My NASA Data - STEM Career Connections

Meet Jessica Meir, Astronaut & Research Scientist

Job Title

Astronaut

Bio

This interview was published by Forbes Magazine entitled "From Marine Biologist To Astronaut: An Interview With Jessica Meir, PhD".

Can you tell us a bit about your background?

My mother tells me I started saying I wanted to be an astronaut when I was five years old. I grew up in a really small town in northern Maine, so I didn’t have any unique exposure to space exploration, although the shuttle program was very prominent in the media when I was growing up. I developed a passion for biology as well, which led me to participate in the NASA Space Life Sciences Training

Program (SLSTP) at Kennedy Space Center, a six-week program that fully immersed students in life sciences side of space research.

As an undergraduate, did you direct all of your studies toward space and preparing yourself for a career at NASA?

My major at Brown was in biology, which was always my favorite academic subject. My professor for Introductory Biology was Dr. Kenneth Miller, a renowned scientist who really played a large role in my decision to stick with biology as a concentration. I hoped to bring my background in biology to space, and ended up at the International Space University in France after graduating from Brown. I was considering going to medical school or pursuing a PhD until I found out about a master's program in space studies, which covered everything from space law and politics to engineering and orbital mechanics to medicine. The international and interdisciplinary perspectives of the program offered a great opportunity.

What brought you back to the United States?

Credit: NASA's Astronaut, Jessica Meir, PhD

While I was in France, I got a call from the Johnson Space Center in Houston, where I'd participated in the "vomit comet," an aircraft simulator that flies in parabolas to achieve weightlessness. The Life Sciences Program at Johnson 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.

Can you give an example of the types of experiments were you working on during that time?

In 2002, I had the opportunity to participate in the NASA Extreme Environment Mission Operations (NEEMO) missions, which involved simulated space missions in very demanding conditions. We used an underwater habitat off of Key Largo to run very real missions, following a timeline. It was an amazing opportunity to be able to work directly with the astronauts and revisit my passions for marine biology and scuba diving.

Did those experiences motivate you to return to marine biology for your PhD?

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. It combined physiology, animal research, and immersive fieldwork across exotic locations like Antarctica. After getting in touch with the group, I started graduate school there in San Diego at Scripps.

What did your research on diving physiology entail?

Our main objective was to try to understand how deep diving mammals and birds, such as emperor penguins and elephant seals, are capable of holding their breath for 30 minutes and up to two hours, respectively. What is unique about their physiology that allows them to do that? We put recording devices on these animals to capture different parameters like heart rate or blood oxygen levels as they dove freely in the wild. After completing my PhD, I became interested in studying the capabilities of high altitude animals that are similarly adept at cop[ing] with hypoxia.

What were your findings on the physiologies of these animals that function underwater and/or at high altitudes?

All of these animals have a number of unique adaptations that make them extremely optimized for their environments. At every level of the oxygen transport cascade, they are uniquely advantaged, allowing them to get more oxygen from the air, into the body, and distributed to individual cells.

What prompted you to redirect your career toward space and the pursuit of becoming an astronaut?

After I left Houston for the first time, I always told myself I'd never come back unless it was to become an astronaut. I thought that would never happen, but by the time I was reasonably competitive to apply, I did. In 2009, I made it to the final round of interviews, bringing me back to Houston. That year, only nine astronauts were selected, and I was pretty heartbroken when I found out I wasn't one of them. They encouraged me to reapply, although I thought I'd missed my only chance. I was speechless when I found out I was one of eight individuals selected for the next astronaut class in 2013.

What was the experience like immediately following your selection?

In August of 2013, our class began the two-year astronaut candidate training period, which requires students to demonstrate proficiency in a variety of areas. One of the main components is flight training, which involves flying NASA's high-performance T-38 jet. We had to develop precise crew resource management to operate the jet effectively. Other training areas include space walk simulations, learning to use the space suit, and education on every mechanical and operational aspect of the International Space Station (ISS). There were a number of additional leadership, survival, and expeditionary training opportunities, as well as required Russian language education.

