

161. Lana Cannatella: The Moon, Mars, and Beyond

Gavin Kelly 00:18

Hey everybody! You're listening to Beyond 1894. This is the official podcast of Louisiana Tech University. My name is Gavin Kelly from the Office of University Communications, and we are joined for this special episode by Louisiana Tech graduate Lana Cannatella. She is a two-time degree holder from Louisiana Tech, and she is currently working as a biomedical flight controller at NASA. So you know, just an everyday casual job like a lot of us have. She's currently in the middle of a special campus visit, so we're happy to have her. And Lana, we appreciate you making time for us today.

Lana Cannatella 00:49

Yeah, thanks for having me. I'm excited.

Gavin Kelly 00:51

So this is your first time on campus since when?

Lana Cannatella 00:54

Well, I come to campus occasionally since I have a few friends here, but this is my first time touring the building and seeing the faculty, so it's been a really sweet visit.

Gavin Kelly 01:02

Very good. And you are on day two of your visit. Yesterday, you got a chance to do a special talk in the engineering building. Tell us about what that was like.

Lana Cannatella 01:12

Wow, it was a fantastic turnout. I was so excited to see all the students. Excited about space flight, and there was a lot of engagement. We, I just shared a little bit about what I do and about some of the ways that students can look and use their degree towards helping the space industry, and it was a really great turn on. Glad everyone showed up.

Gavin Kelly 01:33

Good. Yeah, I heard it was standing room only, so I had to keep bringing chairs in. That's good. So yeah, we. I should mention too that this interview is partly in conjunction with the latest edition of 1894 magazine, our alumni magazine. The feature story for that is about some of our Louisiana Tech alumni who work at NASA and are you know doing things that are smaller pieces and smaller cogs in the giant wheel of these big overarching projects. And you were one of the featured alumni in that story. So you and I have had a chance to talk a little bit in preparation for that story, but we're going to kind of rehash some of that here. First of all, you mentioned in your talk yesterday you spoke to students about you know ways they can utilize their degree in positions at a place like NASA and you know space exploration and space flight. Talk to me a little bit about that now. What are some of those things that you mentioned yesterday?

Lana Cannatella 02:28

Yeah. So the biggest thing that I was benefited by was the connections that I made here. So students in classes having connections that have connections and also being recommendable, so just because you have connections doesn't mean that you are someone that someone would want to put their career on the line to recommend. So both of those things have helped me get to the career that I have today. But say you want to be in space flight and you have no connections, nowhere to start. My advice was to take some of the projects that are built into your curriculum, if you're in engineering, the freshman design project or your senior design project, even your technical writing topics, and start looking at ways that engineering can help solve the problems of space flight. So, I gave some specific biomed examples with the physiology things that astronauts experience, but there's all sorts of disciplines that are going to be needed to solve some of the future space flight problems. So, if it is something you're interested in, building your resume towards that goal is probably the first step in your career.

Gavin Kelly 03:34

Very good, thank you. Yeah, we mentioned too in the magazine that obviously engineering and science programs tend to turn out the most NASA likely graduates, but like even business, you know, one to two of our business alums work at NASA. So there is a need for all disciplines to be working in harmony when it comes to space exploration and the projects that NASA is working on. We're going to get into a little bit of that with you here in a minute, but let's talk about you know we're talking about engineering and kind of discovering how your interest and your expertise works with something as large as NASA. But you know, you told me previously that early on you kind of didn't discover engineering as an academic route for you until late. So talk to me about you know growing up and discovering the things you were interested in, and then figuring out that oh, engineering is kind of how these things all work together, and that's what I want to pursue.

