Victoria Miranda Thomson:

Each of us is donating a little bit of a piece. I said, "I use STEM as the conduit for the content, but I really just want you to be able to be a good decision maker for yourself and to be able to think critically about the information presented to you."

Michael Holtz:

That's an amazing story.

Jessica Fries-Gaither:

Victoria, I'm crying over here.

Victoria Miranda Thomson:

It's just so impactful and powerful, and I think that those are the little stories that don't get heard enough.

Intro:

This is the ORISE Featurecast. Join host Michael Holtz for conversations with ORISE experts on STEM workforce development, scientific and technical reviews, and the evaluation of radiation exposure and environmental contamination. You'll also hear from ORISE research program participants and their mentors as they talk about their experiences, and how they are helping shape the future of science. Welcome to the ORISE Featurecast.

Michael Holtz:

Welcome to the ORISE Featurecast. As ever, it is me, your host, Michael Holtz in the Communications Department at the Oak Ridge Institute for Science and Education. And it is time, once again, for one of my favorite topics, the Albert Einstein Distinguished Educator Fellowship Program, and I have my co-host for this series of podcasts, Zach Proffitt with me. Zach, welcome back.

Zach Proffitt:

Hey.

Michael Holtz:

It's so good to have you here.

Zach Proffitt:

Yes, I'm so glad to be here.

Michael Holtz:

How's life treating you? As we record this, it's February 6th. How are things with all things Fellowship?

Zach Proffitt:

All things Fellowship, Fellowship is kicking up. We are getting ready for our interviews for next season's set of fellows. We got our mid-year presentations coming up. I know all of the fellows are exceptionally busy. I myself have been jet-setting around all throughout January, February to different places, and it's been a really cool ride as of late. Get excited-

Michael Holtz:

Awesome. Awesome. I can't believe you're already talking about interviews for the next cohort.

Zach Proffitt:

It is. It doesn't feel real. It feels surreal, for sure.

Michael Holtz:

Awesome. Well, so we have a couple of guests with us. Tell us who we're talking with today.

Zach Proffitt:

Awesome. So first, these are two of the most qualified people I have interacted with. They're incredible, they're smart, they have beautiful things to say about pretty much everything in life, but especially in the context of this educational world we live in. First off, I'm going to introduce Jessica. Jessica, why don't you tell us a little bit about yourself and where you're hosted at your fellowship?

Jessica Fries-Gaither:

Sure. Thanks, Zach. I'm Jessica Fries-Gaither. I am an elementary science specialist from Columbus, Ohio, and I'm currently placed at the Library of Congress.

Michael Holtz:

Awesome.

Zach Proffitt:

Wonderful. It's the right place too. We did a professional development at the Library of Congress. That was an awesome place to be doing work. It keeps you pretty busy there, right?

Jessica Fries-Gaither:

They keep me pretty busy. I'm juggling about five different projects right now, mainly because I can't say no to anything. And so every time there's something interesting, I say, "Sure, of course I'll help you out with that."

Michael Holtz:

I want to do that. I want to do that.

Zach Proffitt:

We can't help it. A lot of us, that's teacher ed, that's I think, part of it is we just want to be involved. I also have today Victoria, Victoria comes to us from the great state of Connecticut. Victoria, why don't you tell us a little bit about yourself and where you are in your fellowship.

Victoria Miranda Thomson:

Sure. So my name's Victoria Miranda Thomson, and I typically teach in Connecticut. I teach ninth grade high school science, or integrated science astronomy, 21st century science, and I'm currently placed with the United States Geological Survey this year. And I have lots of projects happening too, and I try to really think about what I'm going to be doing on a national level and then also what's happening with the scientists that are working for USGS back in Connecticut, and how can I make sure that the data that they're collecting is getting into the hands of my students?

Zach Proffitt:

And that is cool. That's so neat to be able to tie that to your home state. And I mean, we also did a professional development, the fellows did at the USGS and it was mind-blowing. It was so much fun. We did all this school mapping and rock stuff. It was a great time.

Michael Holtz:

Very cool. See, I need to be a fellow. I feel like-

Zach Proffitt:

You do. You need to get in.

Michael Holtz:

I'm having fellow FOMO. We need to talk to Jill about that.

Zach Proffitt:

That would be dope. I mean, you got to live it to know it, right?

Michael Holtz:

Right, exactly.

Zach Proffitt:

At least one time.

Michael Holtz:

Exactly. I mean, I feel like I get a lot vicariously from these conversations, but every time I talk about it, I learn something new or I'm like, "Oh, I really wish I could do..." I wish I could hang with Jessica at the Library of Congress. I wish I could hang with Victoria at USGS because I hear such amazing things that you guys are up to. So Jessica and Victoria, what was your path to the AEF and how did you decide that this was something you wanted to apply for, and do?

Victoria Miranda Thomson:

Do you want to go first, Jess, or you want me to?

Jessica Fries-Gaither:

Go for it.

Victoria Miranda Thomson:

Okay, so I thought about this. I was thinking, well, the path is the whole path? Just the most recent path? How long is the path? So I always think about being a kid, and I loved. I grew up with my grandparents after the age of 10, so I didn't have my parents around and no one in my family had gone to college before, but school was something I liked and was consistent and stable. And so it was the thing that I wanted to do all the time. And I felt like that fed myself and my sense of self. And so I participated in a federally funded program, Upward Bound in high school. And so I went to Upward Bound in Montana. I graduated from a small high school. There were 48 kids in my graduating class, and then I went to Cornell University. And that was a big switch for me. So being able to succeed in a space like that was challenging, but I did it.

