



INTERVIEW WITH DR SIAN PROCTOR –  
SPACE X ASTRONAUT

## Bathed in ‘Earthlight’, bathed in hope

*During this past Women's Month in August, the US Embassy in Pretoria hosted SpaceX astronaut Dr. Sian Proctor as the US State Department Science Envoy for Space to give talks on the civil use of space, and to inspire young girls to pursue careers in STEM and STEAM. Dr. Proctor was the pilot for the crewed SpaceX Inspiration4 mission, marking several historic firsts as the first artist selected to be an astronaut, the first female commercial spaceship pilot, the first African American woman to pilot a spaceship, and the first African American astronaut to paint in space. Quest was invited to an exclusive interview with this incredibly inspiring scientist, artist and astronaut – asking her about her travels, her art, and her hopes for humanity in collaborating to overcome challenges like Climate Change. Here is the full interview transcript.*

Click [here](#) to see a video where Dr Sian Proctor reads her poem “Earthlight”, describing her experience of seeing the Earth from orbit.

Click [here](#) to watch a full interview with Dr Sian Proctor that was recorded by the SABC during Proctor's visit to South Africa.

**Welcome to South Africa! Can you give us a brief background of who you are and why you are visiting South Africa?**

Hi! I am Dr Sian Proctor and I was the mission pilot for Inspiration4, the first all-civilian mission to orbit. In 2021, I became the first African American woman to pilot a



Dr Sian Proctor during the interview.

spaceship when I flew to space on a SpaceX Dragon rocket and spent three days in orbit. I am currently in South Africa as a US State Department Science Envoy, as part of a tour to visit different countries and talk about civil use of space, and hopefully to inspire young girls to pursue their dreams of becoming scientists or astronauts. I am really honoured to be here in South Africa and to share my space story.

**You are a geoscientist, but your art is what helped you win the prosperity seat on Inspiration4. What inspired you to create the Space2Inspire art brand in the first place?**

"Space to inspire" just sort of became my motto. As I got older, my childhood dream of wanting to be an astronaut continued to grow inside me, basically. I came up with the motto, "Space to inspire" just about a year before the global pandemic hit. It is my way of thinking about not just about *outer* space, but really the physical space that you inhabit, the space that makes you you. In other words, it's about how you can use your individual space to inspire others.

I thought about my career as a teacher and wanting to be able to motivate students and people that I come into contact with. When I can share my stories about using my own 'space to inspire', whether that's by going on geologic adventures or learning new things creatively or even going to space, then I'm hoping that that inspires others to think about their unique space and how they can use it to inspire.

**What did it feel like to paint in orbit?**

I was really nervous! It was only during the COVID-19 pandemic in 2020 that I became a space artist and poet. It wasn't something that I was doing regularly before. When we are in confined situations, we often need to tap into our creativity because that's something that you can control. It's something that can inspire you. During the pandemic, we saw people becoming bakers, and picking up musical instruments, and doing all kinds of things that were creative in order to get through that situation. And for me, it was art and poetry. So I became a space artist and poet. And then, nine months later, that won me a seat to space!

When I knew that I was going to space to spend 3 days there, I specifically asked SpaceX if I could paint in space. At first, they were a little hesitant, but luckily, there was a precedent. Nicole Stott, who was a NASA astronaut, had painted in space with watercolours many years ago. So I used her as an example and SpaceX was like, 'Ok, yes. Let's do this!'.

They helped me to create a beautiful watercolour kit. From a technology standpoint, we had paintbrushes that were pre-filled with water. So now you can buy paintbrushes, especially watercolour paintbrushes, that you can actually load water into. We had a whole set of them, so that made it easier for me because I didn't have to deal with water floating in space. I could simply take these paintbrushes preloaded with water, squeeze them,

and the water would come out onto the bristles, and I could swirl it into the watercolour paint. Surface tension would enable it to stick to the brush and to transfer the paint to the canvas. So I had a much easier time, I think, than my predecessor, Nicole, because the technology had advanced. So it was easier than I thought it would be to paint in space, but on the other hand, you're really nervous that you're gonna mess it up!

You only have one shot to draw and paint in space. You wanna make sure it turns out good, and luckily, it turned out okay. There is video footage of me painting in space, so you can watch it online.

### What was the most surprising aspect of space travel for you personally?

Hands down, the most surprising aspect of space travel was me discovering something new for myself, and that was 'Earthlight'. That's a term I didn't know before I went to space. I discovered earthlight by being up in the cupola, this giant window that SpaceX built for us, and you could float up into it. And through this window, you could see the Earth. But what I realised while I was there was that I was basically being bathed in Earthlight and just being illuminated by our home planet. It is just stunningly beautiful.

As a geoscientist, I knew that the Earth had a high reflectivity, but I never learned this term 'Earthlight' before seeing it. As an artist I was able 'to see the Earth not just from a scientific perspective, but also from an artistic perspective. I was able to be there and say, "Wow!". Earthlight is something amazing and beautiful, and it's something that other people need to know about. So I came home and told myself I was going to bring Earthlight down to Earth, and I wrote a science book titled *Earthlight*, and it just came out last month.

