Transcript: 30 Brave Minutes Podcast

Episode 61: UNCP Rocket Team: Live from Huntsville with Dr. Steven Singletary
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Speaker 1: Dr. Richard Gay

Welcome to 30 Brave Minutes, a podcast of the College of Arts and Sciences at the University of North Carolina at Pembroke. In 30 Brave Minutes we'll give you something interesting to think about. I'm Richard Gay, Dean of the College of Arts and Sciences. With me is Dr. Joanna Hersey, Associate Dean of Student Success and Curriculum. We're coming to you today from our offices in the Oxendine Administrative Building. We're joined today by Professor Stephen Singletary, joining us from Huntsville, Alabama, where he and the UNCP rocket team are visiting with NASA. Get ready for 30 Brave Minutes. Steven, please introduce yourself to the group and tell us what you're doing there in Huntsville.

Speaker 2: Dr. Steven Singletary

So, I'm Dr. Steven Singletary. I'm a member of the Chemistry and Physics Department, and I'm the advisor for the UNCP rocket Team. And we are in Huntsville, Alabama this week, competing in NASA's undergraduate student launch initiative. So, it's our first time that UNCP has ever been here so we're having a lot of fun, learning a lot of stuff, and we're going to be launching rockets here shortly.

Speaker 1: Dr. Richard Gay

That's absolutely wonderful. And I understand this program has been so popular among the students that we now have two teams.

Speaker 2: Dr. Steven Singletary

Correct. The rocket team was actually started several years ago by Dr. Jose D'Arruda, and we competed for many years in the First Nations launch competition, which we still do. But last year when we went, we won several awards. We won the Altitude Award, which was being closest to your predicted altitude. We were third place overall in the competition. And when we came back and people learned we had a rocket team and that we were competitive, we started out the year with enough people that I was able to stand up two teams. And now we're going to two competitions this year. So, we're going back to First Nations. But this is our first time at the big undergraduate launch competition here in Huntsville. We've got people from all over the country. There are teams from the West Coast, Puerto Rico, the Northeast. We're competing against the Naval Academy, West Point, NC State is here. University of Alabama is here. Cal Tech is here. We're punching with the heavyweights here for this competition.

Speaker 1: Dr. Richard Gay

Excellent.

Speaker 2: Dr. Steven Singletary

I don't know if the kids are, but I'm a little intimidated.

Speaker 1: Dr. Richard Gay

I'm sure you prepared them well. I know they've been putting a lot of work behind this. I think participating is a success in itself there. Tell us about what happens at a competition for a rocket team.

Speaker 2: Dr. Steven Singletary

So, the competition, and there are a lot of these different types of competitions. They are called design competitions, and they're usually focused on schools that have engineering departments or engineering colleges and schools. And there will be some kind of challenge that is put out, and then you have to go through in some cases, nine-month, yearlong challenge to see who can come up with the best solution. It's kind of like the x prize if you remember the x prizes from years ago. But for this competition, basically you start out with your challenge, in this case from NASA. And so, our challenge this year was to launch a rocket. It could not go above 6000 feet, had to exceed 4000 feet so we have a window. You have to safely recover your rocket. And then there was an additional payload challenge, which we weren't required to do this year because it was our first year. We're in what's called the lift-off division. Next year, if we compete, we will have to do the payload challenge, and that gets a lot more complicated. But the way the challenge works is at the beginning of the academic year, NASA posts the requirements. And then throughout the year, the team has to submit design reports, preliminary design reports, milestone reports, and then they have to go through presentations. So, there was a design report presentation, and they were scored on these. And the reason for doing this is this design challenge perfectly mimics what the students would be doing in an engineering company. Say, if they work for General Dynamics or Northrop Grumman, and they're building a new aircraft or a new rocket, or a new spacecraft, these are all the steps that they would go through in the industry. So, it's really preparing the next generation of scientists and engineers to enter the workforce to keep moving us forward.

Speaker: Dr. Richard Gay

That's outstanding.

