



Automated Microgreens Growing Machine

Project Sponsor: John Berger



Problem Statement:

Our team was tasked with creating a prototype automated microgreens growing machine that produces 2 cups of greens per day with minimal user input.

Key Requirements:

- Autonomous climate control, watering, lighting, nutrient dispensing.
- Produce Two cups of microgreens per day
 - Support a 90kg load on its roof.
- Users shall be notified via app that greens are ready to harvest.
- Aggregate growth data available online
- Grow multiple varieties of microgreens

HOW IT WORKS

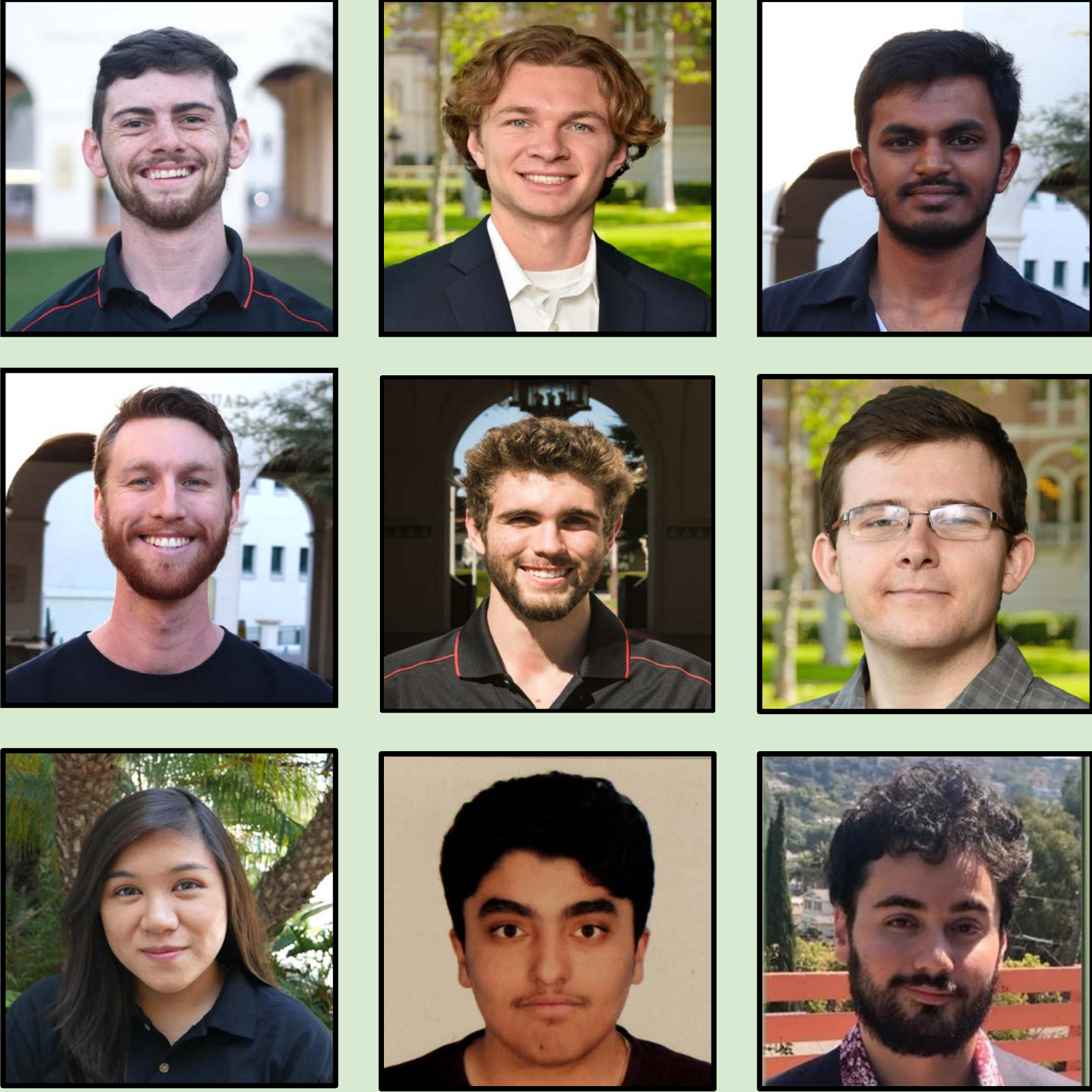
Place Pre Seeded Mat

1

2

3

Harvest!



Team Members

Mechanical Team:
John Berger, Conor Vasiliadis, Thuya Sathiamurthi, Max Merritt

Electrical/ Computer Team:
Eli Wooten, Daniel Kenner, Abigail Dabu, Ali Alqaoud, Jose Baez

Professors: Dr. Shaffar & Prof. Dorr
Advisors: Mr. Lester & Prof. Arnold

Watering System

- 18 gallon ABS water tank supplies grow trays and climate control system with water.
- Five 12V solenoids allow water into each growing area on 15 minute intervals.
- Ebb and flow hydroponics allows for minimal power draw and high solenoid off time.

Climate Control

- Galvanized steel ducting.
- 120 CFM fan provides greens with fresh air.
- Using an evaporative cooler, the climate control can cool a hot dry environment.
- Thermo-electric cooler treats the water to increase cooling power.

pH and Nutrient Control

- Water temperature, electric conductivity, and pH level are monitored in the 3-D printed sensor tank when the pump runs.
- 3-D printed peristaltic pumps driven by stepper motors dispense a metered amount of pH or nutrient solution.

Lighting System

- Five 10" x 10" LED PCBs provide light to the greens.
- Lighting quality maintains the following ratios: R87:B10:FR2.5 with 15% adjustability on each wavelength.
- Lighting system shall provide >15 Daily Light Integral.

Structure and Growing Area

- Welded aluminum tube structure.
- ABS panelling and easy latching doors.
- Removable 3-D printed grow trays allow user to harvest with ease.
- Weight sensors allow tracking of growth for each tray.

User Interface

- Cycle initiation, harvest notifications, and aggregate growth data is available through the ATOMGREENS website.