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JESSICA MEIR:-

FROM THE SEA TO THE STARS

BY

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Author of "[WOMEN SPACEFARERS](#)", Springer International, 2017)*



A marine biologist who researched the physiology of animals in extreme low oxygen environments, Jessica Meir ended up conducting hundreds of experiments with colleagues in the International Space Station, to study another animal in an extreme environment, to better understand the ways in which being in space in a long-duration spaceflight affects humans, and how her own body responds to the extremes of space.

Jessica was assigned to the expedition 61/62 and launched to the International Space Station on board Soyuz MS-15 as a flight engineer on September 25, 2019.

The daughter of a mother from Sweden and an Iraqi-Israeli father, Jessica holds dual American and Swedish citizenship. She is, the first Swedish woman citizenship-holder to be part of a space mission.

Jessica says being Jewish is an important part of her identity: «*My mom didn't officially convert, but we considered ourselves a Jewish family.*» Astronauts are allowed to bring a number of personal items to the International Space Station. Two among Jessica's choices were an Israeli flag (together with a Swedish flag) and a pair of socks with menorah, the traditional candelabrum with seven branches. Jessica celebrated on the ISS the first day of Hanukkah, the Jewish eight-day, wintertime "festival of lights" that celebrates the rededication of the Holy Temple.

The youngest of five children, in the only Jewish family in the town, Jessica Ulrika Meir was born on July 1, 1977 in Caribou, Maine – the most northeastern city in the United States – where she spent her childhood. She played on basketball, softball, tennis, and soccer teams (her favorite sport), played the flute and piccolo in concert band and the saxophone in jazz band, and participated in a variety of school clubs and organizations.

She doesn't know exactly what triggered her interest in space.

«I dreamed about becoming an astronaut my whole life – she says – My mother tells me I started saying I wanted to be an astronaut when I was five and then my first distinct memory was when I was in first grade, we were asked to draw a picture of what we wanted to be when we grew up. I remember drawing an astronaut on the surface of the moon in a space suit standing there next to the flag.»

«I think it was probably a kind of innate inclination I had toward exploration – she adds, considering that growing in a small remote town she never had any exposure to NASA or to space exploration, she didn't have the Internet, and only saw whatever was on the evening news, although the shuttle program was very prominent in the media at that time – and it might have had something to do with the fact that the stars shone so brightly in rural Maine». Jessica attributes her dream of venturing into space exploration to the love of nature she learned from her Swedish mother, who had a natural big connection with nature. Also her father's predilection for wandering and adventure contributed in igniting in her the passion for exploration. All those things were the perfect combination.

At the age of 13, following her sister who was in graduate school at Purdue, Jessica attended a youth space camp at Purdue University in Indiana before starting her freshman year at Caribou High School. *«I was certain that this would be my first concrete step toward a future career in the space industry.»*

By the time she started Caribou High School in Maine, her friends and teachers were well aware of her dream of becoming an astronaut.

After high school, Jessica attended Brown University, in Providence, Rhode Island where she studied biology and played saxophone in the jazz band and flute in the orchestra.

Her passion for biology led her to take part in the NASA Space Life Sciences Training Program (SLSTP), a six-week summer camp at the Kennedy Space Center in Florida program that fully immersed her in life sciences side of space research, attending lectures on various space-related science topics, going on tours of the KSC facilities and conducting her own research project.

In 1999 she earned a Bachelor of Arts in Biology from Brown University. During her senior year at Brown, with a few other students she submitted a proposal for NASA's Reduced Gravity Student Flight Opportunities program. Their experiment was selected, and she had the opportunity to experience microgravity for the first time, without even being in space

In 2000 Jessica earned a Master of Science in Space Studies from the ISU (International Space University) in Strasbourg, France. *«While I was in France – she recalls – I got a call from the Johnson Space Center in Houston. The Life Sciences Program at JSC still had my resume and I was offered a position in the Human Physiology Program. I worked at Johnson for three years as a support scientist, serving as a research liaison between principal investigators and the NASA team of astronauts.»*

During her three years of internships (from 2000 to 2003) in Lockheed Martin's Human Research Facility at NASA's Johnson Space Center (JSC), Jessica worked as a scientist in human research, coordinating, guiding and supporting the human space life science experiment performed by astronauts on Shuttle and ISS missions, studying how physiological processes are altered in space (bone loss, muscle control/atrophy, lung function, etc.), and developing procedures for astronauts on-orbit, training crew members, and providing ground support from Mission Control Center. *«That's when I got to know a lot more about what it takes to be an astronaut.»*

«Working in these research endeavors for three years and supporting studies designed by other scientists really inspired me to want to do my own science. I came across some of the work being done on diving physiology at the Scripps Institution of Oceanography out of the University of California, San Diego. After getting in touch with the group, I started graduate school there.»



