



Panel 1D: Supporting students with visible and invisible disabilities, and students who are neurodivergent

Facilitator: Sarah Oman (Oregon State)

Panelists: Bridget Smyser (Northeastern), Kerry Tate (UT Dallas), Kevin Cotelleso (RHIT Student), Alexis Chivers (GMU Student)

Description: Can your capstone lab accommodate a wheelchair-using student? We'll discuss how to support students who are neurodivergent or have visible/invisible disabilities so they can thrive in Capstone.

Notes:

Big takeaway:

What is one change you can do to the capstone course?

- 1) First day -start with normalizing neurodiversity
- 2) Start of the term survey - learning profile - how can I do help you learn?
- 3) Talk to your disability service director and see what they can do to help me - create that channel of communication
- 4) Two free absences a semester - freebies if you cannot make it to the class. (sometimes people have difficulty even communicating that)
- 5) How to spot common team issues? Training for capstone instructor - so they can notice it and start guiding it.

Sarah Oman, from the School of Mechanical, Industrial, and Manufacturing Engineering at Oregon State University was the facilitator for this panel. She discussed the collaborative and conversational nature of the panel session before allowing the panelists to introduce themselves.

Bridget Smyser from Northeastern University in Boston, teaches capstone design and a large junior level lab class. She described herself as a “real hands-on lab rat kind of person”. She is involved in the College of Engineering Neurodiversity Task Force, working with students and co-op employers to hire neurodivergent students, and also works on professional development, trying to get people to teach in a more neuro-friendly way.

She has ADHD and autism, and had a late diagnosis of both conditions after age 40. She described the diagnosis as “really revolutionary.”

Carrie Tate is from University of Texas at Dallas, and she is the director for Accessibility Resource Center. She has been in this field for 34 years, and she wanted to share the collaboration that she’s had with the Mechanical Engineering department and on capstone projects.

Lexi Chivers is a recent graduate representing George Mason University from Fairfax, Virginia. She completed her senior capstone project with her team this past year, graduated with her Bachelor’s of Science in Mechanical Engineering with a concentration in aerospace and systems engineering, and for her capstone project, they built an autonomous survey robot that drove around campus and identified ADA compliance issues on the college campus, both indoors and outdoors.

Kevin Contesso is a recent graduate from Rose Holman Institute of Technology in Terre Haute, Indiana, and just two days ago he graduated with a Bachelor’s of Science in Computer Science, with focuses in robotics and artificial intelligence. They recently wrapped up their capstone experience, and their capstone team had four members of varying levels of diagnosed neurodivergence and other different types of disabilities, so he brought the student’s perspective working with neurodivergent people. He is “super interested” in learning more about experiences with various neurodivergence and disabilities in students, and just general campus life, of course, and learning more from his fellow panelists about these issues.

After the panel introduction, Sarah introduced herself as a faculty member in the mechanical engineering at Oregon State University, She has been teaching capstone since 2015 and only recently, in the last five or six years, she has started on the first day of class to introduce herself by showing pictures of my hobbies and that kind of thing. She also tells her students from day one she is also part of the neurodivergent community and the LGBTQ community, and when they see that, they hear the ability to normalize who they are. This led her to finding many students coming to my office hours, talking about their struggles, and it’s usually struggles that are related to ADHD and neurodivergent traits. It’s only in that marked difference of letting them know and normalizing, “Hey, you know, we’ve had a lot of students who have executive dysfunction or who wait until the last minute to do things, and, and let’s see how we can support you.”

This was the impetus towards having these kinds of panel sessions. There was a panel session very similar to this, run by Sarah and Bridget, two years ago at the last capstone design conference, and it was very well received. They wanted to continue getting the information out there on how to support students with disabilities or who are neurodivergent.

After asking if there were burning questions, Brett Jeffries from the University of Central Florida asked, “I’ve taught senior design in Penn State as well, previously, and I’ve been at UCF now just almost a year, but one of the things in engaging with the students, and this is the question, is we want them to have to be able to develop their skills, to, for example, public speaking and communicating that they, that might be counter towards how they feel. Everybody feels all students feel not comfortable speaking, for example, but we want, I want to be more sensitive and understanding what may, may, may there may be some special conditions or situations, or how we might introduce topics in a way that will ease, maybe not me, all students ease them in, but also I guess trying to understand and recognize. So that’s my question. What do I need to understand and recognize for neurodivergence versus other students in doing these things?”

Sarah clarified that the question was: “How do we only help our own students, all the students, but how do we specifically recognize and help those folks?”

Carrie responded first. "Let me kind of tell you what I have learned this past year. Now, understand, I'm not a mechanical engineer, nor am I even associated with engineering. I'm doing good just to turn the switch on and off, so that tells you how much I know. But this past year, we ran into that problem with capstones, and what was happening is some of them didn't even have the skills to even know how to present or even how to engage in a team situation, so I got with the engineering department, and so what we did, we had one student that was a severe stutterer, and then on top of that had autism. So we pulled him out of the capstone, and we created a team, and then I was on that team, as well as a coach was on that team, and we coached him through the whole semester. This spring semester, it was a six hour class. I learned how to build a furnace, now know how to melt aluminum, that could be part of my resume now, but doing that, it also brought in a key element to us to realize that we need to start working with the mechanical engineering program, usually between their freshman and sophomore year, doing some presentation, trying to catch these students before they get to the capstone, because we're seeing that all of a sudden they're getting to that capstone and they don't know how to present. One of the other things that we have done in the past is to start with videotaping, have them do it, start their program out with video taping, where they do it by themselves, and they deliver it. Then you can try to graduate from that. Also, maybe bring them into the office, have them present to you. But the student needs to understand it's not going to go away. This is part of being a mechanical engineer, is that you have to work with others, and you have to present, so it's a key element. So that's one of the best ways to do it. Also, they could do auditory first, and then come to video and go from there. But it is a challenge. We've started out audio because some students don't like seeing themselves, and they will speak. You realize it's easier sometimes to talk on the phone than it is to be on a video. Start that out first, but tell them they're going to learn how to present at the very end."