But I'm coming from a small high school that didn't have AP classes or anything like that, and I was still able to be pretty successful. I went to graduate school, University of Arizona and there I had a National Science Foundation fellowship where I was able to teach middle school science to kids in Tucson, Arizona. And that was really fun too. And then I decided to teach and I got my teacher certification in Connecticut. And then I felt stagnant, so I'd done a lot of professional development on my own, but I was like, "You know what? I need more. I need to make a bigger impact on STEM ed. I want to do something bigger." So I Googled, this is not how a lot of people find out about AEF. I Googled, "Paid STEM fellowships," And this came up. And I was like, "Yeah, that's where I should be. That's what I should do." And I've always attacked life in the same way where I was like, "I want this. It's got to exist. I'll just go find it." And that is what brought me to AEF.

Zach Proffitt:

It's good to know our SEO is working, right?

Michael Holtz:

That's right. That's exactly right. First page. I like it.

Zach Proffitt:

I love it.

Michael Holtz:

Jessica, how about for you?

Jessica Fries-Gaither:

Yeah, I first learned about the fellowship probably 10 or 15 years ago at one of the NSTA national conferences. And I was really interested immediately. I've always been a lifelong learner. I'm always looking for the next challenge. But at the time, I was working at Ohio State running some NSF grants, and so I wasn't eligible to apply. So I tucked it away for, oh, maybe someday if I go back to the classroom. Which I did, grant money doesn't last forever. And I found I missed the kids, and so I found myself back in teaching. And then really, you have to be in the classroom for a while, so I didn't apply right away. And then life gets busy and you just get entrenched in what you're doing. But a couple years ago, someone I knew from Dayton got the fellowship and had posted on LinkedIn and I congratulated him and he said, "You really should think about applying. Did you know they have a Library of Congress placements?"

Because he knew I was a children's author as well as a teacher. And it just brought it back up to the surface. So that coming summer, I went to the Library of Congress and did their summer Institute for Teachers, which is amazing professional development, and happened to meet the current fellow who was at the library. And then I went home and through random coincidences that summer, I met two more people who were either outgoing fellows or incoming fellows. I mean, just in the weirdest ways. At a conference or I was speaking to a school district and they have somebody in the waiting room, said something about moving to DC, and I really felt like, "Wow, this is the universe telling me that this is the year. This is when I should apply." So I did and here I am.

Zach Proffitt:

A conflict.

Michael Holtz:

Random. Random

Victoria Miranda Thomson:

Or serendipitous.

Michael Holtz:

Yes. Jill Latchana ask-

Zach Proffitt:

Yes.

Michael Holtz:

She has a way of drawing people in. And I love asking this question, just because we've all been there. But when you apply, did you even think, "I'm going to get this. Of course it's going to happen." Because I know it's a rigorous process. I mean, it's not easy to do, Jessica.

Jessica Fries-Gaither:

I felt like I had a good chance. I will say that when I sent my application in November, I was probably more confident than when I came to interview weekend in and I think we were there in March. Somehow meeting all of the semi-finalists and hearing their resumes and hearing who else was interviewing for the positions that I was, made it much more nerve wracking. And I think it's supposed to be the opposite, but I left that weekend really on edge and nervous.

Michael Holtz:

Victoria, how about for you?

Victoria Miranda Thomson:

So I think part of my approach to life is I have to believe I will get this. This'll happen for me, it'll happen for me. One time I applied for a teacher fellowship, a travel grant, and it was $5,000. And I was like, "Yeah, I'm going to go study astronomy in the Canary Islands." You create your plan. And I told my husband, I said, "Hey, I'm going to get this five grand and we're going to go to the Canary Islands next summer, and I'm going to take this astronomy class and you can chill." He's like, "Why are you talking about it like you've already got it." I was like, "Because I have to [inaudible 00:11:51]"

Michael Holtz:

And?

Victoria Miranda Thomson:

And then I got it. Then I was like, "Okay, yeah. See? You want to go do this thing or not?"

Zach Proffitt:

And you did it.

Victoria Miranda Thomson:

So we did that. With this, I applied twice, so I applied to the first time and I didn't get it. So as an educator, I want to model for my students what I want them to be able to do. So I want them to persevere. I want them to persist. I want them to take healthy risks. And this was that for me. So when I told them, "Hey, I applied for this, it's really hard." And remember I said, "Writing is really important and conveying your ideas are really important. I did that and now I'm going to get to go to DC for the weekend and interview and possibly do this fellowship." And then come back to tell them, "You know what? I tried really hard and I didn't get it, and I don't think I want to give up. I think I'm going to try again." And so I teach at a high school where there's about a thousand kids in the high school, but if I have freshmen, it means I track them the whole time.

So they always see me, whether it's lunch duty, bathroom duty, wherever else, I'm fulfilling one of these other million roles that teachers have at school. They see me. And so like, "Hey, are you doing that again this year? Are you doing that again this year?" So this time I was actually making flashcards on all the national laboratories and the research focus areas during my bathroom duty. And this student would come every time, she liked to get out of this math class. So she would come visit me at the bathroom duty and she would quiz me on my flashcards on the national laboratories and then followed up with me. And so the second time I was like, "Guess what? I got it." And she's like, "I knew you were going to get it. It's because I helped you with your flashcards by bathroom duty." So I always want to lead by example for them. Take risks, make all my flashcards, do the same things, so yeah...

