ICO)**

We discussed cryptocurrencies and different ways companies and individuals use it to their advantage. Specifically, we've discussed Bitcoin and how it's a convertible decentralized virtual currency and its taxed as a property which is subject to capital gains taxes.

## Week 2 – 4: Mechatronics, Embedded Systems and Automation Lab

Week 2:

- Introduction to the Project
- Tour of UC Merced's Mechatronics, Embedded Systems and Automation Lab.
- Lecture of Ros, Arduino, Raspberry Pie
- Lecture on current Ph.D students doing research at MESA Lab
- Drone Overview

Week 3

- Autonomous Vehicle building manual review. Way point navigation demo.
- Set Milestones for the next two weeks
- MESA Lab Research Seminar Series

Week 4:

- Overview of this week's hackathon goal, that is building a real UGV system.
- Build the Software Environment, Build the Vehicle, and make everything work together
- Add Information to the online Manuel

## Week 5: Visiting Local Companies

During the fifth week, the team visited Agtech companies:

Monday: **Stevinson Corporation Itinerary**

Summary: This company is involved in the dairy industry. Technology is helping Stevenson Corporation Itinerary by making it easier to milk the cows, making watering the plants easier by having sensors.

Tuesday: **E & J Gallo – Livingston Visit Itinerary**

Summary: This company is involved in the wine industry. Technology is helping E & J Gallo by making it simpler to track the amount of wine being produced and making the whole process more autonomous.

Wednesday: **Joseph Gallo Farms Itinerary**

Summary: Joseph Gallo Farms Itinerary is involved in the dairy industry. Technology is helping the Joseph Gallo Farms Itinerary by making it simpler to track the efficiency of the machines and the workers.

Thursday : **Hilltop Ranch Inc**

Summary: Hilltop Ranch Inc is involved in the Almond business . Technology is helping Hilltop Ranch Inc. the same way is helping other companies, instead of manual tracking information everything know is tracked through sensors which makes it more convenient.

Friday : **Bowles Farming Company Itinerary**

Summary: : **Bowles Farming Company**

Itinerary is involved in the farming industry. Technology is helping the Bowles Farming Company Itinerary by making it easier to plant the crops by using big machinery.



**Week-5 Conclusions:** All the technologies I saw in my visits to the companies this week shows how the agriculture industry is adapting as technology is increasing. It's becoming the norm for these farms and companies to have technology, which helps in decreasing hard labor and increasing profits. In my observations of the sustainability practice in the industry, it has change since before I visited the farms and companies.

## Personal Reflections and Future Plans

My name is Jaime Rivera, I'm a third year Computer Science and Engineering Major currently attending University of California, Merced. I got accepted for the USDA-NIFA-HSI Summer Program in Summer 2019, and it was a truly amazing experience. During the first week of the internship me and my fellow teammates learned about the economics about agriculture technology. We learned about how to invest, how to finance a new venture, and about what it takes to get in the agriculture business. Weeks 2, 3, and 4 we got hands on experiences with a project that involves AgTech. The project took place at UC Merced's Mechatronics, Embedded Systems and Automation Lab. The project was about building an autonomous vehicle that can help in agriculture. Our jobs were to assist in building the vehicle, implementing code, while working along side Ph.D students. The last week of the internship the team visited local companies to see how they are implementing technology in agriculture. The whole experience taught me and increase my interest in agriculture technology. This summer program was super beneficial for me, it put in a research environment and elevated myself as an engineer. The Future Plans for the for this program are to continue to work on the project and have it done by the end of Summer 2020. Because of this experience, I won the SSI (Student Success Intern) position to continue the autonomous farming machine. Our fun activities are documented in a dedicated YouTube channel:  
<https://www.youtube.com/channel/UCK98qSGpLzqQGwLmnIIS7lw>