Lana Cannatella 04:28

So I was always a huge nerd. Math and science were super interesting and super fun. I loved doing fun science experiments, and I loved bothering my parents with asking why 1000 times to get to the root of something, but I really didn't know how those fit. I didn't have anyone in engineering in my life that I could look up to or explain what the career does. And so, when I got to high school, I was still struggling with what I wanted to pursue as a degree and a career. I knew I loved math. And I, when I took my first anatomy and physiology class, it blew my mind to understand how the body worked and the intricate ways that all of these systems came together, and and how they worked in harmony. And so I didn't know how to reconcile those things. So that I loved math and that I loved anatomy. And so when I was expressing these things with my mom and mulling through what I wanted to do, she told me, "Well, why don't you look into biomedical engineering?" I was like, "I had no idea this path even existed." It's a little bit more well known now, but at the time it was still pretty new, and I had never heard of it. So when I started researching, it also blew my mind that you could design things to help people, and I realized that was my ultimate goal to help people and make this world a better place. So when I initially went into the degree, I was assuming that I would design or help implement medical devices, and that was a super fun path that for me that I was going to take. And the more I learned about that, though, it started to slow down some steam when you realize that you can work your whole life on one medical device and never see it come to fruition. That's still an amazing career, but for me, I felt like I wanted

the the churn of operations and something that would really keep me stimulated. So then, I pivoted with my master's to get more into the project management side and operations, and making things more efficient, so that we could constantly be bettering a process and changing and improving, and keeping that stimulus there. And hope my my hope with that was still medical device companies, but having a little bit more stimulus in the operations side. But then turns out that was not the path that I ended up on. So when I, one of my good college friends got a job at NASA, he was posting about it on Instagram. Super pumped, and I messaged him on Instagram like, oh, that's so awesome! Congratulations. Let me know if they're ever hiring. NASA's cool, and turns out they were hiring. And so it's funny how it works out. I didn't know this was the path that I was on, but my career still was preparing me for operations in biomedical engineering, just in a completely different, unexpected route.

Gavin Kelly 07:21

Yeah, very good. Well, let's talk about Louisiana Tech for you a little bit. So, you know, Louisiana Tech has a little bit of a reputation as an engineering school with you know kind of a world class series of engineering programs here. So, I think when you decided on biomedical engineering, that was part of the reason that tech was appealing. But talk to me first about you know why tech was the right choice for you, and then talk about how tech, you know, the program, the faculty, the the things you did here, how that prepared you for the career you have now.

Lana Cannatella 07:47

Yeah, absolutely. One of the things that really drew me to Louisiana Tech was the curriculum in your first year. A lot of schools and engineering programs, you're getting a foundation of these math and sciences, but here you go through this initial year where you're hands-on with a Bobot or hands-on with a freshman design project, and you really get to experience engineering in its full capacity from very early on, and get a taste of what your career might look like or what you can do with this. And I found that so interesting, and it really sparked a love for the field early on, instead of having to get three years in and not know whether it was something I wanted to do. So when I chose this degree, going into Louisiana Tech, I had never really experienced engineering. So that freshman year was helpful in understanding. Yes, this is what I want to do.

Gavin Kelly 08:39

Yeah, as you're going through and like realizing this is what I want to do, how is sort of the tech experience and and the faculty here helping you prepare for that?

Lana Cannatella 08:50

Oh, they're amazing. They're so approachable. The classes are small. We're smaller, so that

Gavin Kelly 08:54

yeah,

Lana Cannatella 08:54

you had the ability to raise your hand and ask questions right then. They had office hours that were with doors always open, you could go ask questions. There were, and in the community with it, with a class size being smaller and not just this huge auditorium, you get to know your classmates, and then you

develop those connections, not just for the purpose of your career, but for the purpose of making sure you can pass a test or get a homework done. You know, leaning on each other was really important for my career to take each other's skills and weaknesses and share the wealth.

Gavin Kelly 09:28

Yeah, and what were some of those? You know, you mentioned kind of the hands-on learning part of it and the projects that you're kind of able to get into early on, and then all the way up through your graduation. Talk to me about some of those projects and kind of how they've affected you still today?