Speaker: Dr. Steven Singletary

Yeah, it's been quite the learning experience for the students because up until this point, they just know they have homework and they have tests every so often. And this is like, now we're

transitioning them, here's what it's going to be like in the real world. They got a good lesson in that yesterday. We've got an unofficial tour of Huntsville because, after one of our safety inspections, it turns out one of our parts wasn't exactly what they wanted it to be. And so, we spent several hours yesterday driving around looking for a forged eye bolt rather than a bent eye bolt, which is what we had. But what was so worthwhile with that is earlier that day, one of our keynote speakers from Northrop Grumman went through the life of an engineer. These are the types of things that you're going to have to do. And one of her points was, there's always going to be something you don't see coming that you're going to have to prepare for, that you're going to have to scramble to fix. And so, as we're driving around trying to find directions to the Tractor Supply, I look around and I say, hey, you remember what the lady from Northrop Grumman told us this morning? Guess what? We're living it right now. And so don't think this is anything that we did wrong or that you're not going to have to do this again. This is just how the process goes. And actually, I have an extra eye bolt here we bought two just in case we need that.

Speaker 1: Dr. Richard Gay

Just in case. Well, those are the type of problem-solving skills that are transferable to any career or living your daily life. So, it's great that the students have a mentor like yourself to help point out that this really is a success. Don't get discouraged. This is a learning opportunity here, and we're going to pull this off and have a great launch. So, kudos to you and the team for finding that bolt in time for the competition.

Speaker 2: Dr. Steven Singletary

Yeah, so we're cleared to launch, so they successfully navigated that yesterday.

Speaker 1: Dr. Richard Gay

Excellent. And we're speaking with you before the launch. Right? You're launching tomorrow. That will be on April the 15th in the morning, and it's going to be live-streamed. Right? So, I hope everyone will be able to see this. It'll be live-streamed on Facebook, which means it'll be archived if I understand correctly. And so even though this podcast will be out after the event has concluded, they will be able to watch the launch with the team, right?

Speaker 2: Dr. Steven Singletary

Correct. And it's also on Marshall Space Flight Center's YouTube page, so I think they will have it archived as well.

Speaker 1: Dr. Richard Gay

Wonderful. I hope they're all wearing UNCP t-shirts for the event.

Speaker 2: Dr. Steven Singletary

I made sure to tell them that before we left. Make sure you have your UNCP stuff on. It actually paid off last night. They had a student mixer, and they were wearing their UNCP shirts, and the NC State team came over to introduce themselves and so they got a chance to talk. And one of our team captains this year is actually in the 3+2 program. He'll be at State next year, so he's already got his foot in the door to join their team next year.

Speaker 1: Dr. Richard Gay

Excellent. Those networking opportunities are invaluable at all stages of life, and it's great to see that our students are making those connections with future colleagues that hopefully will last a lifetime for them. Now, I know that while you're in Huntsville, you're able to do a little bit more than compete in this important competition. So, can you tell us a little bit more about what the team and yourself have been up to?

Speaker 2: Dr. Steven Singletary

So, this morning, we were actually invited to breakfast by Sheila Cummings. She's the founder and CEO of Cummings Aerospace. They have facilities here in Huntsville, Tampa, Florida. Tucson, Arizona. They're a large engineering company. They have a focus on engineering, mostly with government contracts. She hosted us for breakfast. We got to tour her facility. We got a chance to talk to all of their engineers. Met one of my former students, who is now down here working for her. So, give a shout-out to Ryan Locklear. He was one of our applied physics graduates, and he's now working down here in Huntsville. And it was great. The team had all kinds of questions. The best part for me was watching the engineers there. They immediately started putting their hands on the rocket, asking questions, and quizzing the team and it looked like a design team working together, talking. The way they were getting into it, it was hard for me because I just had to step back instead of getting in there with them because I really wanted to, but I just stepped back and let the kids handle it and just watched them, and they did really good. I've been impressed with not only how much knowledge the team has uploaded to themselves this year, but how they've been able to tell other people about what they're doing, and just interact on that personal level with members outside their team. So, that was really cool. And they have an awesome facility down here. On a side note, I was talking with some of their design engineers and their manufacturing personnel, and we've already got three or four projects that we're going to do in collaborations with them to use our equipment, our 3D printers, and their 3D printers to do some comparisons, see how they work. They're going to help me, like, get some of the students down here for internships. So, it was a really good meeting.

Speaker 1: Dr. Richard Gay

Excellent. It's where learning gets personal. Steven, I really admire the work you're doing with our students, with the rocket team, and with your work with the 3D printing on campus as well.

Speaker 3: Dr. Joanna Hersey

So, Steven, our listeners will have been able to listen to you speak if they caught our April episode this year, which we dedicated to the 3D printing on campus. And in that episode, you mentioned that you all were 3D printing some of these parts for their rocket. Will you talk a little bit about that?