Bridget then responded, "So I see my students twice. That's their curse. They have to have me for the required lab class, and then they usually have me for capstone as well. Mine is a junior level lab class, and I have them present their projects, so I get to see a lot of the neurodivergent kids at that point, and they do presentations in first year as well. So our folks have some practice. One student asked me, you know, when I get really nervous when I'm presenting, is it okay if I have some power putty in my pocket, and just squeeze it when I'm tense or anything. I'm like, sure, you know. So he just had, he had that in his pocket, and he was just kind of squeezing it, and he got through it. I had another student who had fairly severe anxiety who was able to contribute to the talk via Teams, he just could not stand in front of the class. I mean, half the time he didn't, he couldn't even come to class physically, because having all those people around, just like he was going through some stuff. So he presented via teams remotely, while the rest of his team was there, and that really helped him be able to get through it, and we've, I had one guy who just, he in, in capstone, I think we finally got him to present, but I, he just couldn't really, couldn't get himself in to speak, he want to really be on video or anything, so we worked it out as with his team, and we had them all agree. It's like, okay, he's going to develop the presentation, you know, develop the whole thing. You guys are going to present it, is that cool? He did a great job on all the slides, he knew all the material, but they were the ones who spoke it, and in that situation I thought that that was an acceptable compromise. You really have to talk to the student, though. I mean, there's what works for one student won't work for another, but just knowing that being open, so they know they can talk to you, since, like, Sarah was saying, when I tell my students, "Hey, I've got ADHD, I'm autistic, it's cool, and they're equally relaxed about, "Oh, okay, I can talk to her about this, I can, you know, so just even if that's not, you're not part of the club, you're just letting them know, hey, if you have to, if you have any accommodations, let me know how I can help make those work."

Lexi responded next. "One thing I want to add is, when you do have a student that is really struggling, ask them to explain to you about their disability, give them the ownership of saying, share with me what I can do to help you, and it will open doors for you. It really will, because then you too can sit down and work out a plan, but when you sit down and say, share with me and help me understand who you are, and tell me about you shared with me that you have a disability, or that you're neurodivergent. Tell me how you think, how you do think, because I want to

know, because I want to be a better teacher to you from the student perspective. So I was my team lead, and we faced this problem quite a bit in our team dynamic, which was I don't feel like presenting, I don't, I'm or having the conversation of it's been a hard day, or even if you on the lower level, if there is not a severe anxiety attached to it, or there's not a severe or a disability attached to it, just feeling as though you're incapable of doing it, and so a function that our faculty members put in place was for any of our activity reports, not every member on the team had to speak for an activity report, but every member had to be on standing during the presentation, and so that helped us as a team to collaborate and talk about, okay, who feels like they can prepare for this, who feels that they can get ready for a presentation within this week, and you can take on that mental load. And then from my perspective, I've had a lot of opportunities to practice my public speaking, and I think that it's facilitating ways, as the other members here said, facilitating ways for them to start small, so it's much easier to submit a video to your professor of your activity report than it is to stand in front of your classmates, and so starting small is always the easiest, because you start out small, and then three months later you're standing in front of 50 people presenting.”

Kevin spoke next, saying, “I'd like to double down on what Carrie and Bridget said about really getting to know their neuro divergence or their disability, their specific flavor, like how they work. Very important, first of all, to make them actually want to go forward with potentially improving, because a lot of times people feel like you know if their instructor is like assuming what's going to work for them, then it really doesn't work, and they might go along with it, but they, you know, they won't really be into it. But if you really get to know how they work and how they operate, that's really helpful to make sure that they know that you're on their side and you really want them to be able to improve if they want to. Yeah, that's also very important, the members of my capstone team, many of them, multiple of them, had pretty severe anxiety, but they understood that in the future they would have to overcome this to be able to public speak, so that really helped a lot, because they understood that they needed to be there and actively working to figure out whatever they needed to do, so that they could get the point across, so I guess that's kind of the trade off, is you can, you know, they have to do it, but in a way that is working for them, and is, you know, if they have input to it, that makes it that much better for them.

Carrie chimed in, “One other thing that we were challenged with, with the capstone, because it's usually your senior design. It allowed me to go back to the associate dean and the dean to say, What are our technical standards? So that we can start sharing our office as disability service providers can sit down and really talk to some of these students that are wanting mechanical engineering or even engineering. What is it that you want out of it? And then let's look at the technical standards, because you will be doing public speaking in this. Are you going to be challenged with that? And I will share on a personal note, you know, I am severe to profoundly deaf, and I wanted to be an anesthesiologist. I knew that I would be taking a risk of being that for the patient, so I had to really think about a different career in that, and that's what I want to do with some of these students, because I think sometimes they get through the whole program and they wake up at the very end and they're scared, then they can't really go forward a lot, so that's one of the things is our goal is, are we being successful to students by having a capstone at the end to do the presentation when we really need to be doing it at the very beginning to try to help them walk through that. If you don't know what technical standards are, please go out there and research them. They're at various institutions and their technical standards about what the expectations are for that program, public speaking, being able to be professional in your communication verbally as well as orally, because you can go back to that if you need to, if a student doesn't need those.

Sarah took over again saying, “Thank you. I think a lot of these answers so far have been great in terms of we're not just talking about presentation skills, but we're talking about how to accommodate students. Period. And that's through learning about them. I think that's a pretty common theme, is learning what they need, and sometimes it's a one on one conversation. Sometimes it's as simple as let's say in my example, I introduce myself as neurodivergent from the first day. Well, if you're neurotypical, you can't really say that in front of your students, but you can say you can normalize to them. I've had neurodivergent students, I've had conversations with them, we have done accommodations. If you have a stutter, for example, we can, we can increase the time limit that you're

presenting. Don't worry about it. We've had these students in the past, we know we can, we can accommodate you, but it starts with communicating to us first, and that could be a simple, that could be a very quick change that you make in how you teach from the very first day is just normalizing that it's okay to have these experiences of not being able to present or not being able to understand how to how to write correctly because I'm dyslexic or those kind of things. Are there any other pressing questions?"