### How did you personally experience the changed perspective of what astronauts call the Overview Effect and being "baptised in Earthlight"?

The Overview Effect was coined by Frank White, who actually wrote the foreword to my *Earthlight* science book. I knew about the Overview Effect before going to space and when I came back home, I was so happy because I was like, "Frank, I think Earthlight is a big component of the Overview Effect!". And he was like, "Oh, I never thought about that".

To help people relate to this, you can think about moonlight and the fact that when a full moon is rising and people step out into moonlight, it impacts them. I mean, we have love stories and love songs and werewolves and all kinds of history and lore around moonlight. And the amount of lumens [brightness] in moonlight is way way less than what you get in low earth orbit from earthlight.

So when we're talking about that transformative experience and how you are changed, I think the fact that you're literally getting, you know, radiated by all of that energy from the Earth onto your face and body, you cannot but help be transformed in some way. And that degree of transformation really depends, I think, on how open you are to the experience. For me, I came back and I realised that I don't look at our planet the same way.

Now when I see colour and look around me, I think more about the fact that we live in a world of reflected light. The reason why we see colour is because of the materials and properties that are generated by the Earth. And that is all Earthlight. It wouldn't exist if it wasn't for the Earth. When you step outside and you think, oh, I'm stepping out into the sunlight, you're actually stepping out into Earthlight. Without Earthlight, life wouldn't exist. As soon as sunlight hits our planet, the atmosphere takes that full electromagnetic spectrum and strips it down and changes it. The Earth transforms it through reflectivity, through absorption, and scattering, and as a result of the Earth changing the sunlight, it takes away a lot of the harsh deadly stuff that would kill life, and makes it so life can actually exist and thrive. We wouldn't exist without Earthlight.

### What do you think the commercial space race means for humanity?

The commercial space race is opening up access to space for individuals that have not had access to human space exploration before. Not only as an astronaut, but also increasing the global demand for things like satellites in space, opening up access to space entrepreneurs and innovators etc. The space industry is, I believe, worth around \$500 billion right now, and it's trending towards \$1 trillion by the end of this decade. And that's mostly driven by commercial exploration and startups. That is exciting because it means that we now have this new kind of economic space engine that's happening. And as a result, we will see how 'solving for space' is also 'solving for Earth'. As we drive humanity to the moon and on to Mars and then hopefully beyond, we are going to be creating all of this new technology, new innovations, new ways of doing things, but we will create all of that here on Earth. That technology will spin off to make us more efficient here globally. So I'm looking forward to the new ways.

We don't know how to live on the moon and sustain ourselves there right now. We know how to visit the moon, but we don't know how to live there. And in order to live on the moon, we have to be efficient in food, water, energy, shelter, resource management and waste management. What do we have problems here on Earth with? Food, water, energy, resource management and waste management. And so that's why 'solving for

space' is so important to solving problems on Earth. In order for us to become more sustainable, we need to go and push humanity out.

**Why do you personally think JEDI (Justice, Equality, Diversity and Inclusion) space is so important?**

JEDI space is, to me, the ultimate goal. A just, equitable, diverse and inclusive space for all of humanity. I grew up watching *Star Trek*. "Jedi" may be a *Star Wars* acronym, but it is a *Star Trek* thing. It's about us all going *together*. It's about opening up access and saying, yes, let's go and explore the stars, but not as individual nation states – as Earth's people, together, as humanity, as the human race. I want to see that *Star Trek* generation out in space. But really, it is, again, about making us better here on Earth first. How do we create a JEDI space for our families, for our communities, for our work environment, globally here on Earth? One of the pathways to do that is through space. What I mean by that is, you can look at the International Space Station (ISS). We have people from multiple different countries living and working and thriving right now in low Earth orbit on the ISS, and that's a great model for the future.

**As the first African American woman spaceship pilot, what would you like to say to Africa's young women and girls interested in space science, or science, technology, engineering, arts and mathematics (STEAM) careers?**

To all of the young women, and girls here in South Africa who are thinking about space as a career, first, I want to say to them that they can absolutely follow in my footsteps. I might be the first Black woman to pilot a spaceship, but I will not be the last! And the key to following your dreams and making them into a reality is thinking again about your own 'space to inspire'. What are you passionate about? What can you continue to develop and foster and share with the world? I wouldn't be where I am if I didn't share my creativity. I told people that I wanted to be an astronaut, and I wanted to go to space, and people sent me an opportunity because they knew that's what I wanted to do. There are people out there that will help you pursue your dreams and help you make them into a reality, but you need to be prepared. And you do that by being an explorer. An explorer is simply somebody who learns something new for themselves every day.

So constantly explore your knowledge and the world around you, every day. Be an explorer, but also be a modern day renaissance woman. My callsign is Leo. The reason why my crew members gave me the callsign Leo is because they consider me to be a modern-day renaissance woman. I combine both art and science. So keep in mind that there is science in art, and there's art in science. If you're pursuing your science career, don't forget about the arts because without creativity and imagination, we wouldn't have innovation. We

need to be able to dream up possible solutions to very complex problems, and you do that by tapping into your creativity. So be both creative and innovative.