Speaker 2: Dr. Steven Singletary

Yes, several of the parts with the design challenges, it's not just where you can buy a kit, build the kit, and launch the kit. You have to do modifications. And there are ways you can do it using what I would call the old-school methods, but you need a lot of equipment to do it. Milling machines, lathes, all types of stuff. But 3D printing allows you to do the same thing much faster and much cheaper. And the more important part at this point is that 3D printing is becoming so embedded in the manufacturing process that anybody who's graduating with any type of STEM degree that wants to go into one of those fields, if they don't know how to 3D print, they're going to be at a disadvantage. And our visit to Cummings Aerospace this morning really brought that home because everything that they're doing, they're 3D printing. So, I spent a lot of time with their manufacturing techs and their engineers, and they were showing me their 3D printers. They brought out some of their new products. They were all 3D printed. And the kids on the rocket team were like, oh…and they were asking appropriate questions like, what did you print this on? What were your print settings? I mean, what kind of material? And so, they were able to converse with them on the level that you would expect if you're working in the field. So, it just makes me happy to see that they're learning everything that I wanted them to learn and that we're moving in the right direction by teaching these kids all about 3D printing.

Speaker 3: Dr. Joanna Hersey

Can you paint a picture of who are the members of this team? What are their majors? What do you know about them?

Speaker 2: Dr. Steven Singletary

So, I'll start out by saying that the team is open to any UNCP student. We take any and all majors. This year, we've got them split into two competition teams. Our travel team to Alabama has four team members. Two are applied physics majors, one's a biology major and one's a finance major. And it turns out he's the one who's been getting all of the attention from the companies. We went to Cummings Aerospace this morning. He said finance. Everybody wanted to talk to him, engineers don't realize that we have to pay for the stuff that we play with at some point. And it's been eye-opening for him. He made a comment this morning. He's like, yeah, usually when I go somewhere, no one wants to talk to me. But at this meeting, Northrop Grumman was really interested in talking to him. Cummings was interested in talking to him. So, any and all majors are welcome. And our travel team to our other competition to First Nations is

all of our - they're all applied physics majors and we span, I think, our youngest, we have a sophomore and we've got several seniors, a couple of juniors. So, we're all over the place. So, it's good for me. I've got a core of students coming back next year that can help train the people who are coming behind them and they have some of the basic information already on board. It's a good cross-section. I would love to have some more art majors come over, because painting and some of the designs that I have seen on these rockets, I will have to take pictures. But they're works of art in their own right, just the designs that they have on.

Speaker 3: Dr. Joanna Hersey

Can you talk about the logo design? That was a feature of the First Nations launch last year, I believe, where they made the patch, the seal. Can you talk about that history?

Speaker 2: Dr. Steven Singletary

So, the First Nations launch, there's usually a lot of sub-competitions within the main competition. So, there's a patch design contest at First Nations where any team member can enter it. But it's an individual competition. And last year we had a student design. I thought it was the winner. It was a wonderful patch. We even got an email back from the organizer asking her to make a couple of changes. If we were to sew this patch, you could change it. So, I'm thinking we won this. Turns out she didn't win, another patch, won that. But each year now we've got people who want to enter these patch competitions. And so, it was actually our student who's the finance major, came up with our logo this year, which I'm going to adopt as our team logo going forward. He did a really good job of taking the university logo with a rocket launching from over Old Main. And he just brought all of the university's logo elements in the rocket team elements in and it's wonderful. Hopefully, we can put up a picture of it or a JPEG of it, but we had stickers made. Thank you for helping us get those. We've been passing them out. People love them.

Speaker 3: Dr. Joanna Hersey

Oh, I'm so glad!

Speaker 2: Dr. Steven Singletary

We've got one on each rocket this year. So, the logos are going to actually fly. So, there's more to this than just engineering. And I think that's what a lot of the kids are realizing, because throughout the competition, they had to put together the budget for the rocket, they had to figure out how much the travel is going to cost. And so, of course, our finance guy was all over this part. But teamwork, time management, things that we don't really have a class for, these are the things that they're really learning that I think is going to really help you.

