From Rockets to the Final Frontier: A Kid's Adventure on the International Space Station

David H. Lehman, NASA / Jet Propulsion Laboratory,
Project Manager (Retired)

Outline

- Overview of the International Space Station (ISS)
- How to rockets work?
- Vehicles at the ISS
- Living at the ISS
- Research Facilities
- Crew at the ISS now
- What research are we doing on ISS today?
- What's next including ARTEMIS
- Criteria to become a NASA astronaut
- Plan of action for a kid to work for NASA
- Summary

The International Space Station

By the Numbers…

November 2, 2000

17,500 mph

200+ people

52 computers

17 countries

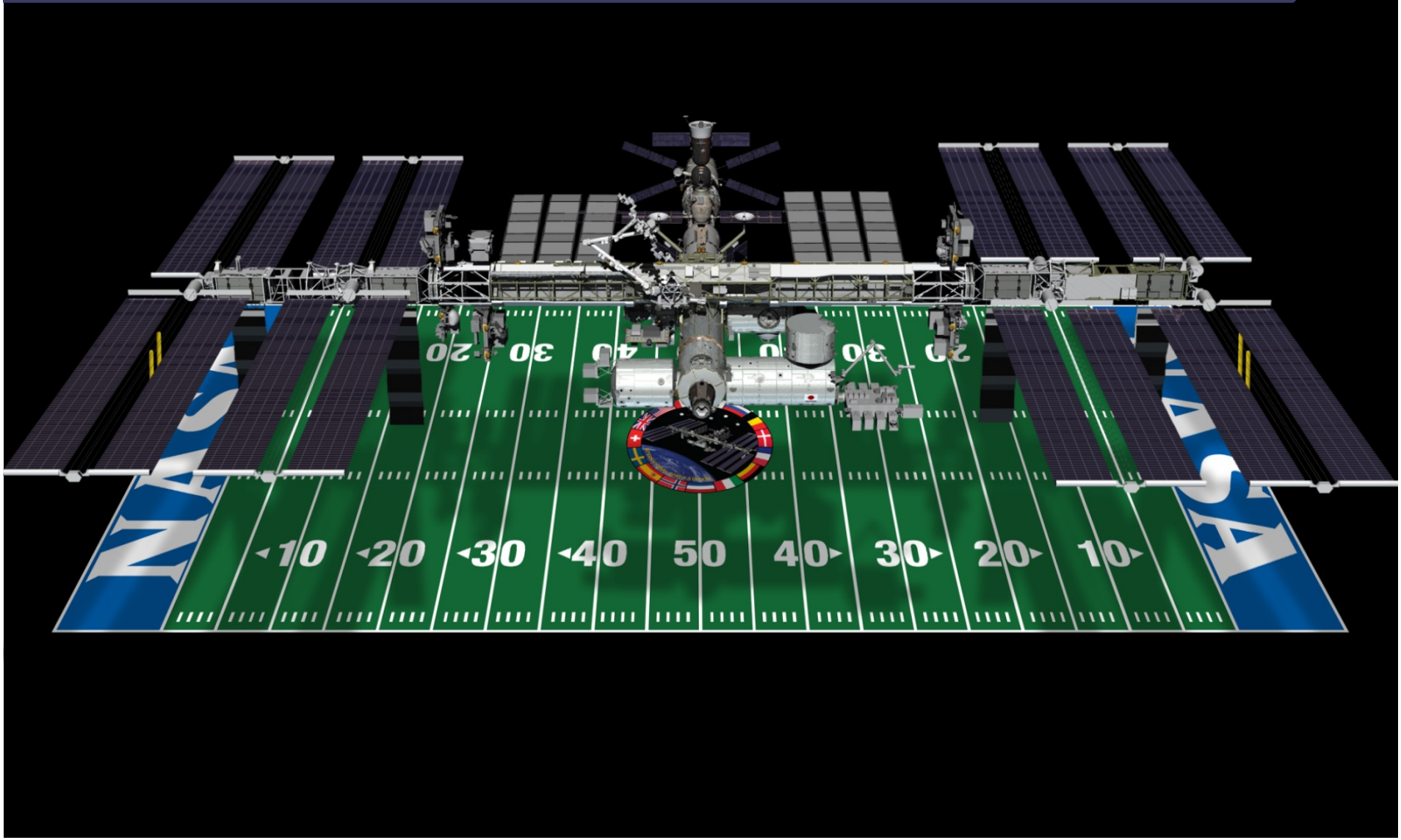
100 racks

1 acre of solar panels

1900+ experiments

4x Mir and 5x Skylab

That’s One Big Space Station



Expedition 71

CTIVE MISSION

Crew Members Oleg Kononenko, **Commander and Flight Engineer** Nikolai Chub, Tracy C. Dyso Matthew Dominick, Jeanette Epps, and Alexander Grebenkin.

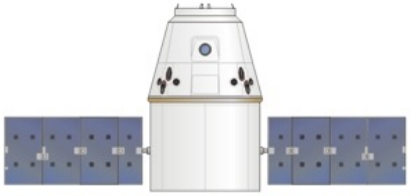

How do Rockets Work?

Visiting Vehicles

Soyuz-TMA

Progress-M

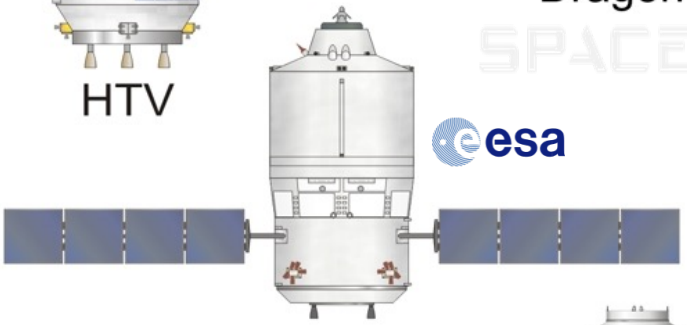
HTV



Dragon

(Boeing)

