

We22

World's Largest Conference for
Women in Engineering and Technology

★★★★★ HOUSTON, TX

October 20-22

George R. Brown Convention Center

CAREER PATH

RESOURCES

Students Solving Problems for ISS and Beyond: Inspiring the Next-Generation

By: Deboshri Sadhukhan & Nancy Hall
NASA Glenn Research Center

SUPPORT

A World of
Opportunity
Awaits

EDUCATION

★ WE22.SWE.ORG / #WE22



Learning Outcomes

After attending, you should be able to:

1. Describe the NASA HUNCH Program, including the program objectives, goals, and strategic partnerships for middle school and high school outreach and advocacy efforts.
2. Identify the innovative strategies NASA is using to work with middle and high school students to solve real-world problems
3. Use the knowledge gained to inspire the next generation of scientists and engineers

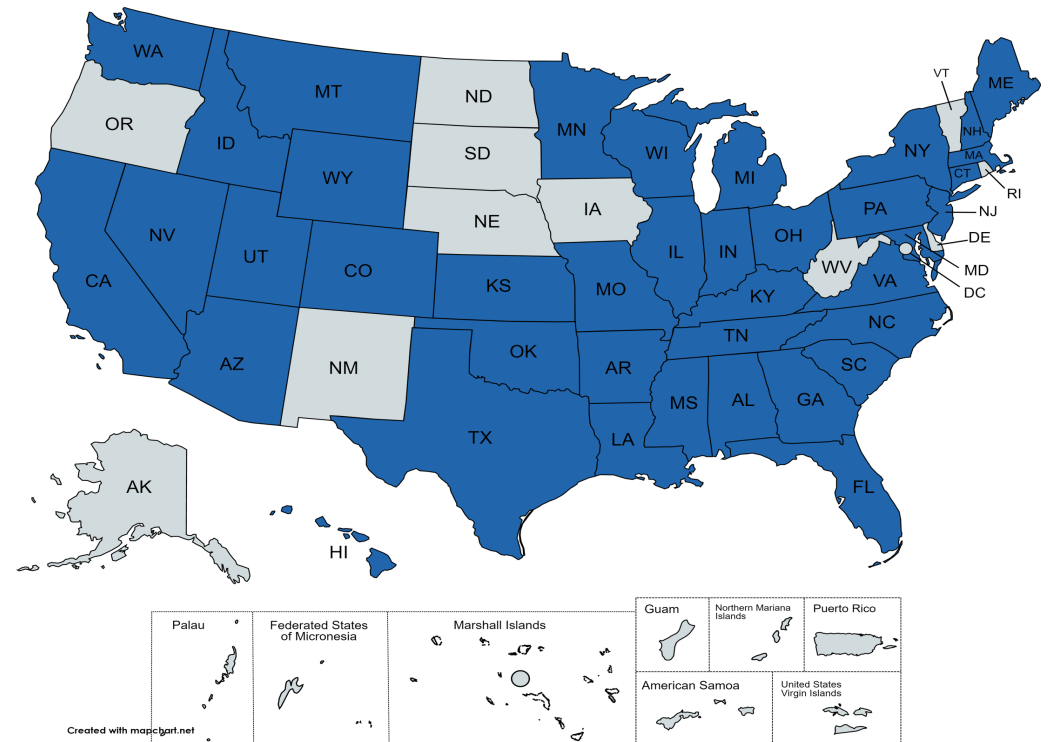
HUNCH Program

The HUNCH mission is to empower and inspire students through a Project Based Learning program where high school students learn 21st century skills and can launch their careers through the participation in the design and fabrication of real-world valued products for NASA.

- ★ Since 2003 the NASA High School Students United with NASA to Create Hardware (HUNCH) Program has partnered with students by challenging them to make critically valued products for NASA.
- ★ Each year the quality, quantity and diversity of these products has improved and expanded as well as the number and diversity of the students. Today over 2,500 students in middle school, high school and some post-secondary schools participate in HUNCH projects.

The Numbers

★ NASA HUNCH comprises 250+ schools in 35+ states and have designed, developed and delivered over 1300 products to NASA



HUNCH Tracks

- ★ The HUNCH program has 7 different tracks:
 - ★ Culinary Challenge
 - ★ Design and Prototyping
 - ★ Health and Biomedical Science (new track)
 - ★ Flight Configurations
 - ★ Precision Machining Hardware
 - ★ Sewn Flight Articles
 - ★ Video Challenge
- ★ To find out more about HUNCH, visit their website at <https://www.nasahunch.com>.



Culinary Challenge

- ★ Students in culinary and food science classes have participated in a Culinary Challenge in which astronauts select various types of entrées that they would like to be included on their menu while on the ISS.
- ★ The teams of students had to meet the strict nutritional requirements as well as understand specific packaging processes needed to preserve food in space without refrigeration.
- ★ Sullivan University partnered with HUNCH provides scholarships to the winning students.
- ★ To find out more about the Culinary track, visit their website at <http://www.hunchculinary.com>.



Culinary Challenges

2022-2023 Challenge
 Hearty Ethnic Soup/Stew



2021-2022 Challenge
 Quarantine Meal



2020-2021 Challenge
 Healthier Comfort Food



2019-2020 Challenge
 Ethnic Dish

2018-2019 Challenge
 Fruit/Vegetable Side Dish

2017-2018 Challenge
 Breakfast

Design & Prototyping

Students in engineering, science and a variety of other high school classes work on design and prototyping projects for the ISS, the moon and beyond.

