Harrisburg Huddle
Episode 104 – Master of Mechanical Engineering

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[Host] Hello and welcome to the Harrisburg Huddle, the Penn State Harrisburg podcast. Our campus is home to numerous engineering programs. We take pride in our excellent labs and facilities, vibrant learning community, and exciting cutting-edge research projects. This week, Associate Professor of Mechanical Engineering, Dr. Rick Ciocci, sat down with Laura Conway, a second-semester mechanical engineering student. Together, they talked about why Laura chose the program and all the exciting opportunities she has to look forward to.

[Dr. Rick Ciocci] My name is Rick Ciocci. I'm an associate professor of mechanical engineering, and I'm here today to talk about the Master of Science in Mechanical Engineering. I have with me Laura Conway.

[Laura Conway] Hi, I'm Laura. I'm really happy to be here today with you to talk about our program.

[RC] We're glad we're... I'm very happy to have you. I'm glad you were... you're part of this. Let's start with a little academic background. Can you tell us a little bit about yourself?

[LC] So, I graduated with my undergraduate degree in mechanical engineering in 2022. I got that at Hofstra University, which is in Long Island. And then I had my summer break, and then I started here in the fall for my Master of Science in Mechanical Engineering.

[RC] Okay, so if we go backwards a little bit... Um, what I'll ask you later, what got you from Hofstra to Middletown, but how did we go to Hofstra in the first place? Where are you from? Long Island?

[LC] No, I'm from Hummelstown.

[RC] Just up the street.

[LC] Yeah, 15 minutes away. Well, I applied to a lot of schools in Pennsylvania. That was one of the only two schools out of state I applied to, and they just sent me an email about a free application, and I was like, "Oh, okay, it's free. I'll apply." And I got a scholarship, and I thought, "I like the beach. I'd like to adventure a little bit. It's the one time in my life I can kind of adventure and not worry too much." So, I decided to go there.

[RC] Alright, so then now, how did you…Hempstead, so coming back home to go to school? Is that part of why you're... you're in Middletown?

[LC] I knew I wanted to be back in Pennsylvania, somewhere in Pennsylvania, for my master's. I was kind of done being out of state, and I applied to, I think, nearly every school in Pennsylvania that had a master's program for mechanical engineering. And I had my choice of where I wanted to go, but I miss my family a lot. I miss being around my nieces and nephews and being able to go to a sports game and stuff. And I know the area really well, obviously. I've grown up here my whole life. I love central Pennsylvania, and it was just the best choice for me out of all of the other schools.

[RC] Academically, what did you think about? But obviously, you knew where Penn State Harrisburg was before, you know, from a long time ago. So, what attracted you back to not just the local area but to Penn State?

[LC] I did some online research, and I thought it would be really great to go to a school that actually put funding into the engineering. Compared to where I was before, it was like... I guess we got more funding than other programs in my undergrad, but like, we... I knew I wasn't the school's focus. But here, like, there are so many engineering students. There's obviously a lot of time and effort put into the program, and I could see that just alone from going on the website. And I was excited to have opportunities and not just be like an afterthought for the program.

[RC] Okay, so I'm happy to hear that. Does your experience... You started here just last fall. Does... Did we meet your expectations? I mean, you know, you're a full semester in, plus you know, almost two weeks. You know, at this point, are we kind of... Kind of what you thought we would be?

[LC] Yes, yes, things have been great. The professors have been so personable and have actually been caring about my future. Just this morning, I got a text from one of... Other students that a professor wanted to see if I would work for them, just doing coding or simulations or just organizational work. Just stuff like that. Like, I haven't... I feel very cared for by the professors. I feel like they want me to be successful and they want to help me, and that's just been a wonderful experience.

[RC] Okay, that's very good to hear. The program's gone through some changes. We started in 2018. The first student was spring of 2018. He had actually had some credits because he started as a non-degree student. But we've had probably, at this point, I probably should know this, talking about it right now, but we've probably had about eight or ten graduates at this point. But as you know, you sat in the intro class, the colloquium class in the fall, and we had nine or ten students.

[LC] Yeah, it was about ten.

[RC] Yeah, and that was a big jump from the six that we had the previous year. So, you know, we're going in the right direction, at least in terms of student population. It is very nice to hear you say nice things about my faculty colleagues. So, we hired four faculty members who started in Fall 2022, just as you did. So, we went from 12 to 16, which is, if you do that on a percentage

basis, is a pretty healthy increase. And it's given us obviously a little bit more background, more different research areas, and so on. So, it is something we're very excited about because we have gone through this growth, not only just in the number of students but also in the faculty numbers as well.

