



## **Episode 4: Jenny Gruber (ENG'99,'99), NASA Engineer**

Host: Jeff Murphy (Questrom'06), BU Alumni Relations

Aerospace engineer Dr. Jennifer Gruber (ENG'99,'99) uncovered her passion for space exploration at the age of seven and today, fulfills her childhood dream working at NASA's Johnson Space Center in the International Space Station Mission Control. Jenny shares insights from her remarkable journey and reflects on the importance of leadership, teamwork and problem solving when working in the realm of human space flight.

### **Podcast Transcript:**

**Jeff Murphy:** I'm Jeff Murphy from Boston University Alumni Relations, and I'm your host for an interview series showcasing the career paths of our most interesting and accomplished alumni. Welcome to the Proud to BU Podcast.

Today's guest is NASA aerospace engineer Dr. Jennifer Gruber. Jenny received her Bachelor's and Master's degrees from BU's College of Engineering. She joined me on the podcast to talk about her lifelong dreams of working at NASA and the role that BU played in making her dreams come true.

Jenny thanks so much for taking time out of your day to talk to us. I've been lucky to know you for a couple years now. You're really involved. You're one of the leadership volunteers for the BU Alumni Council. I know that BU has continued to be important to you and it's been great to get to know you and I'm really delighted to have this chat with you today. I know that you were born and raised in Omaha, Nebraska, right? Can you tell us a little bit about how you got from Nebraska to BU?

**Jennifer Gruber:** Sure. So Boston always intrigued me as a city because it's an incredibly intellectual place and I knew I would learn a lot there and there was some attraction to leaving home, because I'm an explorer and adventurer by nature. So, I looked at who had aerospace engineering programs in Boston because by the time I was a senior in high school I realized that's really, really what I wanted to do and there aren't that many accredited aerospace engineering programs. And, I could only afford to apply to two schools, so I applied to BU and MIT. And MIT rejected me and at the time it was very disappointing. I think I cried for like two hours. But turns out that was one of the best things that's ever happened to me in my life. Ending up at BU is really the right place for me for several reasons.

**Jeff Murphy:** So you knew for a long time, even as a kid, that you were interested in working at NASA or being an astronaut? In getting ready for our chat today, I googled you, which I hadn't done previously and I found a really fun press release from NASA from 2004. If you haven't googled yourself in a while...

**Jennifer Gruber:** [laughing] I bet the hair was probably great in the picture on that one.

Jeff Murphy: There is a good photo of you at a desk. Unfortunately, our listeners can't see, but google Jenny Gruber and see what comes up. But in this press release, and we'll talk about your time at NASA as a co-op, we'll get there, but you mentioned that when you were like seven years old you had seen the movie "The Rights" and from that point on knew that. Is that true?

Jennifer Gruber: It is and I got away from it a little bit because I faced discouragement. So, I grew up in a trailer park. I got free school lunch and people make certain assumptions about the potential of people at lower socioeconomic levels. So I did face a lot of discouragement in junior high and high school. But then again, by the senior year rolled around and I was in advanced placement physics and advanced placement calculus, and I started to realize what was out there. I got inspired again. It never really went away but I was able to sort of overcome all of the discouragement that I was facing and the micro aggressions and such and get back to it by the time I applied to college, which was a good thing. But that's part of why I'm so passionate about human space exploration because that inspiration I felt from these impossible missions that we do in outer space those were able to get me past some of that discouragement and get me on the right path.

Jeff Murphy: Well, it's fun for me to talk to somebody after doing a few of these interviews to find somebody who pretty early on in their life was inspired by a certain career path. And, I can't say for certain whether or not that's quote unquote unusual, but it's great to talk to somebody who's been so driven and so passionate about something for so long. So you get to BU from Nebraska and maybe it wasn't the way that you thought it might all roll out originally, but I'm thrilled to know that it was one of the best things that could've happened to you. Let's do the BU lightning round portion of the podcast. I want to talk more about your experience here with some quick questions. Where did you live when you got to campus? What was your housing like when you were living at BU?