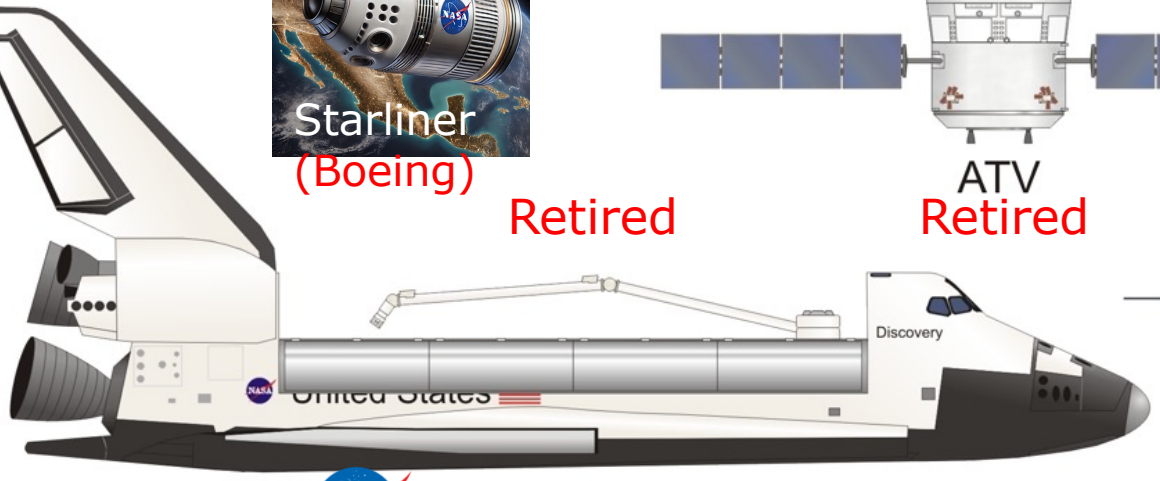
Retired



ATV

Retired

Cygnus



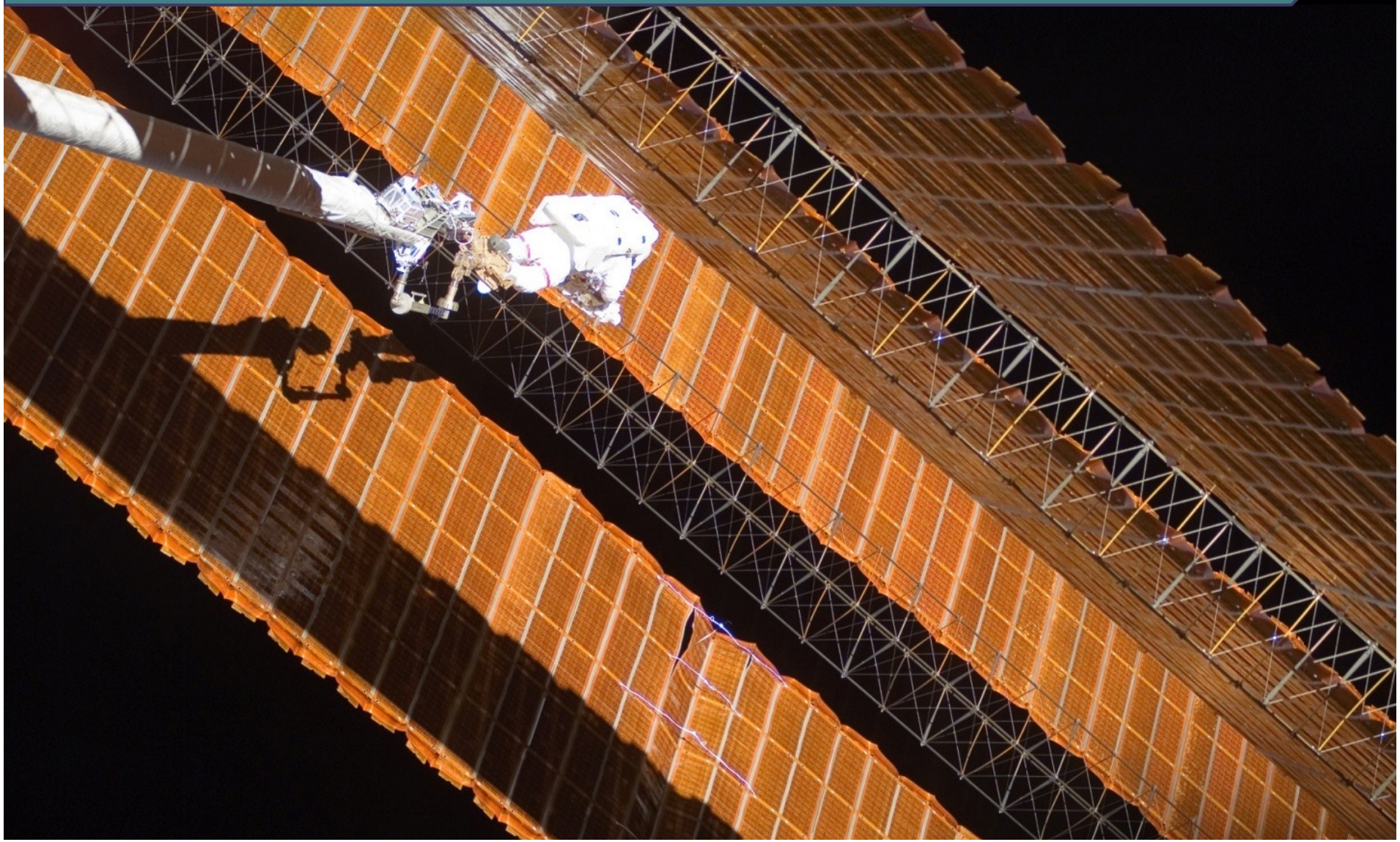
Space Shuttle

HistoricSpacecraft.com

Which vehicle(s) can currently be used at the ISS?

A. Space Shuttle
B. Starship Rocket
C. Tesla 3
D. The cruise ship Titanic
E. Space X Dragon

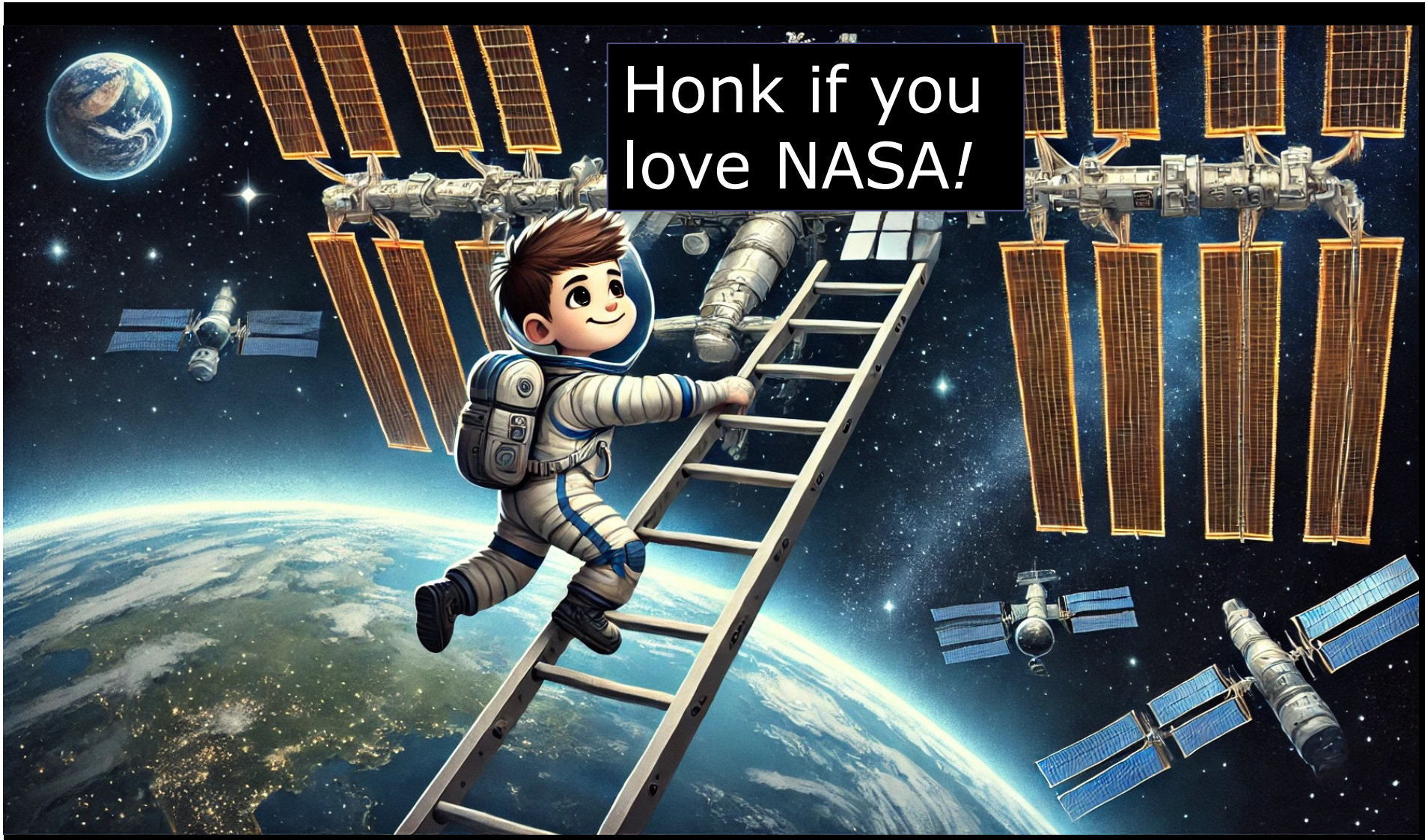
Engineering Achievement



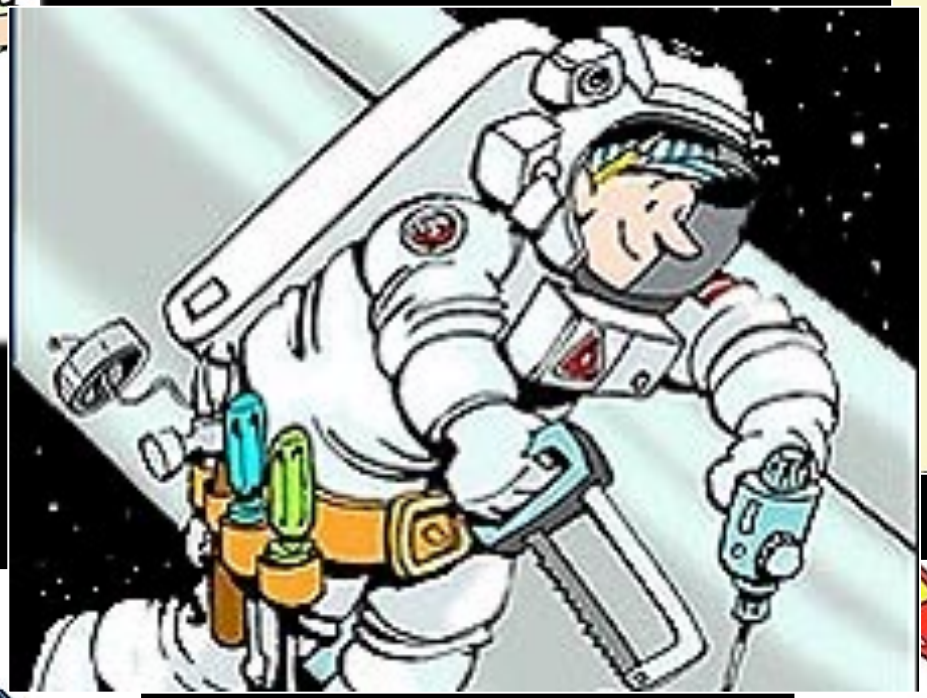
International Achievement

New Knowledge and Benefits

Why did the kid buy himself a 260-mile long ladder?


