Hello, everyone. I'm Rory Cooper. My pronouns are he/him. I'm a white male wheelchair user due to a spinal cord injury, and I'm sitting in my office. In the background are some bookshelves and some items on the walls. And I would like to welcome you to the third event of the National Academies of Science, Engineering, and Medicine Conversation Series on "Accessibility and Inclusion in STEM." And I am chair of the committee, of our Planning Committee, and I'm honored to be with you today. This conversation is the third of five separate conversations. We hope that you were able to watch the prerecorded keynote lectures prior to attending today, and I hope you will enjoy listening to our speakers, who will be here live with us for a discussion. If you had not the opportunity, you could always view them after the event. They are posted online. Our goal for this event will be to offer an opportunity to active--proactive discussion among the speakers, panelists, and those who are listening in via Slido. For those of you viewing in Slido, you can ask questions in the Q&A section of the website. We will do our best to consider your questions and bring them into the discussion. Thank you for participating in this process. I think it's very important for the future of making STEM accessible for individuals with disabilities. At this time, I'd like to introduce each of our Planning Committee members. So I will call on them, and if they would provide their name, title, and affiliation. So I'd like to start with Dr. Emily Ackerman. Good morning, Emily.

Emily: Hello. I'm Emily Ackerman. I am a post-doctoral researcher at Harvard Medical School. I use she/her pronouns, and I am a white woman with brown hair and a green shirt. You can see my wheelchair behind me.

Rory: Thank you, Emily. Next, I would like Dr. Sheryl Burgstahler to introduce herself.

Sheryl: Hello. I'm Sheryl Burgstahler. I direct accessible technology services at the University of Washington, where we have the I.T. Accessibility team for our own campus to make sure we procure, develop, and use accessible technology, and the DO-IT Center, DO-IT being disabilities, opportunities-internetworking, and technology.

Rory: Thank you, Sheryl. Julian. Dr. Julian Brinkley, would you please introduce yourself?

Julian: Hello. My name is Julian Brinkley. I'm an assistant professor of Human-Centered Computing in the School of Computing at Clemson University. I use he/him pronouns, and I am a black male with an orange shirt. Thank you.

Rory: Thank you, Julian. Caroline Solomon, would you please introduce yourself?

Caroline: Hello. I am a professor of Biology at Gallaudet University. I'm also the director of the School of Science, Technology, and Accessibility for Public Health. My pronouns are she and her. I am a white woman with brown hair. I am sitting in my home office.

Rory: Thank you, Caroline. And last, I would like to introduce Dr. Chris Atchison.

Chris: Good morning, folks. Chris Atchison, professor of Geoscience Education at the University of Cincinnati. And I use he/him pronouns. I'm a white male, balding. I have a beard, white-and-blue plaid shirt.

Rory: Thank you, Chris. I didn't realize you're going to be representing the Super Bowl team... today, huh?

Chris: No, that won't be me. I'll be on the sidelines for sure. [Laughter]

Rory: Well, thank you, all of you... not only for your great work on this committee. It's been very helpful. We've gotten right to the halfway point now. So at this point, I'd like to turn over the meeting to Dr. Chris Atchison, who will be our moderator for today's discussion on "Accessibility and Inclusion in STEM" in the context of field-based research and education. Thank you, Chris.

Chris: Thank you, Rory. Appreciate it. Good morning, everyone, here in the U.S., and good day to those of you from wherever you are joining us. Before we dive into our conversation with our panelists and our keynote speakers, I want to provide the opportunity for our speakers to give a brief overview of the highlights from their prerecorded talks. As Dr. Cooper stated, we hope that those of you joining us today had the opportunity to view the prerecorded presentations before this conversation. But if not, the videos are available on the event website, as will be the recorded version of this conversation. We had two excellent keynote presentations for this conversation. First, I would like to call on Dr. Michele Cooke, professor in the Geosciences Department at the University of Massachusetts Amherst. I'd like to point out that she is also the founder of themindhears.org, a blog by and for Deaf and hard-of-hearing academics. And she is also the recipient of the International Association for Geoscience Diversity's Inclusive Geoscience Education and Research Award in 2020. Dr. Cooke?

Michele: Thank you, Chris. I want to share that my sign name... Also, for visual self-description, I'm a white woman, middle aged, with shoulder-length brown hair, wearing a black shirt and sitting in my home office that is blurred, and provide a short summary with the several obstacles that I pointed out to accessible field experiences. And the first one is this misconception that, "Well, we've always done things this way, and because the way we've done" things has worked for me and my colleagues, it must be the best way forward." And this sort of leads to the idea that if we continue to do things the way we have, then we're going to continue to exclude people who haven't been participating in the past, and it doesn't lead us to more diverse scientists. And so one of the ways that we also do this is in the glorification of challenging field condition. When we're promoting our discipline, we might show a picture of a tent on a hillside in a very remote area. And when we show those kinds of pictures, we're trying to draw in people who are comfortable in those settings. An able-bodied person might see that tent and think-- How am I going to... "How am I going to refrigerate my medication?" "How am I going to charge my assistive listening devices?" How am I going to get there? Right? So having those promotional images discourages inclusion. And the third one, which we'll be talking a lot about, is ableism, and in particular, I pointed out the sort of charity model... that comes into play when we are working in the field. Often, the field trip organizer is seen as the person who is sort of knowledgeable about the area, most knowledgeable about the area and the person who...we turn to to sort of offer the accommodations, so that if someone raises a concern about the field trip, it's sort of the field trip leader's guide to fix the situation and provide that accommodation, in this very sort of benevolent model, and there's also ableism in terms of our interactions, but when we're in the field, we are actually all dependent on each other. And so we can sort of toss away that charity and benevolence model of things and more center sort of the disabled experiences and have the group be invested in the group's success and inclusion. And another obstacle is a misconception-- people thinking, "I don't have any disabled folks in my group, so I don't need to change anything." And the trouble there is that 39% of Americans do not report--disclose their disability to their employers. So we know that people aren't disclosing their disabilities. The other challenge there is having a diagnosis, which is the first step to asking for accommodation. That diagnosis is very privileged. It takes someone time, money, and effort

to get a diagnosis, and then the resources that you have once you have that diagnosis are also privileged. So we can't just assume that because no one's asking for accommodation, that there aren't needs out there. And so that leads to, How do we think about our field trips, knowing that some folks are not going to be expressing their needs? And then those kind of lead to, what I'll sum up with is, How do we make it safer for people to disclose their needs and share their needs? And how do we sort of think about universal design of these field trips so that we are including everybody who wants to be there? Thank you.