Speaker 4: Dr. Gary Robin Cummings

This is Chancellor Robin Cummings and I want to thank you for listening to 30 Brave Minutes. Our faculty and students provide expertise, energy, and passion driving our region forward. Our

commitment to southeastern North Carolina has never been stronger through our teaching, our research, and our community outreach. I want to encourage you to consider making a tax-deductible contribution to the College of Arts and Sciences at the University of North Carolina at Pembroke. With your help, we will continue our impact for generations to come. You can donate online at www.uncp.edu/give. Thanks again for listening. Now back for more 30 Brave Minutes.

Speaker 1: Dr. Richard Gay

Steven, if a student wanted to join the team, how could they go about doing that?

Speaker 2: Dr. Steven Singletary

Right now, they would just have to send me an email and contact me. But I'm beginning to work more with admissions, and hopefully, I'm trying to get up with our orientation crew to start working with them as we're bringing new students in to let the student body as a whole know that we have this opportunity that anyone can participate in. So right now, it's just send me an email and block out the time on your calendar because it's a commitment. A lot of the kids are finding this out, too. I mean, it's long nights, sometimes austere conditions when we have to go launch and it's cold. We still have to go get the data. Sometimes you're going to be facing challenges you didn't know you were going to face, but they're all fun. I think everyone here, they finally made it here. There was a lot of grumbling getting here, but as we have sat through all of these presentations from our keynote speakers and everything else, they're like, man, I wish I could come back next year. And our sophomores are already thinking about what we're going to do next year. So, anyone who's interested, just send me an email. We'll get you hooked up with the team.

Speaker 1: Dr. Richard Gay

Steven, I know that there are lots of skills and lots of different types of presentations that the students have to do. You mentioned earlier that it's more than just designing and launching a rocket. So, could you talk a little bit more about the different types of skills and presentations that the students have to do over the course of this experience?

Speaker 2: Dr. Steven Singletary

Sure. And honestly, I think that's one of the hardest things that all of the team members have had to learn to do, is standing up in front of a body of people that know what they're talking about and then explain what they're doing, and then have to answer questions at each step. And actually, in both competitions, in the Undergraduate Launch Initiative and in the First Nations Launch Competition, after every milestone report, there's a presentation that they have to do. So, they have to prep a PowerPoint. They have to prep their presentation of the PowerPoint. They deliver it, and they're delivering it to NASA engineers, Raytheon engineers, Northrop Grumman engineers. And then they get questions, and they have to explain, well, why did you choose this way to do this? What's the rationale for doing this? And that has been the hardest thing to get the

students ready for. They're just not ready to talk, or talk to people. The hard one comes at the competitions because then they have to stand up in front of the people, and give to a live audience. And the entire audience has participated in this whole process, so they know what's been going on. And so, seeing the students, you know, swallow their fear and actually do it, because sometimes I don't know if we can do it. I don't want to do it. Look, if you don't do it, we're automatically disqualified. And so, you'll see them, they take a deep breath and they stand up there and they do it. A couple of years ago, I think the team, when Dr. Dooling brought it to First Nations, they took third place for the oral presentation. So, there's a prize for whoever does the best oral presentation. That's probably the hardest thing for the students to accomplish. And again, it's one of those skills that we normally don't focus on when we're teaching a class. We're presenting all day, every day, but students just sit there and take in the information. They work problems. So that's something that I've been trying to figure out how to give them more practice on. So, thankfully, we've had a very robust outreach effort this year. We're sending the team out to talk to community groups. We're sending them out to middle schools, elementary schools, and so they're getting practice speaking in front of people. And again, it's one of those things that when they get a job in the industry, they have to present their work to their bosses. They have to justify that this is worth spending resources on to accomplish whatever goal it is that they're working on. So, it's something they're going to need. And so hopefully, this is prepping them for success when they get to wherever they end up.

Speaker 1: Dr. Richard Gay

I'm sure it's certainly giving them an advantage that others may not have had. And I also would say that it's very good to help nurture and grow the next generation of students and engineers. Right? Exposing middle schools and high schools to the opportunities that await them, it's really a great thing. So, life's a process, right?

Speaker 2: Dr. Steven Singletary

Yeah. And we keep hearing that same message. Every speaker who works at NASA, somewhere in their presentation, they make sure to say that their job is to inspire the next generation, because we're going to be landing on the moon probably around 2024. Their plans are to go to Mars by 2034. I hope I'm around for that. But at some point, the people who are sitting in that middle school class, they're the ones who are going to be boots on the ground. And so, it's fun to be part of the process.