Honk if you
love NASA!

Living on the Space Station



Space Potty

Eating in Space


What do kids on the ISS use to clean up messes?


Space
Brooms!

Exercising in Space

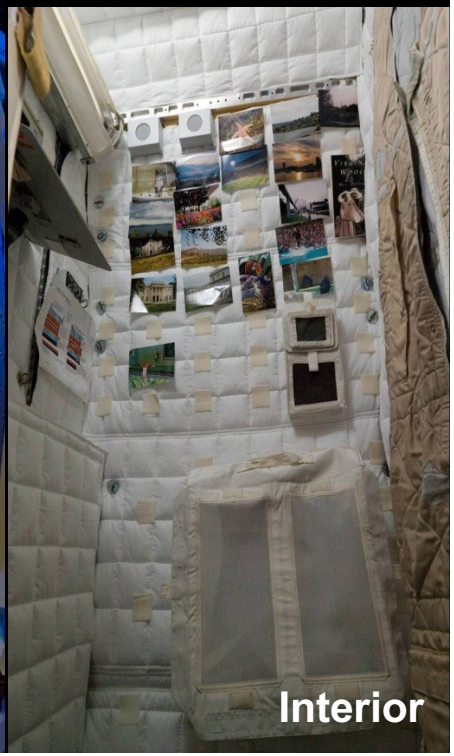
CEVIS
Cycle Ergometer
With Vibration
Isolation System

COLBERT
Combined Operational
Load Bearing
Resistance Exercise
Treadmill

Russian
Cycle Ergometer

ARED
Advanced Resistance
Exercise Device

Sleeping in Space

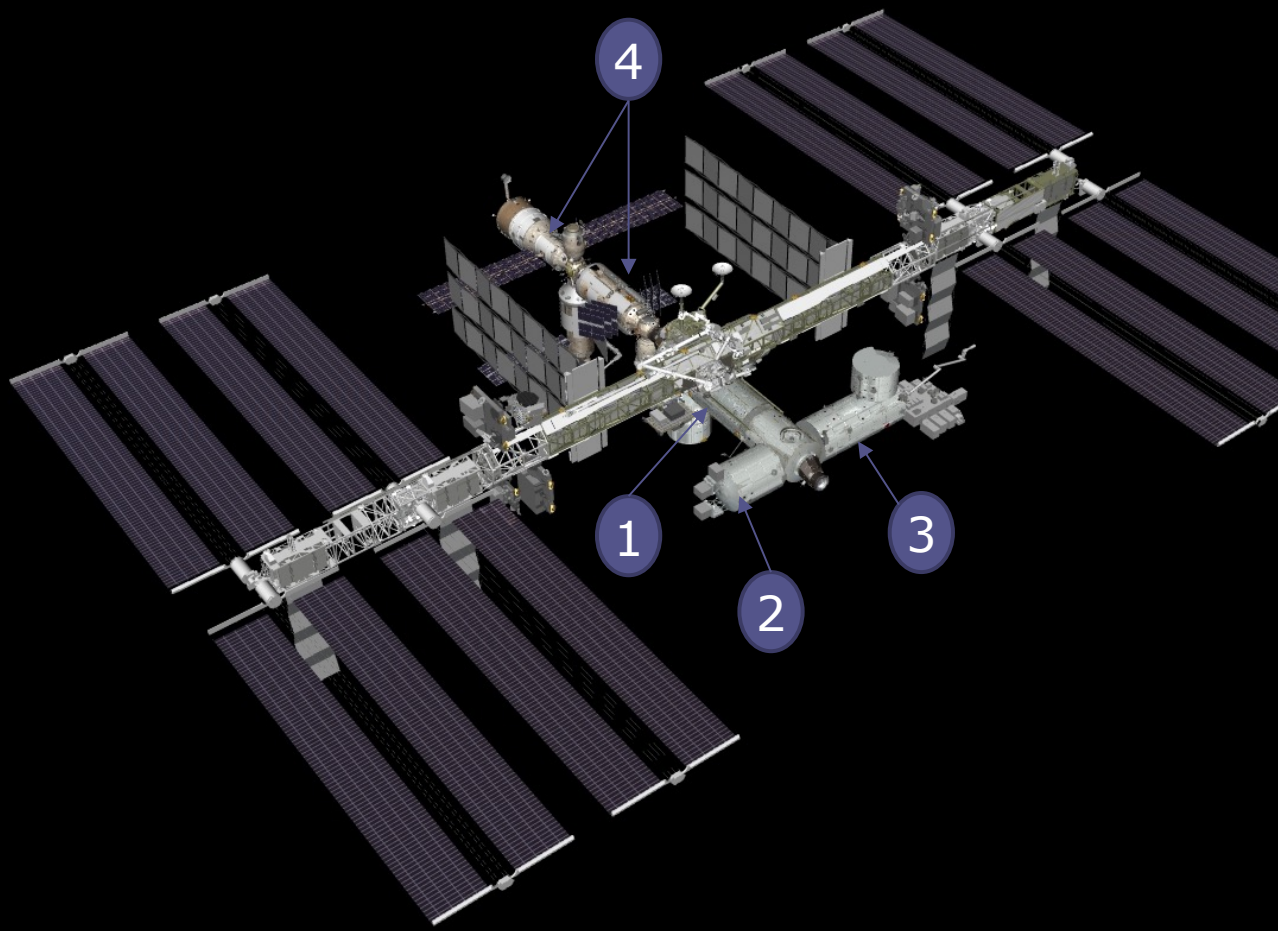


Working in Space

Research Facilities

ISS Contains 4 Research Facilities:

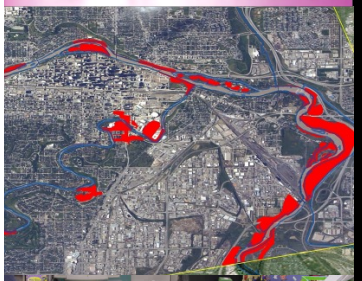
1. US Destiny Laboratory Module (NASA)
2. Columbus Research Laboratory (ESA)
3. Japanese Experiment Module or KIBO (JAXA)
4. Russian Research Facilities (RSA)



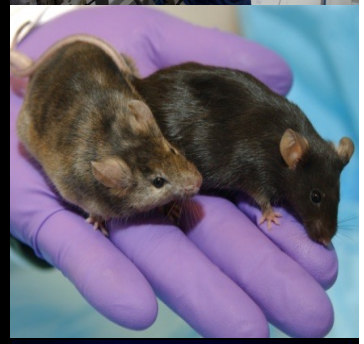
Why do kids on the ISS always do their homework?

Because they don't want to be grounded... back on Earth!