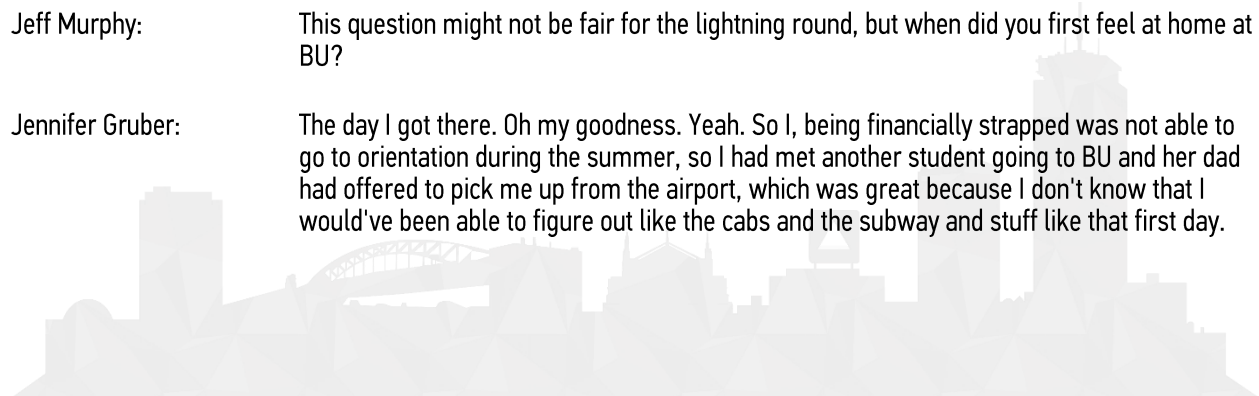
Jennifer Gruber: So I actually lived in Warren Towers, freshman, sophomore, and junior year. I was on co-op when the housing selection happened prior to my junior year. So I was in Warren Towers for three years and then bay state road for my senior year.

Jeff Murphy: Okay, were there favorite hangouts you had on campus? Maybe places you liked to eat, near restaurants or things that stand out as being kind of iconic to you about that time?

Jennifer Gruber: I was so poor [laughing] that I didn't really eat out. I had my meal plan which was covered by financial aid. So, not really restaurants, but I did have iconic activities that we would do, so I was on the gymnastics team and that was a big deal for me. And then also I had friends, we would just go rollerblading around Cambridge and then back into town down by the Commons and all that. And, I remember that as being really fun and then just, this is funny, but MIT fraternity parties, there it is. I'm putting it out there. We did a few of those because you know that girls always get into free or things like that. So yeah, just really seeing Boston, was very exciting for me and even when I go back I find ways to do that. Just getting out in Boston.

Jeff Murphy: This question might not be fair for the lightning round, but when did you first feel at home at BU?

Jennifer Gruber: The day I got there. Oh my goodness. Yeah. So I, being financially strapped was not able to go to orientation during the summer, so I had met another student going to BU and her dad had offered to pick me up from the airport, which was great because I don't know that I would've been able to figure out like the cabs and the subway and stuff like that first day.



But once he dropped me off, I'm on my own 1500 miles from home, knowing nobody, my roommate didn't get in until two days later because she had been at orientation. But I just went exploring. I went down to the GSU and I just walked around campus and just immediately was excited and comfortable being there.

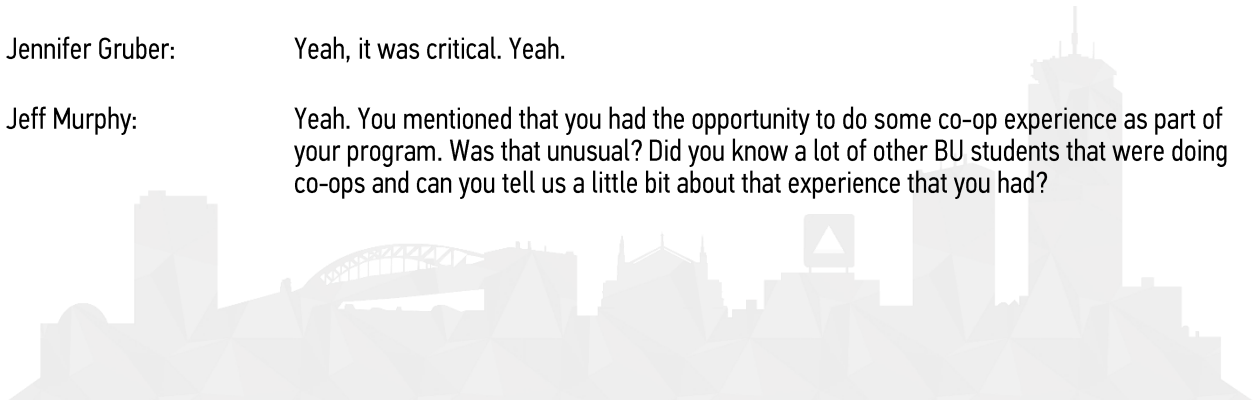
Jeff Murphy: That's awesome. That's great to hear. And I'm sure the orientation folks want to package up that soundbite and share it with people who might be interested in coming to BU. [laughing] So outside of life at BU, let's dive into your academic experience here. You're pretty driven, you arrive on campus pretty much knowing what you've wanted to study your whole life, are there classes or professors that still stand out to you as being really crucial to your experience here?