Chris: Thank you, Michele. I would like to now introduce Anita Marshall. Dr. Anita Marshall was our second keynote speaker. Dr. Marshall is a lecturer and researcher in the Department of Geological Sciences at the University of Florida. And she is currently serving as the executive director of the International Association for Geoscience Diversity. Dr. Marshall?

Anita: Thanks. So I'll do a quick summary of some of the key points of my talk. It's always hard to sieve this stuff down into the commercial, you know, break version, but one of the first points that I made was about, well, I guess most of us would call it the pipeline, the progression from novice to expert to employed in a particular discipline. So in STEM disciplines, people with disabilities are significantly underrepresented. But if you look at the interest in going into STEM disciplines in the high-school population, people with disabilities are well-represented. Somewhere in the college experience, we lose most of them out. And, you know, by the time we get to bachelor's degrees, master's degrees, Ph.Ds., with each step, we lose a significantly larger percentage of people with disabilities out of that progression. So...one of the reasons that this has anything to do with field work is because science disciplines with a strong emphasis on field experiences or lab work, those are the disciplines that have the lowest representation of people with disabilities in their workforce. So it's clear that those experiences, which are most of the time very inaccessible, are a significant barrier along the pathway to being a STEM professional. So one of the things that I spent some time on in my talk is to talk about ways that we can break down those barriers to inclusion in our field courses. There are things you can do that don't require significant amounts of monetary investment that still significantly improve accessibility, things like thinking carefully about the field sites you're visiting. I always encourage instructors to first think about what you want the students to learn and then take a careful look at where you're going, what you hope to learn, and if there's a more accessible place that you could teach those same concepts. It's also very important that you articulate a willingness to adapt field experiences before being asked. Get that idea out there to your students so that they're not the ones that have to broach that subject. Make sure that they know that you're willing to work with them. And provide interactive ways of-- provide alternative ways of interacting with the landscape and the material. There's all kinds of interesting ways that you can do this with 3-D prints and tactile maps and all kinds of alternative ways to engage with the material. Collaboration is a really strong approach for enhancing accessibility. Group work...allows students more flexibility and creativity and allows for some really powerful learning experiences, when they're not expected to get everything done by themselves. So that's another really good tool for inclusion. I finished up my talk by mentioning a few programs that have really done some interesting things in terms of innovative approaches for... improving accessibility, things like the Enabling Remote Activity project in the UK, the GEOPATH project from a few years ago that Chris was a big part of, and the library of excessive... Excessive! The Library of Inclusive Field Technology, which you can learn more about on the iagd website, is a lending library of tech tools to help enable access in the field. And there's some examples of really great virtual field experiences as

well. So I encourage you to take a look at the lecture for more information about that stuff. I guess I'll wrap it up by just saying that one of my key points is that if your departments do not offer accessible field courses, then field courses should not be a requirement for graduation. Full stop. And the lack of field experience should not be seen as a negative or held against students that don't have it. So either provide an accessible opportunity or take it out of your required courses. And I think on that note, I'll wrap up so that we can get to the discussion.

Chris: Yup, agree completely, Anita. Thank you for your comments. Again, if you have not seen the two presentations by Dr. Cooke and Dr. Marshall, please do take some time after this conversation to check those out. We are joined today with two additional panelists, who will join us for a structured conversation with Michele and with Anita. We are joined today by Dr. Jennifer Piatek, a professor in the Department of Geological Sciences at Central Connecticut State University, and Dr. Alison Olcott, associate professor in the Department of Geology and director of the Center for Undergraduate Research at the University of Kansas. Welcome to the conversation, Drs. Piatek and Olcott. I would like to kick off our conversation with some structured questions among our panelists... that were developed by our Planning Committee. For those of you listening in to the webcast via Slido, feel free to add your questions and your thoughts to the Q&A chat, and we will work those questions in after this structured session. So, Anita, I'd like to start with you. You made some really great points on the idea of this concept of recruitment and retention, how we have so many students that are interested in these field-based sciences, but as a result of this transition from secondary to post-secondary, we're losing them. So one thing that I would like to bring up is that there's been several studies on the way that we promote and market field science disciplines to prospective students. Are we doing ourselves a disservice by only promoting adventure and a high context on the natural environment in field-focused disciplines like geology and ecology?

Anita: Yeah, I think this is a really good topic for any department. When they're thinking about revamping their promotional materials or how they do their majors, fairs, or anything like that, they should be considering this sort of thing. So promotional materials, recruitment has a lot to do with what's often referred to in the literature as self-selection. So students are either going to opt in or opt out of courses in your major based on how they perceive their place in that major. So if all of your promotional materials have people rappelling off the side of cliffs and, you know, crawling on hands and knees through a cave, that's going to attract a very specific subset of the population who are already sort of inclined to those sorts of adventures and is going to disincentivize people that immediately see those images and think, "Uh, I can't do that, so clearly there's not a place for me in this major." I'm not sure if it does a disservice so much as it's disingenuous. I mean, the geosciences are such a broad field, and there are so many subdisciplines and so many different things you can do-- you know, lab sciences and computer modeling and all of these things that don't require that adventure aspect. And we rarely talk about them when we're recruiting students. So I think it'd be a more accurate portrayal of our discipline if we gave a broader, more balanced view of the career possibilities and research opportunities that are out there.

Chris: Agreed, agreed. Would any of our panelists like to follow up with that?

Jennifer: Absolutely, if I can jump in. I want to definitely agree with Anita on that. I look at my own department's website, and I see pictures of students hiking out in a field or scrambling up an outcrop, and that's maybe 1/3 of their work, that they're also-- those projects that they're working on, those are

going to combine GIS and satellite image analysis, or they'll be doing lab work in the geochemistry lab. And so not only are we-- you know, we're recruiting from a self-selected population, but we're kind of selling them a mislabeled body of goods here. You're not going to spend your entire field project out, you know, hiking in the wilderness in the middle of nowhere or camping in a tent. You're going to also spend a lot of time in a lab or at a computer, and that's what the career is going to be, too. You may spend some time in the field, but you're going to spend a lot of time in an office or in a lab, as well. So we need to make sure that we're selling an accurate model-- a representation of our field.

Alison: So I'm Alison Olcott, she/hers. I also want to enthusiastically agree. I think we have-- especially in the geosciences, we have a semi-unique recruitment problem, where people don't really understand what the geosciences are. I think for a lot of people, it's, you're looking for dinosaurs or you're looking for oil. And so I think by limiting how we're advertising this as "You're going to go out and climb mountains," we're really limiting the field, that there's so much someone can do as a geoscientist, whatever their identity is. And so by just doing this sort of "Indiana Jones"-flavored view of the geosciences, we're limiting our own field for everybody, which I think is really dangerous for the future of geosciences.

