



INTERNATIONAL SPACE STATION

EXPEDITION 60



Soyuz MS-12 Launched: March 14, 2019
Landing: October 3, 2019*



Soyuz MS-13 Launch: July 20, 2019
Landing: February 6, 2020**



CHRISTINA KOCH (NASA)

Flight Engineer

Born: Grand Rapids, Michigan
Interests: Backpacking, rock climbing, paddling, and sailing
Spaceflights: First Flight
Bio: <https://go.nasa.gov/2QCRHbX>
Twitter: @Astro_Christina



DREW MORGAN (NASA)

Flight Engineer

Born: New Castle, Pennsylvania
Interests: Running, swimming, reading, and family travel
Spaceflights: First Flight
Bio: <https://go.nasa.gov/2Su7ESF>
Twitter: @AstroDrewMorgan



NICK HAGUE (NASA)

Flight Engineer

Born: Belleville, Kansas
Interests: Exercise, flying, snow skiing, and scuba
Spaceflights: Soyuz MS-10
Bio: <https://go.nasa.gov/2WYUI2B>
Twitter: @AstroHague



LUCA PARMITANO (ESA)

Flight Engineer

Born: Paternò, Italy
Interests: Weight training, biking, running, reading, and playing music
Spaceflights: Expedition 36/37
Bio: <https://go.nasa.gov/2SuquJe>
Twitter: @astro_luca



ALEXEY OVCHININ (Roscosmos)

Flight Engineer

Born: Rybinsk, Russia
Spaceflights: Expedition 47/48
Bio: <https://go.nasa.gov/2QAQBgu>



ALEKSANDR SKVORTSOV (Roscosmos)

Flight Engineer

Born: Schelkovo, Russia
Spaceflights: Expedition 23/24, 39/40
Bio: <https://go.nasa.gov/2XrqkZA>

*Christina Koch will return to Earth on Soyuz MS-13 on February 6, 2020

**Drew Morgan will return to Earth on Soyuz MS-15 on April 1, 2020

EXPEDITION 60

Expedition 60 began in June 2019 and ends in October 2019. This expedition will include research investigations and technology demonstrations not possible on Earth to advance scientific knowledge of Earth, space, physical and biological sciences.



SCIENCE ON THE



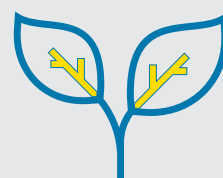
During Expedition 60, researchers will lay the first stepping stones in testing the concept of manufacturing whole human organs in space, they will examine the cell-cell interactions that occur in neurodegenerative diseases, and will evaluate the creation of novel silica forms that could lead to improvements in fuel efficiency back on Earth.

Follow the latest ISS Research and Technology news at: www.nasa.gov/stationresearchnews

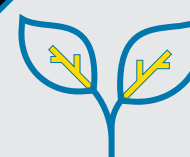
Space Moss

Space Moss (Space Moss) grows mosses aboard the space station, and on Earth, to determine how microgravity affects their growth, development, gene expression, photosynthetic activity, and other features. Tiny plants without roots, mosses need only a small area for growth, an advantage for their potential use in space and future bases on the Moon or Mars. Better understanding of the physiological responses of mosses in space may lead to developing strains of the plants suited for growth on the space station, future space missions, and bases on the Moon or Mars.

Learn more: <https://go.nasa.gov/2Xmzlhh>



BioFabrication Facility

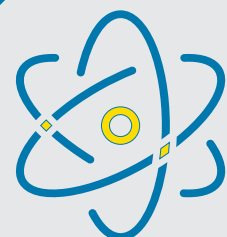


Using 3D biological printers to produce usable human organs has long been a dream of scientists and doctors around the globe. However, printing the tiny, complex structures found inside human organs, such as capillary structures, has proven difficult to accomplish in earth's gravity environment. To overcome this challenge, Techshot designed their BioFabrication Facility (BFF) to print organ-like tissues in microgravity. Microgravity provides a potential additional solution to printing complex organ structures, as minimal gravity removes the need for scaffolding structures to support complex tissue shapes. Techshot intends to use the BFF as a platform for researchers to print organ-like tissues in

microgravity, acting as a stepping stone in a long-term plan to manufacture whole human organs in space using refined biological 3D printing techniques.

Learn more: <https://go.nasa.gov/2Y36Jw1>

Goodyear Tire



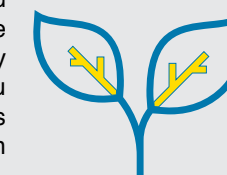
Pushing the Limits of Silica Fillers for Tire Applications (Goodyear Tire) evaluates creation of novel silica forms and structures, or morphologies, using traditional techniques to form silica fillers in microgravity. The space environment may yield results not possible in ground-based environments. Better understanding of silica morphology and the relationship between silica structure and properties may improve the silica design process as well as silica rubber formulation and tire manufacturing and performance on the ground. Recent experiments in microgravity have generated novel mixtures of solids and liquids with the potential to improve silica morphologies and deliver better performance in the tire industry. A breakthrough in research on the effect of silica morphology on rubber compound properties may lead to significant improvements in fuel efficiency, creating transportation cost savings and helping to protect the environment.