Jennifer Gruber: Yeah. So the across the board, the thing with the academics, with the classes that really stands out is this encouragement to think on a deeper level and to drive equations from first principles and such. So in this day and age, I see a lot of superficial thinking. I see a lot of chucking numbers into software and trusting something to come out correctly instead of figuring out what's inside the black box. So I really appreciate that. The problem solving, the deeper thinking were encouraged in every single class. As far as professors, the ones that stand out the most to me as somebody who is coming from a lower socioeconomic background and being female in engineering, there still weren't a lot of those. I think the College of Engineering is now up to 33%, which is fabulous compared to a lot of other schools. But it's not 50/50, so at the time I think there were four of us ladies in aerospace engineering in my class and so I really appreciated professor Sheryl Grace, who's still there, who was a great mentor, in addition to a great professor and willing to talk with me and commiserate with me about some of the things that women face when we're in this male dominated profession. And then I also remember professor Bethune, who was our introductory engineering class professor and he taught cad. And I remember him finding out that I didn't own a computer like everybody else in the class and so I was only able to work on my projects during the hours that the computer lab was open and a teaching assistant was watching it and he appreciated that I was still getting my assignments in on time, but he thought it was unfair. So he managed to change my access so that my id could get me in 24/7 and I wouldn't have to worry about a TA sitting there which put me on a more of a level playing field. And I don't even know if I ever visited after hours, but the fact that somebody was willing to step out and say, "I know you're having a harder time than everybody else and I still want you to do well because I see you working hard." Like, that really meant a lot to me. I think that people who are in situations where they might feel like "other" can get discouraged and then are less likely to be successful. So a couple of people reaching out to me and reminding me that at BU we encourage people to be part of the group and we don't like "othering" people and I saw that in-person and that helped me a lot.

Jeff Murphy: You had told me that story previously and I'm really glad you shared it today because it's an awesome thing to hear about. I think people have these misconceptions about going to a university as large as BU, but here you are coming from 1500 miles away and feeling at home immediately and having people who are looking out for you. It's a really awesome thing to hear about.

Jennifer Gruber: Yeah, it was critical. Yeah.

Jeff Murphy: Yeah. You mentioned that you had the opportunity to do some co-op experience as part of your program. Was that unusual? Did you know a lot of other BU students that were doing co-ops and can you tell us a little bit about that experience that you had?



Jennifer Gruber:

In College of Engineering it's really encouraged and this is one of the things, when I tell the story about how I got rejected from MIT, this is one of the things I bring up. So first of all, the encouragement that I got personally and the fact that professors had office hours that they actually went to and they would make appointments with me if I had class during their office hours and all that stuff. I usually bring that stuff up as being different from other sort of technical institutes, if you will. But also, BU has a cooperative education program and not every university has that. I would not have had access to that had I gone across the river. And I'm a big, big fan of cooperative education. At NASA, we call them pathways interns. I strongly recommend that people take that route if they're still undergrad. We also do have some grad co-oping, so that's an option. But it's a great thing to get real life job experience it. You take time off of school, but you can maintain your full time student status, you don't have to worry about your financial aid and you basically work full time for usually a semester at a time. But I actually moved down to Houston for a year and they let me do that because it was going to be financially prohibitive for me to be flying back and forth and trying to. I didn't own a car in Boston, but you have to have one in Houston. So trying to lease a car for a few months at a time, it's pretty much impossible, but I was able to do it for a year, but I always joke that I got, not only my current job at NASA because I was a co-op, but also my Rhodes scholarship and a husband. [laughing] Because I met my husband while we were there. We were both co-oping starting the same semester and we've been together, I don't know, 21 years or something now. And also, I got a great recommendation from one of my bosses there that I think was critical getting me an interview for the roads.