So, in your coming to Penn State Harrisburg and the MSME program, we divided the program when we initiated it into three concentration areas: the design area, the thermal fluids area, both very typical mechanical engineering, and then also materials engineering because we had a couple of company, local companies, who gave us support, mostly in, you know, pat on the back and say, "Yeah, we'll send our workers to your institution." But also, very good companies for giving us student projects and so on. And they suggested the materials concentration, so that's why we have three. So, putting a little bit on the spot, you have a favorite among those three concentrations?

[LC] I lean more towards the design area, but one thing I do like when signing up for classes, I met with you over Zoom to see what exactly I was supposed to be doing. And I like how flexible it is that I don't have to be married to a concentration. That if I took a class, and let's say Thermo, and I wasn't really feeling it, I don't want to do that as my concentration, that I still get those credits added, and I can move on with something else. Because, you know, it's a very big commitment just to choose your concentration, and that's what you're stuck with. So, right, but I lean towards design.

[RC] Design, okay. So with that design, sort of, is that background now? Now, I tell most students with those three concentrations when they ask me what is the design, I say, well, it's not thermal fluids and it's not materials, and it's essentially everything else. So, that's a very, very broad area. So, is there something in design, is there something in particular you'd like to do? I mean, that's where we put the robotics, that's where we put the 3D printing, that's where we put design, you know, the traditional machine design kind of stuff, but also, sort of, like kind of everything else.

[LC] Yeah, I haven't fully figured it out. I do enjoy robotics. For my, I guess we call it Capstone here, but for me, it was just my senior design project for my undergrad. I created a machine that flipped pancakes, which I thought I would have fun with it.

[RC] Sure.

[LC] And being able to code it and actually try to flip a pancake myself to figure out the angles I needed. Just something like just simple machines like that, I just like I had so much enjoyment out of something like that. I don't think I need to make life-saving equipment or something like that. I don't think that fulfills what I like, but I think more simple everyday items are what I enjoy more.

[RC] Have you done anything in the sustainability area, anything within sort of an environmental focus to it?

[LC] I took a class, um, it was a 400-level course last semester, the sustainable engineering course, and I really enjoyed it.

[RC] Okay, so from a design standpoint, right, there's a way to try to tie into that, right? Using different materials or different processes and so on. That's very good. The university, that's one of the main goals, I would say, objectives that the university has, is for us to get more involved in sustainable practices and so on, processes. So, that's good. Yeah, I think there is a lot one can do in the general design area, sort of with the focus on what the... Another one, obviously, like the 3D printing would, to me, would be another tool type of thing that you could work into doing in a lot of different projects.

[LC] Yeah, I see. Like, the sustainable design is kind of where our future is heading in engineering, and I think that's... We're trying to take, I think every company is trying to take every regular design and trying to make it better for the planet, right?

[RC] And years ago, I got involved in this, what was called... What I every everybody has those green, ugly green folders that hang on a thing and so on and put a little tab at the top, and I did my research, my Ph. D. late in life. I didn't do it as a 22-year-old. I waited a long time. But I was... I got my support, my research support, my assistantship position with the gentleman who's only a year older than I was, and he was head of an Electronics Consortium. He had a pretty good group of people he had to work with in terms of numbers and background areas and so on, so he gave me the folder. And on the tab at the top of the folder said "green engineering." And you open the folder, and there are about eight or ten documents inside. One was an article somebody had written, one was an invitation to a conference, one with a few other things.

He said, "I want you to figure out how this works with electronics." And it was the first time I had thought about what the environmental side of things. So, kind of watching that develop through our undergraduate, like the course you took, and then some of the research that we're doing at the graduate level, I think it is an exploding area we ought to be looking at. The best materials that are also abundant materials and materials that are not toxic and things like that.

So, that's like I think for somebody who's wanting to do design, I think that's a very ripe area because there's a lot of work that certainly can be done in that regard.

[LC] And I think it helps having Dr. Xie teach that class, and he is definitely passionate about the subject. He tells us all about everything he does in his own home to make it more sustainable, better, and also more cost-efficient in ways, right? Yeah, it's great.