Her PhD research explored the physiology of animals in extreme environments, studying how animals – like diving emperor penguins in Antarctica and northern elephant seals in California – are capable of holding their breath for 30 minutes and up to two hours, respectively. A trained scientific diver, she studied Antarctic emperor penguins both above and below the ice. During four research expeditions to the remote, icy continent, she pushed herself deep below sea-level, scuba-diving in the Antarctic under sea ice, to understand how these mammals swim without oxygen.



In 2009 she received her Doctorate in Marine Biology from Scripps Institution of Oceanography at the University of California San Diego (UCSD).

After completing her PhD, Jessica became interested in studying the capabilities of high altitude animals that are similarly adept at cope with hypoxia, and started post-doctoral research at the University of British Columbia to investigate in a controlled environment (by simulating altitudes in a wind tunnel) how the bar-headed geese – which are famed for their long migrations between Mongolia, China and India and are able to migrate over the Himalaya Mountains – can fly at high altitudes, over the world's tallest mountains, despite low oxygen. *«Flapping wings in flight is very metabolically costly and requires an enormous amount of oxygen – and to do that where the air is so thin is remarkable»* – Jessica says. This was the first study to comprehensively measure the physiology of these birds.

After three tries to be chosen for NASA's highly selective astronaut programme, in 2013 she was selected in the first 50% female/male group, as one of eight in the 21st NASA astronaut class.

«Luckily, I stuck to it and persevered. Just in the back of my head, knowing that it was the dream I've had for my entire life, I couldn't not apply. I just wasn't prepared to give up on it yet.» Jessica told students at Caribou High School in 2016.

She has started her mission on the International Space Station on September 25, 2019 when she reached the ISS aboard the Soyuz MS-15, together with the Russian cosmonaut Oleg Ivanovič Skripočka, at his third long-duration mission, and Hazzaa al-Mansoori, the first United Arab Emirates' astronaut and the first Arab on the ISS.



Jessica spent the last year preparing for the mission at Star City, in Russia (and in Russian!), as she was assigned to the left seat of the Soyuz, that means she was the co-pilot, a position that has a lot of responsibilities, and is trained basically at the same level as commander: *«We spend most of our training thinking about the launch and the landing because it's so intensive in terms of what we have to learn, but that in a six-month mission is only a tiny fraction of our time up there. The launch, you're in space within about eight and a half minutes.»*

Astronauts on the Space Station do a wide variety of experiments, including some that will be pivotal for our longer duration missions in the future when we return to the Moon and when we go to Mars, *«With my background as a scientist – she told during a preflight interview – I'm really excited about contributing to all the different kinds of experiments that are going on. The space station is a US national lab and the primary reason for the space station is to do science. I know how much effort it takes to get an experiment going and get all the work done and then wait to collect data. Those scientists on the ground have waited so long and put so much effort in to get the data and they're not in control of it. I am in control of getting them the data. It's nice to understand that hardship. (...) The other thing that I'm really excited for, is to hopefully do a spacewalk.»*

And the dream came true on October 18, 2019, when she ventured into the vacuum of space for seven hours and 17 minutes as part of the first all-female spacewalk with Christina Koch, the lead spacewalker who, at her third EVA, had already logged 20 hours and 31 minutes on open space.

They made history as they became the first team of female astronauts to work in space outside the orbiting research station.



Their job was to replace a failed battery charge controlling unit needed for charging and discharging batteries of the station's solar power network. They paused to take a congratulatory phone call from President Donald Trump, who mistakenly congratulated them for being "the first time for a woman outside of the space station."

When the astronauts got the chance to respond, Jessica politely corrected President Trump: «We don't want to take too much credit because there have been many other female spacewalkers before us. This is just the first time that there have been two women outside at the same time, and it's really interesting for us. We've talked a lot about it up here, you know, for us this is really just us doing our jobs. It's something we've been training for, for six years. We do, of course, want to give credit to all of those that came before us – she continued – There has been a long line of female scientists, explorers, engineers, and astronauts, and we have followed in their footsteps to get us where we are today. We hope that we can provide an inspiration to everybody, not only women, but to everybody that has a dream, that has a big dream and is willing to work hard to make that dream come true.»

Jessica was the 228th person and 15th woman to walk in space.

She participated in a second all-female spacewalk, again with Christina Koch, on Jan 15th, 2020, to remove 4 old nickel-hydrogen batteries outside the Space Station, and replace them with 2 more powerful, longer-lasting lithium-ion batteries, and a new adapter plate, able to keep everything running when the outpost is on the night side of Earth.

The job was completed five days later, on January 20th, during the third all-female spacewalk of the pair. During their EVA of six hour and 58 minute they removed the two remaining nickel-hydrogen batteries and installed the final lithium-ion battery needed by the station's left-side outboard set of solar arrays.

On April 17, 2020, after practicing for seven months extreme social distancing on the ISS Meir, as co-pilot of Soyuz MS-15, came back to a world battling the coronavirus pandemic, and found a completely different planet than the one she had left. When the hatch opened the first humans they saw were the rescue teams, all wearing masks: "Wow! – she told – of the 7.5 billion humans on Earth right now, we are really the only three people that aren't affected by this!".