Zach Proffitt:

There's a school effort.

Michael Holtz:

So how important is that? Because Victoria, you're talking about basically demonstrating perseverance, basically living that experience. For all three of you, how critical is that that students can see themselves in the lives that you're living, the things that you're living out? How critical is that, particularly for students who are interested in the sciences in STEM? And Zach, I'll start with you on this one.

Zach Proffitt:

Sure. I have a fail fast mentality, I suppose.

Michael Holtz:

Okay.

Zach Proffitt:

I try to model for students when I'm in the classroom. If I don't know something, I'm very honest about it. And I also model healthy approaches to challenges. And so I try to say, "Well, I don't know this entirely. I can't quite figure this out, but here's what I do know." And so that's been a big part. As a research teacher, that's basically the whole game. So when nobody knows all of research, that's the hardest part about it as a discipline is that you are forced to collaborate. You're forced to seek outside your comfort zone.

And so I think that number one, it's just about seeing someone who you respect deal with struggle. And so for students, that's oftentimes their teacher. And so being a regulated positive model of dealing with challenge is a big piece and it's still always scary. I also make sure that I know it's not like I'm good at it now. It's just always scary. And so I think modeling is a big piece and going through your external thought process externally with your students can do a lot to help them with some of that difficulty, some of that discovery.

Michael Holtz:

Okay. Jessica, how about you?

Jessica Fries-Gaither:

I think it's essential. The story that comes to mind isn't STEM focused, but I think it's worth sharing. I tutored an eighth grade girl a number of years ago in reading, and we were looking at her social studies book and she was just not super engaged, and I was grasping at straws to try to get her to connect with me. And so at one point I said, "You know what? I read something and I get confused. Here's what I try." And her eyes lit up. She actually stopped and looked at me and said, "Wait, teachers have trouble reading sometimes? You get confused when you read?"

It was a light bulb moment for her, and it was a light bulb moment for me, that when we get up in the classroom and we're showing kids how to do things, we've already mastered it so we come across as these experts who know everything and things come really easy to us. And so I've made it a point since then to talk about academic struggles with my students, and share those strategies and try to let them into my thinking because they just have no way of knowing.

Michael Holtz:

Sure. I like that a lot. Victoria?

Victoria Miranda Thomson:

Yeah. I think in thinking about sense of self too, is that I think a lot about the whole child. And so creating this, Jess mentioned this sense of vulnerability and it's okay to be vulnerable in this space and to make mistakes is really important in a STEM classroom. And I think we underestimate that. And so sometimes students think if they don't fit in a certain box that they're not able to be successful in that space. And so you have to show them your humanity. And so showing them your humanity and your vulnerability and your fallibility, it's just this is human. Teachers are not superhuman, and sometimes they tend to put us in this superhuman box, and I'm like, "We're just human." And so if you create space to let them see that, it allows them to want to create a learning environment that allows them to be successful too.

I mean, I have a lot of personal stories that go with that. Or sometimes students struggling. It's their personal struggles where they'll want to turn off. So if they were to struggle with reading or struggle with parental loss, I had a student who took care of her dad in the end of eighth grade, and he passed away from cancer. And so she said to me this ninth grade, and I said to her... My father died when I was five too, or when I was a child. And so I said, "If there's ever anything you need to connect with, let me know." And she said, "Well, how did you make it? How do you survive?" And I said, poetry and music. Dark poetry, like Emily Dickinson.

Zach Proffitt:

For sure, yeah.

Victoria Miranda Thomson:

All kinds of music. And so that was her freshman year. We started trading songs until she graduated through high school. She would come by in between class and she would stop by and be like, "Here's a song for you to listen to." And we would trade songs. And she's like, "I made it because of you." And she was able to go through a lot of her grieving, but able to come out as she's like, "I want to show you, I'm coming to school all the time now. And I learned how to take notes in English from this teacher, and I learned how to do this from this other educator." So it's not just the one teacher and just STEM, it's all the teachers creating that sense of community and connectedness. And each of us is donating a little bit of a piece. I said, "I use STEM as the conduit for the content, but I really just want you to be able to be a good decision maker for yourself and to be able to think critically about the information presented to you."

Michael Holtz:

That's an amazing story.

Jessica Fries-Gaither:

Victoria, I'm crying over here.

Victoria Miranda Thomson:

It's just so impactful and powerful. And I think that those are the little stories that don't get heard enough.

Zach Proffitt:

And I empathize so significantly with your stories about how difficult it was to take the fellowship, but then ultimately the reason why you go for it is to be living the kind of life that your students can reflect from, or reflect off of. The whole time you're preaching, be your best self, take the opportunities, embrace the challenge. And then if we were to not do so, we would be living this... It would be apparent. So I feel that so much.

Victoria Miranda Thomson:

Thanks

Michael Holtz:

Zach, do you want to take the next question?