[RC] Sure. Did he tell you... I don't know if this was a legend or not or whatever, that he's a water guy?

[LC] Yeah, he says he likes to be called Dr. Water.

[RC] Yeah, yeah, they did get him as his license plates or something like that, the vanity plate. Yeah, he's... He is a water guy, and I think I understood it. He would travel when he would travel, go to conferences and so on, go out of town. When he went to the hotels, he would bring his own coffee pot because he didn't... He would boil the water and so on. And I always thought, "Okay, I have some faith that there is clean water in the United States." Okay, so I need to check and see if that is a legend or not.

[LC] He never told us that!

[RC] Okay, all right. So, if there are different directions you can go with what you're doing. So, now in your program at this point, you're... You know, second semester, you are taking a full load of classes. The research is something you're going to have to think about pretty soon.

[LC] Yeah, that's in the back of my head to figure out this upcoming semester.

[RC] Yeah, yeah, I think that's good. Good. And then you'll certainly ask a lot of questions, right? We don't expect you to go on your own to come up with a topic, but maybe you've got something that, at least in general, kind of gives us something to work on in terms of what, how we can help you, decide exactly what it is that you'd like to be writing about.

So to me, as daunting as that sounds, it's also a very exciting kind of thing. I mean, you came to a research program, you didn't have to. Penn State Harrisburg has other master's degrees that are not research-oriented, and we have an excellent MBA program and all sorts of stuff that engineers can do. But you picked to come into the research program, so I'm assuming it had to be something that you wanted to do, that the idea of researching a topic and sort of becoming the expert, which is, you know, maybe not the expert, but certainly a person who can, you know, go on about that research area.

[LC] Yeah, I was definitely looking forward to having some freedom to be able to find a topic or find a topic that a professor is already researching and try to tag along with it and have, yeah, just have freedom to research, try to, I guess, pioneer the engineering field a little bit. So I am definitely looking forward to that. It's a little bit of a scary thought to have to think of something and, um, I guess be committed to really making a lot of progress on something in just a year's time. It is definitely going to be a triumph.

[RC] Sure.

[LC] But, um, it is definitely something that I'm looking forward to and the professors seem to be really on board to have any student help them with any of their current research.

[RC] Right, yeah, yeah, they are. And when one of our colleagues just a couple weeks ago was announced, got a National Science Foundation, what they call a CAREER award, and that's a big bucks award.

[LC] That's, uh, yeah, what's his, uh, yeah, I have a class with him this semester. He told us about that.

[RC]Yeah, yeah, that's pretty significant. So his research area is materials. I have got this very, very good-sized, it's over $700,000, I believe, for that one award. Yeah, so it's pretty significant. He will be hiring students to work on projects and so on. You know, most of us are scraping by and he's got this big, big chunk of change that he can work with, so it's a, it's a nice, uh, nice for him, certainly good for us in the program to do things that way.

Okay. Um, when I, uh, we talk a little bit about the research and so on and trying to figure out, and what one thing I suggest to students is, though we do most of our writing and our, we even approve at this point, I used to, used to, somebody did a master's paper, we would sign on the second page or something, the student's name was on the first page and then the advisor's and so on would sign the second, but now we do all that electronically. But what we do have is a library, and the library has a lot of volumes of papers that have been written over the years. The MSME, the Master of Science in Mechanical Engineering, we started in 2018, so we don't have a lot of those historically, but we have a lot of papers. We had a Master of Engineering program for a lot of years, a lot of papers that were written. And I think it's a good thing just to go get the monkey off your back worrying about having to create this paper because it's a bound book and it's got so many pages, some are bigger than others and so on, depending on what they did. But I think it's a good thing to do, just take a little bit of time over on the second floor of the library, just to see, take a look at it and say, "Okay, this is not an impossible task." Right? I'm sure Hofstra had you write some stuff at some point, not a thesis.

[LC] Definitely not a thesis, but some... Now, I will definitely be spending some time next week in the library, trying to read some of those papers.

[RC] Yeah, you don't want to give... You don't want to get phased out and, you know, or worried about it because, you know, it is something people have been doing for a long time, and with the right support and... And we wouldn't have brought you here and put you in a research program if we didn't think you could do it. So now you've got to lean on us to make sure we're helping you get done what you want to get done.

[LC] Definitely.