Since long-duration space missions may weaken astronaut's immune system, when Meir got back to Houston, she went into quarantine. This isolation after isolation was a strange welcome. She said she felt more isolated on Earth than she did in space. One more extreme environment she didn't experience before.

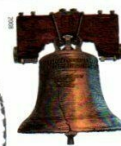
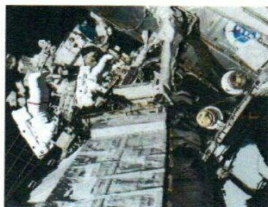


A SELECTION OF SPACE PHILATELIC COVERS:-

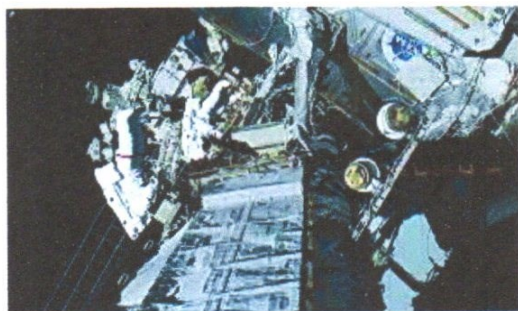


61-62 экспедиция на МКС ISS Expedition 61-62

221th ISS EVA



Astronauts Christina Koch and Jessica Meir carried out history's first all-female spacewalk, October 18, 2019, floating outside the International Space Station and successfully installing a 230-pound replacement battery charger in the lab's solar power system. The 7-hour 17-minute spacewalk began at 7:38 a.m. EDT when Koch, making her fourth excursion, and Meir, making her first, switched their spacesuits to battery power inside the Quest airlock. It was the first by two women in the 54 years since the first "extra-vehicular activity," or EVA, by a Russian cosmonaut in 1965, sparking widespread public interest. The spacewalk was to replace a faulty 232-pound battery charger in the lab's solar power system. After floating out of the airlock, Koch promptly made her way to the left side of the station's power truss, anchored her feet on the end of the lab's robot arm and unbolted a spare battery controller. Meir, meanwhile, made her way outboard to the left-most solar array and prepared the faulty unit for removal from an equipment bay. The two then teamed back up. Koch handed the controller off to Meir and got off the arm. The astronauts then carefully carried the spare out to the port 6 (P6), solar array segment work site. The spacewalkers had no problems, easily moving the bulky controller to the work site and installing it in place of the faulty unit. After an initial health check, flight controllers stood by while the system came back on line. Koch and Meir already were paired up for one of five spacewalks to replace aging solar array batteries. But after two of those excursions, a battery charge-discharge unit, or BCDU, failed knocking a newly-installed battery off line. While the remaining battery installation spacewalks were put on hold, NASA managers opted to keep the Koch-Meir pairing intact, assigning them instead to the BCDU change out. The station's electricity is provided by four huge solar wings, two on each end of a truss that stretches the length of a football field. Two dozen battery charge controllers, six per solar wing, divert electricity to powerful batteries for recharging when the lab is in sunlight and then deliver that stored power when the station moves through Earth's shadow. Replacing the faulty BCDU effectively restored 4 to 5 kilowatts of power to the lab's electrical system that was lost when the original charger failed after 19 years of normal operation, knocking a newly-installed lithium-ion battery off line. With the BCDU swap-out complete, Koch and Meir carried the faulty unit back to the airlock for eventual return to Earth aboard a future SpaceX Dragon cargo ship for troubleshooting and, if possible, repair. They then carried out a few other, more routine tasks, adjusting multi-layer insulation around spare components to make access easier, securing an ethernet cable and installing a fitting on the European Space Agency's Columbus laboratory module that will be needed when an experiment platform is attached later. Three of six lithium-ion batteries were installed on the left outboard array during spacewalks October 6 and 11 by Koch and Morgan. Shortly thereafter, engineers discovered one of the three BCDUs in that circuit had failed, sidelining one of the new batteries. This was the 221th spacewalk devoted to station assembly and maintenance since construction began in 1998. Photo Credit: NASA



**ISS Expedition 61 Spacewalk 58 EVA-3
First All Female Spacewalk
Houston TX – October 18 2019**



This spacewalk was the third of Expedition 61 and the third of a series of 5 to replace and improve ISS batteries on the P6 truss. Some of the battery swaps have been moved to EVA 227 and a later date because of a power failure in a Battery Charge Discharge Unit in slots 5 and 6 on the P6 Truss taking the 4B battery channel offline. Koch and Meir went outside and replaced the failed unit and brought it inside. The battery swap was moved to EVA 227 to save time and Meir and Koch wrapped up the spacewalk by installing a stanchion on the Columbus Module and tightening the bolts on the S0 Truss which had come loose. This spacewalk was the first all female spacewalk on the station. During the spacewalk, President Trump called the station and congratulated Koch and Meir on this milestone. (Credit: Wikipedia)