Lana Cannatella 09:41

Well, freshman year, I specifically remember doing the Bobot where you code with our an Arduino and make this robot run this course, and I found that so fascinating. I had never in my life coded or done any sort of wiring and. It was so fun to get hands on and also troubleshoot a code and for hours just to realize you missed a semicolon. But it was rewarding, and and I didn't know I was building those problem solving skills. And then when you're freshman design project, you get to take any real world problem and try to make it better. I selfishly picked that I struggled to wake up for 8am. at the time. So don't we all? So I ended up making an alarm clock you stand on to turn off, and then when you stand on it, it starts your coffee pot, which was silly, but also it was so fun to take a problem that I experienced and try to make their world better, it was getting to that deep desire of wanting to help people, even if it wasn't this like grandiose medical device thing at the time. It was something tangible and fun that kept building that love for engineering. And then my senior design project, I ended up having to do two because we initially didn't get enough data set for the our initial project. We were wanting to quantify the depth of anesthesia with EEG signals, and we were working with a neurosurgeon in Shreveport to do that. During epilepsy surgery, they place electrodes on the brain. They turn them on quickly during surgery to make sure they work, and we had the neurosurgeon keep them on so that as they woke up throughout anesthesia, after anesthesia, we were seeing if we could quantify the depth. But at about December mark, we only had two patients, which is not enough data to build a whole senior design capstone project. So I remember staying here with my team over winter break and pivoting, so we I ended up doing one and a half capstone projects, but we pivoted to a retroactive seizure detection algorithm because at the time neurosurgeons would have to take time to go line by line through EEG signals and say yes, this is the part where a seizure is, and so it was, but throughout my career, taking those little projects and building and learning things to make the world better, that was super rewarding.

Gavin Kelly 12:08

And where is the stand on the alarm clock and make your pot of coffee now? Do you still you still use it? I do not. It was not

Lana Cannatella 12:15

loud enough. I couldn't figure it out. Interesting. Yeah.

Gavin Kelly 12:17

Well, you might be onto something if it. You might want to patent that if this if this gets out, so you know, we we're kind of beating around the bush a little bit, but we're we're talking about kind of the the

things that all pointed you in the current direction of your career, and you're at NASA. How long have you been at NASA, by the way?

Lana Cannatella 12:34

I've been there five and a half years.

Gavin Kelly 12:35

Okay, clearly you love what you do, and I think too that we're going to get into this, but you know, you mentioned picking your major and following through into the career because you want to use your expertise in engineering to help people, and I think there are lots of ways that you're able to do that at NASA. So let's talk about like the very start of your time at NASA and what that was like, like the gravity of I'm working at NASA. Did that wear off quickly, and it was like, let's get to work. Was it? Oh my gosh, this is dream come true for a lot of people, and I never saw myself here. Like, what were those early days like? The

Lana Cannatella 13:13

early days were. I look back with so much joy because I was just in awe that I got to work at NASA, and not just NASA, but I get to work at Mission Control. On my first day ever, my mentor was giving me a tour of all the facilities, and we got to Mission Control. And there's a viewing room behind it where a guest can kind of just look overlook the the room. And he looked at me and said, "Hey, this is gonna the excitement's gonna fade. You know, it it is a job. You get paid to be here. You're not doing it for free, but never forget that people vacation to come watch you work. And that that's a perspective that I still think during to this day. When I'm sitting in Mission Control and maybe I'm having a rough day, you can hear little kids tapping on the glass, and you turn around and wave at them, you know. It's it's such a rewarding job to like everyone's excited about space flight. It's one of the government agencies that we're we're all just pumped for as a nation. And yeah, it's it's super fun. It's super exciting. No days are the same. And so those early days, I was drinking from a fire hose, trying to learn all of the information, you go through this extended kind of course period when you first get hired, where you're taking tests and making sure you pass for the sake of your job, though instead of a degree at this point. So it's a little scary, but it it sets the foundation of everything you need to know to be able to do the job, and it was so fun.

