

When it Mattered

Episode 5: Shawna Pandya

Chitra: Hello, and welcome to When It Mattered. I'm your host, Chitra Ragavan. On this episode we will be talking to Dr. Shawna Pandya. She's a Canadian physician, citizen scientist, astronaut and aquanaut, and pilot in training. She's a martial artist with a black belt in Tae Kwon Do, and she also practices the Thai martial arts, Muay Thai. Dr. Pandya currently serves as the life sciences team lead for the Association of Space Flight Professionals, and she's the life sciences chair for the Canadian Space Society. Dr. Pandya holds a bachelor's degree in neuroscience, a master's degree in space studies, and a medical degree. She's licensed as a general practitioner and is an accomplished public speaker. Dr Pandya, welcome to the podcast.

Shawna: Thank you so much for having me.

Chitra: I believe you fit the definition of a polymath, one who excels at many things. How old were you when you began to define your goals and ambitions?

Shawna: I was always an ambitious kid. When I was four, I wanted to be a superhero, or a Transformer, and save the world, and fight crime. And then I realized that that's not something you could actually go to school to do. And so I set my ambitions a little bit lower, and said I'm going to be a billionaire, and I'll be the world's richest person, and use my wealth to solve all the world's problems. And that was when I was seven.

Shawna: And then I realized that you can't exactly go get a degree in billionaire-ologies. So then I set my sights on the next ambition, which was becoming an astronaut and going to space. And that really set the trap for everything that came next, especially in my adult life as in my professional career. And so everything I did as a child, whether it was what I was reading about my homework assignments, it was all about going to space and becoming an astronaut. And that laid the foundation for my professional life.

Chitra: You were an avid reader, and you said it caused your mom a little bit of concern.

Shawna: Yeah, that's a really funny story. So when I was in the second grade, I loved reading. All I would do would be reading. So at recess, regardless of whether it was the middle of winter, or rain or shine, I would just have a book, and I would just read in a corner to the point where my teacher called my mom about it. And one day my mom was listening to a child psychologist on a radio talk show, and they were talking about problems with raising children. And my mom called into this child psychologist, and she said, "My kid reads too much. What do I do about that?" And that was kind of emblematic of the kind of child I was.

Chitra: Was there a moment when you realized your passion for space?

Shawna: I think it was always a fixture for me growing up. Some of my fondest memories are camping with my family, going to these beautiful locations, away from city lights. Just seeing the dark night sky and the stars leap out at you. I remember on one camping trip when I was seven, it was the Leonides meteor shower, and all we did was stay up till 2:00 AM watching shooting stars through the sky. And it was just this wonderful moment where you're truly aware of how beautiful, and mysterious, and big the universe is.

Shawna: My childhood was peppered with experiences like these. I grew up in the 90's when we had several Canadian astronauts fly as shuttle astronauts. And so in commemoration, Canada Post, our version of the US Post Office released these commemorative little brochures that were really interactive.

Shawna: They were holographic, and they'd pull out some popups, and they were all about space. They were all about facts of our solar system. What is the length of the day on Jupiter? What is the density of Saturn? How much would you weigh on Mars? And I was just obsessed with it. And so anything that was related to space always leapt out at me during my childhood. I can't say that there was one defining moment.

Chitra: But you also wanted to be a neurosurgeon. You had kind of these dueling ambitions. How did you end up reconciling those two, and then making both your dreams come true in the end?

Shawna: Yes. So actually my dream to be a neurosurgeon, fed directly off my astronaut ambitions. And so I was a huge fan of Dr Roberta Bondar, the first Canadian

woman in space. And I modeled a lot of what I did after what she did. And so I looked at her and checked those tick boxes. So I said, she's Canadian, I'm Canadian. She's a female, I'm a female. She was a Girl Guide, I'm a Girl Guide. So the next three steps are become a physician, become a neuroscientist, and become an astronaut.

Shawna: And so that's what led me to do my degree in honors neuroscience. And then what led me to want to be a physician. And I knew she was a neuro ophthalmologist. So I said, okay, I'm going to be a neurosurgeon. And so through my high school years, I was obsessed with becoming a neurosurgeon. And to the point where my high school yearbook is littered with comments of, "I hope you'll be a great neurosurgeon one day." And, "If I ever see a two for one lobotomy deal, I'll know it was you." Just fun comments like that from my friends. And so for me that was actually not a dueling ambition, but a stepping stone to the path of being an astronaut while also bringing in my love for medicine. And so that was how that ambition fit into my overall career path.