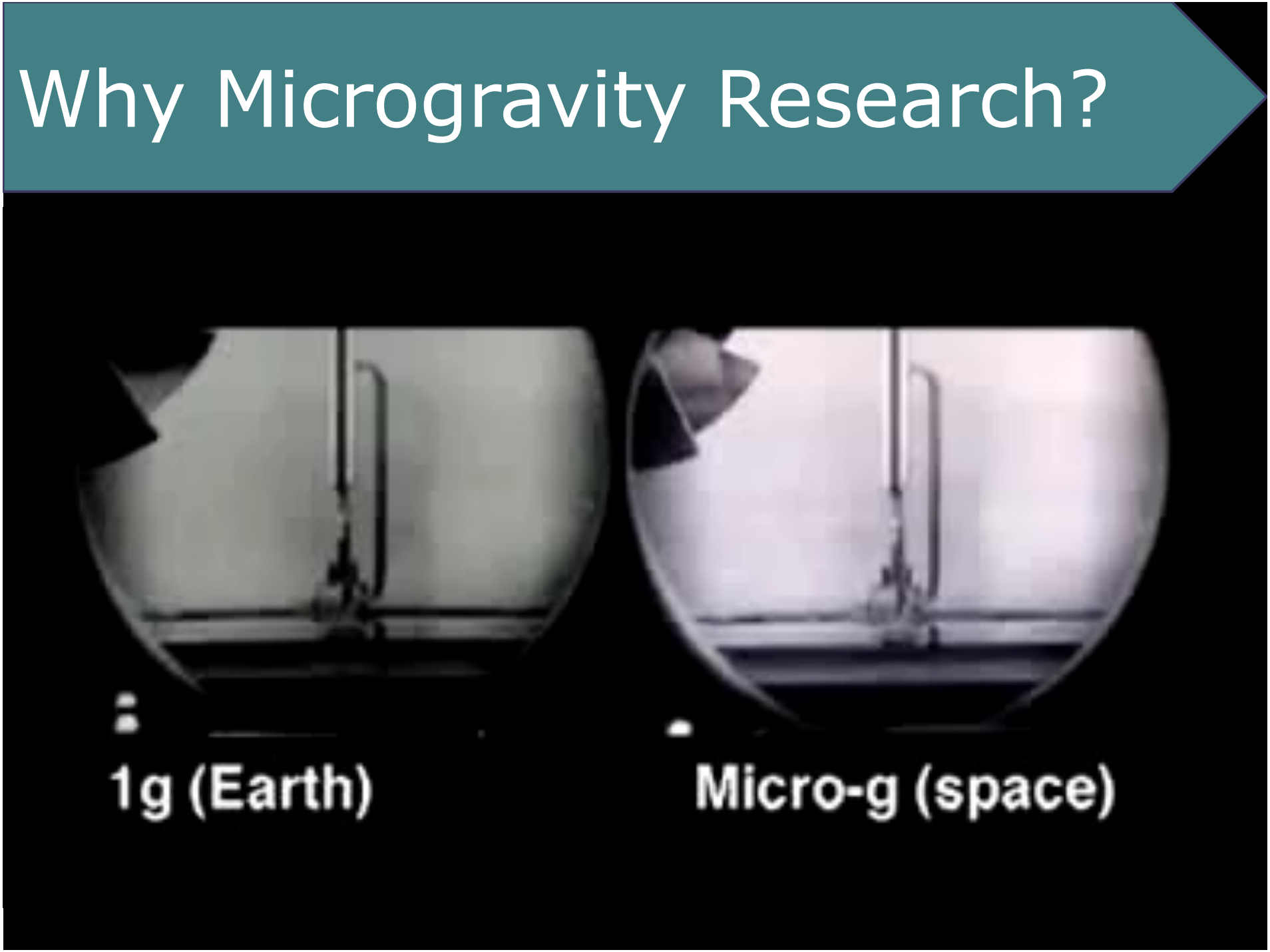
What research are we doing on ISS today?



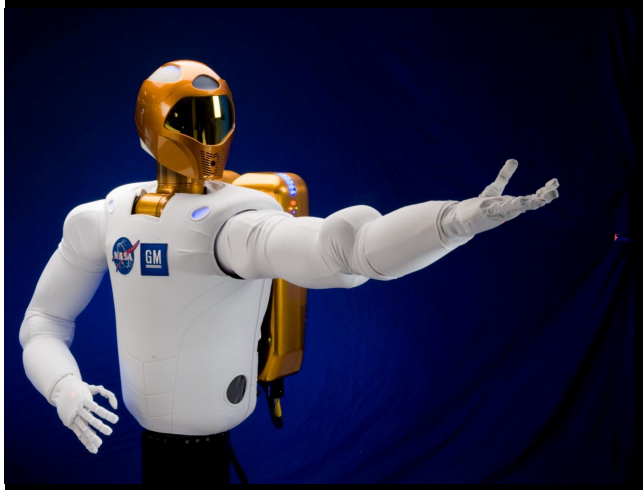
- Biology and Biotechnology
- Human Research
- Physical Sciences
- Tech Demos
- Earth Science
- Astrophysics
- Education

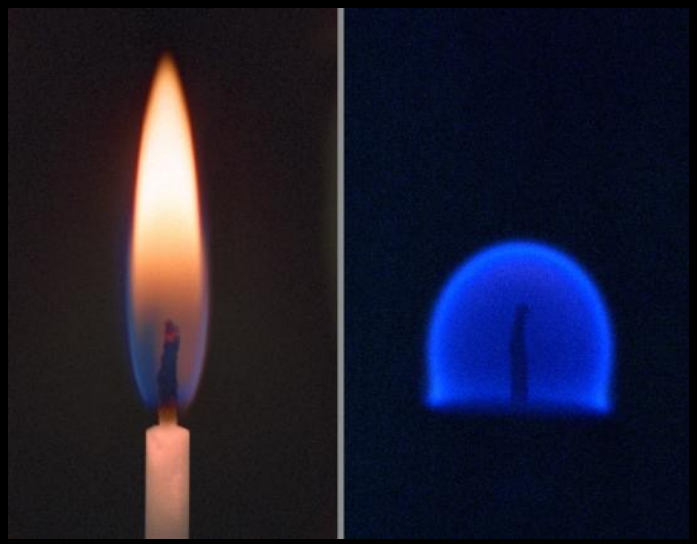


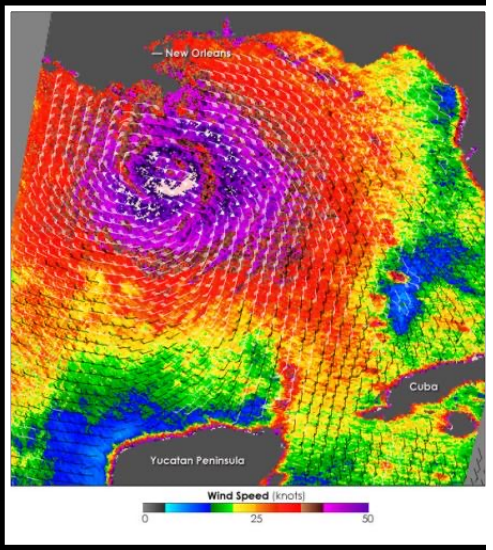
Why Microgravity Research?

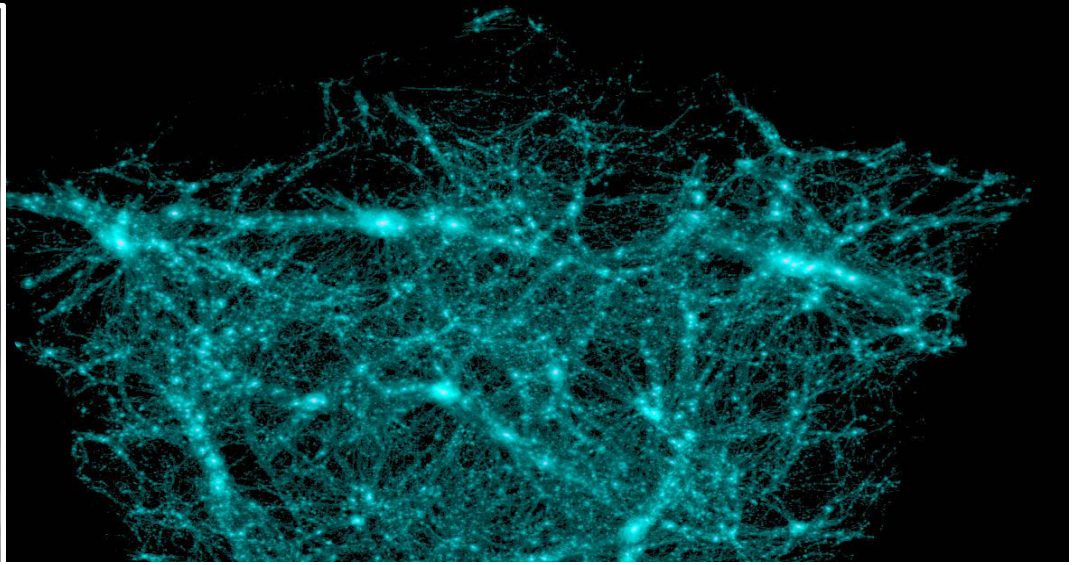


Research Examples

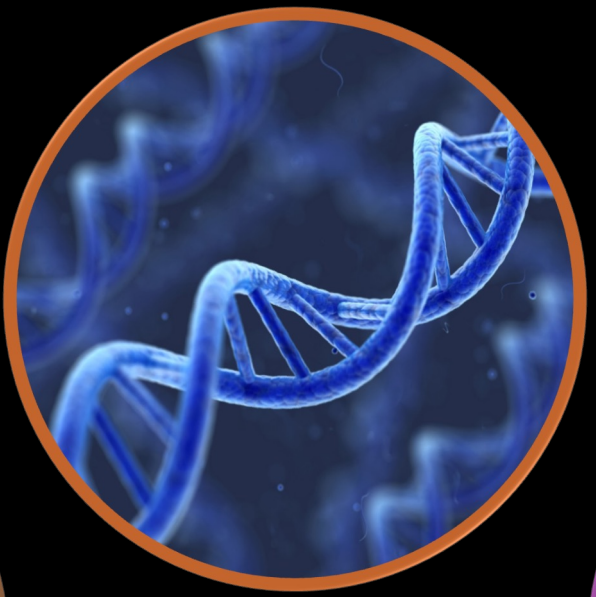








What are the benefits?