[RC] I serve the program as a professor in charge, so the university assigns someone other than sort of the program chair. Penn State Harrisburg gives titles a little differently than some of the other campuses, so we have what we call a school director who's an administrator. He happens to be a mechanical engineer that we've had in the past, electrical engineers. So he, more recently, Dr. Motevalli has come. He is a mechanical engineer. And then within his area or the different program areas, and ours is mechanical engineering, includes the BS in mechanical engineering, the MS, and then we also have the BS in mechanical engineering technology that our same faculty is responsible for. As a professor in charge, I'm here to answer any questions you've got, so I'll give you an opportunity to do that. I'm happy to answer any questions that

you have. I'm here to help and support you. We connected before we met in person, and that was because of the distance and so on, and everybody getting very comfortable using Zoom to ask a few questions and so on. It's very helpful that way. But I certainly can answer any questions that you've got. I'd be happy to do so.

[LC] So, since in the next year I have to start my research, I'm still searching for what I'm going to be doing. What are some of the different research areas that our current faculty are doing?

[RC] Okay, when I talked about the concentration areas before, let me try to go that direction with it. And I, and you'll excuse me if I don't remember exactly the four new people and what they're doing, but I have a pretty good idea. I can probably bluff my way through it if I need to.

If I look at the materials, you have Dr. Tavangarian in your class, right? Do you... What is that, a special topics class?

[LC] Yes, a special topics class.

[RC] You know what the title he gave it? Not important. I just kind of...

[LC] I can't remember the title.

[RC] He's done... He's done a lot of his research since he joined us a few years ago in nano materials. Really small stuff, very small-scale stuff, and carbon fiber kind of stuff. He hasn't done much of the 3D printing, that's elsewhere, but his materials research, I would say, is the car, the carbon fiber, and the nanomaterials. He and Dr. Rashwan and Dr. Rahman. Rahman taught the colloquium that you took. I don't know if you've met Dr. Rashwan yet.

[LC] She came…

[RC] That doesn't surprise me. She would do that. She's very good that way. They're also, to me, in the materials area, for the most part. She's kind of taken over the 3D printing portion of what we've been doing. Rahman is more traditional materials, running experiments, sort of an experimental approach to materials. So that's, that's probably not the biggest group, but it's a little bit bigger than the materials.

Thermal fluids is traditional thermal fluids. We have Dr. Maicke, whose PhD is in aerospace engineering. He has a Bachelor's BS degree in mechanical, but his Master's and PhD are in aerospace. And we had a lot of students who are really interested in aerospace and that kind of stuff. So his classes tend to be pretty popular. So he does his research in a lot of simulation. I don't know how much experimentation he does, but probably more of a synthesized design and simulation kind of stuff.

Dr. Taherian is a thermal fluids person. Dr. Imadojemu is the thermal fluids person. That's probably not the biggest group, but it's a little bit bigger than the materials.

And then you get to the design area, which is really wide open. It's everything that's not thermal fluids or not materials. So we have Dr. Attaluri. Dr. Attaluri has made a connection from his own background to the Hershey College of Medicine in Hershey. Dr. Attaluri, if you go back on his resume and look, spent three years as a postdoctoral researcher with Johns Hopkins and got the opportunity to work in the medical school there. So he's translated that. Well, we had already had before he came a couple of connections. We've had capstone projects where the medical center sponsored a topic that we have students working on. So that, you know, that's been going on for a little while. So we have Dr. Attaluri, Dr. Attaluri has brought through his lab certainly more than any individual instructor than we've had anybody else do quite yet.

Robotics falls into the robotics and automation. Some of your classmates, that's why they're here, are interested in the robotics and automation. You probably got some sense for that.

[LC] Yeah, I'm taking a robotics course this semester.

[RC] Okay, all right. So yeah, and actually the reason we're doing that is in the fall, we had a robotics course, but it conflicted colloquium, right?

[LC] Yeah

[RC] So we had to run robotics again this semester. I'm glad you're taking that. Controls falls under the design.

[LC] I'm taking that.

[RC] That's one of the 500-level classes that we have. So the, uh, Dr. Banerjee is robotics. Dr. Abu-Ayyad is the controls. Who else is doing what? So the new people, trying to think of where they are. Dr. Emam is working with Tavangarian and is working on some of the material stuff. Dr. Fu is somewhat materials, but a little bit of manufacturing, which is good because, to this point, I've been the manufacturing guy. So it's nice that there's somebody else into that as well. Dr. Ferdous is a design type. And Dr. Nagassou has also got a little bit of manufacturing. He's, um, he's probably going to be our energy person. He has an interest in renewable energy and so on. So I don't know how much sustainability he's got, but he does have at least an interest in general in that particular area.