Chitra: I've been rewatching the TV series Mad Men, and the office manager in it, Joan Holloway, says to the copywriter, Peggy Olsen, in words to the effect that you have to take a job and make it yours. And it sounds like that's exactly what you did. You kind of created your own dream job.

Shawna: Yeah. If you told me as a child the path that I would've followed, and the things I guess do today, they've surpassed even my childhood ambitions and dreams. That everyday just keeps getting better and better. And so, to kind of continue the story, for a while these ambitions were at odds, and then they were complimentary.

Shawna: And so going into neuroscience, my ambition was always to get to medical school, but I never truly forgot the space dream. And I would always look for opportunities for internships and further education opportunities in space. And when it came time to apply for medical school, after my senior year, I realized that I wasn't guaranteed a place in medical school. I knew incredible candidates with perfect resumes, perfect personalities to be a doctor, perfect GPA's, who weren't even getting interviews.

Shawna: And I thought, what can I do if I don't get into medical school that I would spend a year doing and I would be equally happy about what I'm doing. And so I had always known about something called the International Space University and they had a masters program. So I applied to medical school and the master's program in the same year. And to my surprise, I got into both.

Shawna: And that was the beginning. Because I couldn't really forget about this space path. And I talked to the Faculty of Medicine, and I was so lucky. They were so supportive, and they encouraged me to defer admission for a year. And that was the start of everything that came next. So I was lucky enough to intern at the European Astronaut Center Crew Medical Support Office as part of that. I Wrote some papers on telemedicine and medical technology spinoffs from space that have benefited medicine on earth. I attended conferences.

Shawna: And all that made me a competitive candidate for my next opportunity, which was an aerospace medical elective at NASA's Johnson Space Center, which is the most fun you could ever imagine. It was like Disneyland for space nerds. And it was just everyday was this incredible adventure.

Shawna: And so coming full circle, we started talking about neurosurgery. After I finished medical school and all of these wonderful experiences, I came back to my neurosurgical dream, and actually landed a residency spot as a neurosurgical resident. And for a few years, I trained at this. But the fact of the matter is nobody wants a distracted brain surgeon. And I couldn't quite forget about my space dream. And again, it came to making a key decision.

Shawna: And so ultimately I left neurosurgery, which was a bit heartbreaking at the time, but also led me to the path where today I'm a licensed general practitioner, and I am a citizen scientist astronaut candidate with Project PoSSUM, which we can certainly talk about. But to have at least trained in neurosurgery, to have been part of brain surgeries for a few short years was just an awe inspiring incredible experience. And medicine, will always, it makes me grateful at least for the good that we often take for granted like good health and full mobility and having independence. So it was an incredible journey that I could've never imagined.

Chitra: Before we get to some of the cool stuff you've been doing in space, I just want to say, in my introduction, I didn't even get to the part where in addition to all of what you've just described, you've co-founded a startup, you've completed emergency spacecraft and sea survival training, wilderness medical training. You have certifications in solo skydiving, open water, Nitrox, and rescue diving. You speak numerous languages. You even sing and play the piano. How do you get it all done? To many, what you're doing is something they could aspire to, but never accomplish. Just the sheer effort of it. What does it take to pull it off?

Shawna: I think it's easy to get overwhelmed when you list it in a laundry list like that, but the fact of the matter is I'm not jumping in a plane, then jumping out of the plane, then going to the OR, and then delivering a baby. And then having a full day at the hospital, and then speaking Russian and Spanish and Hindi, and then going to a skydiving trek, all in the same 24 hours.

Shawna: We all have the same span of hours available to us into a day. We all have the same 24 hours available to us. And it matters, what you get done, is a function of how you prioritize. And so I like to say there's a season for everything. Even if you're a star varsity athlete, and you play soccer, and football, and baseball, and softball, and badminton, and tennis, and volleyball, you're not doing all of those sports in the same day.

Shawna: And maybe there's seasons that overlap, and maybe there's times that are more busy, and more stressful than others. Certainly there's times when some things will take priority over others. And so there's been times that have been incredibly busy in my life. I remember the summer and fall of 2016 were particularly busy as there was the Canadian Space Agency astronaut selection, my medical licensing exams, I was trying to get hours on my flying up, get more diving certifications, skydiving certification. But also train for the World Cup of Tae Kwon Do. And it was incredibly busy time.