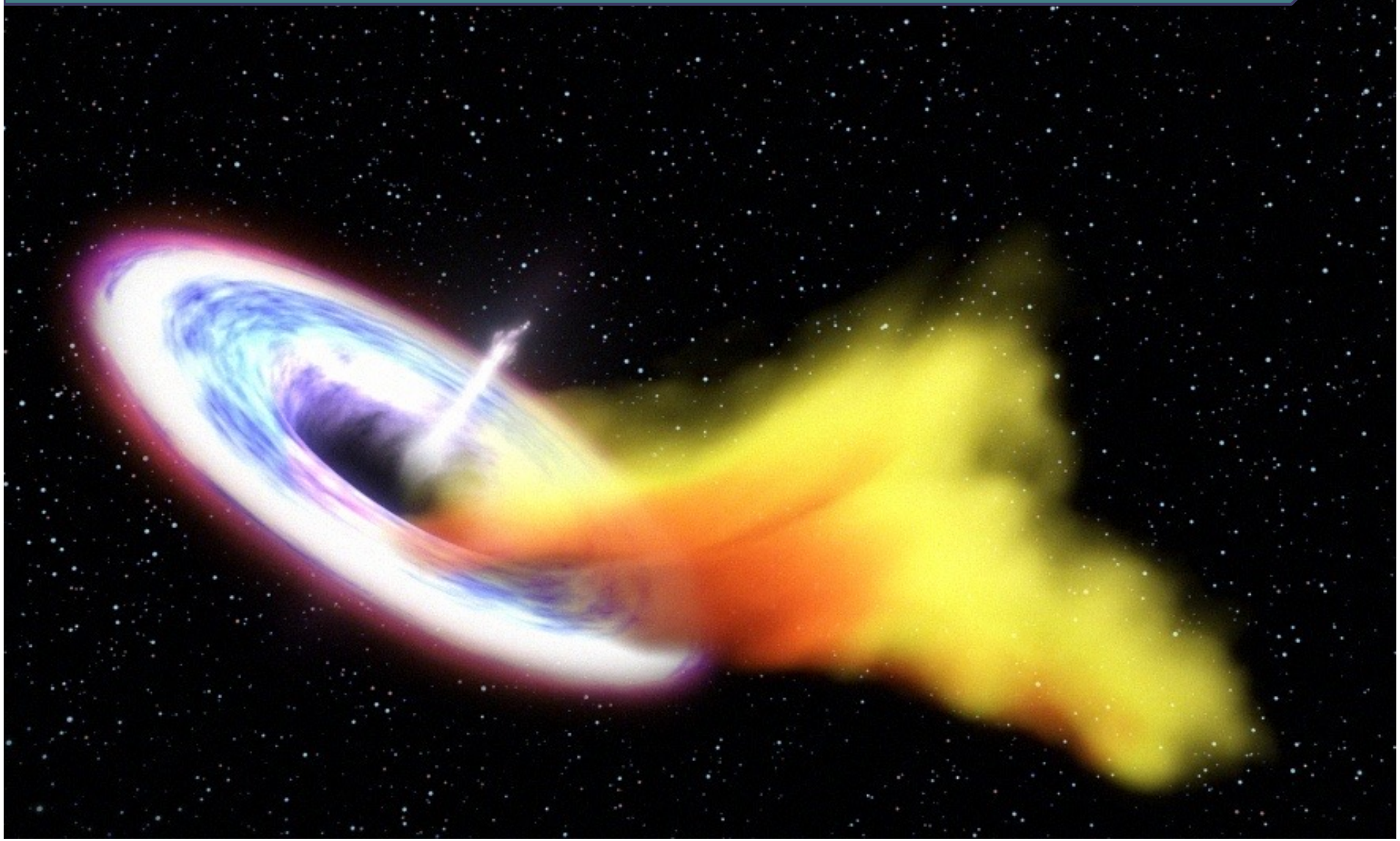


Scientific Discovery

Benefits for Humanity

Enabling Future Exploration

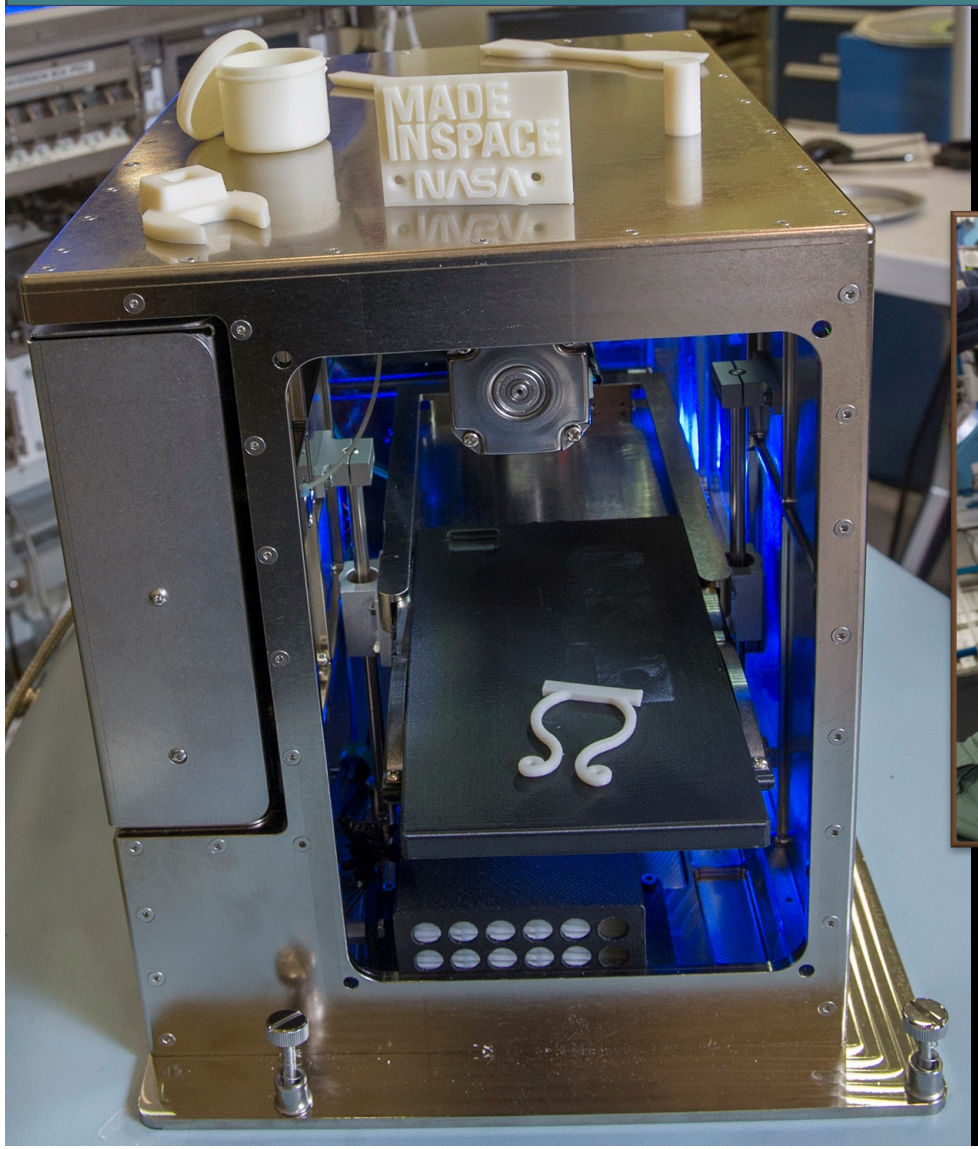
Scientific Discovery

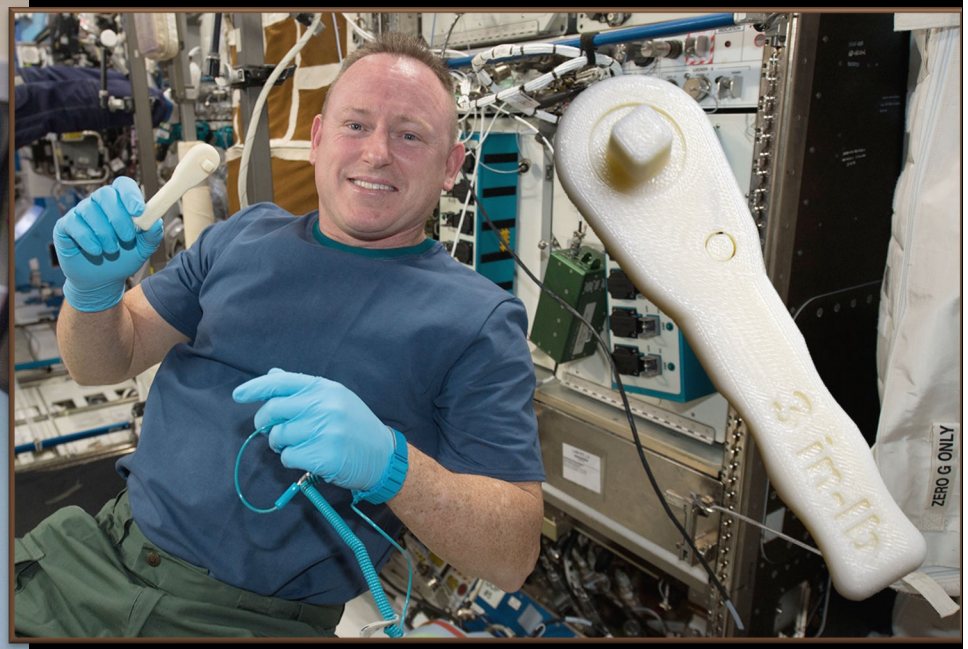


I weigh 180 pounds on Earth. How much would I weigh on the ISS?