Speaker 1: Dr. Richard Gay

Absolutely. And honestly, it's really an honor to watch you contribute to that process.

Speaker 2: Dr. Steven Singletary

Thank you. Well, I appreciate it if it wasn't for all of the help we get from you guys, all the support that we get, we wouldn't be able to do it. So, we really appreciate everything, all the help that we've gotten from you guys.

Speaker 1: Dr. Richard Gay

Well, that's our pleasure.

Speaker 3: Dr. Joanna Hersey

Okay, so we talked about the patch and how the artistic element is one of the things about this Rocket Team experience that we might not think about at first glance. And another aspect that is one of my personal favorites is the marketing. This team does all their own marketing and social media for all of their competitions and events and the different things that they participate in across the academic year and spend a lot of their personal time gaining these skills. In addition to the design of the patch itself, they're making videos and sharing reels. They have Twitter, Facebook, Instagram and TikTok. You can find them at UNCP Rocket Team, and we will link those accounts below in the show notes of course. So, listeners that are listening to this, after we've recorded it before the competition, we will be able to go back and see the video from the launch that will get posted this week from Huntsville and shout out to those students who are doing that work as well. Telling the stories as we've been saying, in addition to just living the stories. And we know Steven, that you have to go and find the students and figure out what your next move is today down in Huntsville. Thank you for being here with us. Before we let you go though, what are some of the future plans for you, your dreams for the Rocket Team as we head into the summer and then into next year?

Speaker 2: Dr. Steven Singletary

So, one of the things that I want to do, and I get goose bumps when I think about this, what we're going to start building, we are going to start building what I'm calling the University's Rocket. It's not for competition. This is going to be, right now, the design is 14 inches in diameter, 20 foot tall, and the plan is at some point in the next couple of years to take it out to the test range in Nevada. We're shooting for 300,000 feet, so we're going to have cameras on it so that we can take pictures. We're going to actually see the curvature of the earth, you're going to see the thin layer of the atmosphere, grading to black. So right now during the competition, the competition altitudes are usually between 4000 and 6000 feet. That's just so we have a chance to recover the rockets and we don't have people running all over everywhere. But there are hobbyists and there are ranges where there's unrestricted altitude. And so, there's a range in Nevada where rocket enthusiasts who are really going for altitude will go, and rockets routinely go up to 100,000, 200,000, 300,000 feet. And so, we want to build one that will do that, that will hit 300,000 feet. Of course, it's going to be fully outfitted with cameras, recording devices, it's not just so that we

can launch that high and to say, we did it. We want a rocket that we can use for recruiting efforts, that we can use as a technology demonstrator just because we can.

Speaker 1: Dr. Richard Gay

I would hope that when we launch that high-altitude rocket that we can bring back some of the students that work with you over the years who have graduated and moved on to their professions. Maybe they can come back and be a part of that great experience as well.

Speaker 2: Dr. Steven Singletary

I don't know how I'm going to pay for it yet, but I'm already looking for different grant proposals, but I see the trip in my mind. We may try to video and document the build process as we go through, just to make a recruiting video out of that. So, document the experience.

Speaker 1: Dr. Richard Gay

I think one of those with a building of the competition rocket would be interesting too. Are there any final thoughts that we want to share with our listeners before we wrap up this episode of 30 Brave Minutes?

Speaker 2: Dr. Steven Singletary

So just keep your fingers crossed for blue skies, no winds, and safe landings.

Speaker 1: Dr. Richard Gay

Absolutely. And I will be glued to your live stream rooting the team on to success. Well, Steven, it's been truly a pleasure to speak with you today from Huntsville, Alabama. Thank you for joining us while you're there working with our students on this important launch with NASA. We wish the team an incredible launch, and we'll be rooting for them from home.

Speaker 2: Dr. Steven Singletary

Thank you.

Speaker 1: Dr. Richard Gay

Go Braves!

Speaker 2: Dr. Steven Singletary

We appreciate it. I'll let the team know as well, and hopefully, we get off the pad tomorrow.

Speaker 3: Dr. Joanna Hersey

Crossing all our fingers and toes. Yes. Tell the team we think they are awesome.

Speaker 2: Dr. Steven Singletary

All right, I will. You guys have a good day.

Speaker 3: Dr. Joanna Hersey

All right, bye-bye.

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