**You advocate for freeze-dried food in your TED talk to "Eat like a Martian", to ship nutrients rather than water, and to buy locally. Do you think freeze-drying is a cost-effective option for African countries as well, in terms of food security?**

I absolutely think that freeze-dry technology is a solution for any country globally to think about in dealing with food insecurities. Food is nutrients and water, and we spend a ton of energy shipping both of those around the world when we should really just be shipping the nutrients without the heavy and energy-expensive water, so we can leave the water at its source.

A lot of people buy frozen fruits and vegetables. Why are we freezing fruits and vegetables instead of freeze-drying them? Think about blueberries, for instance. Blueberries might be picked somewhere around the world, and when they are picked, we will actually take time to freeze those blueberries. And once we freeze them, we have to transport them globally in that frozen form. Think about how heavy water is, and think about how much energy it takes to refrigerate something from the point when it's frozen to then distributing it to its store. Then when we go and we buy it, we bring it home, and we have to freeze it again. So there's a lot of energy stored up in that frozen food where we could just freeze-dry it at the source and then ship just the nutrients. It's lighter, it's shelf-stable, and now you're taking all that extra energy and weight out of the transportation and storage system. When it comes to food insecurities, freeze-dried fruits or vegetables or meat are right there when you need them. It's shelf-stable, and all you have to do is rehydrate it when you need the food. Or you can just pop it in your mouth and eat it, and your mouth will rehydrate it! So it can help with global food waste and insecurities. It doesn't mean replacing fresh food. It's really about how can we improve the food value chain.

It is more expensive to freeze-dry than to simply freeze, but it is not more expensive when you look at the whole food distribution network. You put in the energy at the beginning, but then you get all of those cost savings along the entire distribution chain where you don't have to transport and keep frozen any water.

**As a geoscientist, what do you think are the most promising solutions to Climate Change and sustainability?**

I'm gonna say the most promising thing we can do to deal with Climate Change is to globally work towards the Artemis project and the Artemis Accords of going back to the moon. Because again, as we solve for space, we will solve for Earth as well. All the problems

SpaceX



The SpaceX Inspiration4 crew: Dr Sian Proctor, Jared Isaacman, Christopher Sembroski and Hayley Arceneaux.

associated with living on the moon, you know, energy, water, resource management, shelter, all of those things contribute to global Climate Change here on Earth. If we can figure out efficiencies to be able to do it right on the moon, it's the spinoff technologies that are really going to make us more sustainable down here on Earth. I can imagine us coming up with new energy solutions for the moon that can be applied here on Earth, or water recycling, mineral extraction, off-Earth manufacturing and sustainable resource harvesting etc.

**There's so much negativity around Climate Change, and the current projections are not looking great. What do you think are reasons to stay hopeful?**

A great reason to stay hopeful is the youth. Today's youth are much more environmentally conscious, which means there are increasingly lots of smart people working on technologies and solutions.

I'm an optimist, so I'm definitely hopeful. I was just at the 2024 Breakthrough Energy Summit, which was started by Bill Gates and hosted this year in London. And seeing all of the new technologies and the spinoff ideas around ways of reducing our carbon footprint in agriculture, energy, distribution etc. really gives you hope. I see all of this emerging technology and people doing amazing things and thinking very creatively for solutions. It gives me hope that we are going to solve this crisis before we come to a tipping point.

**South Africa has a young space programme (SANSA), but has a rich space history through the Hartebeesthoek relay station (used by NASA), various astronomical observatories, Mark Shuttleworth being the first space tourist, building many homegrown nanosatellites (not to mention producing Elon Musk) – what do you see in South Africa's space future?**

The biggest thing that I see in South Africa's space future is 1) being a big part of the Artemis program by helping with the tracking of the Artemis crew and spacecraft, which is worth celebrating. And 2) working towards an African astronaut corps and thinking about who is going to be the next person to follow in Mark Shuttleworth's footsteps. Hopefully, a woman of colour – I would love to see that. I can't wait to see who from our youth will become South Africa's first 'Afronauts'.

Since we've just celebrated Women's Month, can you finish the sentence, "When a woman packs her bag..."

When a woman packs her bag, it actually isn't about material things that she's taking with her. It's about how she became who she is, and how she's packing herself on a unique journey of discovery. Women have a lot of determination and grit and resiliency built into their makeup. That is what we, as women, pack with us as we take on challenges in our lives.

*Article written by Dr Fanie van Rooyen, Editor.*

Nwedzini wa vha fumakadzi wofhiraho nga thangule, US embassy fhala doroboni ya pitori, ho swielwa Vho Dokotela Sian proctor vhane vhavha space x astronaut khala south Afrika Vhodo vha na nyambedzano ya mathakheni. Vho Proctor ndi mufumakadzi wa uthoma uvha commercial spaceship pilot, mufumakadzi wauthoma murema uvha mission pilot na astronaut. Vho amba na nga u endela mashango mavho, na zwa arts na fulufhelo kha vhuthu na u shumisana u fhenya dzinwe dza khaedu dzinonga u shanduka a mutsho.

Translated into TshiVenda by Tshauambea Ramukumba