

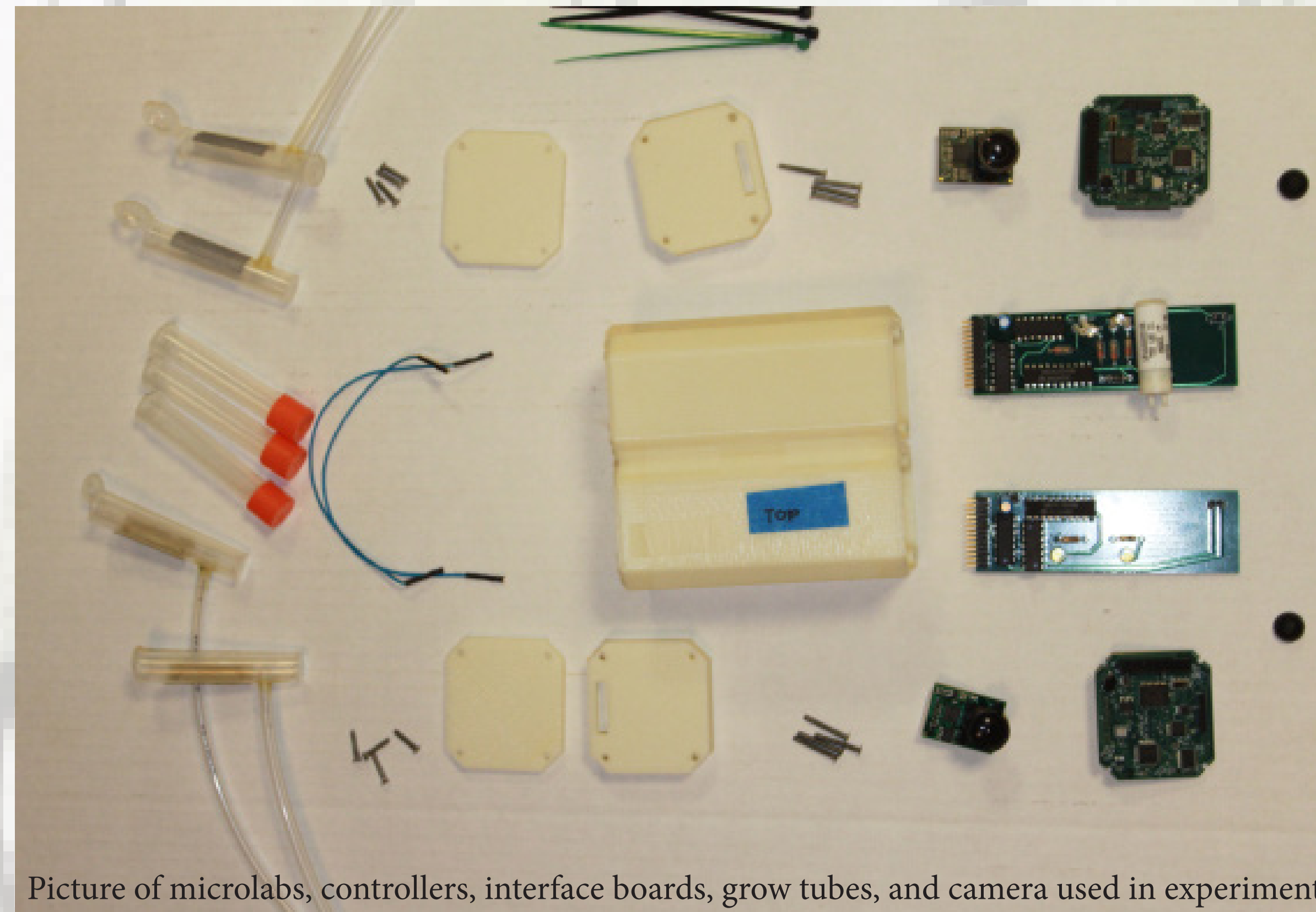


ARUGULA PLANT GROWTH PROJECT ON THE INTERNATIONAL SPACE STATION

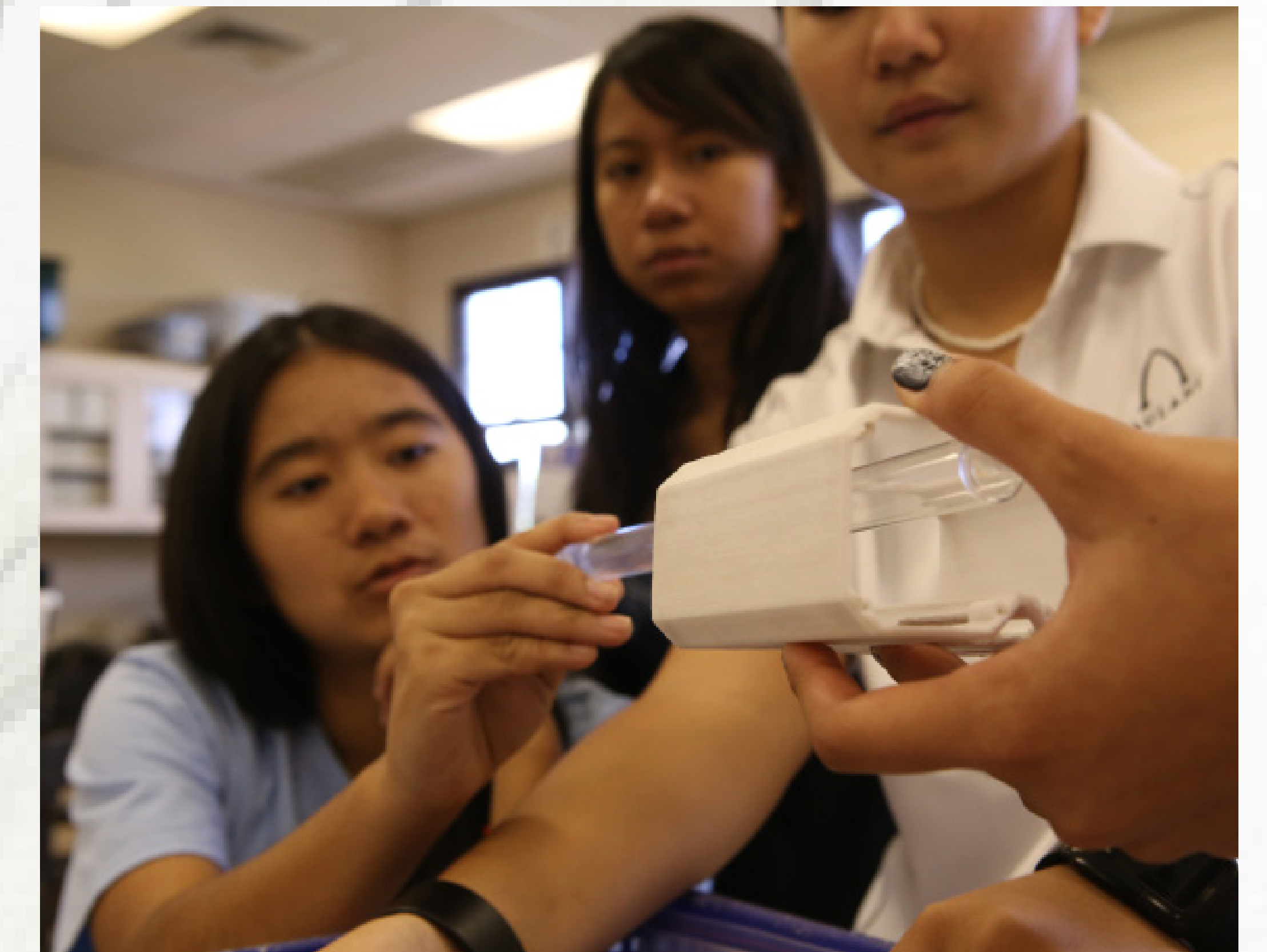
Kent D. Kobayashi, Tropical Plant and Soil Sciences Department University of Hawai`i at Manoa

INTRODUCTION

The Girl Scouts of Hawai`i, in partnership with Valley Christian School in San Jose, California, provided a stellar opportunity for eight high school girls to embark on an extraterrestrial adventure. Their mission - - to research, develop, construct and engineer a scientific experiment that would be sent to the International Space Station (ISS). Mentored by several adult volunteers with backgrounds in engineering, computer and software programming, horticulture, project management, design and communications, the all-girl team decided to construct an experiment to determine the differences between arugula seedlings grown in microgravity on the ISS, and those grown on Earth.



Picture of microlabs, controllers, interface boards, grow tubes, and camera used in experiment.



What did we do? Sent arugula seeds into space + Designed and engineered a programmed watering, lighting and photography system + Utilized 3 treatments for plant growth: organic nutrients, synthetic nutrients and no nutrients + Utilized red and blue LED lights for plant growth + Tested numerous combinations of arugula seeds, lighting, nutrients, and water levels + Conducted flight simulations to ensure experiment would be a success on the ISS

REFLECTION

More than ever, the challenge of providing access to and the means to grow food globally is of utmost importance to our planet. Perhaps we can learn how to enhance and improve the growing process on earth by exploring options of creating a sustainable system of growing food in space. Our team's project was designed to investigate this idea and contribute to further extending space exploration by developing methods and means to produce edible and nutritious foods for consumption by astronauts.