Another attendee spoke up, "Okay, I actually have two questions. I cheated here. No, okay. So one of my questions is, how do you train people who are neurotypical on the team to learn to accommodate this, and the second question, along with this, is how do we handle the students who are just figuring out their limitations and helping them get through it."

Bridget spoke first: "Okay, let's tackle the first question first, so the question is, how to train neurotypical people. Got it. So, some of it is first of all talking to the neurodivergent student on the team and finding out a bit about how open they are about it. Some people don't want to talk about it when I've had students like that, so say they've got ADHD, don't want to mention it, and it affects them because they've got executive function issues, so they don't want to, they can't get started until really late, right before it's due, because they need that adrenaline to focus, and there's a lot of people who are like that, and that's that's how they focus, they get that adrenaline, oh, it's due in five hours, okay, and then they sit down, do that. Well, the people want to get it done four days before are ready to strangle them, so the trying to come to a compromise, where okay, I told, I'll tell the whole team, I'll send an email, I'll say just be aware there's some folks who this is how they operate, and if you are one of these folks, you might want to set yourself an artificial duty that's a little bit before, so that you could get your adrenaline going, and everyone else, if you, and also if you know that you're one of these people, try to make sure that you're not doing the one thing that everyone else is depending on, so if nothing can be done until the results get processed on the lab report, don't do, don't volunteer to do the results if you're that person, and I've also had some students who were fairly severely autistic. A lot of, at the beginning of my class, I always, my lab class, I always give people the option of naming one or two people who they do want to work with, one or two people who they don't want to work with, and that's often how I can identify the neurotypical students, because there's multiple people who don't want to work with them, which is sad, but it's one way, it's like, okay, this person is going to need some coaching, and their team is going to need some coaching. I had one guy, he had already graduated, and people were still saying that they didn't want to work with him if he was somehow in the class, so it's like that's not good. So, when I've had students like this, I just start talking to the team and the student about, okay, you know, he's your team member. If he's fidgeting a lot, that's fine. You know, if it seems like he's not paying attention because he's playing on his phone or she's knitting, it may just be that that's how they focus. So, just letting them know some things that happen and I had a student on one of my teams last spring who, that's how she focused, was knitting, so she was always knitting something, so I knew she was listening if she was knitting, but you have to know that that's what she did to focus, and so it's it's a two-way street, and just getting the team to talk to each other is also very helpful."

Lexi spoke next. "So I do identify as neurotypical. I was in the gifted program in middle school and high school all through that, but I don't necessarily think that that comes with any of the disabilities that are associated with some like neural processing disorders or hyper ADHD things of that nature, so I've been very fortunate to have friends throughout my life that are neurodivergent, and so it all really starts with a conversation, first and foremost, of what is your normal, because normal is subjective to the person themselves, and it's really important to understand how your friend thinks, how your friend processes information. Perfect example is I was driving my best friend Paige nuts because she has ADHD and autism and she creates a schedule in her head of everything she has to get done by what time and I had not known that she had created the schedule for us and so we had plans to go do x y and z things that day, and I took 30 minutes longer to get something done than she had allotted for us to do, and that put her into a difficult mental space, because I had thrown her off her schedule, and I could tell she was agitated, I could tell she was upset, and I asked her, Why are you upset? What's wrong? What did I

do? She said, You're not on my schedule, and I said you never told me your schedule, and so that is the crux of it, is communicating, and so as a team lead for my capstone process and my capstone project, communication was the number one most important aspect of any decision that we made, finding out where everybody on the team was emotionally, physically, how they were doing, and then back to the idea of training neurotypical-ness. It's really exposure, like giving people a safe space to say, I need to, I need to play with a fidget while I'm in class, because it's the best way that I can focus, you know, and having a safe, open conversation with your student or with your team members, of how can I best show up for you and how can you best show up for me, so conversations work well."

Kevin added, "Yeah, so first of all, plus one, plus one on all the "make sure you're communicating". I'm one of the only neurotypical students on my four person capstone team, and the way that I was able to manage communication with the team. First of all, I was lucky enough that my team are my friends, and they're very open to sharing with me how they work, and if I'm doing something that's not working for them it's not fitting in and not allowing them to be as productive as they could be, letting me know about that, so I can improve, and that's something that, of course, I gained their trust by being able to be open to that and listening to them and actually actioning on anything they told me that you know was reasonable for me to do, I feel like the harder problem is if you have neurotypical students like you were mentioning, where they consistently people say they don't want to work with them, and there's a reason for that. It's because they're not listening and understanding. So the real training needs to be, I feel like, how do you get students to be able to listen and understand, and that is a whole other, like that's a whole thing, that's, you know, that's a very important soft skill that I feel like everybody should have, and there's many people who don't have that, and that's not specific to working with neurodivergent or disabled students, but perhaps the answer is maybe more formal education on just that skill of being able to communicate and listen with other people. As for something that's a little bit like smaller and easier to implement, just an overview of the strategy. Something that Bridget mentioned was setting artificial deadlines earlier, that's something that I had to implement as the leader of my team, because I had students that would basically not do much until the adrenaline kicked in, and they needed that in order to be productive. So we set artificial deadlines a couple of days, maybe even more days earlier than that, and just that's the deadline we talked about, that's the deadline we were working with, and then we had a huge, oh crap moment, right before that deadline, and then even if we didn't get everything done by that deadline, we still managed to get done by the final deadline, because we were able to, you know, we got the crunch in, and then it was kind of a relaxed crunch for the rest of the week until the final deadline. So strategies like that, like training on how to, like, you know, there's obviously there's tools that work for managing certain types of neurodivergence, and strategies that work for dyslexia, dysgraphia, all the things. These are things that my team had, and you know, training on that, especially if you have a team where you know students have these disabilities are neurodivergent, and you have neurotypical members that may not have issues with, like, starting early and working toward a deadline, or, you know, flexible schedules, just sharing strategies that work for various situations, so they could be done with, like, a survey at the beginning, or just understanding."