Shawna: It came down to prioritizing, and also at times saying, okay, of all of these things, if something has to give, what will that be? What are my priorities? And then you just have to accept that. So the other way I like to navigate my life is by maintaining what I call is a rate of scan. It's a principle I picked up through piloting, and skydiving, and scuba diving. But it's the same principle as if you're driving a car.

Shawna: And that principle is that you're always scanning between the road ahead of you, your instrument dashboard panel and your rear view mirror. And the point is you're trying to see where you are now in relation to where you want to be, and where you've been since. And so goal setting is much the same. So you have your overarching goals, where you want to be in 10 years, for example.

Shawna: And then you reverse engineer your immediate term, your short term, and your intermediate term as well as your longer term goals based on that. And then you just scan between your immediate term goals, what you're going to do today versus your shorter and intermediate term goals to see what your progress is in relationship to your longterm goals. So that's kind of how I

navigate my life. It helps me stay focused, and also it helps me gauge my progress at regular intervals.

Chitra: Your dream is to combine your medicine and space knowledge to further research in space medicine, including studying how bodies are reacting in a completely different environment from the earth, and to keep humans healthy and safe. And you're part of numerous projects as a citizen astronaut to do just that. Can you talk about a couple of those projects, PoSSUM and PHEOM among others?

Shawna: Yeah. And so I am currently a citizen scientist astronaut candidate with Project PoSSUM. And in the space world we love our acronyms. And so PoSSUM stands for Polar Suborbital Science of the Upper Mesosphere. So just to take a step back, we've all heard of governmental space agency astronauts like NASA astronauts and Canadian Space Agency astronauts.

Shawna: But as commercial space progresses, as we talk about going to space, a suborbital flight with Blue Origin, for example, or Virgin Galactic, we're also talking about on a philosophical level, opening up access to space to far more people. And so the obvious implication is tourism. But the second implication is what kind of science can you do with that kind of access? And so Project PoSSUM aims to take citizens who are passionate about space, who may not necessarily have trained in aeronomy, or study of the upper mesosphere, to take them on a suborbital flight to conduct science in that medium.

Shawna: And so that's where the moniker citizen scientist comes from. So all that means is that you're contributing to science in a field outside of your own expertise. And so coming back to the mission of PoSSUM, it started off wanting to study noctilucent clouds in the upper mesosphere. And so these clouds are thought to be a marker of climate change. But they're relatively new in the atmospheric records. The earliest records in indigenous people tracking and charting of the upper atmosphere and clouds, the meteorological phenomena tends to be in the late 1800's.

Shawna: And now we know that these clouds are becoming more prevalent, they're appearing more frequently, and they're also descending to lower latitudes than before. Whereas previously they tended to be very polar. And so the thought is they tend to be related to climate change, and that they may be occurring more frequently because byproducts of methane admissions form a layer of ice crystals that high in the mesosphere causing super cooling and ice crystals that form around this water layer creating these cloud phenomena.

Shawna: And so the mission started off with sending up scientists to get high resolution video, photography, atmospheric samples, thermal samples to just to gather more data about something that's a relatively new occurrence in the meteorological record. Since then we have branched out to tests spacesuits IVA or Intra Vehicular Activity spacesuits in zero G. I was part of the first crew to test the commercial space suit in zero gravity. We've tested the spacesuit in emergency spacecraft landing scenarios.

Shawna: And I've got to bring my own expertise to the project. I'm the chief instructor for operational space medicine where we challenge our students to think, and act, and triage in resource limited environments, to make decisions in critical situations, and also push the boundaries of design based on what we know about human space missions and EVA, or Extra Vehicular Activity.

Chitra: So are you on track to become a full fledged astronaut?

Shawna: That is my hope. So with Project PoSSUM, we're at the mercy of the commercial space flight industry. So as soon as those companies start to fly, that's when we can aim for a spot, and aim for some science payloads and science experiments aboard one of those vehicles. So basically this has been a burgeoning industry. Some of these companies have been around since the early 2000's and have increased their testing and their readiness for space. Many of them are already selling tickets for space tourists. And so, our hope is that following the suborbital path, we can send citizen scientist astronauts to space above the 100 kilometer line where space begins.

Chitra: I'm sure this year must have particular emotional resonance for you as we celebrate the 50th anniversary of the Apollo 11 Moon landing, which captured global imagination and opened up a new frontier of space. Can you talk a little bit about what it's been like for you to relive the Apollo legacy, and to realize that you are a leader in this next leg of the journey into space exploration, and what that exploration is shaping up to be?