A. 180 pounds.
B. 18 pounds.
C. 1087 pounds
D. 90 pounds.
E. 0 pounds.

Enabling Future Exploration





Benefits for Humanity

Human Health

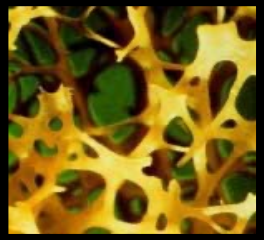
Earth Observation
and
Disaster Response

Innovative
Technology

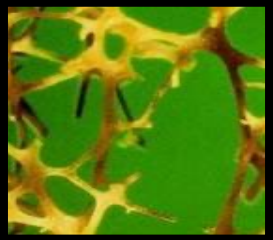
Global Education

Economic
Development of
Space

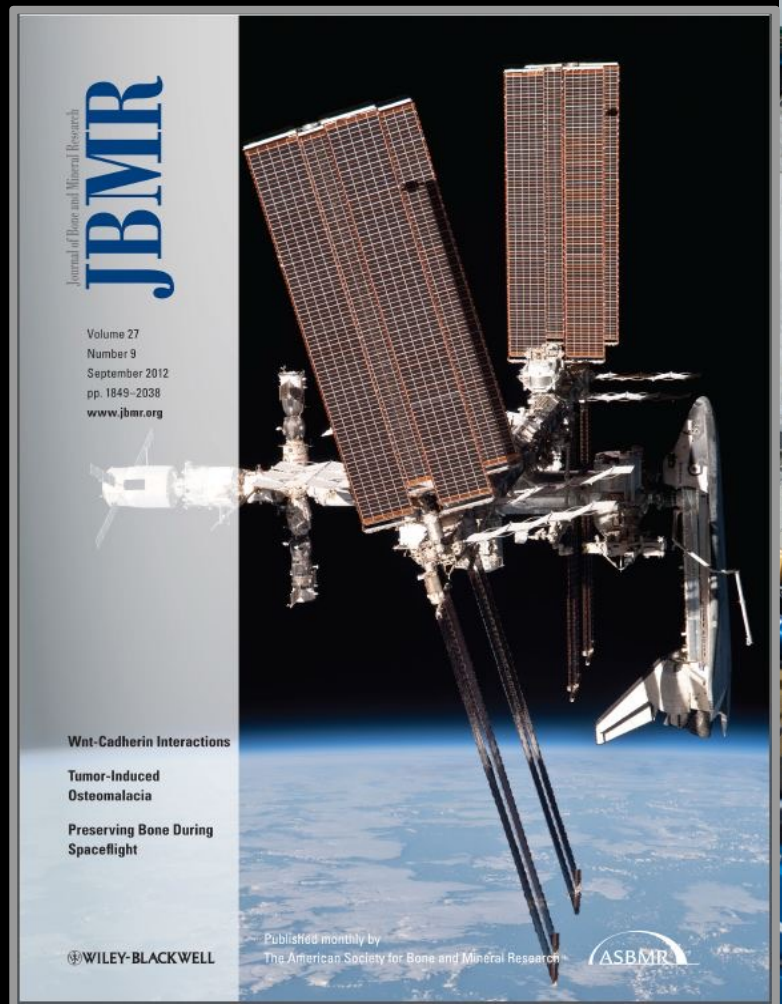
Human Health



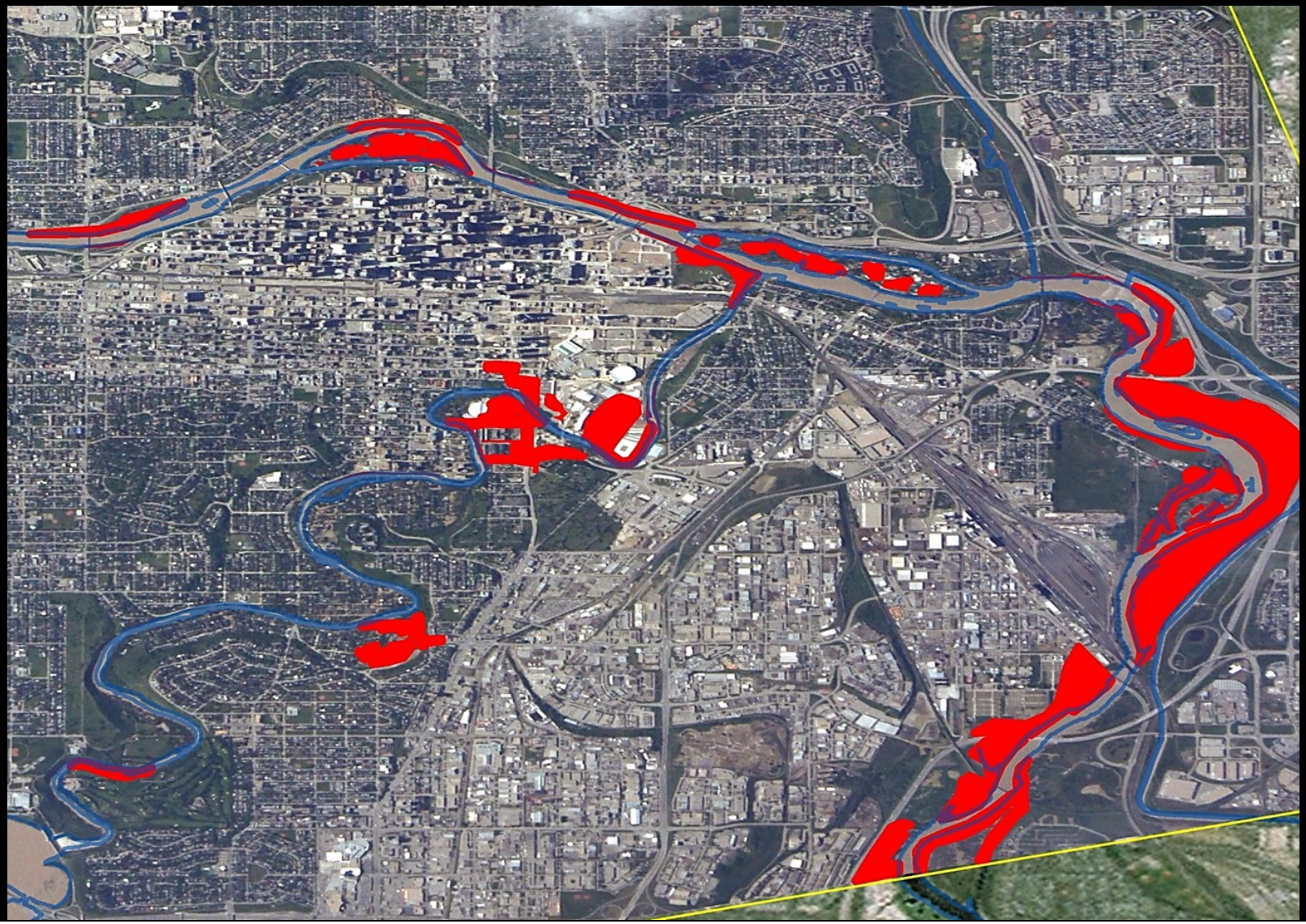
Normal Bone



Osteoporotic Bone



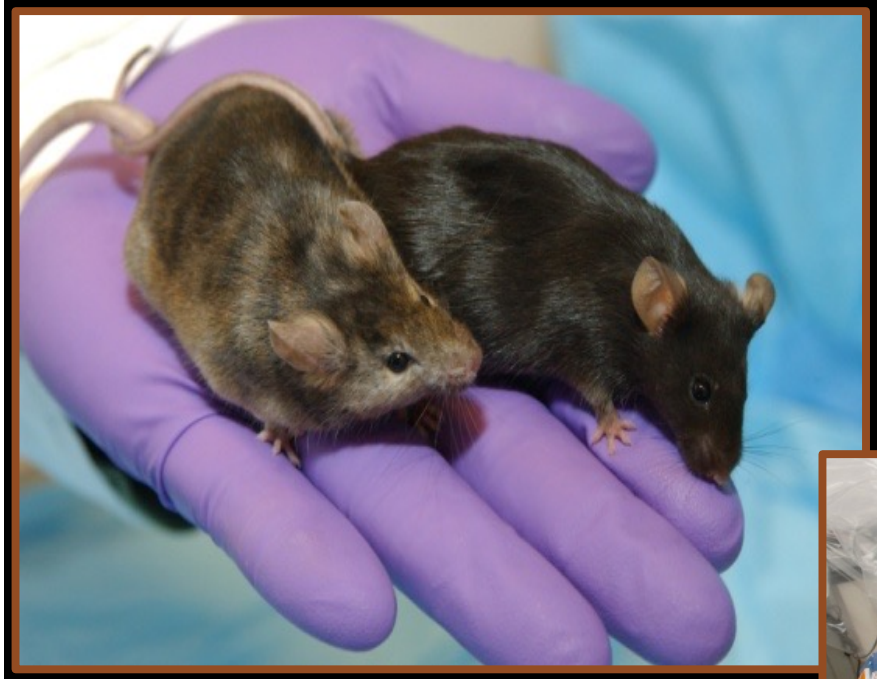
Earth Observations and Disaster Response



