

Question 1:

Dear Cheap Astronomy – How bad is gender bias in space

In a perfect world, special consideration of women in space would be unnecessary. There would just be consideration about generic humans where we might ponder a range of physical differences. So, for example, the shortest astronaut in space was Peggy Whitson, at 1.6 metres, the first female commander of the International Space Station and the tallest astronaut was Jim Wetherbee at 1.93 metres, who flew the most space shuttle landings, five. The youngest astronaut was Gherman Titov at 25 years old and the oldest astronaut was John Glenn at 77 years old.

But since we don't live in a perfect world, it is the case that women are substantially under-represented in the astronaut population, making up around 10% over the history of human spaceflight, though things have been improving with women making up around 30% of active-flying NASA astronauts right now. The gender bias somewhat arises from child-rearing where the average age of flying astronauts is around 38, so mothers tend to be disadvantaged in the very competitive world of astronaut career advancement should they choose to take some time out. That's the only issue though, women and men have had children after flying to space. Various early concerns about menstruation needing gravity to work came to nothing – after all it's not like women stand upright 24 hours a day. If there were ever any equivalent concerns about men's sperm losing their way in microgravity, these never got much attention. Men and women's plumbing differences are largely irrelevant – early on women managed to adapt to toilets primarily designed for men – and nowadays there is an essentially unisex toilet aboard the ISS, with no particular reason for there having not being one before.

To be fair, the initial US push to get astronauts into space was gender-biased with a purpose. By ensuring that astronauts were military personnel and quite often test pilots, it meant they were people who already had a higher than average likelihood of dying at work. That said, the Russians seemed a bit more relaxed about it all, flying both Valentina Tereshkova in 1963 (two years after Yuri Gagarin) and Svetlana Savitskaya in 1982 before Sally Ride from the US went up in 1983. Over the course of the astronaut age there have been 19 fatalities in flight, 15 US and 4 Russian, with 4 (all US) being female. This is all tragic, particularly losing the first teacher in space, but none of these deaths, male or female were absolute show-stoppers. So, just because something's dangerous, doesn't mean you should just send men.

And a quick aside here, did you know about the Fallen Astronaut installation on the Moon? In 1971, the Apollo 15 crew dropped an apparently-unauthorized plaque listing the fourteen US and Russian astronauts that had died up to that time. The installation includes a 9cm aluminum astronaut figurine lying prone on the ground amongst astronaut footprints in the lunar soil.

So, while human beings may be tragically flawed, they still do occasionally shine and all the gender discomfort is just dumb-stupid Earthling stuff. Since space exploration seems the best answer to our ongoing existential dilemma about what should we do next, we should also be aiming to accommodate the whole of humanity in our space travel plans.

A March 2019 plan for the first spacewalk to be conducted by two women had to be canned, because there weren't enough small size spacesuits to accommodate both women. There is a reason for this insofar as space suits are expensive so limited stock means the majority will fit an average sized person. But this exemplifies the whole gender bias issue. If most of the available space suits are too big to accommodate the female crew, because most spacewalks are done by men, then most spacewalks will continue to be done by men. This is just a failure to address the requirements of 50% of humanity. As it turned a two women spacewalk did go ahead in October 2019, where a subsequent female crew member was able to wear a medium sized space suit. The next generation of spacesuits planned for the Artemis missions are expected to be more accommodating of different sized people and will hopefully get the first woman on the Moon. It's about time.

Question 2:

Dear Cheap Astronomy – Can you, you know, get it up in space.

In terms of the sheer mechanics involved, the key point here, at least for the male half of the equation, is whether can you get it up in space. This is not to discount the vitally important role played by women in the overall transaction, but if the guys can't get it up, the rest of the process does become a bit problematic. Of course there are a wide range of health issues that may contribute to erectile dysfunction, back on Earth, but what we're asking here is can the various alpha males who pass all the vigorous physiological testing required to get on board a rocket actually get it up when they are up.

However, put this issue and see if you get anywhere. I mean, come on, seriously, some guys have spent more than a year in space and no-one's ever thought to ask, umm... so, you know, when it's all quiet and dark and everyone else is asleep and your mind starts drifting from your mission priorities, have you ever, you know? And here we are going to keep on saying, come on.

The mechanics of sperm production are pretty much unstoppable and all those sperm have to go somewhere. And here we don't doubt the men and the women who have flown in space are all extreme professionals and for the most part had committed relationships with partners back on Earth, so it's not likely there's never been an episode of genuine hanky panky up there. But, again, all those sperm have to go somewhere. So guys, come on, you're up there for a year or more and OK maybe it's never really quiet or dark and it's never the case that all the crew are ever asleep at the same time. But, even then after a year of snuggling into your vertical sleeping bag with an eye mask and noise-cancelling ear buds – surely there are some times when it's quiet and dark and your mind starts drifting from your mission priorities...

If it is actually true that no male astronaut has ever had a moment of earnest and rhythmic unprofessionalism in the privacy of his own sleeping bag, isn't that a bit physiologically remarkable and maybe worth a scientific paper or two?

In the absence of any reported data, we can at least ponder the mechanics of it. Your body's health and integrity depends up on maintaining sufficient blood pressure so that blood can flow through all your tissues to deliver oxygen and remove waste products, including carbon dioxide. In microgravity, you do get by with a bit less blood pressure since your cardiovascular system doesn't need to work as hard to push the blood through your vascular circuit against gravity. But here we are talking 10 or 20 millimeters of Mercury lower pressure. Even in microgravity, you still need a fair bit of blood pressure.

So when it's dark and quiet and your mind starts drifting from your mission priorities, it's very plausible that certain arterial valves could relax open, allowing blood to rush in, while other venous exit valves might tighten to slow the blood flow out then what was a previously limp appendage suddenly makes itself known. So, since you retain enough blood pressure in space to perfuse your all your other body tissues, it hard to see why microgravity could substantially affect a male person's ability to, you know.

And if microgravity did have an effect? Or it initially it didn't but later it did, that should give some important insight into how microgravity affects the performance of your vascular system over time, not to mention a much more specific type of performance. Isn't this an important bit advice for a male astronaut embarking on a two year mission to Mars. Er, by the way, when you get back.. mmm, nuh.

So come on guys, how about it? Given the preponderance of male astronauts isn't time someone owned up in the name of science? Even if the answer is nope never done it, or that we discover nine of 10 male astronauts do and the other one's lying, all that is data. So, come on guys, it's time to stand tall and just put it out there, can you or can't you in space.