ASCAN 2013 Media Day. Photo Date: August 20, 2013. Location: Building 9NW - Orion Mockup. Photographer: Robert Markowitz

Aside from the ISS, what's the status of future missions, such as a manned mission to Mars?

Like the ISS, the vehicles being developed commercially by SpaceX and Boeing are designed for low-Earth orbit. In order to explore beyond low-Earth orbit, NASA is currently building a spacecraft called Orion, as well as a space launch system with a rocket even bigger than that of Saturn V. The Orion spacecraft has already been tested, unmanned, and I believe the current target for the first manned mission is 2021. As far as specific missions, such as going to Mars or going back to the Moon, these are largely subject to the administration in office and the amount of funding received from Congress.

What missions are you hoping to see in the near future?

Personally, I hope that we go back to the moon. I think that returning to the Moon is an important stepping-stone to eventually reaching Mars. The Orion spacecraft and space launch system could be used for any number of future missions, so I think the priority is to first build a vehicle that makes those missions possible. NASA does talk a lot about the journey to Mars, and we are definitely on that journey as an organization. Everything that we're doing right now on the ISS and on Earth is supporting the effort to launch longer missions.

What will be the most important factors affecting our ability to achieve longer missions, such as a manned journey to Mars?

Our current ISS missions will give us a better understanding of how the space flight microgravity environment and associated radiation affect the human body, as well as mechanical hardware, in the

long term. The other important factors will be our further development of robotic technology to complement the advantages offered by astronauts, as well as further cultivation of the international effort toward space exploration.

Source: Forbes Magazine

Education

- Graduated from Caribou High School, Caribou, Maine.
- Earned a Bachelor of Arts degree in Biology from Brown University in 1999.
- Earned a Master of Science degree in Space Studies from International Space University in 2000.
- Earned a Doctorate in Marine Biology (diving physiology) from Scripps Institution of Oceanography (UCSD) in 2009.

Work Description

Jessica U. Meir was selected by NASA in 2013. From 2000 to 2003, Dr. Meir worked for Lockheed Martin's Human Research Facility, supporting human physiology research. During this time, she also participated in research flights on NASA's reduced gravity aircraft and served as an aquanaut in an underwater habitat for NASA Extreme Environment Mission Operations (NEEMO).

NASA Connections

Review the following video to hear directly from Dr. Meir about her experiences growing up and becoming an astronaut. ***NOTE: This is not a NASA-produced video; NASA does not endorse any products or advertisements that may appear with this video.***

Video: Jessica Meir, Ph.D. – From Marine Biologist to Astronaut

Video

NASA Professional Profile

From 2000 to 2003, Dr. Meir worked for Lockheed Martin's Human Research Facility (NASA Johnson Space Center), supporting human physiology research on the space shuttle and International Space Station. During this time, she also participated in research flights on NASA's reduced gravity aircraft and served as an aquanaut crew member in the Aquarius underwater habitat for the 4th NASA Extreme Environment Mission Operations (NEEMO) mission. Dr. Meir was selected in June 2013 as one of eight members of the 21st NASA astronaut class. Her Astronaut Candidate Training included scientific and technical briefings, intensive instruction in International Space Station systems, spacewalks, robotics, physiological training, T-38 flight training, and water and wilderness survival training.

In the astronaut office, Meir has extensive Mission Control Capsule Communicator (CapCom) experience, including serving as Lead CapCom for Expedition 47, the BEAM (Bigelow expandable module on the International Space Station) mission, and an HTV (Japanese Space Agency cargo vehicle) mission. She was also the ground IV (mission control communicator to spacewalking astronauts) for two space station spacewalks. In 2016, Meir served as a crew member on the European Space Agency (ESA) CAVES space analog caving mission in Sardinia, Italy. As of 2019, she currently works onboard the International Space Station on her first spaceflight as part of Expedition 61 and 62.