Gavin Kelly 14:44

Yeah, I think just by the very nature of I work at NASA, like that's it's a as you said, it's kind of a unifying government agency. In fact, the the magazine story puts a little bit of an emphasis on the Artemis project because it's relevant from the past year. The spring of this past year, and it's kind of one of those things where you know a rocket is getting launched into space, and astronauts are going to be in space, and that gets the world's attention. But it's kind of like the Olympics; like everybody rallies behind something like that. And I think too, it there's a quote from you from our phone interview for the magazine where you said that something like that put a spark in the culture of NASA, and I think that that's a really great way to put it. And again, kind of a rallying thing that no matter what your job is at NASA, because we'll talk about this too in a second, that even if your job is not a direct line to Artemis, you know, the things you're doing and the things you're working on are going to have an effect on these bigger projects. So, kind of getting everybody pumped about the same thing is what these big projects

tend to do. But also, it's the result of the work of a lot of smaller teams and a lot of smaller projects that are all building towards again going deeper into the realm of space exploration and space flight. So, let's talk about your work. So your work primarily supports the International Space Station, right?

Lana Cannatella 16:06

Yes.

Gavin Kelly 16:07

So talk to me kind of about what your job looks like and and the sort of things you do.

Lana Cannatella 16:12

Yeah. So there's kind of two layers to my job. There's the on console and off console. So when we're on console, that is sitting in mission control, and we are responsible for the crew health hardware that is on the International Space Station. There's three different categories of hardware. There's the exercise equipment. There's the environmental equipment that monitors and makes sure the environment is safe. And then there's just the health maintenance system, which is kind of the catch-all for all the other medical equipment used for diagnostics or treating anything that were to happen on orbit. So we are the owners of all of that hardware. There's a lot of maintenance that that hardware needs, and there's also planned activities where we're checking that the astronauts are doing okay health-wise and monitoring any sort of space flight symptoms that they might get, or and making sure that they're not getting any sort of space flight symptoms. So it keeps us busy and it's super fun. Then when we're off console, we are subject matter experts for a piece of that hardware. So we're responsible for writing the procedures that the astronauts will perform. We're responsible for helping schedule the maintenance, and yeah, attending meetings, working with hardware engineers and different international parties. So keeps us busy. Yeah,

Gavin Kelly 17:30

and you're you're responsible for you know kind of the safety and the the health of people on ISS, but also eventually the astronauts that go even deeper into space, right? Because a lot of the technology that you're working on and the the products, if you want to call them that, projects that you're developing are going to be tested on ISS first, right? And then eventually, maybe deeper in space flight. One thing that you've talked to me about, it's mentioned in the magazine, is e4 D, which has taken up a lot of your work over the last few years, talk to me about that.

Lana Cannatella 18:02

Yeah, so I started working on E4D when I was hired. It was still in the development process. It's a the European Enhanced Exploration Exercise Device, and so it is in collaboration with our international partners, the European Space Agency, also known as ESA. They own and operate the E4D device, and NASA owns and operates the vibration isolation system that it sits on. So we work in collaborate close collaboration with them to make sure that the crew members can exercise and that the vibrations of the exercise are isolated, so that the space station doesn't get knocked out of orbit because $F = MA$, right? If you're importing a force into the space station, which is in a vacuum with no returning force, it's going to get knocked out of orbit. So we have a vis that isolates those, and it's also then a collaboration of NASA astronauts and also our international partner astronauts that are exercising on

this, so we make sure that we are keeping our crew members safe and healthy. So it's a fun joint project.

Gavin Kelly 19:12

And you mentioned to me again, going back to kind of the connectedness, the connectedness of all of these NASA projects. You mentioned that in earlier stages of E4D, you attended testing, and one of the astronauts that was there with you at the time testing was Luca Parmitano, who has since been announced as a pilot on one of the coming Artemis projects. So, talk to me about you know what it's like to work with with astronauts that closely, and what it's like to see, you know, again a full circle moment where these big overarching world attention grabbing projects are are occupied by people who you've worked with.

Lana Cannatella 19:52

Yeah. So e4 D is the newest exercise hardware we are introducing on the International Space Station, and we've had. Kind of a set suite of those for a long time, so it's already new and exciting to introduce a new piece of hardware. But this device is intended to help solve some problems that we're already anticipating for exploration. So this device is smaller, it's more compact, and it has multiple modalities. So you don't need this full suite of exercise hardware. You just need this one thing, so we don't have to have multiple modules for exercise. We just need this one space for this one thing. So it is a test bed. The ISS is a test bed for exploration and making sure that this device can provide exercise for the Moon, Mars, and Beyond. And so it was. It's kind of full circle that I got to work some of that testing in Denmark with Luca, who is now going to the moon and enabling the organization to go to the moon Mars and beyond. It's it's it's really rewarding.