Chris: Agreed. Thank you, Alison and Jen. You know what? I want to follow up with this question, and I think I want to start with Michele here on this follow-up, because she talks a lot about this in her presentation. But, you know, there's a power dynamic at play here, too. And I would like Michele to kind of discuss this power dynamic. And I ask Michele, Do you think that there's a sense of gatekeeping in the field sciences? And talk about this power dynamic when it comes to doing field work for both faculty and students.

Michele: Sure. And I think, you know-- it relates to the issue of why people aren't disclosing, right? You may not want to be disclosing because of those power imbalances between the person who's running the field trip, be it the instructor or be it just the field trip leader. And it kind of goes back also to this model of, the person who has the power position is sort of the one who decides what accommodations is appropriate or not, right? That's what these conversations are usually about. That field trip person may or may not have familiarity with the disability, may not have familiarity with the accommodations, so they're not necessarily in the best position to decide what's most appropriate. So it's sort of an interesting situation. In the classroom, our modalities are more constrained than they are in the field. Also, in the field, conditions change. You know, conditions in the morning might be very different than the afternoon. And so establishing a way that you can sort of erode that power structure that might normally be within the academic hierarchy so that more voices can... participate in the decision making will also facilitate conversations about inclusion and access. I went off on a little bit of a tangent, but, yeah.

Chris: No. All good information, Michele. Anita, would you like to have a last crack at that question? Just, you know, Do you think that we're gatekeeping as a result of how we promote the science and how we recruit and retain, or attempt to retain? Are we gatekeeping?

Anita: I think, yeah. I think there's a bit of... I think there's definitely gatekeeping. And a lot of it, I've noticed, is around "tradition" or, like, how we've always done things. Um... If we want to come at, say, a field research problem a little differently than the instructors or the people who have done it before us, there's a lot of times some pushback against that not being "real" field science. We get that a lot on our accessible field trips on how, you know, if we use technology, you know, "Oh, well, we're going to fly a

drone out there and collect data that way" instead of physically walking out there," people often push back on, "Well, that's not a real field trip." Oh, and we often stay in hotels because they're way more accessible and it's incredibly hard to find accessible campgrounds. And we get pushback on that, on how that's not a real geology field trip because, "Oh, look at us. Fancy's staying in a hotel." And that's gatekeeping, too, right? All of that, it's cultural gatekeeping. It's basically, you know, sort of pooh-poohing more accessible, inclusive ways of doing things, you know, in preference to tradition. And so, yeah, that's a big part of the gatekeeping.

Chris: Yeah. I got to tell you, the older I get, the less I want to sleep in a tent. So I kind of prefer the way we do our accessible field trips, to be honest with you. You know, and so there's a few other things that come up with this that I would ask our panelists to kind of try to integrate these into responses as we move forward. But this all presents this sense of othering, that, you know, that "We're not doing it the way that we've always done it," we're othering the people who don't fit into that model. And then, obviously, there's this intense sense of ableism that our field science disciplines continue to portray. So think about those two things as we continue and see if there are ways to integrate those into your responses, if you would, OK, I would like to move on to kind of another focus, and I want to ask Michele to focus on this question here. In her presentation, she discusses a lot about universal design. And so, Michele, I'd ask you, How can we use universal design? How can we focus on universal design for learning when planning our field work?

Michele: Sure. I think Anita said it really well, to say that there needs to be flexibility in your plans because things may not work out. I would also add to that, the first solution you try won't work. Just plan on it not working. Like, just, I-- We've all encountered that, in the classroom it happening. In the field, you're even more vulnerable to your plans not working out, and your plan that what you think everybody can do, what you think everyone can access, they can't. And so just having a second plan. I also see this going back to sort of coming back to the core of, What is the importance of people to get out of that field trip? And, you know, as we were just talking about, a lot of people will say, Well, the outcrop... Or I'll try to make an ecology example. Though I'm in geology, I'm trying to expand it out. So if I want to get to that lake that's very far away, at the top of the mountain to sample something, "Uh, why is that lake the only lake that's going to serve the purpose of this field trip," right? So echoing what Anita said before. But I think the more we can kind of keep at the core what's really important, then that gives us a framework for being flexible about what our field trip is there for. And, you know, if another lake will do and the core concepts or the core skills or the core observations that people need to make are available there, then there's no reason to be limited and constrained to going to the lake on top of the hill. And then I also wanted to throw out this idea of, like-- I've alluded to it before-- this power structure where the field trip leader is seen as the one who, well, they've been there before, right? That's why they're leading the trip. So they know the most about the anticipated conditions. So it's certainly their responsibility to make those conditions known to everybody. And then what if, after that, like, they make the condition known, they set the goal, they say, "These are the observations we want to collect," what if, after that, they turn power over to the participants and say, "OK, how should we design the field regime so that everybody can participate equitably?" What if they didn't design the whole thing but just handed power over? I'm really intrigued by what field trips would look like if everybody was engaged in their design with some pre-knowledge of conditions and expectations.

Chris: Yeah. Would any of the other panelists like to follow up with that?

Anita: Uh, sure. This is Anita. So Jen and I are co-PIs on a project where we're going to find out exactly what that kind of a field trip looks like this summer. We'll be running a field course that centers the disability experience, and our students are going to help us design our field campaigns. The first week of the course is basically orienting them to the geology of the area, getting them familiar with, you know, what's out there and what to expect. And then the second week, they're going to help us design what field work looks like in an accessible, inclusive format that allows all of them to have a say in how we do what we do in the field. So I'm very excited about that. So I just thought I'd throw that out there, that we're going to see what that looks like this summer. [Chuckles]

Chris: Very good. You know, and I want to follow up with this because there's another really important piece that I want to make sure that our listeners hear from all of you. So I think it's great to center that, the idea-- the field study idea on the disabled experience. But how do current field instructors ask the questions about what students need? There's such a reluctance and almost a fear of asking students, you know, for what accommodations that they might need or if they have a disability. Or, you know, there's just this barrier that instructors are just afraid to ask. So how do they ask?