- ★ NASA engineers and astronauts tasked with facing difficulties while working or living in space are the main sources of ideas for these projects. They either want something redesigned, replaced or created which would improve living and working on the ISS and beyond.
- ★ To find out more about the Design & Prototype track, visit their website at <https://www.hunchdesign.com>.

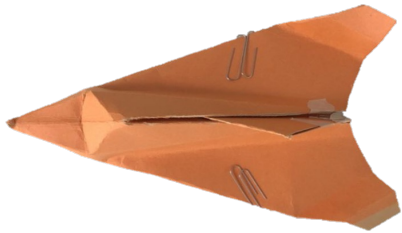


2022-2023 Projects:

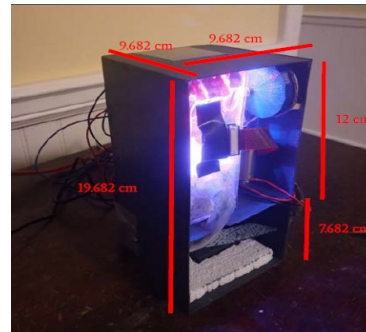
1. Lunar Scooter Wheels
2. Lunar Habitat Chairs
3. Lunar Habitat Table
4. Lunar Worktable with Power
5. Collapsible Mirror
6. Dust Remover
7. Pipe, Auger, Extruder
8. Insect Nanolab
9. Microgravity Dice Rolling
10. Sun Tracker – Software

Past Student Projects

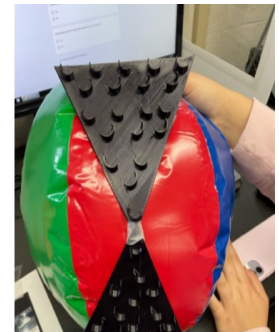
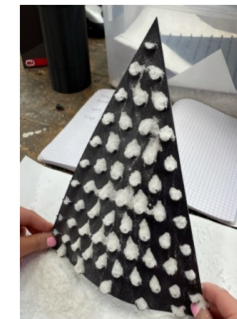
No Heat Shield



Generic Mini-Agricultural Lab



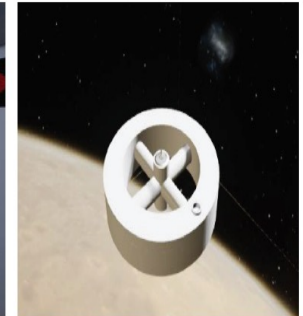
Lunar Dust Waffle/Baffle



HUNCH Final Presentations



Simulated Virtual Reality



Health and Biomedical Science (New Track)

Students in engineering, science and a variety of other high school classes work on design and prototyping projects for the ISS, the moon and beyond focused on the health and biomedical sciences.

- ★ As we look to the future of colonization on the Moon and Mars, we must consider physiological and psychological changes that happen to humans in space and find ways to mitigate those changes
- ★ To find out more about the Health and Biomedical Science track, visit their website at <http://hunch-biohealth.com>



2022-2023 Projects:

1. Mental Health in Space
2. IV Fluid Administration on Long Duration Space Flight
3. 3D Printed Medical Instruments
4. Edible Packing for Long Duration Missions
5. Portable IV Fluid Generation
6. Medical Inventory System

Flight Configurations

- ★ Students in Career and Technical Education courses, such as Manufacturing and Engineering Design worked on projects that were selected in Design and Prototyping as projects that NASA astronauts have indicated they would like to be sent to the ISS.
- ★ The students, using machining techniques, additive manufacturing, and parametric modeling software, mature the selected designs working toward a completed, ready to deliver project.



Precision Machining Hardware

- ★ Students in manufacturing classes have produced 138 Flight Ready Single Stowage Lockers (SSL) for the ISS as of March 2022.
- ★ This equates to over 30,000 individual precision machined components being produced and delivered to the ISS program office.
- ★ These lockers have parts that must be fabricated on Computer Numeric Controlled (CNC) machines. However, since hardware is going to the ISS the parts not only have to be precision machined and finished but also documented according to NASA's stringent requirements for Quality Assurance.



Student Built Hardware



Sewn Flight Articles

- ★ Students in Family and Consumer classes or Fashion Design classes to produce both training and flight sewn products for ISS.
- ★ These products require both attention to detail and engineering acuity. Some of the items that HUNCH students have produced are hygiene kits, Zero-Gravity Stowage Rack (ZSR) Panels, & Foot Pads as well as cargo transfer bags.



Video Challenge

- ★ In order to provide videos to inspire students in K-12 education, HUNCH partners with the Association for Career and Technical Education (ACTE) to manage and fund a video challenge.
- ★ Students in video classes and other courses are tasked with making 2-minute videos to inspire the next generation of scientists and explorers.
- ★ To find out more about last year's Video Challenge, visit their website at <https://www.acteonline.org/why-cte/cte-awareness/cte-month/cte-month-2021-and-nasa-hunch-video-challenge/>
- ★ The theme for the 2022-2023 Video Challenge is “The Benefit of NASA” and the website will be available soon.



CELEBRATE TODAY,
OWN TOMORROW!





Take the survey to leave feedback on my WE22 virtual session.

Scan the QR code with your phone camera.