Jeff Murphy:

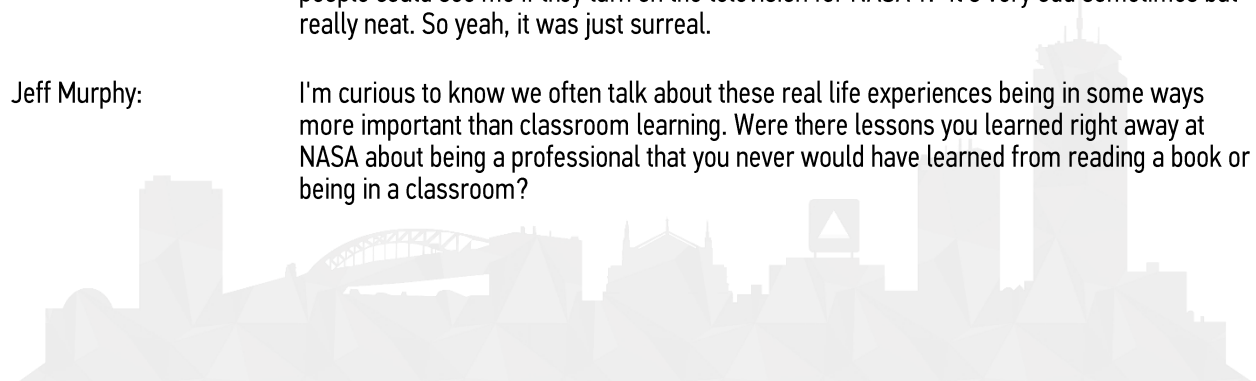
So back to your undergrad day, and I certainly want to talk more about you being a Rhodes scholar and your time at Oxford and things like that, but as you're telling me about the co-op experience and knowing that you sort of grew up with this idea of being an astronaut since you were seven years old watching the right stuff. What was it like when you landed that co-op experience and you found yourself, you were at the Johnson Space Center. How did that feel as a junior at BU? What was that like?

Jennifer Gruber:

Yeah, I would have been starting my junior year if I had been at BU at that point. Yeah. So you roll into the main gate at NASA and there was a Saturn V laying on its side on the front lawn and a couple of other rockets but Saturn V is really massive. And, the first time I rolled in there and rolled past that and I'm going to the security building to get my badge. I was just like, I can't believe I'm here. This is unreal. And then one of the first things you do as a government employee, even as an intern is take the oath to protect and defend the Constitution. And I remember that being particularly powerful and when I came on full time, they had us do it again and it just really hit me. I'm actually doing this and that first co-op tour was in the area where they work on simulators, so I got to see all the cool stuff with the buttons and switches and meet astronauts and all those things. And NASA is also very supportive of the co-ops, so we had a lot of neat tours and we're able to talk to old flight directors like Gene Kranz. If you've seen "Apollo 13," you know who he is. The center director would come and talk to us sometimes. So we had all these neat opportunities and just were really welcomed there. But I still every now and again wonder whose life I'm living because it's pretty amazing. I mean day to day I'm kind of in the grind, get my job done, but every once in a while I'll sit back and go, "I am sitting in mission control and people could see me if they turn on the television for NASA T." It's very odd sometimes but really neat. So yeah, it was just surreal.

Jeff Murphy:

I'm curious to know we often talk about these real life experiences being in some ways more important than classroom learning. Were there lessons you learned right away at NASA about being a professional that you never would have learned from reading a book or being in a classroom?