Carrie had this to say: "I just wanted to add a suggestion, real quick. In terminology, of course, my quick suggestion about the terminology of artificial deadline is to change it to internal team deadline, so that you have accountability to your other teammates and building in that buffer time before the final version, whatever the deliverable is that your team has. I actually just want to add one little thing. Okay."

Bridget chimed in, "I was just gonna say, when I, so I was, you know, around 40 when I got the ADHD diagnosis, and it explained so much about a lot of things that had happened before. It's like, oh, that explains a lot, and I started experimenting on myself, you know, I teach a big lab class, and experimenting is what I do. So I started experimenting with myself to figure out what helps me focus the most. So, if I have a big stack of things to grade, and I actually started a little experiment where I had different background noises and see how many pages I got graded, and I found out, you know, silence doesn't work, and music, I start to pay too much attention to it. I tried

all these different things. I found that, you know, found footage horror movies are actually some of my best things to have in the background, because they all have one plot, so you don't really have to pay attention. It's like people go into haunted law with a camera, they get picked off one by one. Someone finds the camera at the end, so it doesn't really matter which one you're watching, and so you'll just have it as the background noise. And I found that very productive, but I encourage my neurodivergent students, especially ones who are just starting to think, you know, I think I might have ADHD, then experiment with yourself, even if you don't have a diagnosis, you know, look up on the web what they suggest for ADHD, autism, dysgraphia, whatever it is, and you know, start to experiment with yourself, see what helps. So turn yourself into a lab experiment, it's all good."

An audience member added, "So, my wife's a professor of special education, so I get a lot of this at home. So, there's a researcher named Todd Rose. He has a good TED talk about this. It's called Myth of the Average, and the idea here is that this is a very useful tool to show students, because he talks about what's called the jagged learning profile, and we talk about neurotypical neurodivergent, and we're like aggregating everybody that's neurotypical as essentially average, and functionally, yeah, we aggregate to an average, but there is still a jagged learning profile of every person, and so you get them to talk about their own jagged learning profile, and then in that process of like setting up that team contract, you talk about what is your jagged profile, it exposes or demonstrates the neurodivergent learning profile as well, and it makes loving level playing ground for all. And then also, like, as a neurotypical person, like I have weaknesses and strengths, I'm going to, in that jagged learning profile, I'm going to demonstrate mine as well. And that's the idea, is to create a jagged learning profile that magnifies the team, so I think an important point is that you can do this in such a way that everybody is doing it, rather than asking under talking to a specific neurodivergent student about what are your accommodations. It's like, let's see how you can impart it into everybody, I mean, that's a perfect example. Have everyone find their learning profile, not just the neurodivergence. I think that's that's a critical thing that I think, like a lot of these answers have kind of highlighted on this communication, not just communication between the neurotypical to the neurodivergent, but neurodivergent to neurodivergent neurotypical to neurotypical, having those those conversations regardless of neurotype everybody is exposing their own problems.

Another speaker commented, "That's a very excellent point about how everybody has their own learning curve profile. I would say that's good when you're communicating with students, because some of them, like my teammates, were very open about, hey, I have autism, right? I have ADHD, I have dyslexia. Some students aren't as open to just, you know, saying that to somebody that maybe, if you're a professor, they haven't had before, you know, it can be hard for them to open up. So that's why it's important to say your learning requirements to all the students. It's like, what do I need to do to help you learn, and how you present in these scenarios that you're going to have to do. I think it's important to phrase it that way, at least when you're starting with any new student that you is an unknown quantity."

The audience member spoke up again, "I've found the thought again, so the typically neurodivergent students and individuals have various coping strategies to help them fit in with the world at large, and so I think when we're having these conversations, especially for me with neurotypicalness, is that you have to recognize that the world is built for a neurotypical person and neurodivergent individuals have to create coping strategies to basically mask into that world, and so now I think in education we're having this awesome conversation of how do you make a how do you make a classroom inviting for everybody, and every learning type, and every thought process, and every background, and you brought up a great point of you have students that will have weaknesses, whether or not they're neurodivergent or neurotypical, and so helping them map where their strengths, and then where their weaknesses are, regardless of their either their learning disabilities or their neurodivergencies or neurotypicalness, I think is a great way to bridge that gap, because as a neurotypical person, I don't have to notice the things that a neurodivergent student would have to notice, like I don't have to notice that, you know, the font size is way too small for me to be able to read it, because I'm deaf and I can't hear from the back of the class, like I don't have to think about that as some of my other classmates would have to, and so once you kind of once

you create a conversation and facilitate with students who are neurotypical about maybe look at the world from a different perspective. I guarantee that there will be much more collaboration between neurodivergent and neurotypical students for the future in capstone process.”

Carrie spoke up, “Very good point. One of the things that I do want to also share with you, not just on neurodivergent individuals, but also if you have a deaf student or a student that uses captioning or an interpreter in a classroom, remember when you assign them like groups and everything, a lot of times groups will say, okay, let’s meet at 12 midnight and we’re going to work from 12 to two and you need to be there, and they may plan this the day beforehand. We can’t get an interpreter that early, and it really leaves the deaf individual out. And so, really, if you do have that work with your disability services and have your leaders meet with them, one of your questions is, what do you do? We bring in all the leaders at the very beginning, and we sit down, we talk about learning styles, we talk about there are going to be people in there that have undiagnosed disabilities, as well as diagnosed disabilities, or they’re registered with our office. How do you approach them? If you have a deaf student that’s in there, be mindful that you schedule two days out, so that we can try to get an interpreter for you, even if you meet at 12 at night, we can still make that happen. It’s just that we can’t do it on a whim, and you know, to talk about the student that we had that was stuttering. I don’t know if many of you are aware of anyone that stutters, but if they sing a lot of times or they rap, they don’t stutter. So, what we did with this student is he loved to sing, so we said make a song out of mechanical engineering of your topic and start off with it, and he did, and it was hilarious. Everybody loved it, because you don’t have to be serious when you do a capstone project, and he did that, and then it was calming to him to go into what he was talking about. People still remember it, because they remember his capstone project, because he’s saying so. Creativity is another thing that I really encourage you to look at. If you have the same standards that you do all the time, think outside the box, think, think, what could you do to help this student make an initiative to make a place in his position, like he was talking about with his group, how the communication was really open. I really encourage that, because the more communication you can do, the better it is, because there’s a lot of misunderstanding.”