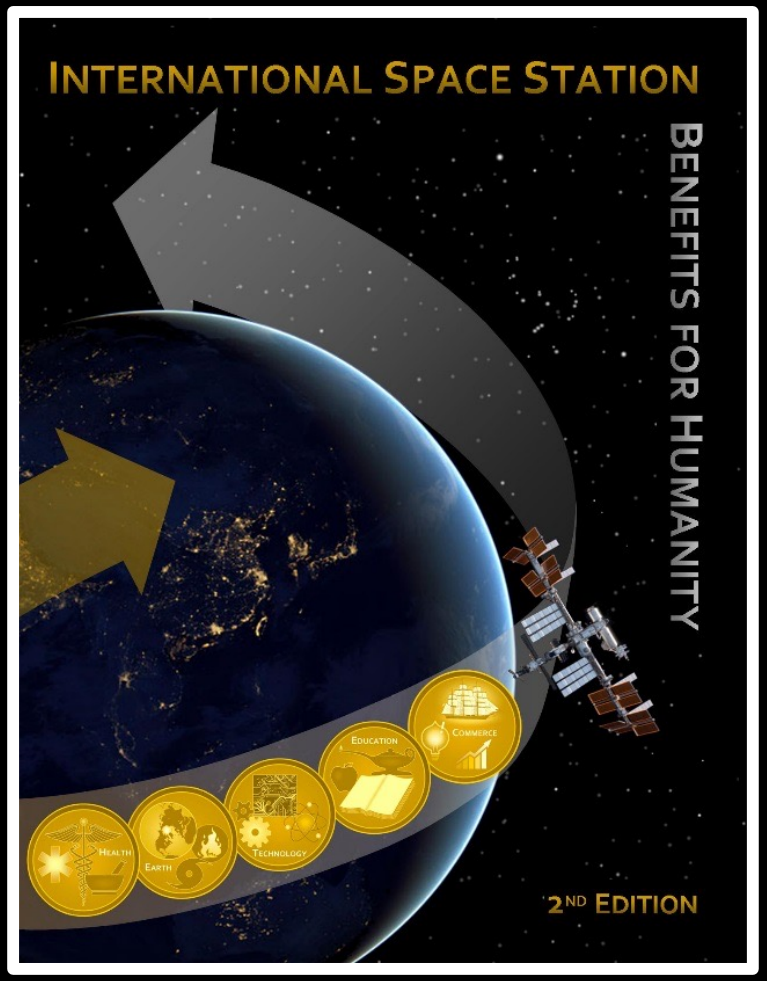
Innovative Tech

Global Education

Economic Development of Space

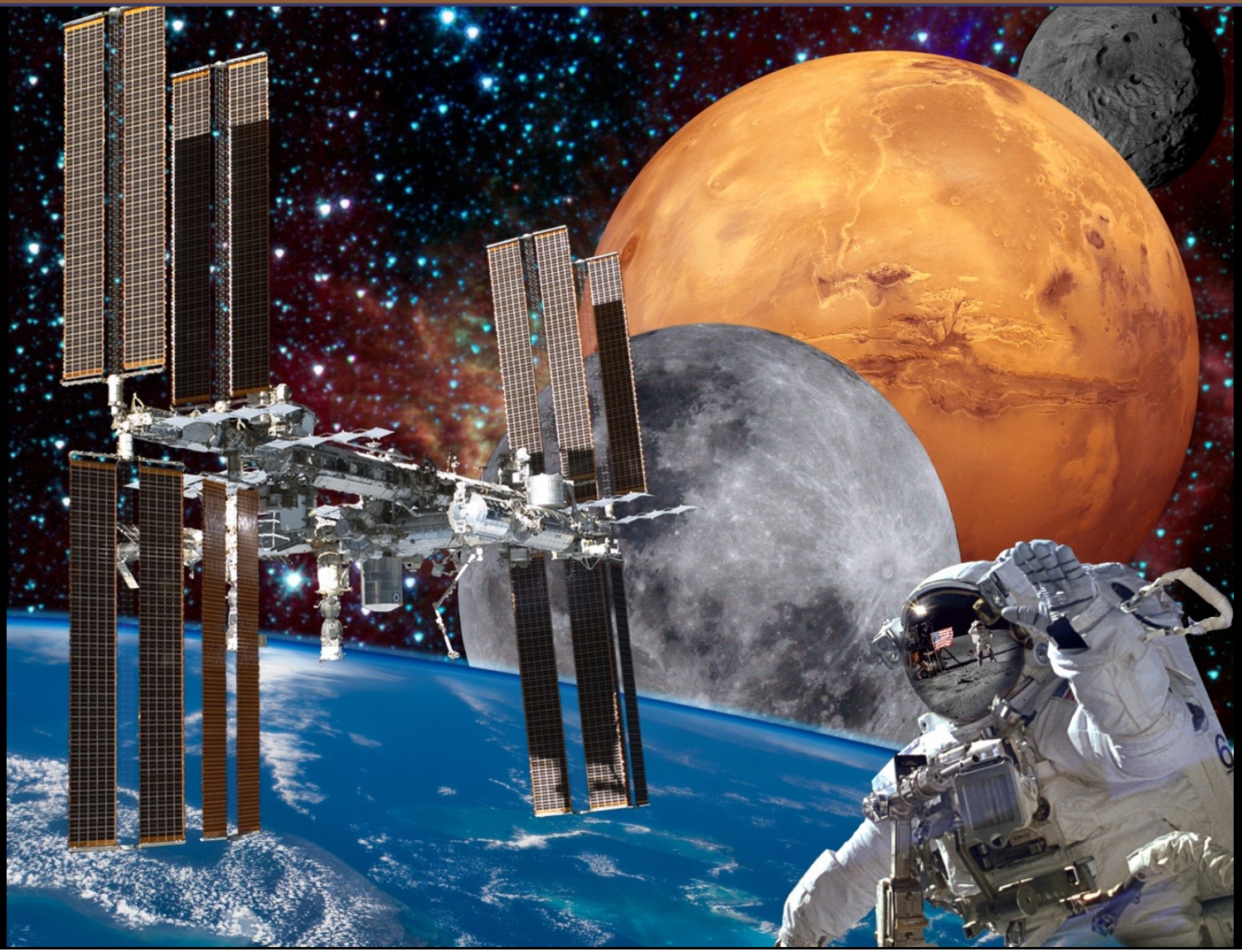


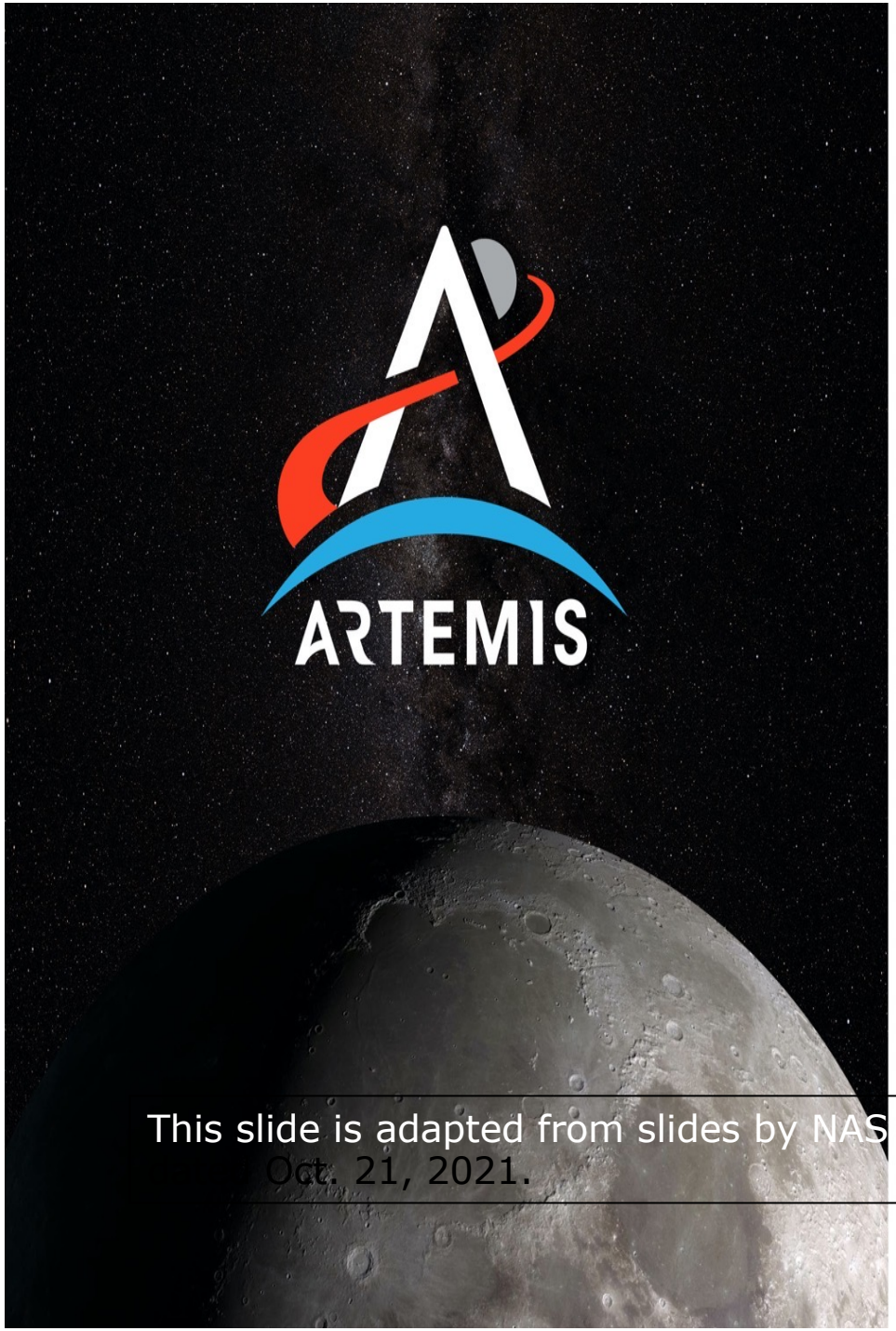
Benefits for Humanity



Spot the Station

What's Next?





ARTEMIS

Twin sister of Apollo and goddess of the Moon in Greek mythology. With Artemis missions, NASA will:

- Collaborate with international and commercial partners to establish the first long-term presence on the Moon,
- Land the first woman and first person of color on the Moon, and
- Use what we learn on and around the Moon to take the next giant leap: sending the first astronauts to Mars.

This slide is adapted from slides by NAS ARTEMIS Chief Nujoud Merancy, Oct. 21, 2021.

The Artemis II Lunar Flyby Mission Crew Members announced on April 3, 2023
Include (from left): NASA astronauts Christina Koch, Victor Glover, Reid Wiseman (foreground) and Canadian Space Agency astronaut Jeremy Hansen.