So that's' pretty much the cast of characters. The four new people certainly broadened our reach in terms of things that we hadn't thought of. Some of them have been able to bring some research with them, which is a good thing for a faculty member. And, all four of these…I think this is a true statement, I'll stand on it if I need too…All four of them are tenure track faculty members, not teaching faculty members. Basic difference is you do a lot of research over here, and you basically don't have to do any research over there, kind of thing. So all four of them involved in different research areas gives us a more broad approach.

[LC] So that covers a wide array of what I could potentially try to join in on for my future research.

[RC] Right, right. And before I forget to ask, did you flip the pancake? Did it work?

[LC] Yes, it actually worked. It was good enough that the professor, he destroyed basically all of them. To use them for parts, the motors and stuff. But he said, um, my group project was so good that that was going to be one that he would keep intact and show to future classes for years to come.

[RC] So it's successful.

[LC] It was very successful. Yeah, compared to other people doing, like, just a windshield wiper, it was kind of impressive to have something actually moving in the air.

[RC] Very nice. Cool, glad to hear that.

[LC] Okay, my next question. So you mentioned that we've added four new faculty, so this program is definitely growing. What do we have to look forward to in the program, or what are this school's goals for this program in the future?

[RC] I see us going in lots of different directions. We're on top of the 3D printing, and I think that's really important. I, myself, wouldn't find that if that was the end game. I wouldn't put it… as a tool. I think it's a really good thing, and I'm really interested in that.

The sustainability is going to be a lot more. You may not be aware, but Penn State at University Park has what they call a Sustainability Institute. And the Sustainability Institute is sort of, it's a group of experts in various fields. There's an academic side to it in addition to it's there to support the maintenance and operations of the university. But there are a lot of resources there that we already are sort of connecting on here, and feel very good about that. We have a Sustainability Council on campus that includes student membership, but it's a faculty-staff type organization. So I think as we move forward, there'll be a lot more of the green applications than we've been seeing before.

I mean, Penn State Harrisburg's history is an old Air Force Base, and before that, they tell me it was a pickle farm or a cucumber farm or whatever pickles were made out of.

You know that we've obviously, the campus has changed over time, and probably, I don't know how much you visited while you were here, if you were on campus for any reason. But the campus has changed significantly, and you know, there is talk of another academic building, but it's going to be right over here. We sit on a hill where we are in the theater. There's room enough when they built this building. They laid out all the utilities. It was obvious that they weren't ending here. Yeah, all right. So there's that growth, too. So the space, kind of thing, would give us a lot more room to roam.

The electrical engineers don't need any more space than they have. They work with those little bitty things, and you know, once in a while, they got a robot that they want to do something, and they think they can do 3D printing. So that's okay.

The civil folks have a lot of labs. There is, um, I don't know how familiar you are with the Educational Activities Building, the EAB.

[LC] My colloquium was originally in there until students complained about having to go from Olmsted to colloquium to Olmsted, so then it got changed. So I've been in there a handful of times.

[RC] Okay, all right. The most of that building, some people call it the Engineering Building. I don't because we're not there. Okay, our engineering is up on the hill. The one story that you may not have been there.

[LC] I've been in there. I've been in the labs in there.

[RC] Okay, I forget what it's called. The education... Well, the engineering lab building or the education... Now the education...

[LC] I've been in class in there.

[RC] Okay, all right, yeah, that... Yeah, that one. That's the one that's connected. There's a story behind that, that we can get into a different time.

Going back to the idea of what are we excited about here, I think what we are excited about is doing something with the space. From a faculty member's standpoint, with the right space, I can see us doing a lot more with the programs. We can handle more students, and we'd like to do that. We have started, it's taken a little bit to get moving, a PhD program in Engineering Systems.

[LC] Yeah, I heard about that.

[RC] And it has three concentrations as well, but a little bit more obvious ones, mechanical, civil, and electrical, because those are the faculty areas that we've got. So it's exciting to think about. We've started this master's program in civil engineering, a master's program. It started at the same time as our mechanical. So they're just a few years old. But now we're talking already about, you know, the next step for students who want to do the doctorate. And it's a PhD in Engineering Systems. It won't say mechanical engineering systems. It'll say Engineering Systems. But one of the areas that you can do the work in is mechanical. So I think that is a growth area that has been pretty exciting. The number of doctoral degrees at this institution has been pretty steady. We've always had a few. But it's all been, I think, three or four. And now we're adding another one that is in the engineering area. So we are pretty excited about that.

