



Summer 2022 Workshop Agenda: Cosmosphere

Outcomes: Participants will be able to...

- assemble an Arduino microcontroller and sensors.
 - program an Arduino and collect data from the sensors.
 - assemble a CubeSat frame with an Arduino microcontroller.
 - integrate CubeSats onto a balloon launch platform.
 - launch, communicate with, and recover a balloon mission.
 - communicate with CubeSats on suborbital and orbital missions.
 - collect, present, and disseminate data collected from CubeSat missions.
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Day 0 - 7/11 - Mon - Meet & Greet - Salt City Brewery - 7:00 pm

Day 1 - 7/12 - Tue - Microcontrollers & Sensors

Breakfast	8:30 am
TIS & Cosmosphere Introductions	9:30 am
Intro to Working with Arduino	9:45 am
• Arduino Board Parts	15 min.
• Breadboard & Connections	15 min.
• Arduino IDE	15 min.
• LED Wiring & Programming	15 min.
Sensor Install & Programming	10:45 am
• Photosensor	15 min.
• Soldering Components	45 min.
Dr. Barbie Buckner, Education Specialist for NASA EPDC	11:45 am
• Building a Satellite Classroom Activity	45 min.

Lunch	12:30 pm
Dr. Barbie Buckner, Education Specialist for NASA EPDC	1:30 pm
• Building a Satellite Classroom Activity (Cont.)	45 min.
Brian Kaplinger, University of Kansas	2:15 pm
• Engineering the Future Workforce	90 min.
Onsite Experience - Cosmosphere Tour	3:45 pm
Dinner	6:00 pm

Day 2 - 7/13 - Wed - Arduino & CubeSats

Breakfast	8:30 am
Sensor Install, Programming, & Soldering	9:30 am
• Temperature	30 min.
• SD Storage Expansion	15 min.
• Real-time Clock	45 min.
• UV Sensor	15 min.
• Heart Rate Monitor	30 min.
Dr. Barbie Buckner, Education Specialist for NASA EPDC	11:45 am
• Launching a Satellite Classroom Activity	45 min.
Lunch	12:30 pm
Dr. Barbie Buckner, Education Specialist for NASA EPDC	1:30 pm
• Launching a Satellite Classroom Activity (Cont.)	45 min.
Sensor Install, Programming & Soldering	2:15 pm
• Air Quality Sensor	45 min.
• Gyroscope/Accelerometer	30 min.
• Cube Frame Build	60 min.
Licensing Orbital Satellites	4:30 pm
Wrap-up	5:00 pm

Day 3 - 7/14 - Thu - Communications & Data

Breakfast	8:30 am
Satellite Communications	9:30 am
• Basic Radio Communications	10 min.
• Orbital Mechanics	10 min.
• Satellite ID & Tracking	10 min.
• Factors Affecting Communication	5 min.
• Building a Simple Ground Receiver	30 min.
• Communicating with ISS	5 min.

● Serenity Satellite	10 min.
● Working with Data from Satellites	15 min.
Data Analysis	11:05am
● Retrieving Data	15 min.
● Data Formats	15 min.
● Making Sense of Data	15 min.
● Creating Visual Representations	15 min.
Experimental Development in the Classroom	12:05 pm
● CubeSats in the classroom brainstorm	25 min.
Lunch	12:30 am
Hasshi Sudler - Villanova University	1:30 pm
● Blockchain in Space	90 min.
Integrating CubeSats onto Flights & Launches	3:00 pm
Commercial Satellites & Space Debris	3:40 pm
Nanoracks/Dream Up - Future of Space & Education	4:00 pm
Q&A/Post Surveys/Wrap Up	5:00 pm
Dinner	6:00 pm