Jennifer: If I can jump in here--this is Jen. And I wanted to--I think this is leading to a point I've been thinking about, which is we all, as instructors, often have this boilerplate legalese language that is given to us by our university about students that have accommodations that have been assigned to them by the disability office and all that. But that's ignoring students who maybe don't have the sort of self-advocacy to go get that accommodation, or they don't have just the financial ability to get those accommodations. We forget that those require diagnoses and doctor's notes and all that. So what if, instead, we put on-- and I've tried to do this with my own-- put on the top of our syllabus that "We are willing to work with any student to make accommodations to make you succeed in this class"? Because, really, that's the goal, right? It's not to have you memorize this set of concepts in the back of my textbook or to hike to the top of that mountain or to get a sample of whatever. It's, "There's a learning outcome "that I would like you to achieve. So as an instructor," it's my job to say to you, "What do you need? You tell me." What would help you? "If you are struggling, can you tell me what would help you to get to that learning outcome?" And if we can demonstrate a willingness to adapt and to change when those accommodations are requested, then we should be able to help all of our students.

Michele: I would. Yeah, I agree 100%. And, in addition, you also need checks in during the field trip because conditions change, like someone who might be managing pain or managing fatigue. They might do fantastic in the morning, but by the afternoon, they've realized that they're not able to manage the field trip. So there needs to be an accountability, kind of, of the group for each other that happens during the conversation. So doing it beforehand but also during... whatever field campaign is going on in order to sort of check in with people that everyone is able to participate. And just wanted to emphasize, again, you know, not everyone has a diagnosis, not everybody has, you know, an official accommodation through disability services. A lot of these are going to be conversations that are happening in the moment that you need to respond to.

Anita: Yeah...this is Anita. I wanted to add real quick, it's also important to note that students are under no obligation to share any of that information with you. In fact, you know, if they don't want to disclose to you, they don't have to. That's their right. So this presents a challenge to people who are planning fieldwork. You know, How do you get students to open up about what they need? And I hammer on this with every presentation I give. It all comes down to trust. People with disabilities have been burned so

many times by disclosing our disability to people that we have an inherent distrust of the system. We don't trust you. So you have to start building that trust well before the field trip starts, so...

Chris: You know, and thinking about this asking for accommodations and requiring diagnoses and letters from the offices of accessibility services, right, we talked about this privilege. And, also, it creates this culture of othering, right? So I want to ask

Alison: Alison, do you have anything you would like to add to that idea?

Alison: Yeah. So I think this idea of building trust is really important, and sort of trying to encourage people to open up. But I would also sort of flip the notion on the head a little. You know, some people worry, "Well, if we don't know the numbers, if we don't know how many" disabled students we have, we're not going to be able to help them." But I would argue that even in this world of metric-driven higher education, we don't need to know how many students we have. If people don't want to disclose, they don't have to because, you know, the disabilities cut across so many identities, the accommodations that help students with disabilities help other students, too. They help visual learners, they help auditory learners, they help people who are, you know, single parents and can't go out and camp in the woods for a month or people who have to work or... I think it's just good teaching to do things like backwards design and figure out why you're taking your students out in the field or, you know, thinking about alternate ways to provide field experience where maybe you're going out and collecting storm runoff from in front of the department because you can analyze that rainwater rather than going out into a forest. So I would argue it's really important to build trust and make people comfortable with getting the help they need, but also, these kinds of accommodations really help everybody. So thinking of your learning goals, having your class work together to help figure out the best ways to accomplish your learning goals, all of those will help all of your students in addition to your disabled students. So I think we don't need to know how many of X types of students we have in our class or on our field trip or in our field station to help people.

Chris: Yeah, absolutely. And then to just kind of round that back to the conversation on universal design, when you have multiple representation of the different activities that you're trying to accomplish, then all of your students are going to fit into aspects of the activities and have a legitimate engagement and inclusion with the learning community. So I really encourage us to dig into UDL a little bit more. Michele, real quick?

Michele: Sure. I was going to add to that by pointing out that when we design the trip, we might say, "Compromise: hiking to the top of a mountain to go to something closer." There may be, you know, the billy goats, I call them, the people on the field trip who just love hiking, and they might feel like, "That's not fair. I'm not doing what I want to do." And what you do in that case is, those folks are used to having power on field trips. They're used to being the ones first at the lake on the top of the hill. They're used to being the fittest in the group. And by taking that out, they're not used to not being in power. So they may be uncomfortable with that. And I found that when I did a field trip where it was a mixed-- hearing and Deaf students-- and I taught in ASL and my hearing students, who had been learning from me with my voice until then, were really uncomfortable with that experience. I described it in the keynote. But what I recognized is my hearing students were used to being in power and the conversation being in their preferred mode, and they were very uncomfortable when the mode was not their preferred mode. And as field trip leaders and instructors, we need to recognize that for what it is and say, "It's OK for the folks who were in the power position to be in their discomfort zone. That's OK."

Chris: Yes. Thank you, Michele, for adding that. That's a very important piece there. I'd like to move on to the next question here. And Anita really kind of alluded to this reluctance of disclosure, and understanding that our students are under no obligation to disclose any type of a disability to any of their instructors, all right? So we need to make sure that that is understood from the beginning. But why do we have--so, Alison, I ask you, Why do we have this resistance to disclosing? And how can everyone that's listening work to reduce this resistance? I know Anita talked about this overall trust building, this anti-trust that students have, but I think there's a lot more at play here. So what can we do to include--or to build this culture of trust?

Alison: So I think it's a really complicated-- it's a large charge to try to undo, you know, a lifetime of sort of othering that people, when they disclose their identity, have this fear that they'll be treated differently as a result of it. You know, people don't want to be the reason that "We always go up to this lake on the top of the hill, "but because Billy's in class, now we're going to go to this other lake." You know, people don't want to be put in that position and feel that. So I think, again, is this idea of really deliberately--one way for it is really deliberately designing what you're doing and why you're doing it. So, you know, trying-- trying to explain the learning goals of your field trip, rather than "we're not going to this-- we're going to this cool outcrop 'cause it's really cool," but this is the science you're gonna learn on the trip" to try to make it clear why things are being done and not singling out individual students, individual accommodations. But I think it's really this idea of sort of building community and--and not doing a deficit-based approach that, you know, it's-- everyone is bringing something unique, whoever they are, to this field experience and really celebrating that, rather than focusing on deficits. But I'd be really interested in what other people have to say about this very large and complicated problem.