Learn More: <https://go.nasa.gov/2XpjK5N>

MVP Cell-2

The Experimental Evolution of Bacillus subtilis Populations in Space: Mutation, Selection and Population Dynamics (MVP Cell-02) investigation seeks to understand how organisms adapt to the space environment, an important component of future space exploration. Microbes may play fundamental roles in the development of biologically-based closed-loop regenerative life support, in-situ resource utilization, and will have extensive interactions with human and plant hosts. Further, microbes may pose challenges through virulence and contamination, and as nuisance factors such as biofilms in water supply and ventilation systems.

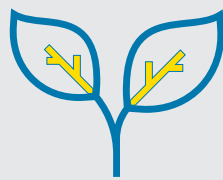
Learn more: <https://go.nasa.gov/2XtEI3M>



The Effects of Microgravity on Microglia 3-Dimensional Models of Parkinson's Disease and Multiple Sclerosis

Cells from patients with Parkinson's and PPMS will be cultured on the space station for the first time to examine cell-cell interactions that occur in neurodegenerative disease. The researchers will convert induced pluripotent stem cells (iPSCs) derived from patients with Parkinson's and primary progressive multiple sclerosis (PPMS) into different types of brain cells that, when cultured, form 3D aggregates called "organoids." Such organoids serve as advanced human cellular models of the diseases that researchers can use to better understand the behavior of cells in people with neurodegenerative disease. Results may help provide novel approaches to characterizing, understanding, and developing therapies for Parkinson's disease and multiple sclerosis.

Learn more: <https://go.nasa.gov/2Xp1fi1>



The Moon landing is one of the most extraordinary feats of humankind, an embodiment of ingenuity and desire for exploration. The patch of Expedition 60 commemorates the 50th anniversary of that landing: a constellation of three stars with the Moon superimposed forms the letter "L," the Latin symbol for 50. The Moon is depicted as a waxing crescent, as it was on July 20, 1969.

The familiar silhouette of the International Space Station is visible, flying across the night sky. Stars, numerous and bright as seen from the space station, form the shape of an eagle in the same pose as on the iconic patch of the Apollo 11 mission. The sunrise represents the fact that we are still in the early stages of humanity's exploration of space.

The hexagonal shape of the patch represents the space station's cupola, with the six points of the hexagon symbolizing the six crewmembers of Expedition 60. The names and nationalities are not present, as on the original Apollo 11 mission patch, to highlight that space missions – then, now, and in the future – are for Earth and all humankind.

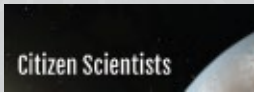


Space Station Research Explorer At any given time on board the space station, a large array of different experiments are underway within a wide range of disciplines. Here, you can search the database of experiments to learn more about each experiment's objectives, descriptions, results, and imagery, as well as find links to additional information beyond this database.

https://www.nasa.gov/mission_pages/station/research/experiments/explorer/

STEMonstrations STEMonstrations fit the need for students and educators to have high quality, informative videos that cover the wide range of topics outlined in the Next Generation Science Standards (NGSS). Astronauts film videos instructing students in biology, chemistry, physics, Earth science, and space science. The videos align to a "Try This" one- to two-page lesson plan where students and educators can make connections to topics they are working on in the classroom.

<https://www.nasa.gov/stemonstrations>



Citizen Science Projects For years, solar system and exploration have brought excitement and inspiration to people of all ages. This is especially true now, with new opportunities for students and citizen scientists to directly participate in expanding our knowledge of the solar system. Amateur astronomers and students with wide ranges of equipment and expertise are making valuable contributions to our growing understanding of our nearest celestial neighbor. Learn how you can become part of the adventure!

<https://science.nasa.gov/citizenscientists>

Sally Ride EarthKAM Sally Ride EarthKAM (Earth Knowledge Acquired by Middle school students) is a NASA educational outreach program that enables students, teachers, and the public to learn about Earth from the unique perspective of space. Students can "program" the camera aboard the International Space Station to take pictures of the Earth from space and study the images they receive.

<https://www.earthkam.org/>



Spot the Station Watch the International Space Station pass overhead from several thousand worldwide locations. It is the third brightest object in the sky and easy to spot if you know when to look up. Visible to the naked eye, it looks like a fast-moving plane only much higher and traveling thousands of miles an hour faster!

<https://spotthestation.nasa.gov/>

Story Time from Space While in space, astronauts videotape themselves reading books to children on Earth. In addition, cross-content curriculum is designed to support the Next Generation Science Standards and Common Core.

<http://storytimefromspace.com/>

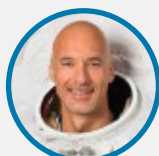


Amateur Radio on the ISS ARISS lets students worldwide experience the excitement of talking directly with crew members of the International Space Station, inspiring them to pursue interests in careers in science, technology, engineering and math, and engaging them with radio science technology through amateur radio.

www.ariss.org/

In-flight Education Downlinks Wouldn't it be great if students could talk with an astronaut aboard the International Space Station about what it is like to live and work in space? Well, they can! Educational organizations located in the United States can host an in-flight education downlink with space station crew members. Students pose questions and watch as astronauts answer the questions and demonstrate science, technology, engineering and mathematics concepts in ways that are impossible on Earth.

<https://www.nasa.gov/audience/foreducators/stem-on-station/downlinks.html>



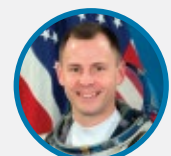
@astro_luca



@AstroDrewMorgan



@Astro_Christina



@AstroHague