Zach Proffitt:

Sure, sure, sure. So one of the things we're thinking about here in terms of supporting all of our students, making sure that they can get into the STEM field, the broad STEM fields that exist now we're talking about trying to get more students who are science or math curious into the science and math workforce. What ways do you think that educators can help dismantle these barriers that prevent students from engaging with science and math or STEM careers in general? What are some ways that you feel educators have played a specifically important role in breaking those? We want to go with Jessica first, maybe.

Jessica Fries-Gaither:

So I can speak most confidently about girls in STEM, since that's been my teaching position for the last 12 years prior to the fellowship.

Zach Proffitt:

Sure. Yeah. Sorry, sorry to interrupt. It's an all-girls school, is that right? [inaudible 00:21:53]

Jessica Fries-Gaither:

It's an all-girls school. Yeah. Three-year-olds through 12th grade. It's a really nice place.

Zach Proffitt:

Three through 12. That's amazing.

Jessica Fries-Gaither:

Yeah.

Victoria Miranda Thomson:

Jess [inaudible 00:22:01] tell us what the mascot is.

Zach Proffitt:

Oh, what's your mascot?

Jessica Fries-Gaither:

Our mascot is a unicorn.

Zach Proffitt:

That's fantastic.

Michael Holtz:

I love it.

Jessica Fries-Gaither:

We were founded in 1898 by some very progressive women who were not happy with the educational offerings in Columbus. And so we've been a progressive force for women and girls ever since. And the unicorn was chosen as the mascot a long time ago, from that really famous art piece. It's like a unicorn in a park, in a foresty setting. I'm blanking on the name of it, but it's great now. The little girls just love it.

Zach Proffitt:

I'm sure. I'm sure. And you have all this unicorn uniform stuff that you can wear for your whole life.

Jessica Fries-Gaither:

In the last five or 10 years, yeah, it's amazing. So we will have theme days where it's like, "Wear your unicorn stuff," And it's great.

Michael Holtz:

Nice.

Jessica Fries-Gaither:

So we partner with a lot of organizations that care deeply about girls education and girls success. And one of those locally is called ROX, which stands for Ruling our Experiences. They're a nonprofit. We use their curriculum for social emotional learning, and for things like that. But they also do a lot of research on early adolescent and adolescent girls nationwide. And every couple of years they do something called the Girls Index and then put out a report of what they found. And this last one has been really fascinating because they showed that since 2017, which was the last index, girls are more interested in science than ever. And that cuts across socio-economic class, it cuts across ethnicity. So many of them are really interested, but they are not confident that they can be successful in it.

There's been this huge decline in confidence starting in fifth grade. And so to me, as a teacher that says, "Okay, we're doing things to help girls become interested," We still need to keep up that front. We need to show them examples and we need to talk about careers. But we really also have to attend to just their self-advocacy as a learner in the classroom, and that they can work hard and achieve what they want to. One of the most shocking statistics that they found was that many girls, almost half of girls in high school don't believe they're smart enough for their dream career, and it's even among 4.0 valedictorians. So that's really changed-

Zach Proffitt:

Regardless of ability level.

Jessica Fries-Gaither:

Yeah, regardless of ability level. That's really changed the way that I'm thinking about what I can do in my classroom with my first through fifth grade students and really focusing on confidence and self-efficacy.

Zach Proffitt:

Very cool. Very cool.

Jessica Fries-Gaither:

Okay.

Zach Proffitt:

Victoria, what do you think, what kinds of barriers can we help dismantle as educators?

Victoria Miranda Thomson:

So I think when thinking about those barriers, what I try to do is make sure to have a wide variety of people and different types of scientists show up, either through posters, like the visual displays in my room, and/or through the people that have come to my classroom. So in my 21st century science class, I base that around this guiding question, "How do you use data and science to drive decision making in your field?" And so I'll invite guest lecturers into the room to say, "Hey, how do you do this?" And tell us about your path. What was your path? How do you get to be you? And also, how's your field been changing over the last five years, how's it changed? How do you anticipate it'll change five years from now? And so in doing that, I tried to bring in, I brought in a pilot who flies down to Antarctica and to Greenland to deliver scientists and research equipment.

So there's science there, but it's also like, how do you land and take off on skis? That's really different. Who's loading the plane and how are you being mindful of how you're loading the plane? How have the propellers evolved over time? And so I'll have someone else visit that's a medical illustrator for the New England Journal of Medicine, and she'll come in and really think about how do we merge art and science? So merging of art and science and what was once done on paper and in textbooks, now is done a lot digitally. And so I'll have them come. And then after I started doing this class, I started having parents of students say, "Hey, I heard what you're doing in your class. Could I come in?" And I had a parent come in and he said, "I have to come in because I graduated from this high school. I think I was in the bottom 3%. I was one of the lowest kids in my graduating class. And now I work and do quality control at Moderna and do all these things."

And I want to talk to them about going from bottom of my class to being a dishwasher at this restaurant, to having a baby when I was really young, to thinking I need to provide for this baby, and how in the heck can I do that? And just contributing in a way that I hadn't anticipated. So people have come in from the community wanting to be a part of that place too. Harvard also creates this series of posters, and it's called I Am A Scientist. And so it features people, the title of their role, and what they love to do personally. So students think teachers are superhuman. It has, "I am an ornithologist, but I love playing video games and cooking soufflés too." So it's making it more human, connecting to the human, even just thinking that these scientists aren't superhuman either. They're still human too. And you are human, so you could do that too.