Chris: I want to follow up with that as well, as other people chime in here, but, you know, a lot of the work that we do, and I've talked to all of you about this at some point, was that so many people are reluctant to focus on accessibility because they don't see students, they don't see that the students are there, right? So there's this concept of self-reported data. You know, the data around disability, around the disability community is so-- it's so uncertain because, one, it's not a data set that's routinely collected, and in most--and for the most part, it's all self-reported data. So how does this impact the work we do, not really, truly understanding how large the community is that we're actually working to support? And then it goes back to this whole reluctance to disclose, so it's kind of a catch-22. We're trying to support this community, but we're really not sure how massive this community is. So what--what can we do there? Any of you. [Chuckles]

Anita: So, yeah, I'm trying to figure out where to even start. Um--heh! So... in a big-picture way-- so it's--this is very challenging for scientists who really... crave data before they have--are spurred to any kind of action. So when they really-- you know, when scientists really get interested in this disability inclusion topic, they want numbers that we simply cannot provide to them. They want granular detail that does not exist. And, in some ways, that's a real barrier to getting people to take this topic seriously, but on the other hand, it doesn't matter. For many of the things that we've hit on today, right, like, it doesn't matter. We--people with disabilities are here. They need support. It shouldn't matter if it's one or a thousand or a million. They're here. The other thing that I want to point out in field sciences is that--[chuckles]--like, there are people that do not consider themselves disabled, right, but you get them out in a field setting and all of a sudden, they have problems, right? They are... they--they suddenly feel disabled, right? They have, you know, knee problems or they have fatigue issues or things that never

bother them in their daily lives, but we're expecting them to do a lot more than just walk across campus when on these field trips. So we're not just talking about people who are formally recognized as disabled when we're talking about disability inclusion. And I will stop there because this is a soapbox I could talk about for an hour, so...

Chris: Anyone else like to respond to that one, you know, like Anita said here, and we all could? Like Anita said, there's a whole bunch of other disabling conditions that might not be considered a disability, but yet still have a major impact on our students. No? Nobody's gonna take me up on that? Jen, Jen, you're muted, if you were trying to say something.

Jennifer: No, I was just shaking my head because what Anita said, we could go on on this for a couple of hours, but I would go with-- there's also those temporary things that happen to students in the middle of field trips, you know, so your example of the billy goat student that wants to hike the 5 miles up to the top of the hill and the lake, maybe picks the wrong path up to the lake and turns an ankle, and on day two of the trip, they can't hike 5 miles up to the top of the hill. So our ability to adapt on the fly and to be willing to adapt will help all of those, all of those folks, whether it's temporary or a more permanent disability.

Anita: Yeah, and, you know, one of the other things that I think bears mentioning-- Michele often brings this little point up that this conversation, many, many times focuses on the student experience because that's what we're used to thinking of as--we, you know, we think of this problem as abled professors providing accommodations for disabled students, but the problem is bigger than that. There are professors with disabilities, there are instructors with disabilities, and there are all kinds of power dynamics at play in, you know, in all levels of this, so... I just--I thought I'd throw that out there as well, that, you know, we kind of narrow this-- I think this, again, is sort of this ableist perspective when we think of only students as having disabilities, rather than thinking of our colleagues and, you know, professionals in our industry and how there are people with disabilities at all levels of our profession, not--it's not like they just disappear after they graduate, right? So...

Chris: Yeah, and so we're going to--I want to transition to this last question that we have before we open it up to the audience, but the thing that I want to wrap up with that question specifically, and I think Jen alluded to this, was that, you know, how are we presenting our coursework? How are we--are we putting inclusion statements in our syllabi, on our website? You know, you're not just gonna go and put pictures up of students with disabilities all over our websites, and then those students come, and there's nobody there that looks like them. It's false advertising. But we can put this kind of text and descriptive information about our programs that talks about inclusion and accessibility. Those are things that we should really be considering. You're probably gonna create more of an inclusive culture... [Chime] with that, so all right. That was my timer. All right. I want to go to this last question here. I'm gonna ask Jen to respond to this. But, you know, we talk about the field being what we can go out and, you know, for the most part, access, it's right outside the door. But how might the practices for access and inclusion that we've discussed today translate across different field environments, like marine-based research or atmospheric or polar regions and planetary and space sciences? How might this work look in research, which you do, that's not easily accessible?

Jennifer: Absolutely. So this gives me a good chance to kind of point out the things that you can't see on the Zoom. So I'm a planetary geologist by training, and I am also a, by now, a paraplegic with a manual wheelchair, and that came as the result of an accident after I had gone through all of my...schooling and

my training. So I'm--one of the things that I've had to do is relearn, and I was, in a way, somewhat fortunate that I am a "Nintendo geologist," that most of my work is on completely inaccessible field sites on places like Mars or the moon, where I have to use remote technologies to access that. Well, we've been doing that in the planetary and space sciences for...centuries. I mean, Galileo was doing it, right? So we should be able to adapt to this, and it also gives us an opportunity to adapt how we train our geoscientists so we can look at how teams function in these different disciplines where we do have inaccessible and very remote field sites, and then we can bring our perspective into those where-- you know, one of the things that we often do in planetary is we'll use Earth terrestrial field sites as analogs, as ground truths so that we can learn how to interpret our data. Well, here we go. We're bringing in diverse viewpoints into doing this, so we bring in a diverse set of... of viewpoints, whether it's diverse because we have different disciplines or diverse because we have different perspectives, because we look at the world a different way, because we're looking at it through the lens of "I'm a wheelchair user. I need to think about terrain. I'm a person who has" a visual impairment. I interact with the world in a different way." So I think we can learn a lot from these, and it's not, you know, it's not, then, we're making the world accessible for, it's we're learning how to deal with--you know, how to view the world from different perspectives and to bring that, all of that into our science. And I wanted to--I see the note in your notes about this, that this was kind of the focus of a recent project called Astro Access, which brought a group of-- I believe it was 12 ambassadors who have different disabilities on a weightless one of the vomit comet trips, where they experience weightlessness to see how folks with these different ways of interacting with the world because they have a disability, how do they deal with microgravity? So there are a lot of people on the fringes of this research looking at--not as let's make things accessible, but let's see how these different viewpoints enable us to better understand our science.

Chris: Thanks, Jen. I wanted to call real quickly, also, on Dr. Carrie Solomon, who has done a lot of work in this as well, to respond to this, so, Dr. Solomon?