Gavin Kelly 20:53

When when projects like that take years, you know how do you how do you stay in it? How do you kind of keep checking yourself along the way and and pushing towards the goal of you know completion because I'm sure those you know deadlines change and and as you work on projects and hardware and things that are involved, especially in the realm of biomedical engineering, where you know human lives are a part of the the result of these projects. You know how do you how do you keep yourself in the middle of all that and keep your head down and keep working?

Lana Cannatella 21:24

I think that's the fun of operations, right? Where it's where it's constantly changing, and and sure that can be frustrating, but it's also exciting because no days are the same. So I've got to see this piece of hardware from the development stages. I got to input comments into the designs to make it to try to make it better with my knowledge of what I knew of the other exercise hardware at the time. Then once we got past the design phase, and once things are being developed and tested, we got to see impacts of that testing. And oh, maybe this the the for the vid specifically, there were some issues, and so now we have to write procedures and activities to help mitigate that. And it's constantly changing, and it's super fun to follow along on this journey and to know you're a part of it. So,

Gavin Kelly 22:12

yeah. Well, what's it like too, in in that same vein, to see something you've worked on, no matter how big or small, in orbit, and know that it's going to be used in space. Like, what is that like?

Lana Cannatella 22:23

It's incredible. And what was what was really exciting was me and my co-me's got the honor of getting to watch e4 D launch into orbit. So we were invited out to Florida and got to sit on on top of this building and watch it launch, and it was it was really cool. That was the first time I'd ever really seen even a rocket launch. And and knowing that something that you have invested five years in at the time, in it it was just it was beautiful. And then a few days later, we're back in Houston, and it's on board, and we're back to work. You know, getting it installed, and it was it was it's awesome,

Gavin Kelly 23:02

but you got to celebrate the victories too. Yeah, exactly. It also helps keep you going. Oh yeah. What has it been like for you? You know, coming from studying biomedical engineering and not necessarily knowing you were going to work at NASA and in space exploration and space flight to have now been doing that for a few years and learning and and seeing and doing so much in that very specific realm that also is captured a lot in pop culture. I guess my question is, you know, like movies and television that explore stories about space flight and space exploration. What has it been like for you working at NASA and kind of seeing these things, like like, are you a fan of movies about space? Has that changed for you becoming an expert in that realm, or what's different?

Lana Cannatella 23:50

Yeah, I love like Project Hail Mary was super great. You know, it's kind of funny. It it makes watching those movies a little bit different. Where like I know that it takes hours to get out the door before you go on a spacewalk, and and no movie, of course, you know that's not fun. Yeah. So there's little nuances like that where I turn to my husband and like that that wouldn't happen, and he's like, okay, enjoy the movie. But yeah, it is super fun because I I always loved space, and so that hasn't changed. But developing a deeper understanding and appreciation for it just makes me appreciate all of the love even more.

Gavin Kelly 24:30

So, what are some of those favorite space movies of yours?

Lana Cannatella 24:32

Yeah, Project Hail Mary was amazing, and really, Andy, anything Andy Weir writes is is incredible, and and obviously Star Wars is a classic. All those things, but

Gavin Kelly 24:43

yeah, I think I think to the significance of space as a topic, a backdrop, a setting in so many movies and television shows and books and just pop culture. Like I said, in general, it kind of speaks to what we were talking about earlier when a rocket gets launched into space and people are. Ready to go to the moon, the world kind of stops and pays attention for a second, and I think too in this in this modern culture of attention spans being shortened every day, it seems it's hard to get a lot of people's attention all at once like that. So the fact that a NASA project is one of the few things left, I think, that can still do

it. It's pretty special. So when kind of the world's eyes are on NASA for something like Artemis, for something like a rocket launching, what's it like for you to kind of exist as a fan, as a spectator? You mentioned getting to see e4 D launch to the ISS. When those moments come up and you get to kind of take it all in and separate yourself from the work a little bit, what is that like for you?