Can Astronauts Dance?


DO YOU HAVE WHAT IT TAKES TO #BeAnAstronaut?
NASA
U.S. citizen
Master's degree in STEM field
Two years related, professional experience
Pass NASA astronaut physical

Idea to "How to Reach for the Stars!"
Based on Graphic from MiMi Aung*

Hard Work

+

Critical Thinking

Dream ➡ Reality

* Former Mars Helicopter Project Manager

Back Up Charts

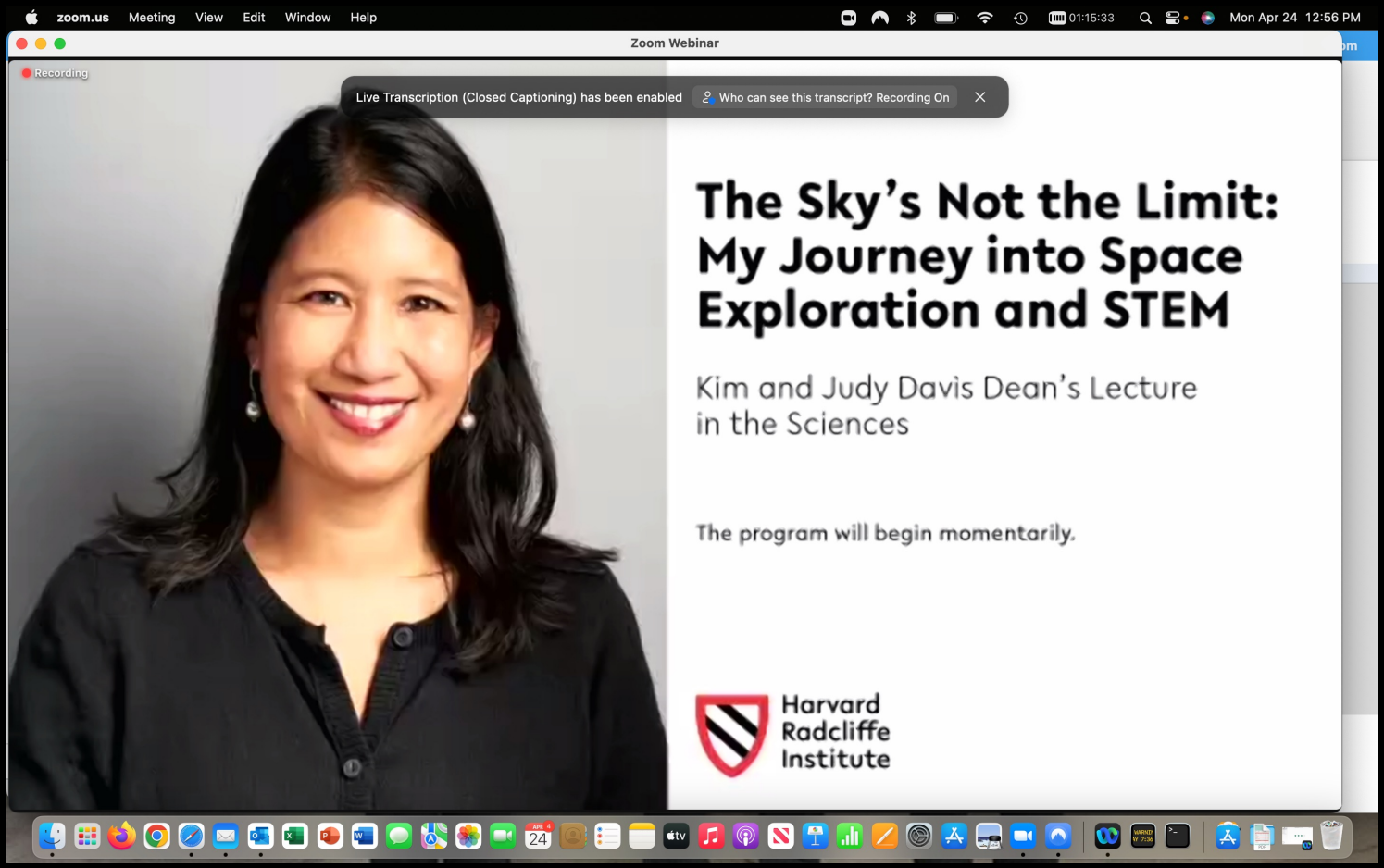
- Main Reference
- MiMi Aung

MAIN REFERENCE: ISS Livingood 20151118 Station and One Year Crew

INTERNATIONAL SPACE STATION

OFF THE EARTH, FOR THE EARTH

...and in the Classroom!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Mon Apr 24 12:56 PM
Zoom Webinar
Recording
Live Transcription (Closed Captioning) has been enabled
Who can see this transcript? Recording On
The Sky's Not the Limit: My Journey into Space Exploration and STEM
Kim and Judy Davis Dean's Lecture in the Sciences
The program will begin momentarily.
Harvard Radcliffe Institute