Dr. Solomon: Yes, yeah, so one of the things that we talk about when we're talking about field work is talking about field work on a boat. So, as a marine ecologist, we do a lot of work on boats and ships, and one of the things that is interesting about that work is ableism because it doesn't come from our colleagues, our fellow scientists. It comes from the boat crew. The boat crew captain or the crew is concerned about safety, and their ideas of safety on a boat are very different from my colleagues'. So, for example, they would be worried about, if we have to jump ship for some reason, how would we know to jump ship? And honestly, if people are running and jumping off a boat, I'm gonna do the same thing, right? Ha ha! But you don't really think about different communication systems on a boat, too, and... where people are and where people are permitted to be on a boat for the UNOLS Fleet, and so that had a pretty standard issue with that fleet's needs, and they had some guidelines about accessibility on all of their boats. And one really fascinating part about that is they had a recent student, a recent graduate student, and they would not allow her to take the safety course for the boat to drive, right? And Deaf people can drive cars, so Deaf people can drive boats, and there are parallels about that with ableism, too. So ableism is not only between colleagues and within ourselves, it is also other people and their misunderstandings of our disabilities and guidelines. And again, you know, disclosure is not always... it--sometimes you can't hide your disability. Some disabilities are very visible, and so you don't have the option to not disclose. So, with that, that perception of ableism is almost immediate, instead of having to have a conversation about what solutions exist. Each person has solutions of their own to share. It doesn't matter if we're on land or on water. And also, I'm thinking about how AstroAccess

impacts, too. So I was one of the people involved in that project, and one of the things that-- with the submarine was going underneath the water and going into the submarine. Man... I can't think about that accessibility without having some sort of... experience with it, right? And so, really, any part of the earth, disabled people can go. Why not? And of course, people worry, you know, "Maybe I shouldn't go to a certain area" or "If something happens, you know, "how do I evacuate from that area or, like, the Arctic?" and how we think about different able-bodied people in those environments and really embracing the diversity in those environments, and so, I mean, we just have to focus on listening to each person and making sure that we're satisfying their needs.

Chris: Excellent. Thank you, Carrie. Would any of our panelists like to follow up with that before we move on into audience questions? I mean, how do you follow that up, right? OK. I will ask that on-- anybody listening in, if you would like to add any questions to the Slido, we would be happy to entertain any questions you might have. We do have one here from the audience that I want to present to the panel: "Do you have thoughts on promoting cultural shifts in field-heavy disciplines?" "It can be very isolating to be the only one that can't fully engage" in field opportunities. "It's harder to make friends and have a support system, and it's often harder" to be seen as a top student in professors' eyes as well." Anyone?

Anita: So, boy, do I-- [chuckles]--empathize with that question. So my disability was the result of an accident at the end, towards the end of my master's work, so I did my undergrad and most of my master's without a disability, and then, when I came back to school for my Ph.D., the... the cultural landscape of navigating a geoscience discipline with a disability was so different. It was really astounding to me. I didn't realize how much of the...social capital in the geosciences is built around extracurricular activities, like field work and camping and that sort of thing. And...you know, it's--heh!-- it's pretty hard to build those networks if you can't participate in those kinds of opportunities. And it kind of goes back to our question earlier about disclosure and, you know, that sort of thing. There were several opportunities where, once people knew that I couldn't keep up in the field, they stopped asking me to go...right? Or, "Oh, you can't haul a big, heavy, "you know, pack of gear? Well, then what good are you in the field, right?" So you don't get asked to go for your brain and for your ability to be a scientist. You get asked for your ability to be a pack mule, and if you can't fulfill that role, you often, as a student, don't get asked to go. And so it's this whole sort of vicious cycle of, "OK, I disclosed, now I'm being shut out." Now, you know, it's-- [sighs]. Yeah, and I don't know what the magic answer is to that. I know it's incredibly frustrating, but I think part of it is building in these opportunities that don't hinge on field experiences, right, like building other opportunities to get to know your professors and future letter writers and people who might offer you internships or research opportunities, and for faculty to be more conscious of those biases and start thinking about how to include students who are gifted scientists and great thinkers without immediately thinking about what they can physically contribute to an operation.

Jennifer: If I can follow on, I'll try to be short, so cut me off if I'm going too long. This is Jen. I can absolutely empathize with the comments that you made, Anita, because as I think back at-- to when my accident happened, the invitations to participate with our geoscience club or to go on field trips with other classes disappeared completely the moment I was in a wheelchair. So there's never a question, you know. There's never an ask of, you know, "I know you can't "hike up the hill, but you can hang out at the outcrop by the parking lot. That's--" that doesn't exist anymore. And I think, unfortunately, it falls on... not only on us as disabled folks, but also on us as professor-- it's also on us as professors to make

sure we accommodate, but it unfortunately becomes on us as disabled folks to advocate and say, I want to be there! and "Make it work for me!" And I hate to do that because it shouldn't be our job, but until we can change the culture that requires that in order to be a geologist, you have to be able to hike up a cliffside and rappel down and get samples or whatever, that until that happens, that we have to be the squeaky wheel and insist that we be included. And we can also--I mean, if we can model that in some way by making sure that you include somebody who doesn't go on the hike, even if they don't have a visible disability, if we can model that there are opportunities to be that don't require that physical activity, then maybe we can help to foster that change. And we need to also not forget that there's a social aspect to sharing science that can be done in a classroom, in a van, in a professor's office, so that we're not just limiting our perceptions of who's a good student to who can haul a 50-pound backpack on a 5-mile hike.

Michele: Yeah, this is Michele, and I'm gonna add just one more little twist on this and... and something I've been calling, like, "cripping lab" or "cripping the field," this idea of when disabled people are in charge of the field trip, it looks really different; like, you want to go on Anita's field trip, you want to go on Jennifer's field trips because their field trips are gonna look really different than someone else's. Now, what this means is-- you know, the question was getting at how do we shift culture, and I think none of us has quick fixes for this. You know, that kind of change is slow, but we need to be putting having disabled people in leadership where they're cripping the field trip. What I mean by crippling the field trip is--is this idea of the field trip is designed inherently to be accessible and with various communication modalities and with various participation and low tech and high tech. And all of these things are considered because the instructor has a different point of view than what's been used to design field trips in the past.

Chris: And I'll ask, Alison, if you want to add anything to that, but I would like to add, you know, whose responsibility is it? We talk about advocacy here, and Jen talks a lot about, you know, it's really--it's fallen on the shoulders of the student to advocate for themselves. How can we change that? How can we change that culture to where, you know, faculty are aware, right, they're aware of able-- that ableism exists, they're aware that students all have very different things to... to focus on, to worry about, not just-- it's this high cognitive load that they are dealing with, not just focused on the content. Alison, do you have anything you want to add to that?

Alison: Well, I think Carrie had her hand up, so—

Chris: Oh, I'm sorry. OK.

Alison: may want to let her—

Chris: Carrie? Yep, thank you. Carrie, go ahead.