So I think that highlighting different kinds of people and having that wide variety. Thinking about an ichthyologist, you're like, "Well, what is that? I didn't even know that's a specialty." That's someone that studies just fish. So you are just getting them to see that there's a huge variety and it's not just... Even engineering, "Oh, I'm going to be an engineer." Okay, well that's really broad actually. So exposing them to all of those different types of engineers that you could be is also important too. And sharing what you learn. I love this fellowship because there's so many federal resources and materials that are created that I can then provide to my students, that I didn't even know about. So having access to that, and then as soon as I find out about things, I'm always disseminating them to my department and my district. And just making sure that the materials reach everyone, I think helps to break down some of those barriers.

Zach Proffitt:

Yeah, I think both of y'all highlighted that. Go ahead. Go ahead. Yeah.

Jessica Fries-Gaither:

I love that you're highlighting those interesting and maybe on unsung careers with science. And that's something that I've learned a lot about this year. My time at the library, I didn't know that the library had a whole science lab in the basement called the Preservation Lab. And they do everything from analyzing the inks and the pigments in old documents, to conducting tests on any material that would ever come in contact with an artifact. And I'm so excited to share that with students to think about, if you love science, but you also love history and arts, and you have an application there for x-ray spectroscopy and all those other things that we learned in college but didn't see the real world value of.

Victoria Miranda Thomson:

I loved that too. That's a story that I share back with everyone that I meet. I'm like the basement of the Library of Congress, I think is my favorite thing. You'll see the [inaudible 00:30:24] campus hiding down there, doing all sorts of rad work. But that also leads me to think about our trip to NASA. So when we went to NASA, I was so impressed with all the audiovisuals. So as an astronomy teacher, my students regularly listen to NASA podcasts, and then we come back and share out. I'm like, "This is how scientists learn about a lot of different things." So you tell me what you heard and tell me what you learned and why you think my other important question to students is, why do you think it should matter to other people too?"

So why is what you're learning relevant to anyone else that's in our community? And when we were there at NASA, we saw all of their communications, and they were really talking a lot about how we have students here that are communications majors that love science. And then we have scientists that figure out that they want to focus more on communications. So just seeing the marrying of all of these different fields that tend to be looked at in isolation, has been a really beautiful experience for me to be able to tell to my students and my community.

Zach Proffitt:

Yeah, and I think both of y'all highlighted so effectively how teachers play that role of conduit. And exposure through a teacher who you believe in and who you trust, it is so different than just encountering an ad on a social media feed or finding or seeing someone in a movie doing it. But when you Ms. Thomson come in and say, "This is an ornithologist. She might be one of the coolest people I've ever met. Listen to her talk about birds." That's a way different experience for the students, and it really is. The multitude of opportunities for students embraces all these and skilled technical workforce as well as the academic traditional linear path. And so speaking from my own experience at the national labs, the number of people, the number of technicians, the number of skilled technical workforce they need to run a lot of these giant linear accelerators, or massive observatories it far outweighs the number of technical scientists and researchers they need. There's so many more people that are going into this, making our laboratory our STEM progress great. As opposed to just what students might think of as engineers and doctors, and-

Victoria Miranda Thomson:

Ooh, can I add another one from USGS?

Michael Holtz:

Yes.

Victoria Miranda Thomson:

USGS we have, one of my great things is I like coffee breaks. I think coffee breaks are great to meet and greet and be like, "Hey, what are you up to?" And so USGS has in-person coffee breaks on Tuesdays for half an hour. You go down, there's all the mission areas come down, everyone that's at headquarters, and it's a great time for us to meet and greet and see who's doing what. And I was creating a lesson to use on minerals in the classroom, and I got connected with someone who does all the research on aluminum. So all the aluminum reserves that we have, bauxite is the ore that we get aluminum from. And so he's like, "I have the National Mineral Inventory booklet up in my office. I'll give you a copy." So we get up there and I'm like, "So tell me about yourself."

And he starts talking about how he has his bachelor's in geology and then an MBA. So he went always into mining and was just like, "How are we getting these natural resources from the earth? And then how do we make sure that it's profitable? How do we know how much we have? How do we make sure that we do that as sustainably as possible and mitigate any negative environmental impacts?" So he really has experience with the business side of it, plus the rock side of that, and then the economy. So I think even kind of merging all those things was really a unique experience to learn about too.

Zach Proffitt:

That's very cool.

Michael Holtz:

I love that. And I heard from all of you, also just the empathy side of it, of not only do you need to know this, but why do I need to know it? And so that you can understand why that knowledge has its place in your individual universe of here's why you need to know about this or why it's important that you have this information

Victoria Miranda Thomson:

For science we've talked a lot about scale. So what's the temporal and spatial scale that this has impact on? So it's like, how does this impact us in our classroom? But how does it impact us in our town? How does it impact us at the state level? How does it impact us federally and even globally? So I think that considering scale is important too, so that they're able to see that the world is much bigger than just our four walls in our classroom.

Michael Holtz:

Sure, absolutely.

Jessica Fries-Gaither:

That's another area that that research pointed to, that most girls, the surveyed want to have a career that makes a difference in the world. And so one of their recommendations was really working on reframing STEM as a pathway for good and thinking about that impact in more of an altruistic way, as opposed to just learning something cool.

