



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Geneva D. Trovato	Project Number J0325
Project Title OB 1 (Orchard Bot 1): Building an Autonomous Robot	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals California has recently passed a law to increase the minimum wage. This means that it will cost more for orchards to pay humans to pick fruit. The objective for this project is to design an autonomous robot that is less expensive to pick fruit than paying a human. Three parts go into getting fruit, finding fruit, moving to the fruit, and picking fruit. To find the fruit, this researcher used a camera that can detect the color orange and an ultra sonic range finder to get the x, y, and z coordinates. To move to the fruit this researcher built a base that has wheels and motors and used programming. To pick the fruit this researcher designed an arm and claw plus used programming to reach the fruit. To conclude, yes there is a less expensive way to pick fruit than paying for humans to do it. This robot is not the final product, this student is planning of perfecting it for the next four years. This robot is a proof of concept.</p> <p>Methods/Materials A citrus picker, some Vex Robotics equipment, RobotC (a Vex Robots programming site), a camera, an ultrasonic range finder. I programmed this robot with my dad's help.</p> <p>Results Several trials were ran by this robot. On the fourth attempt this robot successfully picked fruit on its own. A few problems occurred in the programming as well as the actual design of the robot, but they were fixed and now it works. This robot needs a bit of work, but it works and that was my main objective.</p> <p>Conclusions/Discussion In conclusion, the robot that this researcher add is fully capable of picking fruit on its own. Some design issues occurred, but they were taken care of. This student not only has a robot that can pick fruit, but also has a larger knowledge base in robotics and coding. The main objective here was to build a robot that can do something on its own successfully and this objective has been achieved. In the future, this researcher hopes to expand the robot's capabilities to not just picking oranges, but picking a majority of fruits. This researcher also plans on using Raspberry Pi instead of the VEX robotics cortex and to install treads instead of wheels. They also plan on developing new claws for different kinds of fruit and possibly testing the robot out on actual orchards to see how it would perform its main job.</p>	
Summary Statement I created a robot that can pick oranges by itself using its programming and unique design.	
Help Received I built, programmed and designed this robot in my garage and in my yard by myself. I was helped by my father who is a physicist.	