Jennifer Gruber:

Right. So, at BU we were encouraged to do team projects and presentations and things. So on the surface I think it does great job of preparing you to go out and be a professional engineer. I think the biggest surprise for me is the unwritten rules that are in the workplace. And things like micro aggressions and subconscious biases. When I first got to NASA, those were my first opportunities to see those things in action and really feel those. And all of a sudden sometimes what people are saying in English isn't really what they mean. The English words aren't really what they mean. So that whole indirectness and unwritten rules and this concept of subconscious biases, micro aggressions, that was really the first opportunity I had to feel those. And they're real. And those things can be discouraging. I think the other thing that happened on co-op was I got way more motivated to go back to school because I had been to the mountaintop and seen the promise land. I realized that there's a job that I would work where instead of the 70 to 80 hours I would be spending on work at school. I'm only having to work 40, maybe 50 hours a week and I don't take homework home and I'm working on space stuff. So it was just really motivational.

Jeff Murphy:

So you finished at BU with some real life experience, a Bachelor's degree and a Master's degree. At what point does Oxford come into the picture?

Jennifer Gruber:

Oh, yeah. So, I'm going to ask you to indulge me because this is one of my favorite stories. So I had this 5 to 10 year plan. And, I think it's important to have the 10 year plan so you have a target, but I always tell people don't get stuck on a 10 year plan because if you're aiming towards your target and you've got one path and there's a couple of turnoffs be willing to examine the forks in the road and be willing to potentially deviate from what you thought your 10 year plan was. And if you don't have a 10 year plan, that's all right, hang out, something is going to come at you. And this is a perfect example of this. So I was going to work for NASA full time and get a second Master's in geology. I had this whole thing going and when I was gonna apply for astronaut selection, all this stuff. And junior year, I realized I didn't have enough money to pay for my senior year and financially it wasn't going to cover it. And I was kind of maxed out on loans and my parents were not in a position to be able to take out loans. So I applied for this scholarship called the Melville. And the Melville is one female at BU and there's a variety of criteria for academics, character, all this and it pays full tuition. But if you apply for that, you don't get it, you can still get a little bit of cash. And that's kinda what I was thinking was going to happen. I thought, "Oh, I'll apply for this. And if they don't give it to me, I can at least say I tried and 'can I have 10 grand or something?'" And I actually got the scholarship and when I got the call about it, all I could think in my head was, "My tuition is paid." I all of a sudden don't have to worry as much. I can go ahead and graduate from BU. But the guy on the phone Craig Klaffer, who I stayed in contact for a while, he was a former Oxonian person. He went to Oxford and he was the head of the Office of Fellowships and Scholarships at BU said, "You should think about applying for Rhodes." And I had a friend sit next to me who was an art history major. And to her credit, she says nothing this entire time that we're talking, but she can overhear what's happening. And I basically said, "Oh no, I've got this plan, we're not really interested in this Rhodes thing. But thanks anyway." And he said, "If you change your mind, go ahead and give me a call." So I hang up the phone and we're quietly watching TV and after a few minutes I turned to my friend and I say, "Was that dumb?" And she goes, "Are you kidding me? You know what that is, right?" I almost turned down the opportunity to apply for a Rhodes because I had this 10 year plan and I thought there was only one path to it. So needless to say, I called him right back and said I'd come visit him the next business day. And he was like, "Yeah, I think that's a good idea." I ended up applying for it and the rest is history. So the important takeaway there is absolutely have a target if there's something you're passionate about, but look out for other opportunities and things have a funny way of working out. And, not getting into MIT is a classic example of that. I thought that was my





plan and it didn't work out, but I ended up exactly where I needed to be, exactly the right place for me.

Jeff Murphy: And also it doesn't hurt to have friends that you trust sitting next to you while you're contemplating big decisions.

Jennifer Gruber: [laughing] Who are willing to tell you you're being stupid. Oh man, yeah.

Jeff Murphy: So you make it over to England and get your PhD at Oxford and then the whole time are you thinking about getting back to NASA and achieving those dreams?

Jennifer Gruber: Yeah, that was really the plan. And I was with my now husband, then at the time boyfriend, long distance. So I had a strong motivation to get back to Houston. I did apply with some other companies because I thought it was a smart thing to do, but nothing was as attractive as working on human space flight. Because it is really what I'm passionate about.

Jeff Murphy: So when you finally get back to NASA full time with the PhD under your belt, is it different, and tell me if I'm sort of using the wrong terminology about NASA. The more I've chatted with you, the less I understand the internal workings, but is it different now as a full time professional than their co-op experience or is it just sort of feel like right back where you left it?