Shawna: Being alive in the era of the 50th anniversary of the Apollo Moon landing is like being part of a springboard into the future. And so it's been an incredibly busy few weeks being part of these celebrations, talking about what we've achieved, talking about the history of space flight. But also extrapolating on the future, and talking about the future that we want to see.

Shawna: And so it's been inspiring to look back at what we've achieved and celebrate that, but it's also been equally or more inspiring to use this as a springboard to

say what comes next. And the future of space flight is incredibly exciting. We talked about the commercial space flight industry with suborbital vehicles. We're now talking about a new Moon rush, or return to the Moon. NASA has announced plans to land the first female on the moon by 2024. And Canadian Space Agency will be a partner in that with the Lunar Gateway.

Shawna: And it's an incredible time to be looking forward to the next 50 years. We've talked about Apollo in the past 50, and now NASA is talking about Artemis, the twin of Apollo, but looking at bringing women to space, to the Moon. And so imagining the future of space, imagining what happens when you make the space more accessible to all, imagining the possibilities that can stem from that. It's an incredibly exciting time. And to be part of it is magical.

Chitra: And now with Silicon Valley becoming more and more involved in space travel and space exploration, we know it's already opening up the next frontier for exploration with Jeff Bezos' Blue Origin, or Richard Branson's Virgin Galactic, just to name a couple of them. So where do you see that going? And of course you've got SpaceX with Elon Musk. So how is that all going to impact the future?

Shawna: So I think the implications come back to a bigger philosophical question. And that's, what happens when you empower people? What happens when you give them platforms? And I think that the short answer is we open up our advancement and our progress as a species. What happens when you've give people Internet access? What happens when you let anyone be a broadcaster on YouTube? We've seen the explosion of education, of things we know, of things we teach.

Shawna: And so extrapolating that to space, what happens when space becomes accessible to all? What happens if you make lower earth orbit and suborbital space easily accessible? Not just to scientists, and engineers, and pilots, and traditional astronauts, but what happens when you open that up to artists, and entrepreneurs, and athletes? What will follow from that?

Shawna: You have Elon Musk with SpaceX proposing to land humans on Mars in the next decade. What happens when we send wave after wave of people to become the first settlers on another planet. So it's a time for ambition. It's a time for dreams, but it's also time for pushing the boundaries of our technology to achieve those dreams. And it's anyone's guess as to what will happen next. But the cool part about being alive in a day where we're as

empowered as we've ever been, is that we can be a part of this. And we can architect the future that we want to see.

Chitra: In addition to being a citizen astronaut, you're also an aquanaut. Can you talk briefly about what that means, and some of the work that you're doing in the ocean?

Shawna: Yeah. So right now I am an honorary aquanaut, or aquanaut candidate. And by the end of this year I will be a fully fledged aquanaut. So if you have spend 24 hours in saturation, you get your aquanaut designation. So I recently completed a hyperbaric and dive medicine course with the World Extreme Medicine Organization. And that took me to Aquarius Reef Base, which is one of the world's only, if not only, under sea research laboratories.

Shawna: This is where NASA runs its NEEMO, or NASA Extreme Environment Mission Operations missions. So they send astronauts under the sea for up to 16 days at a time to run science and conduct work under the water. And so as part of this course, I got to spend a night underwater at the Aquarius Reef Base. And it was the most incredible experience. You're in this habitat and there's Goliath Groupers and schools of fish just swimming by your window. And you just can't tear yourself away from the ocean outside.

Shawna: And it was indescribable, indescribable, how cool it was to be in that environment. And so I'm actually going back, not to Aquarius Reef Base, but to the Jules' Undersea Lodge, also in the Florida Keys, later this year to partake in my first underwater mission. Over five days where we'll be doing science and testing technology payloads underwater, and working with the Coral Restoration Foundation to look at science related to coral preservation. And that's where I'll get my aquanaut designation.

Shawna: And so to me this is incredibly exciting to be an explorer, not just in space, but in the ocean as well. And for those who wonder, what's the connection between space and ocean exploration? We actually know more about the surface of the Moon than we do about our oceans. We have more data looking at the geography and the geology of the Moon then we do of our oceans. We've only mapped 5% of the oceans to date. And we have put more men, 12 people, on the Moon that we have sent to the deepest part of the ocean at the Marianas Trench where only four people have walked before.

Chitra: That's incredible. In addition to space and medicine, you have also a deep interest in martial arts. You've been practicing Tae Kwon Do for 17 years.