Zach Proffitt:

Yeah, yeah. Some kids want to do it just because hard, which is crazy to me. When I was a kid, I definitely didn't want to do just hard stuff. But I do think that that data is right in that. The number of kids I have seen in recent years that want to make an impact, that want to change something about the world it's really moving up. I think that's cool.

Michael Holtz:

And that gets to, I think, the whole imposter syndrome notion of Jessica from the survey, girls thinking that they're not qualified no matter what level of education, of skill level, even though as you said, the 4.0 students don't feel like they're qualified, prepared for the thing they want to do. Being able to reframe it sounds like a way to overcome that. It's not just about learning the stuff, it's not just about doing hard things. It's about putting it in context with, here's the good you can do with this knowledge and with this information and how it all fits together.

Jessica Fries-Gaither:

Yeah, absolutely. And I think that's where mentoring ends up becoming a really crucial component, whether it's formal or informal, or a teacher that you love at school. Being able to say, "I don't know that I'm good enough to do this." And them saying, "I feel that way too. Here's how I overcome it. Or everyone feels this way." Your feeling is not necessarily reflective of your actual competence in the area. I think the more we talk about it, the less powerful hold it has on all of us.

Michael Holtz:

Your feelings are lying to you.

Zach Proffitt:

Your brain is not your friend. If only it was.

Michael Holtz:

Right. Right. Zach, do you want to take the next question?

Zach Proffitt:

Oh, about imposter syndrome?

Michael Holtz:

Or a question or... I know we jumped all over the map with our prepared-

Zach Proffitt:

Absolutely. Yeah, we're doing it.

Michael Holtz:

But that's okay.

Zach Proffitt:

What Jessica said, really, I mean, I know there's that whole Dunning-Kruger effect thing, or it's supposed to be as your ability gets higher, and that's what you're saying is that it's not always correlative of what is reality. And I encountered, it must've been a video or something, or maybe it was a podcast recently. We were talking about how they're actually finding recently that more acclaimed, people who have accomplished more have higher levels of imposter syndrome. And I can't remember, anyways, sorry. I should have had my source, but the idea is it made me think about how we treat gifted students. How we treat students who are, you might say, top of their class, and what supports we provide to them.

Because I think in some classrooms, we don't necessarily focus on them. We don't necessarily focus on that efficacy, that self-confidence piece. And whereas we do focus for the broader class on those types of self-confidence. And so it just really hit home that all people need to be reinforced in terms of their ability to do things because everybody, even people that seem to... I think it's the people that seem like they have it together the most really are struggling with it the most because nobody reflects off that, when they're not presenting that to the world, that lack of self-confidence, that imposter syndrome. They figured out how to mask it best right out of all of us.

Jessica Fries-Gaither:

Yeah. I think that goes back to also how we talk to kids in classrooms and how we give praise and feedback. And I know there's research, I don't have sources in front of me, but talking about if you tell a kid, "Oh, you're so smart. You're so smart." That is very different than saying, "You worked hard on this and you overcame obstacles." And I think, Zach, you're talking about the gifted kids. I feel like they've probably heard that first message a lot in their lives, and then that ends up undermining their confidence in the long run, as opposed to thinking about their effort and their persistence.

Zach Proffitt:

Yeah, I agree.

Victoria Miranda Thomson:

It's a constant for me that I try to tell students when I'm passing back any created work that your grade does not reflect your self-worth. That this represents what and understand on that day in that moment, and this is not a reflection of your value. And I think that that's a message that should be relayed to all students all the time because it's the thing that they do every day and it's how they think they should measure themselves.

Zach Proffitt:

Absolutely.

Michael Holtz:

And it's a huge paradigm shift from the world that we grew up in. And you were identified by your grade point average-

Zach Proffitt:

Sure, how all their classes go.

Michael Holtz:

... and all of those things. And your value was determined often by that as opposed to understanding Victoria as you said, this is where you are today. This is a snapshot in time. It's not the whole picture.

Zach Proffitt:

And so that makes me think about, I mean, obviously teachers can only have so much impact because we only see our students for so much time. I mean, how do you guys [inaudible 00:41:53] the way that we're seeing these community centers be leveraged, the way that families are interacting, what role do you think that they have in building that self-confidence, building that self-efficacy? Should we be spending more resources on lifting up those outside of school support systems, or do you think it should be more focused on inside of school resources?

Victoria Miranda Thomson:

That's an interesting question, and I think depends a lot on our school itself too. I just was talking to my aunt yesterday because I said, "I don't feel that my school, my community values education. They value extracurricular activities and there's no space..." My son was out with the flu last week for four days, so I said, "How lucky is he to have a parent that can work with him on this partial quotient division homework?" Because what do you do if you go home to a family where that person can't help you or there's no one to help you with making up four days of math because you had the flu? And it's not in our school's culture for teachers to stay after school because all the kids are trucked off to different activities and extracurriculars and all those things. And my aunt's rebuttal was, "Well, they do value the education except they want you to do it all."

They want the teachers to be the ones that get it all done and get them to that point in time. I said, "But here's where I want to counter-argue with you. Our priorities are what we spend time and money on, and if they choose to spend their time and money after school in those other activities, then they are not valuing or prioritizing education." So within my community, I would like to see that it isn't just all on the teachers and that my community does put more priority and value on that educational space if that's what they want. If they're saying that's what they want, then I think you choose, you do your own inventory of your priorities, and our priorities are how we spend our time and money.