Sarah then said, “Okay, we’re going back to question number two from Shraddha. I don’t know if we’re all aware that she did ask two questions, I had to write it down to remember. So, the second question we kind of touched on it a little bit, but it was, How do we support students who are learning they’re in the process of learning that they may be neurodivergent, that that there is such a thing as neurodivergent, that that that these quirks that they’ve had that they’ve had to mask for so long are actually things that you can embrace and then find ways to to accommodate within yourself or with with your with your teammates, so how how do we handle that? So I’m going to, I’m going to preface that while you’re thinking about your potential answers, but, but one thing that I found is is to direct them to social media, because there are some amazing content creators who are neurodivergent and in STEM fields, and they’re normalizing what it’s like to be a STEM person who is neurodivergent, and there’s some amazing content creators out there that help me. I’m in Bridget’s boat. They help me at an old age, no, at a more adult age, learn that I’m neurodivergent, because there’s some content creators that’s like, oh my god, I do that, and then his next content was something on on how to how to gain your own mental stopping ability on this, this, and this. So, there’s some amazing content creators out there. It does mean that they have to be a part of social media, but there is stuff out there to kind of direct them towards, to make them learn about themselves.

Bridget added, “That goes along with my, you know, do some experimenting on yourself. What works for you in terms of writing, in terms of studying, in terms of whatever it is, and also there’s so much that we can do as professors that’s really not that hard that makes it so they don’t have to worry about accommodations, for example, at the beginning of term, you know, if you, when you set up whatever your particular course management system is, if you can put up all the, you know, all the modules, all the work for the entire term, at the beginning of the term, right there that helps so many students with their planning, their executive function, and so on. If you can have all the lecture notes up, either in, if you use PowerPoint or whatever in PDF or PowerPoint form beforehand, then they can take notes on those. Some of my students have told me they like to be able to read those before, so that they know what to expect, and professors sometimes are like, well, I don’t want to put

my lecture notes out, or I'm not going to put it out until after class, or else they'll look at the notes and not come to class, if they're, and that I don't find that that's entirely true, and it just helps them so much. It's just these little things, putting the captions on PowerPoint takes half a second, and it's so much. They're not perfect captions. Sometimes they're kind of like surrealist poetry. It's kind of fun to watch them go by. But it really helps the students who may not be able to hear as well or understand, because it's 8 am and I'm mumbling, you know, whatever it is, so there's really easy things, and I know there's a lot of controversy about recording lectures. It's like, oh, if we record lectures, people won't come, or if we have it on teams, people won't come, and sometimes I mean, I teach 8 o'clock classes, I know that even if, whether I record things or not, I'm going to have a bunch of people who are not there, because it's an 8 o'clock class. I get that, but if I'm recording and I have it on Teams, if they're tuning in on Teams at 8am instead of being in front of me, they're still tuned in, they're still doing the in-class problems, they're asking questions, and if the point is to have them learn, then I'm okay with that, and if that, if my reporting it allows them to review it and go back to it, or just, you know, I had, I woke up with the flu, and I couldn't focus that day, it's so easy to do, and it is just so beneficial to all the students, but particularly the neurodivergent ones."

Carrie said, "I would encourage, if they come to you and say, I am neurodivergent, even though that is a kind of a group of things, they could be also dyslexic, have learning disabilities on top of ADHD or autism. Encourage them to come to the Office of Student Accessibility or your Accessibility Resource Center, because there may be some accommodations that they can get that will treat them equally, but please start, start them out there, because you don't want to put yourself in a position that you're trying to accommodate them without having someone behind you to back you on that. One of the things that we do at the UT Dallas is that we give a software to all of our students in it called Geneo, and Genio is a software that's a note-taking software, and it helps organize some of their notes for them, especially students that are ADHD. But what I love about it is they can go into it and say, okay, help create a test, help me create a multiple choice test from my notes, and then they can start practicing on that. You'll be surprised how many students don't know how to do an essay exam, because a lot of times they have been doing multiple choice or they've been doing Scantron, so this kind of helps start that, but to add to that, Universal Design is another component. It's out there. There's a lot of research, and if you're not aware of it, it's called Do It, and it's at the University of Washington, and is they have wonderful resources for faculty, and what I like about it is it can help you with making a universal design classroom where it meets everyone, and I encourage you to look at that if you're teaching."

Kevin said, "So on my capstone team, in my experience, there was one member who was neurodivergent, and I was lucky enough that he had a very, very good handle on all the things that he had to do in order to potentially mask in with society, and that really helped me understand him better, and understand neurodivergence better. Where I'm going with that is, if you have a student who, you know, college is a time where students find out a lot about themselves and about other people, it's a huge, like it's a place of growth, so somebody is figuring out their potentially, if they have disabilities, or if they have neurodivergence, and they're, they don't know quite yet what their, what they have to do, what works for them, what doesn't work for them, it's, it can be hard for them to do that, and also to do assignments, and all that stuff, so I believe one of the best ways is to have them interact regularly with somebody who understands neurodivergence. Professors who have, or are neurodivergent, are uniquely suited to, like, helping out with this, obviously. But maybe just a seed is an idea. It's also possible for when you're doing teaming, when you're assigning teams, potentially there is an opportunity for finding students who have, I guess, experienced neurodivergence, like my friends, and teaming them with people who are potentially figuring it out. That can be so, so helpful for them to, like, you know, help each other in terms of this isn't working for me, but you kind of understand where I'm coming from, whereas other people might not, so you can help me figure it out for myself, so I can help communicate it to other people, so that'd be a strategy that works."