Carrie: Yeah, I was trying to answer your question, but at the same time, I'm thinking I want to add that we need to change the narrative, especially with work in the field, because we talk a lot about what a disabled person can contribute to the field and in different ways. But one way I want to say is, like, disabled--like, Deaf people don't get seasick very often because of the nature of our disability. I don't get motion-sick, which means I can do lab work on the boat with my hearing peers while they are sick. I am not, so, you know, it's an advantage that I have as a disabled person being on the boat, and so I think changing that narrative about how disabled people actually, you know, contribute in the best way on

the trip. In some ways, we have the advantage, and so I think that's some ways that we need to kind of encourage students to advocate for themselves and really advocating for themselves and viewing their contributions in a different way that maybe able-bodied people don't realize.

Chris: Very good. Yeah. Excellent. Thank you, Carrie. Alison?

Alison: Yeah, so I like this idea of changing the narrative and not coming at it from the deficit, that really looking at it by what is everybody bringing. And I think, again, culture shifts are really hard to push, but I think, pragmatically, one way to help with department-wide culture is to keep stressing the ways that this helps everybody, that it's not just helping your disabled student, it's really helping everybody. I am a single mom of two small kids, and so, when I take my class out, I have to take my kids with me, and so I make field trips that you don't hike very far because my two-year-old can't hike, so, you know, that accommodation is helping the other students who can't hike very far, so I think stressing the ways that accommodations really are benefiting everybody and not just a subset of people, trying to remove that othering, is a way to help sort of push some of this culture shift.

Chris: Great. Great. Thank you for that. Another question that's come in that I will ask, and this--I'll open it up to the committee as well, not just the panel here, but, you know, have there been any recent advances in technology that makes it easier for physically disabled persons to access the outdoors?

Sheryl: Ahem. I'll make a comment on that.

Chris: Go ahead, Sheryl.

Sheryl: Sheryl Burgstahler. Ahem. Well, there's a lot of technology that isn't even recent and isn't even complicated, but ways different people can do things that if a person has-- is not able to do something physically in a planned activity, they can-- there are--there might be other ways they can do it. I mean, there could-- somebody be videotaping aspects of it and they're back at, you know, at the office, taking the notes and doing some different efforts. Probably not a good example 'cause I'm not in your field, but there's a lot of technology like that. And speaking of technology, we talked a lot today about universal design, where we proactively design things, and then accommodations, where, when we haven't done so well or something can't be done, where there has to be specific accommodations. And I think it's--the point has been made otherwise, but we need to kind of switch what we're thinking about and think about universal design first and accommodations as an--very, very much an exception. You know what this reminds me of which is kind of an odd thing, but I grew up in the age of the women's movement. When I came to the University of Washington back in 1984, one of the first things I was assigned to is the Potty Parity Committee-- all women, focused on STEM fields, counting the number of places to go potty in the STEM buildings, and it was pretty much appalling-- business school as well-- and made recommendations to the university about this. Now, that's kind of a ridiculous thing when you think about it now, that because I and others were women, we had to advocate for that, and too often, people with disabilities are advocating things that just should be a natural part of the environment, and also, the comment that was made about faculty wanting to know numbers and so forth--I suggest that you look at the numbers within your disability services office. Now, most people haven't declared a disability, and they're not registered there, so keep that in mind, but ask them, "What kind of accommodations are costing you the most money and taking most time right now?" Many of them are in I.T., and the two number-ones are providing accessible documents, rather than inaccessible PDFs and so forth that students with some types of disabilities-- physical, learning, or visual-- cannot access. And

the second one is having accurate captions on videos; not just videos created by a computer, like on YouTube, but get in there and edit them so that they're accurate, because when you think about it, it's a really mean trick to have a video that's not accurately captioned with punctuation and good spelling or accurate spelling to someone who's an English-language learner or someone who's Deaf. So we just should do that, and so I suggest, after discussing all these really important things, to start with something simple, all right? Do you have accessible documents and instructions to your students? Is your web page accessible and recruiting people to your field? If it's not an accessible website, how welcome are you making a person with a disability feel about being in your courses and in your program? And so thinking about those, and the other thing I would like to do is have people think more about--less about disability and thinking about diversity and ability. Everyone in this group right now has-- does not necessarily have a disability, but we all have abilities; the ability to see or walk or read print or whatever. We all could rate ourselves and be exceptionally on the positive side of that or maybe a little bit down, where we have some challenges in those areas. Everybody here would have a profile as far as abilities, and we're all different, and so diversity is the normal part of the human experience, not an exceptional part. People in offices like Disability Services need to use that word "disability" because it's defined in law and so forth, the medical field, whatever, and people have to have documented disabilities and apply for accommodations in order to get those, and they have conditions for that. That's not-- I don't know if it's anybody in this particular group, right? We have students, and we should just think that there's a broad range of abilities in that group, or will be in our next class and just kind of think of alternatives for that.

Chris: Anyone else want to respond to that one? Michele?

Michele: Yeah, this is Michele. I would. The question about sort of differing abilities, I just wanted to say one thing that is very powerful about saying, you know, "I'm a full professor, I have a disability," is that it is a radical act of destigmatizing disability, so I think we don't have to destigmatize disability by necessarily saying we all have varying degrees of ability, but we can also destigmatize it by saying that disabled people are capable of great success, capable of doing fantastic field work, capable of leading, and so I think that's really critical, too.

Sheryl: Absolutely.

Chris: Anita?

Anita: Yeah, I think this question about, you know, advances in technology in the field is-- you know, always gets me excited 'cause I work a lot with that. And, you know, things like drones, UAVs, and that sort of thing have revolutionized how we can conduct field work in inaccessible terrains, so there's all kinds of new advances in how we can collect data in the field, especially when you're talking about, you know, UAVs and remote technologies. But some of the most useful tools on our field trips are things that everybody's familiar with anyway. If you've ever been at a-- in a shop or a store and you've seen teenagers shopping with somebody who's not there, using FaceTime, they're, you know, intimately involved in the shopping experience, even though they are nowhere in the store. We use those same types of technologies to work from more and less accessible terrains on our field trips. The students can, you know, video-chat each other, share photos and videos back and forth, and that can be a powerful means of access as well, so a lot of times, it's not so much new technology as creative uses of common technologies, so that's something to think about as well.

Chris: Rory, you got some comments there?