You're a second degree black belt. And you've also competed in a world Tae Kwon Do competition as a member of Canada's Tae Kwon Do team. And you recently also won your first amateur Muay Thai competition, which is the Thai boxing martial arts in Thailand. Can you describe what drew you to that, and what it has taught you fighting in that competition?

Shawna: Yeah. So I have been in Tae Kwon Do for 20 years now. And that was part of a childhood ambition that I'd set up for myself that I am going to get a black belt in something .and that something ended up being Tae Kwon Do. And for a lot of the people, the concept of a black belt is an achievement in and of itself. But for anyone who stays in any martial art for an extended period of time, a black belt is a license to learn at a whole new level. It's the equivalent of going from your private pilot's license to your commercial. It's the equivalent of graduating from medical school to residency. You're in a whole new ballgame. So I never truly realized what competition, and what a cognitive and physical game it is to compete as a martial artist until I reached the black belt level.

Shawna: And it's very humbling. Suddenly where I'd been medaling... at every tournament, I was at a color belt. There would be times when you walked away medalless regardless of how much time you would put into training for a competition. So Tae Kwon Do has taught me so much about physical prowess, about discipline when it comes to training, and about creating a community that's inclusive for all, and that empowers anyone, whether they're man, woman, child to compete at their best performance.

Shawna: Muay Thai is something that I've always been interested in, that I dabbled a little bit here and there while I was in Canada, and then finally had the opportunity to go to a Muay Thai fight camp for the first time in 2015. And just train like you've never trained before. You train for two hours in the morning, train for two hours at night, you go swim a few laps in the pool in between. You're walking to and from your hotel to your treatment camp. You're doing this all in 36 degree Celsius heat, which is something ridiculous like 96, 98 Fahrenheit. You're sweating buckets. And you're just really pushing your limits.

Shawna: And so I did that for three years consecutively. And the last time I was there, there was the opportunity to fight in my first amateur Muay Thai fight. And as they say, when in Thailand, when in Rome, you may as well. And that was something I never saw coming. But that was just an experience unlike any other I've ever had.

Chitra: How challenging was it, and what did you learn from that experience?

Shawna: Sure. Yeah. So that experience taught me so much. And so, they try to match you evenly by weight to my skill level. But the only other girl who had signed up for the fight was this German MMA and boxer lady who was skilled. I would watch her in class. She had some good techniques. She outweighed me by 35 pounds. But I went into that fight thinking it's not just... the mentality in which you take to your fights, or even to your life really gauges how your outcomes turn out.

Shawna: And so I initially went in thinking, how do I survive this? And then I thought, no, how do I win this? I don't want to leave anything on the table. And as skilled as you can be as a fighter, it's not just about who's the most skilled fighter. It's about who wants it more. And who's the best fighter that night. And it was a harrowing experience. Some things didn't go right. My contact lens was punched out in the first 30 seconds. So I was kind of fighting without any depth perception, which tends to be pretty important as it turns out in martial arts.

Shawna: And they promised us, regardless of the outcome, whether it was win, lose, or tie, after three rounds, they would call it. And so I gave it everything I had. I had no gas left in the tank. And at the end of the third round, I felt my hand go up. And then I saw her hand go up. And it was a tie. And I thought, okay, well at least I fought as hard as I could. And then the crowd started chanting, "One more round. One more round."

Shawna: And they took it to a fourth round, despite everything. And I thought, at this point it was just an effort to bring up your leg to kick, or bring up your arm to punch. And I thought, okay, you know what, at least I'm just going to go out with a bang. And I ended up winning that fight. And it was just all about all that training, all that discipline, all about saying, I will leave nothing on the table. And it was just an incredible push yourself kind of experience.

Chitra: That's an amazing story. Thank you so much for sharing that, and for joining me today. Where can people learn more about you?

Shawna: So if anyone wants to find me, they can find me on Twitter @ShawnaPandya. S-H-A-W-N-A-P-A-N-D-Y-A. That is also my Instagram handle. They can also find me on Facebook, Dr. Shawna Pandya, and I will look for you there if you have any questions, or just want to connect, come say hi.

Chitra: Well thank you so much for joining me today. It's been a real pleasure.

Shawna: Thank you so much for having me.

Chitra: Dr. Shawna Pandya is a physician, speaker, citizen scientist, astronaut, and martial artist. Thank you for listening to When It Mattered. Don't forget to subscribe on Apple Podcasts, or your preferred podcast platform. And if you liked the show, please rate it five stars, leave a review, and do recommend it to your friends, family, and colleagues.

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