Lana Cannatella 25:48

Yeah, there's such a culture at NASA that like when one program wins, we're all winning. So though I don't have a direct hand in the pie of Artemis, kind of like you alluded to, it was such a win for the whole organization all around, and we felt that, especially on the ISS when our ops are continuous. There's always someone on the ISS, and the day to day doesn't stop. It it was cool to have that fresh breath come in and get everyone super excited about NASA. I we we don't touch the telescopes in my in my role, but even the Roman telescope that just launched. Super exciting to explore and get new pictures and learn more things about the vastness of space. So yeah, it's it's incredible to work for this organization and experience the wins that you might not even get to be a part of, but you can just feel.

Gavin Kelly 26:46

Yeah, and again, everything's connected, even by the smallest threads. It's kind of there's a greater mission at play at NASA, and typically all the projects seem to be working in harmony. So as you know, not not to get where do you see yourself in five years too much because I don't like that kind of questioning. But as you look ahead towards the the future of your career at NASA, what are some things you anticipate working on? What are some things you hope you develop as an expert in your field? Talk to me about that.

Lana Cannatella 27:20

Yeah. So right now I am a biomedical flight controller, and I'm also an instructor. So I get to help train our future biomedical flight controllers to be flight controllers, which is super rewarding because I had people that trained trained me, and so it's a full circle moment of getting to take the knowledge that they invested in me and then push that into the next generation, and as we're adding new hardware, as we're changing our day to day, our trainings have to change as well. So getting to be a part of that and developing those new trainings is super exciting. What's next after this? I'm not sure. I know the organization is doing some great things with our commercial crew, with commercial partners, with Artemis, with Moonbase, and beyond. So it's it's exciting to not know. It's exciting to be a part of an organization that's doing a lot and get to just kind of see what lies ahead, so I'm excited. Yeah,

Gavin Kelly 28:25

very good, very good. Yeah, it's it's one of those things where it sounds like you know you're you're being along for the ride is not so bad. Yeah, you know because it's gonna it's gonna take you to a special place no matter what. Early on in the podcast, you kind of gave a little bit of a recap of your talk yesterday and some of the advice you gave to the College of Engineering and Science students. I'm going to ask you a little bit similar of a question. So, as you look back at how you were pre NASA and the thoughts you had about, you know, well, Mission Control is a special place. Who works in Mission Control? That would never be me. And then here you are. So, when you think about somebody else out there who, you know, loves space or is interested in the idea of working in space exploration, and has a similar mentality of, well, that's you know only a handful of people get to do that in the whole world. You

know why? Why would I even bother going for it if the chances are so slim? You know, what would you say to a person like that who's got that on their radar.

Lana Cannatella 29:23

I'd say shoot for the stars. Like you are capable. If you put your mind to it and you work hard, you might have to try and try and try again. But be resilient. That's a fantastic piece of life, and also in your career, there things aren't always going to be on the straight path forward, but resiliency will get you far and setting yourself up for success. So, doing the things now that can make you a better candidate, that can stand out. Just research the job descriptions of what you want and. Tailor your resume to be someone that's marketable for that position. So,

Gavin Kelly 30:06

yeah, it can be done. It can be done. Well, again, I know that your visit here is keeping you busy, and you've got things to do. So, I appreciate you making time to be on the podcast. It sounds like we might have to have you back in a couple years or so, and talk about more of the projects you've been working on because it sounds like there's always something happening. Which it's NASA, so of course. Right. But again, thanks for making time for us here on your visit, and and keep in touch and and let us know what you're working on because it's it's very exciting. I'm I'm thankful that we were able to get connected and get you featured in the magazine story because I do think we even put a little editor's note at the end of the article that says, "If you know, we want to tell the stories of all of our Louisiana Tech alumni who who work at NASA and do these cool things." So, if you're listening and you happen to be one of those people, please reach out because we we again we like to share those stories. But Lana, yeah, we appreciate it, and thanks so much.

Lana Cannatella 31:01

Yeah, thanks for having me.

Gavin Kelly 31:15

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