Zach Proffitt:

Yes, invest, right?

Victoria Miranda Thomson:

But that's very specific for, and that is a certain demographic at this point in time.

Zach Proffitt:

Yeah. We all only have our own experience, I was in California just recently, and I was talking with someone, they were talking about how the school that their children went to was a parent inclusive school. And so the parents had to rotate. It was a private school, but the parents had to rotate being involved in the class. And so three parents or so every day would come in and help the teacher teach by breaking the class down into smaller pieces and you have a rotating schedule. I was like, "That's an amazing thing." But also, again, you're reliant on parents who have the ability to be flexible with their schedule and to be able to be there and have maybe some subject matter expertise and all that stuff. So it does depend on that. It makes it hard.

Jessica Fries-Gaither:

I took your question a totally different direction that I was thinking about, so I'm going to change it.

Zach Proffitt:

That's great.

Michael Holtz:

That's okay. That's okay.

Jessica Fries-Gaither:

When you were asking about community centers and other things, I was thinking about how, as a teacher who has 160 girls that I see on a regular basis, I'd love to think that I personally connect and vibe to use their word with all of them, but that's just not true. I mean, some people you connect better to. We all have those stories of, this was my teacher that I connected with. Whereas somebody else loved another teacher. And I think as we're talking and those personal connections are what really go a long way in helping students in STEM, helping them with the imposter syndrome, helping them with confidence. And it's impossible to expect a teacher to have that level of impact on every single kid that they have in their classroom. So I think it takes a village. I think it takes the whole community saying, "Here's how science and STEM are part of my life in my career, that may not be a formal academic STEM position." Here's what you can do to be involved in that. If we want to reach everybody, we need to have everybody on deck.

Zach Proffitt:

I agree. And I think that your answer I love because it highlights the difference between mentorship and teaching. Mentorship is something that is essential to everyone, but mentors are not always teachers, and nor can a teacher be a mentor to every single student in a meaningful way. I mean, they can do things that help students feel a part of things, but they can't be a mentor. And I think that that's one of the hardest roles that I see teachers try to take on these days, is trying to be a mentor to every single one of their students. Which you said 160, I mean, that's just so many, that's too many people to be that person for.

Jessica Fries-Gaither:

Yeah. And definitely I think there's been a cultural shift in expectation where we are that person. We talk about how important teachers are and the difference they make, and that is very true, but I think people are think... I like how you frame it as mentoring because I think that's the difference that people are idealizing and it's impossible for one person to do that for everyone.

Zach Proffitt:

Yeah. That's just not a realistic expectation.

Michael Holtz:

Yeah, absolutely.

Victoria Miranda Thomson:

I think you bring up a good point Jess too, is thinking about if we want to make sure that everyone can see themselves as being part of the community, that it has to happen beyond the classroom, and you have to have an administration and superintendents and principals that are willing to create partnerships with your community too. The school that I taught at prior to the one I'm at now, a title one high school, and most of my students may have had family members that may not have had a positive relationship with school. What's your relationship like with school? How much schooling did you have?

If I have any students with interrupted educations themselves, and I have parents that may have had the same experience or adults living there. So it's up to us to create opportunities, not for us, but for the administration to create opportunities for there to feel like there's a connection between school and community. And so when there's no connection between school and community, we can't have trust between school and community. And then I think that we're in suboptimal conditions, so teachers can't do it all. And we definitely need the support of administrators that are willing to create those opportunities to build community and connection and show the positive space that school can be.

Michael Holtz:

And I think that goes back Victoria too, to what we were talking about earlier. If I'm a communicator who's interested in science, if I don't see that in my community, if someone's not showing me that role, if I don't see myself being someone who can communicate the science, if that makes sense. I'm not seeing a mentor. I'm not seeing an example. I'm not seeing what that looks like, for me to be able to, as a student say, "Oh, I can do that." Or, "I can be an ornithologist who also likes a hard, heavy metal and hard rock."

Zach Proffitt:

We going to have a ton of ornithologists after this episode. Ornithology in four years is going to be just-

Michael Holtz:

That's right. That's right.

Zach Proffitt:

... Through the roof. Not enough birds to study. So I did want to give you all a chance to share if you feel that there are any programs or initiatives that might play a role in helping students develop their sense of self. Do you guys have any, I mean, certainly we've talked about the fellowship has been exposing us to amazing things all around. Did either of you have a vignette or something you wanted to share about? Something you encountered in the fellowship, or a program that you've interacted with that might feel along those lines?

Victoria Miranda Thomson:

I have just from USGS specifically, I'd like to highlight that they do virtual classroom visits. So USGS has employees everywhere, all over the country, and they do virtual classroom visits. So if you were to say, "I really want to meet with a vulcanologist, I really want to meet with a herpetologist," There are ways for you to connect with them. So if you looked at USGS virtual classroom visits, you can then sign up and be paired with the scientists that you're interested in speaking to. And that can be a great opportunity for students to see themselves there in that space.

Zach Proffitt:

And they do whole classroom visits as well as individual?

Victoria Miranda Thomson:

Whole classroom. Mostly whole classroom, but I think you could probably arrange individual, but whole classroom mostly.

Zach Proffitt:

That's awesome. Very cool.

Jessica Fries-Gaither:

There's a similar program called Skype a Scientist that I'm not affiliated with. I've connected with scientists between- [inaudible 00:51:39]

Zach Proffitt:

I've used them. They're awesome.

