LunarCulture

Hydroponic Farming on the Moon

Automated Seed Germination

Motivation:

- Life support systems are critical for human-crewed space missions.
- Resupply becomes difficult, and therefore, food production and recycling become essential.
- Hydroponic farming is advantageous as it does not rely on soil.
- Lunar hydroponics is of immediate interest for developing a self-sufficient Moon Village using local lunar resources.

Automated Food Waste recycling

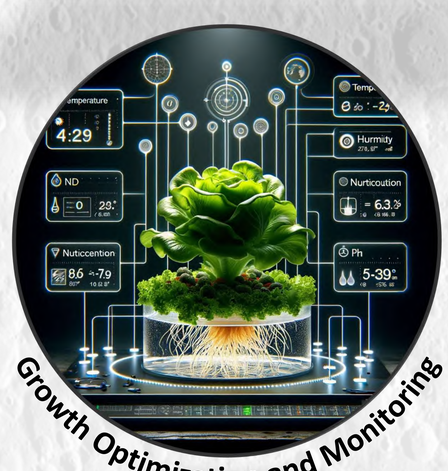
Projects:

- Design and develop hydroponic close-loop growth chambers with controlled environments to investigate the effects of nutrition, temperature, humidity, light source, and light cycle on plant growth.
- Design and develop an automated recycling system to extract water and minerals from food and human waste necessary for plant nutrition.
- Design and develop a fully autonomous agricultural system from germination, growing, and health monitoring to harvesting.

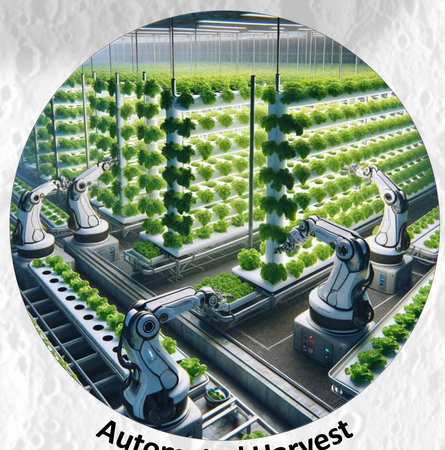
Autonomous Hydroponic Lunar Food Production

Learning objectives:

- Understand the principles of hydroponic farming, food waste recycling and closed ecological life support systems.
- Apply engineering principles such as design, fluid mechanics, thermodynamics, mechatronics, controls and robotics.
- Data collection, analysis and machine learning
- Hands-on experience in the design and development of hydroponic systems, food waste recycling and automation in space.
- Plant bio-physics.



Growth Optimization and Monitoring



Automated Harvest