

Women in space

On 20 July 1969, Neil Armstrong took the first step on the moon. But women have also played a crucial part in space travel, as **Caroline Roberts** reports

Half a century ago, people across the world watched in awe as those grainy, black and white pictures flickered onto our screens. Then they looked up at the moon and marvelled that men were walking on its surface. It may have been a man who took that momentous first step, but few realised at the time that women were instrumental in putting him there.

It wasn't until 2016 that the film *Hidden Figures* brought to wider attention the role of the mainly African-American female 'computers' who had toiled over the complex equations that enabled the country's early space flights. Among them was the brilliant mathematician Katherine Johnson, who calculated the flight trajectories for America's first manned space missions in the early 1960s, and later for the moon landings.

And a woman had already orbited the Earth. In June 1963, the Soviet Union's Valentina Tereshkova, a 26-year-old former factory worker, blasted off for a three-day mission. On her return, she was jettisoned from her craft at a height of seven kilometres and parachuted back down to Earth to be met with a hero's welcome. But things could have turned out very differently. Years later it emerged that she had

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been in real danger of spinning off into outer space as engineers had forgotten to programme the craft for her descent. Fortunately, Valentina spotted the mistake and it was corrected.

In the USA, aspiring female astronauts had to wait a further 20 years. In 1983, Sally Ride joined the crew of the space shuttle *Challenger* and became the first American woman in space. She was followed by a handful of others and, as the decade drew to a close, the UK got in on the act.

SHOOTING STAR

The closest Sheffield-born chemist Helen Sharman had come to space was working at the confectionery

giant Mars. But in 1989 she happened to catch a radio advert that was to change her life: 'Astronaut wanted, no experience necessary.' After a rigorous selection process, Helen was chosen from among 13,000 applicants and, in 1991, at the age of 27, became the first Briton in space. Project Juno, her seven-day mission to the Mir space station, was a collaborative effort between British companies and the Soviet space agency. While aboard, she carried out scientific experiments and chatted with British schoolchildren via a radio link.

Today, Helen works in the chemistry department of London's Imperial College, and still gives talks and takes

part in events to inspire others about space exploration and science in general. 'We should push forward not only our own individual boundaries, but also the boundaries of what humans believe is possible,' she says.

Women are still pushing those boundaries. Experienced US astronaut, Sunita Williams – only the second woman to take command of the International Space Station – is due to make another visit there as a crew member on the inaugural flight of the new Boeing Starliner scheduled to launch later this year. Dubbed a 'space taxi', the Starliner will eventually offer seats to space tourists – provided they have around £40 million to spare.

ROCKET SCIENCE

Space travel may be limited to the few, but opportunities in the wider industry are endless, says Kathie Bowden, who promotes skills and careers at the UK Space Agency. 'It's not just about firing pieces of high-tech kit into space, it's about interpreting all the data we get from them.'

There are almost 5,000 satellites orbiting the planet transmitting communications signals, operating GPS systems and enabling us to monitor an array of things, such as the environment and climate change. Many female engineers and scientists already work in space-related fields, but still more are needed, says Kathie. 'Women bring a lot to the industry as they often work very well collaboratively. You need teams of people with different skills to build complex pieces of equipment. Women tend to be very good at that kind of teamwork.'

Sue Horne knows all about working in a team. As head of space exploration

at the UK Space Agency, she is responsible for setting UK strategy in consultation with scientists and industry, and representing UK interests at the European Space Agency. 'Space exploration is about exploring locations where humans may work and live, such as the moon, Mars and asteroids,' she explains.

LIFE ON MARS

A major project is the ExoMars programme, which will look for evidence of past life on the Red Planet. Fittingly, the surface rover due to be launched in 2020 is named in honour of Rosalind Franklin, a key contributor to the understanding of DNA. 'She worked in the life sciences and has been overlooked in the past, and we wanted to name it after a woman,' says Sue.

Has she ever fancied venturing into space herself? 'No, because I've been to a satellite launch where the rocket exploded, so being bolted onto one doesn't appeal,' she laughs. 'But I've been on a parabolic flight where you experience zero gravity, and that was



amazing. It's like that feeling you get in your stomach when you go over a road bridge in a car, but it goes on for about 30 seconds. That was a job highlight, along with being awarded the MBE for services to space. And I have to give the Clangers a mention. I knit them for a bit of stress relief – and they've become agency mascots. I have a picture of Tim Peake on the International Space Station with one of my Clangers.'

Some think space exploration is a waste of money, Sue says, but it inspires the next generation of scientists and brings benefits worth 10 times the money spent in terms of medical and technological spin-offs. And then there's the big question: is anyone out there? 'If we find evidence there's been life on Mars, it will fundamentally change our perspective on things. We're starting to understand that where there's a star, there's likely to be planets and, if we find life in other places in our solar system, it has to be occurring elsewhere.'

Plans are taking shape for a human mission to Mars in the next 20 years, and there are sure to be plenty of female astronauts up for the trip. As Helen Sharman says, 'If I knew I could return, I would do it in an instant.' Before too long there may be a footprint on the Red Planet, and this time it could be that of a woman.



Marking the moon landing

Fiftieth anniversary events include:

- the Moon Festival in London from 19-26 July, involving art exhibitions, music and science talks. www.moonfestival.co.uk
- a series of events throughout the year at Jodrell Bank Discovery Centre

in Cheshire, including the 'One Giant Leap' talk especially for groups. www.jodrellbank.net/moon-landing-50th

- a talk by Helen Sharman at Birmingham Town Hall on 22 June. www.thsh.co.uk