Jessica Fries-Gaither:

Yeah, they're great. They have some general broadcasts, but then I've been able to find some really amazing people who have done a great job at bringing science down to my little ones. And as we know, not everybody's good at that.

Zach Proffitt:

No.

Victoria Miranda Thomson:

I've used them too. They're good. I've used someone that was actually a biostatistician that studies, ready? Bird flu. Of our ornithology, so [inaudible 00:52:16] math.

Zach Proffitt:

Amazing. [inaudible 00:52:16] full circle.

Michael Holtz:

Nice. Zach, do you have an example?

Zach Proffitt:

I mean, I'm obviously incredibly proud of what my home office does at the Department of Energy, where we put students, both community college, undergraduate. We recently graduated faculty into our national labs and partnered them with lab scientists to help them get experience. There's a whole host of different types of placement programs that all support that role of developing the STEM workforce. And so that's endless, so you could find that. If folks were wanting to say they were connected with students, there's a very limited amount of K-12 stuff at the moment, but that's growing as well. But if you're connected with students who have recently graduated, get them into our national labs. We love hosting students, and the scientists that I've interacted with are just so kind and so can't say enough good about that.

Michael Holtz:

Awesome.

Jessica Fries-Gaither:

I feel like I need to take a minute to shout out the Library then, because you've both talked about your agencies. I'd be [inaudible 00:53:20].

Zach Proffitt:

You're right.

Michael Holtz:

Absolutely.

Jessica Fries-Gaither:

The Library has an astonishing number of intern and fellowship programs, ranging from high school students during the summer, to college students taking a semester to come, either virtually via an intern with the Library or in person. And I've gotten to interact with a lot of those interns. We have meetings with them and interface with them as fellows, and they really know how to support people in everything from working in the chem lab in the basement, to being a historian in the manuscript department. So it's a great place to do research, and on any topic really, it doesn't have to be social studies or humanities.

Zach Proffitt:

Yeah. We went to an event there for a lunch and learn, and it was all about music. It was all about jazz and musicals, and they had all these artifacts pulled out, like scores and original planning documents and scripts. I was like, "This is so awesome." I mean, a library is so much more than what it was when we were kids, right?

Jessica Fries-Gaither:

Yeah.

Zach Proffitt:

It's just incredible.

Michael Holtz:

Absolutely. Love it. Well y'all, I know we could keep going with this conversation for hours, but I do want to wrap it up and I want to ask everyone one final question. What is it that brings you joy? And Victoria, I'm going to start with you. Victoria, what brings you joy?

Victoria Miranda Thomson:

So I have moments that bring me joy, and it's seeing certain things in nature. Okay, I'm going to sound like a total weirdo, and that's okay because this is me. One of the things that brings me joy is seeing the way the sunlight scatters through clouds.

Michael Holtz:

Okay, I like that.

Victoria Miranda Thomson:

Or the way it scatters through trees and lands on the forest floor. And watching scattered sunlight dance on the surface of our earth brings me so much joy, I can cry when I see it.

Jessica Fries-Gaither:

Victoria, you're not going to believe this, but my answer was along the same lines.

Zach Proffitt:

Oh, no way. Collusion.

Jessica Fries-Gaither:

We can be weirdos together.

Zach Proffitt:

That's great.

Michael Holtz:

I love it.

Jessica Fries-Gaither:

Yeah, so I'll expand. I love watching those sunbeams come through things, but I'll just say nature in general. Whether trees in particular, I love trees. A beautiful blue sky, a cool rock, things like that.

Michael Holtz:

Awesome.

Zach Proffitt:

Very cool.

Michael Holtz:

Zach, how about for you?

Zach Proffitt:

My son's getting ready to embark on this amazing collegiate journey. He's getting ready to graduate high school this year, and so we've started the audition and the campus visit season and all that, and there's just so much vibrance to it, and that's bringing me a lot of joy. I'm just so proud.

Michael Holtz:

Awesome.

Zach Proffitt:

So that's where my joy is coming from currently. Michael, you last?

Michael Holtz:

That's right. So there is a band called Shinedown. They're sort of-

Jessica Fries-Gaither:

I know them.

Michael Holtz:

... heavy metal, punk. They're this genre busting group, Brent Smith and Zach Myers and their band, and they just released two new songs, 365 and Dance, Kid, Dance. And right now their music is bringing me joy.

Zach Proffitt:

That's great.

Michael Holtz:

Yeah.

Zach Proffitt:

Cool.

Michael Holtz:

And I love music in general, but those songs right now are-

Zach Proffitt:

Well, you're kind of an audiophile. Yeah.

Michael Holtz:

Yeah, I kind of am. Yeah.

Zach Proffitt:

That's awesome.

Michael Holtz:

So there you go. Well, Victoria, Jessica and Zach, as ever, thank you all so much for the opportunity to get to know a little bit about you and about your placements in the fellowship, but also about an issue that's really important to you in terms of letting students see themselves in STEM and how we can help facilitate that. I really appreciate the conversation. I think we've had a great conversation today, and I look forward to you sharing it with the world in a week or so. So thank you so much.

Zach Proffitt:

Yes, thanks so much for being here.

Jessica Fries-Gaither:

Thank you, Michael.

Victoria Miranda Thomson:

Thank you.

Outro:

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