While the experiment mechanically functioned as expected for the duration of the flight, there were no traces of water in the capsule compartment when it returned from space. Our hypothesis was the water storage bladder leaked and evaporated during a four month launch delay in preflight wait status. Although it was disappointing to not achieve desirable results, the process of the experiment still proved vital to shaping our experiences and skills in the field of STEM.

“Success is a journey, not a destination. The doing is often more important than the outcomes.” -Arthur Ashe

WORKING TEAMS

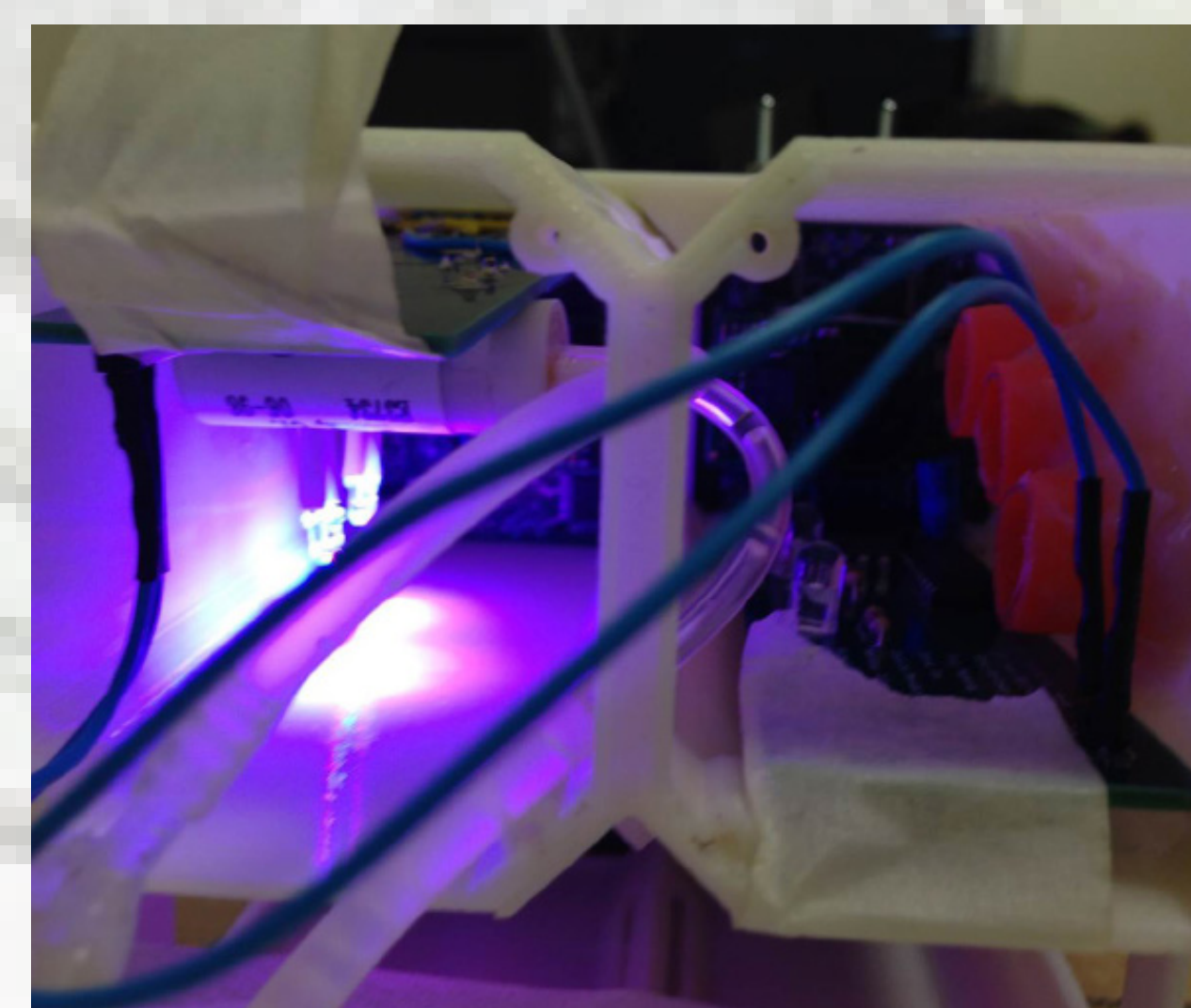
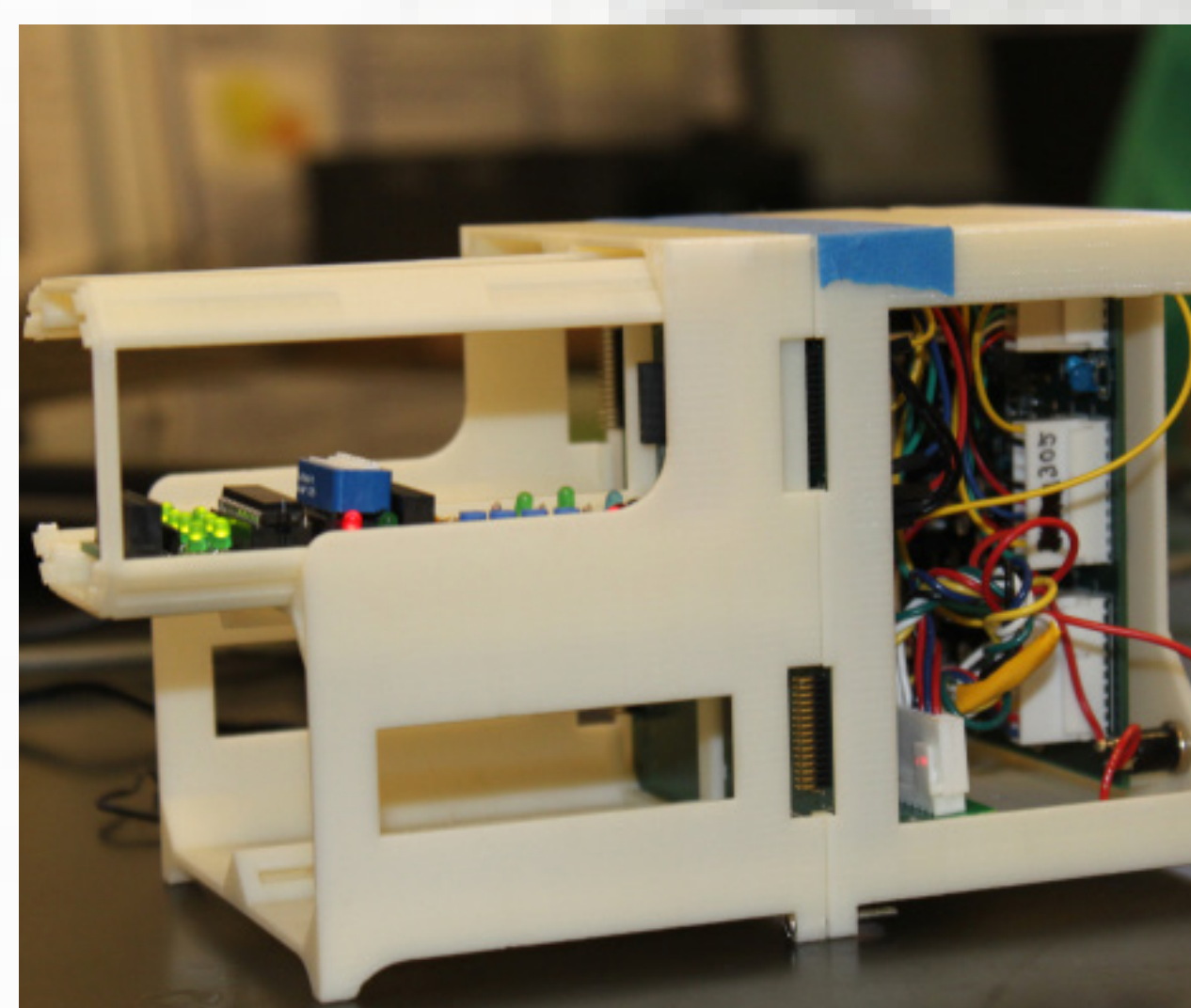
⚙️ ENGINEERING

⌘ PROGRAMMING

💧 DESIGN

💬 COMMUNICATIONS

🌱 HORTICULTURE



Team Members (2013-2014): Rafael Lee, Rachel Watanabe, Marissa Takebayashi, Talissa Wright, Fely Magaoay, Jessica Mendoza, Bond Bortman, Jenna Tom. Poster Board: Rafael Lee, Rachel Watanabe, Marissa Takebayashi, Kristen Takebayashi