An audience member had a question comparing student athletes who struggle with struggling neurodivergent students. "I think, how's comes to this; this is part of accommodation. If the student doesn't want to talk with the student sport office, because I do have a student right now that is refusing consistently to speak with the student sports center, and it becomes, it is becoming an issue of actually being very aggressive to the other students in the team, and if I take the student out... I do not want to actually discriminate against the student himself, but if it was not a neurodivergent student, I would have taken the student out, so that's like the question." In essence, the audience member wanted to know whether bad behavior should be tolerated by neurodivergent students.

Carrie replied, "Remember, they still have, you know, a disability. If they don't want to disclose their disability and they don't want the assistance, then what we do is we sit down with them, or the faculty, we encourage the faculty member to sit down and say, look, we have services here to help you have an equal playing field. However, you have elected not to do that. I have to treat you the same, and it's starting to look like it is a behavioral issue or a discipline issue here, and there are times that we just have to send them to the discipline. Another thing is, if you have a behavior intervention team on your campus, refer them to there, because a lot of times we get involved in that as disability services, and we can try to encourage them, hey, we don't want this to become a discipline issue. I encourage you to do intervention of, like, a behavioral intervention. I don't know what your campus calls it. What's that reporting of a student? Yeah. Do you have.. how many of you have, like, an intervention team, and we call it Bate because it's Behavioral and Intervention Team. You should have one on your campus, both campuses have them, and I would just refer them because then what it is is the whole team gets on there and then they can work with that student and try to get them to resources, we have a basic need program on our campus that will also help with that, get them outside resources, because there may be something else going on. They may be homeless, they may be, you know, food insecurity. We don't know, and they're not telling us."

Sarah spoke up, "I'll add on to that, or do a plus one, like Kevin said, I like that way. That a lot of times when I see major issues with a single student, like something's not right. If I sit down with them and just ask, what's going on in your life right now outside of capstone, because I feel like what's happening in capstone, your stress level is not because of capstone, it's because of something else. Can you, can you tell me what's going on? And almost always it is something like I have actually had a number of students who are houseless. I've had a number of students who, it turned out two family members died within a week of each other, and they were international students, and they couldn't go, you know, pay their respects, but they didn't feel comfortable telling that to their team. They felt like their team would look down on them if, if they disclosed this information, but they were okay with talking to me about it. And then, then I could figure out, and oftentimes just offloading, letting them offload to you is enough to then say, okay, let's, let's set an internal deadline. I love internal deadline now to get you to hit this, so that we can move, move past it, kind of thing."

Darien Schwarz had a question next. "It's actually almost the same as the first question, but I'm Darien Kutter Schwartz. I'm at the University of Colorado Boulder in mechanical engineering, and a teaching faculty there. For a bit of context: we have a fairly large department, so it also means that our sizes of our teams at large, our industry section that two of us teach is 250 ish students. We have 30 teams, and many of our teams are eight to 12, which are big. And based on today, yes, when you all saw the survey, we have large teams. All of our teams have roles that are on them, and our project managers over the years, when you have teams that big, it is pretty usual to have multiple issues on a team, in terms of folks with mental health issues, folks who are going, who identify as neurodivergent, folks with disabilities. We have project managers who can have multiple folks on a single team, which is a lot for someone to take on a 22 when they're also learning themselves how to lead a team, how to do the technical work, how to do the professional skills, how to manage getting a job. Their own mental health starts to actually suffer, and we watch this actually more and more now as our, as the disabilities have become more severe, and this also is in K through 12. We see a lot of support, and then we throw kids into college with no support. A lot of our folks who come to us, their disability letters, we get pretty much all say time and a half, and that's all we get. Within six weeks, we figure out a lot of what's going on. A lot of the strategies you all talk to us

about, our teams use, our project managers use, but we'll let you know the thing they're now asking us for is, Can you give us resources? They said, I am not equipped to walk in and manage a team like this, even though we give them training around project management, even though they're curious and they talk one on one with team members to understand they will look and say, I am trying to support nine to 10 team members, and I'm not equipped to do this. I am not equipped with the resources to know enough about strategies. How do we, so it's not just the fact they want to talk, they want to be trained as a leader to lead people well and make sure they're cared for across all these different issues. So, I guess the question I have for you, we've heard two resources so far. The one we just heard was from TikTok, right? Because what that is, what our students are now asking us for, which is what are trusted resources. We brought up Todd Rose, I know we had talked about some of it, but when I'm going to do it came up from University of Washington for Universal Design and resources for faculty, and I'm sorry, I'm not looking while I'm talking. Also, in the question I have is, do you each have resources you could give us, trusted resources that you could say yes when we have, because these are engineers, right? They want to go learn and read, and they're curious, and they're like, can you give me resources so I can go educate myself? And that's what my question is. And it would be for anyone in this room, if you could say, hey, these are trusted resources you could share with students who are leaders on teams and other team members too, right? Because sometimes we have to train entire teams. We had a team this year with one individual who was deaf, one individual who was quite autistic, and we're talking, it's the end of the year, but that's what we're, my question is for you all. If you have found that there are really good resources, that if you had someone who came to you and said, what would you recommend for a resource, that's what my question is to the panel."

Sarah then asked the panel for their suggestions about resources. Carrie responded first. "This is the reason why I have really made it a mission of mine to be in communication with the Mechanical Engineering Department. I go to their meeting. I am almost over there three to four times a week, because you're right, there are not resources out there, and unfortunately, there are some resources out there, and I know that she's going to share some, but that's something that you've really given me a spark on that I need to go back and start creating, because you're right, my brother's an engineer, it's black and white to him, so, and here I am, Miss Gray, and he doesn't get it, and so I've had to really look at, and I do think that you guys are asking for this, I do think it's something that we need to bring to your table, because we do have a lot of people out there that are getting into the engineering program. So, at the beginning of our capstone process, we have required reading. We read, I'm sure you guys have heard this, but *The Five Dysfunctions of a Team* by Patrick Lencioni. We have that as required reading, and then we discuss it as a team, and I've seen that the teams that were more ethical were the ones who read it, because they had a much better understanding and agreement with one another of what a dysfunction looks like and how everybody can contribute to it, even if you think that you're not. I also know that the Project Management Institute, I believe they have free tutorials for students, and I found a lot of my resources on LinkedIn Learning. We got that free through Mason. They have wonderful tutorials about project management, specifically in engineering roles, because that mental burden is massive for a student who's working part time, like my background, I was doing research, working part time, managing a team, you know, x y and z family things come up, you know, and so luckily I had a team that in our contract we basically created like a hierarchy of if I have to step down, who's going to take over my role? Like, if I can't do it, who, if I say this is my limit, I've hit my upper limit, they'll step in for me. And we instituted that in our team contract. And then I also think that it's really helpful to empower your students, we have a, we have a course called *Developing the Societal Engineer*, and that is a course in the first semester of your capstone process that covers engineering ethics, engineering leadership, and our department brings in guest lecturers in this class specifically who talk about their real world world experiences, and that was a great place to network, and for me to find mentors, because that was how I pretty much made it through this year, is like I found mentors, I found people that were engineering leaders that I could lean on, that I could ask for assistance with, and I could ask for help from, and so encouraging your team leads and project managers, and having multiple project managers on one team. I mean, we were five people, you know, having a team of 12 people. I can't even imagine being a project manager on that one in an undergraduate