[LC] Yeah, it definitely seems like the engineering programs are just growing exponentially on campus. So, you mentioned previously that we have a relationship with University Park. Obviously, we have the Penn State name. But what is the connection or even the difference between Penn State Harrisburg and the Penn State main campus?

[RC] Yeah, that's an excellent question. The for, at the master's level, at the graduate level, it has to do more with academics than anything else, the physical things, right? With the campuses. So Penn State Harrisburg is our campus name. It indicates where we are, where we're located. But we are also called Capitol College. Yeah, and Capitol College is distinguished from the College of Engineering, distinguished from the College of Liberal Arts, the College of Arts and Architecture. And so, it's a University Park has a bunch of buildings that gather, and they have colleges. We have a campus that is a college.

And then what's important for understanding that is the college is responsible for the program. The college is responsible for admitting students, offering the classes the students need, and then eventually graduating the students. So we are responsible for this MSME program. There is an MSME program at University Park. They have both in-person and online programs, and they've had that for a very long time. MSMEs are not anything new, new to us but not new to the world. But in talking about resources and so on, what our connection and what it gives us, the Big Ten, I call it the Big 16 because I can count to 16. Um, has obviously an athletic connection. All these 16 universities, well, the 14, this year, next year when they add UCLA and USC, it'll be 16. Um, have this connection on an athletic standpoint. But also, there is a research connection to those universities as well.

If you go to the library on campus and you're trying to find, you know, you chose your research area and you want to see what's the latest, what's going on, and somebody wrote a paper and you want to look at the historical aspect because, I want to make sure it's on paper because otherwise my story doesn't hold very well. But let's say it's a paper from about seven years ago, all right? And it's actually printed somewhere, and Penn State doesn't have it. I'd be surprised, but it can happen. Then you go to the nice people in the library who love to look stuff up. It's what they do and what they live for. So our grad students keep them happy. And they find out that they don't have it. They'll find it for you. They'll go to Purdue, they'll go to Wisconsin, they'll go to Northwestern, and they'll keep checking all the other Big Ten universities in order to track down this particular article that you think is very important to your research.

So they, so we are Capitol College. We have our own very nice library and so on. But we are connected to University Park. So that academic connection is very important. And that academic connection is what gives us that sort of expanding who we are and what we have. That is something that we share with the other campus because everybody is connected through University Park.

[LC] A benefit of being here at Penn State Harrisburg is our intimacy.

[RC] Certainly, it certainly is. Yes, you're right. It is more intimate. It is knowing students by their names. I mean, it sounds, you know, something everybody's a number, that kind of stuff. But really, I don't know what your experiences were last fall with my colleagues, but I, it takes me, depending on the class, the class is 35 students that I have this semester. It's going to take me a little bit longer, but I will know their names before we get halfway through the semester. For certain.

[LC] And for me, only having classes with about, I think my biggest class is about, I want to say like 13 to 15, and the professors do already know our names because it's such a small class.

[RC] That's true.

[LC] And I already know, just from last semester, I know most of my fellow students on a first-name basis, which has been great because I think in my undergrad, it took me until I was taking the same classes with everyone, with the same people, to learn most people's names, until my last semester. Um, compared to now, I know most people. I'm learning new people this semester just with having different classes. But yeah, so that's been a great experience, definitely. And also, I feel like the professors definitely know me better, yes, having one semester with me. Like, they'll say hi to me, or they remember my name, right? They don't just forget it. Um, compared to undergrad, where it just feels like I'm clocking in for class, do my job, they grade my stuff, and then it's all done.

[RC] Sure, yeah. I thank all of you who've been interested enough to listen to this. I thank Laura for being part of this. I greatly appreciate her participation and sharing our experiences with us. As a professor in charge of the MS in Mechanical Engineering, I'd be happy to meet with anyone interested. I can do that in person anytime remotely. Certainly, I can arrange that as well. But I am open to any questions anybody's got. I'd be happy to do this. I've been the professor in charge since the program started in 2018. And I thank you for your kind attention.

[Music]