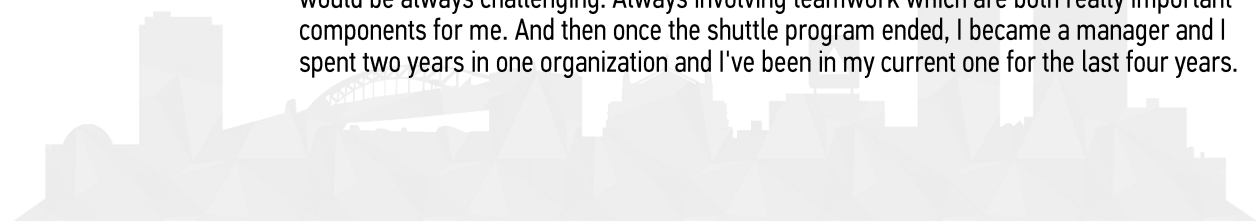
Jennifer Gruber: A little bit of both. So you do get to do interesting real work when you're a co-op. So my assignments weren't all that different except they were more focused on the long term. Because co-op is only like 10 or 12 weeks. There's a little less frivolity when you're a full time employee. So all the tours and lectures and things that we were encouraged to do at co-ops and moving organizations was easier as co-op. All of a sudden you've got to buckle down and do your permanent job. But there's also some comfort in that. There's a relief to knowing you're done with school and you have a steady, secure job because civil service tends to be very secure and things like buying a house and getting married happened pretty quickly after. So yeah, it did feel different to some extent, but still, I think it was exciting to be working in human space flight. That never went away.

Jeff Murphy: So you've been at NASA basically your entire career.

Jennifer Gruber: That's odd, isn't it? [laughing] To be in the same place for 20 years? Yeah.

Jeff Murphy: Yeah, I don't know if I would describe it as odd. I've also been at Boston University for a long time, but it seems unusual and I guess the reason why I asked the question is to your point, it's becoming less frequent that you'll find somebody who's been at the same organization for such a long time. Your work has been very much from project to project. Has that been helpful in kind of keeping it fresh and making you want to stay at the same organization for so long?

Jennifer Gruber: Absolutely. Yeah. So as I was getting started in flight dynamics, I went through a training program that certified me first as an analyst and then as a flight dynamics officer for a space shuttle and you do it in phases. So first I was a FIDO for the orbit phase and then I trained and became a FIDO for the entry and landing phase and then I was training for the launch phase. And so every couple of years I would be trying something different and it would be always challenging. Always involving teamwork which are both really important components for me. And then once the shuttle program ended, I became a manager and I spent two years in one organization and I've been in my current one for the last four years.



And that has started to seem like maybe I've been there too long and I'm getting a little stagnant. So, I'm getting ready to leave and go work on some moon missions outside of flight operations. So yes, it has definitely helped that I was able to move within my organization to do different projects and get different experiences and grow more in different ways.

Jeff Murphy:

So you've talked a lot about the. Certainly, there are so many technical skills that you need to get hired or to work at NASA on any of the projects that you've worked on. You've talked a little bit about some of the challenges that you've run up against. You talked about some micro aggressions as a woman in the field. What I'm getting around to, in a very roundabout way, is asking you to think about, for people who whether it's students or other alumni who contact you about what it's like to work at NASA, what advice you have to share with them about how you get your foot in the door at a place like that, what are the skills, the characteristics and maybe outside of the technical training, but what are those things that people need to be able to do in order to be successful at NASA?

Jennifer Gruber:

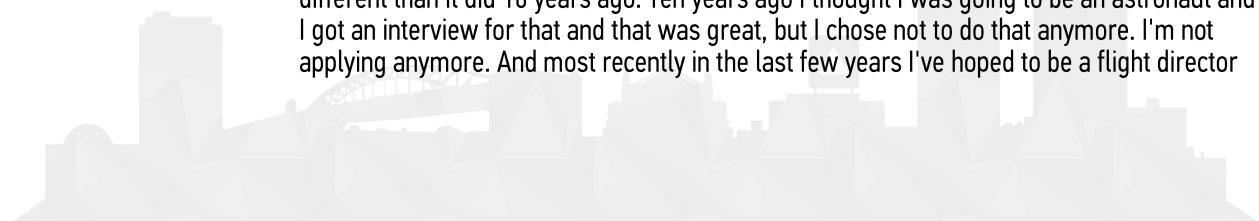
I will tell you the competition is fierce and the technical capability and certain GPAs at certain schools and that's a baseline assumption going in that everybody has that amount of impressiveness and BU is well respected. So when I get an application from BU I can get attention on it. But there's a baseline assumption that you did well in engineering school. And by well I mean highly competitive kind of well, but beyond that, I don't even ask people technical questions in the interview myself when I'm helping out with job interviews to bring people over into my group. I'm asking them questions like, "Tell me about a time you led a group and had to work with a quote unquote difficult person." "Tell me about a time you led a group of diverse people who had competing priorities and different ways of thinking." "Tell me about a time you failed." And a lot of people, they try to bs that fail question. They try to say, "Well, I started with one major and changed to..." No, that's not failure. That's changing your mind. And I say, "No, you really messed up in front of a bunch of people. Tell me about that." Because what I'm getting at there is I need to know that somebody can roll with the punches. I need to know that failure won't bring them down and that they can learn from it and apply it in the next situation. I need to know they have experience working with a variety of different people because teamwork is such an integral part of what we do. And then I'm also paying attention to the communication, which is easy to do in an interview. I even play a little game where I try to determine how concisely they can communicate a problem. I sort of stop the job interview to ask them to indulge me in this little game where I asked them about a time they had to call for help and get them to tell me how concisely they can do it. So, communication and teamwork and leadership are major components that separate one candidate from another in our organization.

Jeff Murphy:

Awesome. And Jenny, I know we're running up against time here. I appreciate you chatting with me. Last question for you. You've mentioned that you're about to move on to some new challenges within NASA. And you talked about that 10 year plan. I'm curious to know with the new projects you are going to be working on in your 10 year plan, do you feel like you have an understanding of what it's going to take to accomplish all the goals you've set out for yourself for the next 10 years?

Jennifer Gruber:

Wow. I think I have a good foundation. I've gotten to the point in my career where the contributions that I'm going to make are more based on my foundation and my ability to adapt. Adaptability is massive at this point in human history. So I do think that I have the skills and experiences and the ability to adapt. I realize now that my 10 year plan looks a lot different than it did 10 years ago. Ten years ago I thought I was going to be an astronaut and I got an interview for that and that was great, but I chose not to do that anymore. I'm not applying anymore. And most recently in the last few years I've hoped to be a flight director



and I've come to realize that even though I still want to do that, I will not be selected. And so I'm facing the disappointment of that along with the excitement of what other opportunities are out there because even though I'm disappointed that one group of people isn't interested in my skills and experiences, the people doing the moon missions are very much interested in using those skills and experiences. So I'm really excited to see how I can use the foundation I already have. And I think I do have what it takes to use that foundation and also to learn new things because you can't ever stop learning. And adaptability is going to be key because we've gone to the moon before, but we haven't put a space station out by the moon, which is what we're talking about doing now. We haven't gone to Mars before, which is the next step. So I'm really excited to see how I adapt to that.

Jeff Murphy: Jenny, thanks so much for your time. And on a personal note, you've heard me tell this joke before, but I'm so excited to be able to tell my friends and family that I get to know a NASA rocket scientist as a regular thing for my job. But thank you for all that you've done for BU. Thank you for the time you've given me. It's really been great to hear about your career path and your work at NASA.

Jennifer Gruber: My pleasure.

Jeff Murphy: My thanks once again to Jenny Gruber for joining me on Proud to BU. Jenny's a wonderful ambassador for the university and I've really appreciated getting to know her during her time on the BU Alumni Council. If you're an alum or a student looking to connect with Jenny for career advice, definitely connect with her on the BU career advisory network at [bu.edu/alumni/can](http://bu.edu/alumni/can). Thanks again for listening to the Proud to BU Podcast. If you like what we're doing, please be sure to subscribe, rate, and review Proud to BU wherever you download your episodes. I'm Jeff Murphy and no matter where your path takes you, be Proud to BU. The Proud to BU Podcast is produced by Boston University Alumni Relations. Our theme is from Jump and APM music. To learn more about Proud to BU, visit [bu.edu/alumni/podcast](http://bu.edu/alumni/podcast).