environment. So, power to them, but encouraging them to find mentorship outside of the classroom as well, I think, might be helpful too.”

Shraddha Sangelkar chimed in as well from the audience. “I guess the one thing I'll like emphasize is that it's all very good. At least my school, Rose Holman, has an engineering management like department kind of thing, and it's there's classes out of engineering management. There's see, I don't even know where they are, but that's the thing, is if you can figure out resources that your school has that can teach leadership strategies and kind of do a little bit of intramural collaboration where they can help with the content of the capstone, where you actually can present like leadership training in the early stages of capstone, because I do think that that's important content for like the course area of capstone, is like how do you lead a team, even if you're not leading a team? How do you, how does your leader lead the team, and what can you do to make it easier on them? And if that, if you can find the content in places like LinkedIn Learning, or even on social media, you know it exists out there, but a lot of universities also have stuff in their, in their wheelhouse, or in one of their departments that can provide teaching assistance on that. So, if you can find that and link it to your department, then that would probably work pretty well too.”

Bridget offered her suggestions. “So our college has this neurodiversity initiative that was started by our dean, who has two severely autistic kids, and I will, I actually just emailed the link to you, Daria, but I'll make sure it gets into the notes as well. I have no idea how to, if we can project or anything, but what if you go, if you just Google Northeastern University Neurodiversity Initiative, you should be able to find it, and this has resources for educators, it has resources for students. We do a neurodiversity conference every year. We just started a couple years ago. It will be at Northeastern later this summer. I should probably find out when, because I'm supposed to be leading a session on neurodivergent instructors, but there's a consortium of folks that are working on its Northeastern Yukon, Vanderbilt, University of Rhode Island, I think, University of New Hampshire, and so there's there's folks who are working on helping educators and to help their students to change up their classrooms, so it's, it's a lot of, there's a lot of information here, it's got links to a lot of other information as well. So I highly recommend it. There's, you know, worksheets for students on studying and executive function. There's information for educators about what does this look like in your classroom, so there are useful resources out there.”

Below is a list of resources and also a table of information for people who are interested in knowing more.

Listed of trusted resources

- 1) Tiktok
- 2) Do it - U of Washington
- 3) Kerry Tate (UT Dallas) - plans to look into creating the resource list - put your name and email below if you want this list of resources
- 4) <https://neurodiversityinitiative.sites.northeastern.edu/>
- 5) <https://open.ed.ac.uk/nest-neurodivergent-peer-support-toolkit/>
- 6) Job Accommodation Network : <https://askjan.org/>

Name	Emails
Shraddha Sangelkar	sangelka@rose-hulman.edu
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Keith Stanfill	stanfill@utk.edu
Katy Daniels	kdanie29@vols.utk.edu

Speaker 4 1:08:51

Someone offered up, “ I use this not just with capstone students, but oh, sorry, not just with neurodivergence issues, but when the team is struggling as such. I have them go in a circle and talk about what is going wrong and how can we fix it, and they all take turns and talk about that, and then they go back in that same circle and they see what they heard from other people, and through that, a lot of other issues have come up, not just this, but you know, and one of the students told me that he had an English wasn't his first language, and he was talking to himself in the garage before talking to his team, and they all immediately like shifted their perspective and started helping out and stuff. So it's more like a strategy than resource.”

Someone else added, “From Open Ed, there's a, it's called Nest Neurodivergent Peer Support Toolkit, and so that's a useful tool that could be Neurodivergent Peer Support Toolkit, and it's abbreviated Nest, and it's from Open Ed out of the UK, so this may be a useful tool as well.”

One of the students spoke up next, “I'm Noemi, a recent graduate from George Mason in mechanical engineering, and I'm hearing a lot of talk about how to prepare students in their college career, but not a lot of talk of how to prepare them once they get into industry. So, how do you go about approaching that conversation for a student that has just started their job and needs accommodations to their employer, whether that's like for example, for me, I don't know if I could focus for from my nine to five strictly, and I'll probably need breaks and need to work overtime. So, how could I approach that conversation?”

Sarah responded, “All right, that's a brilliant question. So, we, we have disability accommodations for K through 12, we have disability accommodations for undergrad, grad, but what do we do once we're in industry?”

Carrie's response was, “I really encourage you to work with your career center, because that's one of the things that we work with very closely with our career center on is how do you disclose your disability and when do you disclose it, because there are going to be some accommodations that you're going to need, you may need in your job environment, and I really encourage you to look at that, because once you leave the institution, the obligation is still not, is not really there. We still want you to, as an alum, we want to help you, but once you exit the institution, there's not a whole lot that we can put in, but if you can do it beforehand, right before you leave, go to the career center, start working with them. One of the things that we have noticed, we've got about 675 students that are on the spectrum that have disclosed in our office. There are many more at our institution. Our institution was a graduate school before it became an undergrad, and so that's one of the things that we've been focusing on, is that a lot of these students don't have jobs, they have never had a job, so once they get into their capstone, they also are starting to panic, they've not had that experience, so that's one of the reasons why we're encouraging them to go to the career center when they're freshmen, sophomore, and juniors, seniors, to try to get them to start practicing on their disclosure to their employer, but here's another thing, for you, I would go to Jan is J A N in a Job Accommodation Network. it is a really good resource if you have students that come to you and say, "Hey, how do I ask for accommodations in mechanical engineering? And as a project manager, you can go

to that website and it will pull up that job description, and it will also make some recommendation for accommodation, and I really encourage you to do that as well.”