Rory: Yeah, sure. Yeah, and there's also pretty cool technology for wheelchair users, like tracked wheelchairs that can literally go-- they're like small tanks. They can go outside over rough terrain, and, you know, we provide those at our university. You can basically check it out to get some training, then check it out, and the students that don't have disabilities actually think it's kind of cool because, I mean, it's a pretty cool technology. And there are people that are also working on exoskeleton technology that would allow people with limited mobility to walk around the field site as well. That might be kind of a cool future technology.

Chris: Thank you.

Rory: The other thing is also, for example, wheelchair-mounted robotic arms that can allow a person who doesn't have the use of their upper extremity or their lower extremities to go to a field site and manipulate objects, using the robotic arm.

Chris: Very cool. Alison?

Alison: Yeah, I don't have specific examples, but I did sort of want to point out the elephant in the Zoom room here, that we all were forced, you know, almost 3 years ago to start doing our jobs with technology in a way we never would have imagined. And so I think sort of applying the same spirit of what can we do and what can we make work together, I think, is really important to take out into the field, that, you know--I think if we had asked any of us if we thought we could all do our jobs from our houses for several years, a lot of us would have really been pretty scornful of that idea, but here we are and we're doing it, and so I think, you know, sort of coming at it with the idea that there can be solutions for this and, you know, you can take FaceTime out in the field or we can do these things to surmount these problems is a really good lesson to take from this pandemic out into the field. Chris: Thank you. Jen, final comments on this one?

Jennifer: Yeah, I just wanted to kind of wrap around to some of the technologies, the--some of the, like, the Trax wheelchairs and the exoskeletons. Those represent sort of a significant financial investment, and so those may not be necessarily accessible to, say, your department or even-- you certainly don't want to put that kind of burden on a student, so, I mean, I think we need to constantly be thinking about what may be the low-tech situation or what's-- so what are low-tech or no-tech solutions that would also provide accessibility. And there are some sort of less expensive technologies to make manual wheelchairs more adaptable to rugged terrain, but again, I think that all comes back to we need to be designing things, trips that are accessible and don't require those kinds of things. That really should be falling on us as instructors and as researchers when we design our field projects as well.

Chris: And I want to-- I appreciate that, Jen, and I see your hand up, Rory. I want to go to--I have one more question here I want to get to before we log off for the day, and this might be something that all of you can respond to real quickly. We only have a few more minutes, but "What are some "low-hanging-fruit things that we can be doing" for all of us to start "changing to an asset model for education and research in the field, lab," intensive disciplines, "rather than focusing on, you know, identifying this ableism, not looking" for the--not looking "at everyone's deficits, but how can we change this culture to an asset-minded focus for both education and research?"

Anita: So I'll jump in here real quick. I think a big part of this is changing the way that we look at field opportunities, field learning opportunities, going back to this idea of thinking about why you're going out in the field in the first place. Think about the learning that you want your students to accomplish, what you want them to see or experience, and then thinking about places you could go and do those things that are more accessible for a broader range of people, so thinking about the "why" before the "where," right? Like, why are you going there? And don't just pick sites based on sentimental reasons or personal attachment, the coming at it from a learning, centered approach, where you're thinking about what you want your students to learn and then picking field locations that are great accessible places to learn those things.

Chris: Any other thoughts around this one? Jen?

Jen: I was gonna just follow on with that, that you had the "where" and the "why," and we kind of need to add the "how long," that we always need to keep in mind that, you know, we as professionals can go to a rock outcrop or a field site and do a thing in a certain amount of time. Our students who are learning how to do that need longer to do that, and so, if we can not put the pressure on them by having a field schedule that's packed and, you know, "The van pulls up, get out, eat lunch, make your measurements, back in the van, 15 minutes!" Give them the time that they need to get those skills, and then maybe you're gonna reduce--you know, they're not sitting there thinking about, "I have to get this done, and then we have to go pee and then we have to eat and--" Give them the time, and so be realistic with your schedule and think about what it is that you want to get out of that trip, and it's not just "I want to show you all the cool outcrops, it's" "What do I want you to learn by doing this?"

Chris: OK. Thank you. Michele or Alison, do you have anything to add to that?

Michele: Yeah, I really liked what Jen added and the comment already, and I guess I was going to just--I'm reiterating a little bit, but this--not only just the slowing down, which helps people who are navigating, listening fatigue, in pain and overall fatigue, but also just these sort of check-ins. Like, if your--if the people on your field trip-- I'm not gonna use "students" 'cause I think this applies to professional field trips, research trips as well, so I'm just gonna put that in there, but, you know, everyone on your field trip-- if you're losing people, then that doesn't mean you need to hurry up and get to the next outcrop. It means you need to, like, slow down and figure out what's not working. So I'm guilty of this, too. I start to lose people and I think--[gasps]--"OK! We need to just move to the next outcrop." But really, I probably needed to change things around. I gave an example of that in the keynote of when I lost half my group, so yeah.

Alison: And this is Alison. I just want to jump in and sort of echo what Michele had said earlier about seeking input from the people on the trip, you know, letting people help with the trip-planning. It's--it helps make a good trip. It helps people bring their skills in. If it's a class, it's a good educational approach, letting them see how you plan a trip and how you attain learning goals, and so I think that is another way to bring in the "who" as well.

Chris: Yeah, and I'll follow that up with just-- a real last, quick comment is, you know, if you've been doing field work for 30 years in your career, you're obviously not seeing it from--through the lenses of your students, and if you're not communicating to your students about what you plan to do or what they will be doing, then you're losing them. You know, a great example here is you might be able to go all day without using the restroom. Your students can't, and if you haven't identified where you plan to

stop to use the facilities, your students are not drinking water, they're not drinking fluids, and you're dealing with a really dangerous situation. They're not drinking water so that they don't have to use the facilities, so things like that, you know. Pull yourself out of your own perspective for a while and ask your students about what their concerns are. Would be a really great-- a great start. But unfortunately, I think we're running out of time here. I would like to thank everyone, thank our panelists for a fantastic conversation today about how we can improve accessibility and inclusion for field-based research and education in STEM. As we heard at the beginning of the conversation, this is just the third of 5 discussions. There will be two more discussions. All 3 of these--in fact, all 5 of these will be recorded and placed--made available on the event website. The next conversation will be on Tuesday, March 15th, from 10:30 a.m. to 12 noon Eastern, and we'll focus on specific recommendations to improve accessibility and inclusion in the context of the computational STEM disciplines. So we hope that you'll--that you can join us. Additional information about the conversation will be made available on the series website. Like today's webcast, it will be recorded and posted on the website, as will all future conversations. So, with that, I would like to thank you all. Thank you to our panelists, and I hope you all enjoy the rest of the day and hope to see you all in March.