Bridget described another approach. “I know the way we do it at Northeastern is we’re a co-op school, that’s what we’ve been known for. We’ve been a co-op school for a long time, and part of our neurodiversity initiative was working with our co-op employers to identify ones that are willing to work with neurodivergent students for co-op, and train the managers of the co-op employers how to support neurodivergent workers. There are several companies hiring neurodivergent people, just to remind myself, Microsoft, Google Cloud, SAP, IBM, Dell, Wells Fargo. What do they say? Charles Schwab. A lot of these, they have neurodiversity programs where they are actively trying to hire people who think differently, because that’s the what neurodivergence is having a different way of thinking things, and it can lead to some really out of the box thinking if you support these folks, and so these have programs where the managers are trained, and often they’ll match a new neurodivergent employee with a buddy employee who can help them navigate, how do you do work when you’re not used to it, and getting more of these internships or co-ops gives folks practice before they get to that point, and we had, we had a student who was, I mean, he was autistic, but he could do like calculus in his head, and you know, he saw everything he saw, he turned it into equations, and he was just out of the park, brilliant. So we found him employers to interview with, and he ended up getting hired, I believe, by Dell, because he could just, he designed these amazing things, but it just working with him, he had to, he needed certain things, he needed, you know, a distraction-free office, and things like that, and I, I’m the same way, like, I need to have an, they’re doing more and more shared offices, and I just said I need to have an office with a door that I can shut, so I can focus, or I’m never going to get anything done. I don’t care if you put me in a closet in the basement, but I need my own office, and so I’ve managed to keep my own office, which is good, because right now I have an understanding boss, but there are companies out there who are working specifically with neurodivergent, neurodivergent employees, and that’s what they want. So, there is a little bit of working, a little bit of searching, you can find these, and a lot of it is just the same with students communicating with your manager, even if you don’t have a formal diagnosis, just saying, “Hey, is it possible for me to say wear noise-canceling headphones because the cube farm makes me crazy? or, you know, “Is it okay if I work from home because I’m less distracted there? or “If I can work hours where there’s fewer people, or whatever it is, so just talking is really helpful.

A final question was posed to the panel: “What is one change you could recommend to capstone faculty that could be implemented easily and immediately in their capstone program to help disabilities, neurodivergence, anything like that? What’s one change that you could consider that would be so easy to do.

Carrie began with, “My one change is what I mentioned I’ve been doing for four or five years now, that’s made all the world difference in the world is normalizing it’s okay to come talk to me, and that there are others before them who have had accommodations or not had disability accommodations, but we work with them one on one, and it’s okay to come talk to me, and that has made all the difference in the world. If you just start the first day off with just saying, hey, I’ve had people with stutters, I’ve had people who were deaf, I’ve had people who had executive dysfunction, and we’ve worked with them, it’s okay to come talk to me, so that’s the one change that I would recommend.”

Next, Bridget said, “One change I would recommend is doing a start of the term survey with all your students, and one of the.. I asked them things like, you know, what is your learning? What is your best learning style? And how can I help you learn? And in the prompt for that, I asked them, you know, are you neurodivergent? Are you someone who you know prefers to read versus listen to things, or whatever it is, so it’s not just you, are you neurodivergent, but that’s one of the things that I ask about, among others. It’s like, what can I do to help you learn, and I get, I get a lot of really good answers, and a lot of times it is, you know, I’ve got ADHD, but I didn’t get accommodations, so sometimes I might need an extension or something, and it’s just a real easy way to get to know your students, all of them, and get to know what they need.”

Another speaker said, "I say, go and talk to your disability service director and try to get them to be on your side. I have learned so much about the mechanical engineering program, and I have really built a good rapport with them, so that they communicate to me when there is an issue that's going on, instead of letting it become a burden to them. So I would encourage you to try to go and sit down and have a meaningful meeting with them, and say, hey, look, we want to be on your side, and we want to support you, but what can we do to try to help these students before I get frustrated, the department gets frustrated, and the student does."

Lexi added, "This one's gonna be just like very ridiculous, but just you get two free absences a semester. I know a lot of schools do this, but I think that it's very, very awesome for an educator to put that into their course curriculum, because you get, you get one or two free freebies if you can't come to class for whatever reason, you don't have to communicate it to me. I'll understand that you can't be here, but we had that in our capstone process, and I communicated with my team. We had great team communication across our department, but that it's very helpful, especially if someone's having a very low functioning day and they can't communicate. It's it helps nip that issue of why didn't you come to class if you give them that too. And then we use online attendance trackers for our program so quickly, or whatever it's called, quirky, or whatever. And then they'll just take those off, just because attendance is a large portion of our grade in our courses,"

Kevin finished the question saying, "So this one's not going to be like a super easy one minute fix, I would say, but I know there's another panel here about like onboarding for instructors, you're just getting into capstone, but adding something to the capstone instructors' knowledge about how to spot common teaming issues and how to spot, I guess, common issues that people have who are divergent or who have ADHD or dysgraphia or dyslexia, or these any of these cognitive disabilities, because you know it's one thing to talk to people, but if you're able to notice it quickly, and that'll kind of guide you in helping start that conversation with the student, so again, not not something you can implement like super easily, but some amount of training in noticing when there is a teaming issue that is something that's easily fixable, and you just have to talk to them about it, especially, especially easy fixes, because obviously it's not - you're not going to become like a super expert in team management, but if you're able to help with certain situations that crop up a lot with project management or teaming with early virgin and neurotypical and individuals, then that can go so far, in addition to being a clear communicator and listening all that"

Sarah then thanked the audience and the panel, and the session was ended.