

➤ **Dr. Streveler: Welcome to the Research Briefs podcast.**

I'm your host, Ruth Streveler coming to you from the School of Engineering Education at Purdue University.

The goal of Research Briefs is to expand the boundaries of engineering education research. In these podcasts we'll speak to researchers about new theories, new methods, and new findings in engineering education research.

My guest today on Research Briefs is Dr. Alice Pawley Associate Professor of Engineering Education at Purdue and my colleague.

In her writing, Alice has brought different aspects of feminist theory into her engineering education research looking at structural reasons why engineering education remains so male dominated.

I've asked her to speak to us about her guest editorial from the October 2017 issue of the Journal of Engineering Education entitled "Shifting the Default: The case for making diversity the expected condition for engineering education and making whiteness and maleness visible."

Alice, welcome to Research Briefs.

❖ **Dr. Pawley: Thank you so much for having me, Ruth.**

➤ *To provide a bit of an introduction to listeners can you briefly tell us about your pathway into engineering education research?*

❖ Sure. There are a couple of key moments I would say. I did my undergraduate degree in chemical engineering at McGill University in Montreal. I was going to save the world through environmental engineering. But, I realized in the middle of my third year that faculty are not taught how to teach; and that was a revelation to me at that point. I thought, maybe it's not all my fault that I'm having difficulty in this; I think it was a materials engineering class. And so, that realization led me to do summer work through the Engineering Learning Center [Undergraduate Learning Center (ULC)] at the University of Wisconsin, Madison, which was, at the time, part of the Foundation Coalition. So, I count myself a Coalition baby.

➤ *And, that's your hometown, right? That's why you were in Madison over the summer?*

❖ That's right, yeah. I had had summer jobs working for my dad inventing a course on 3-D microscopy and I thought at some point I need a job that is not a result of nepotism. So, my dad helped me get that job in that he cold called in a snowy February in Wisconsin the director and said, "If someone was interested in working over the summer for you how would we do that?" And I'm really grateful for that cold call. I've learned you can just phone people.

So, I spent a summer working for the Engineering Learning Center for their

Science and Engineering Education Scholars Program. And then when I went back to McGill, I did a sort of senior thesis. I did one senior thesis on branched metallocene polyethylene and I did another one inventing a first-year engineering course for chemical engineers because at McGill we didn't have common first-year program. I went straight into chemical engineering and there were problems I felt like with that. So, it's great to be a place like Purdue which has a common first-year. So, that was the first point.

Then the second point was that summer job led into doing sort of generic program support in engineering education at UW-Madison. And, I was sort of doing a research assistantship but really organizing programming and coordinating TAs to work in physics, engineering, and math and sort of aligning those sections together and so forth. And, I wasn't sure where my grad research was going to go although I was getting a Ph.D. ostensibly in industrial engineering.

And, a colleague recommended I take a women's studies class. So, I had not been particularly aware of gender in engineering up until that point. In fact, half of my chemical engineering class was women. So, I took this women's studies class and it happened to be that that term, it focused on feminist approaches to science in science fiction, which I didn't realize was a thing. I had no idea that there were both critiques of the scientific method, as I had learned it, offered by scientists who were feminists and alternatives. And that was mind altering; I was not able to shut that critical eye off.

So, I started taking science and technology studies courses, sociology courses, and more women's studies courses; and usually I was the only

engineer there. So, that was the sort of second big moment of sort of moving down this path.

And the third one was about learning about Purdue's School of Engineering Education. So, I went to FIE [Frontiers in Education] in San Diego as a graduate student. I had not written a whole lot of my dissertation at that point, and I picked up a job ad and I thought, "What the heck? Sure, I'll apply," because my alternative is to like go work at a Women in Engineering program as sort of staff and that would be fine and maybe there's something else. And so, I applied and almost died of shock three months later when Purdue called to offer an interview. And here I am 10 years later.

➤ *Fabulous. For those who haven't read your guest editorial yet, could you summarize the main point?*

❖ So, it was based on a concept I'm learning about in a professional development program I'm doing called, "Playing Big," with Tara Moore. She asks, "How can we design behavior changes in a way that doing them is as easy as water flowing downhill?" So, how do you let it be easy?

And, one of the tools she offers is having you think about making the desired condition the default condition. So, in a really trivial example, if you were trying to watch less TV when you come home at the end of the day, you would unplug the television so that you'd sit down, you could not just easily turn on the television with your remote control; you would have to choose to get up, plug it in, and then watch television. So, that is sort of

setting the desired condition, as the default, is that I'm not going to watch television.

So, what I was thinking was, how do we make valuing diversity in engineering education the default condition rather than having to justify it as different from the norm. So, I had two ideas. The first was, what if research on women and people of color in engineering education didn't have to explain why focusing on them was important anymore. I was at ASEE [American Society for Engineering Education] last year; I was listening to France Córdova talk about the NSF [National Science Foundation] Includes Program. And she went through this sort of litany of common reasons why we should care about diversity. And I was like, "Have we not moved past this yet?" Like, is there anyone in this room who actually thinks we need to justify why we care about diversity? Can't we move on? And, how much effort and attention is going into that explanation, which takes away from actually doing work in service of that goal.

So, if we didn't have to justify that, how do I say? It would be as though having an engineering workforce that looked like the general population didn't require explanation. That would be normal; that would be the default condition is the expectation that engineering education looked like the general population.

Then, conversely, research that's done on populations that were predominately male or predominately white should instead have to justify why that was a valid decision, right, why that's a valid choice. So, we'd turn the tables. So, the default should be that engineering education should look

like the general population and the exception that requires an explanation is when it doesn't. So, that was the first point.

The second point was to try and make physical research which is predominately on white people and male people as such and not to let those populations serve as the default and all other populations require naming as different. So, it's not methodologically sound to let research findings be drawn on populations that are predominately white and predominantly male to be used on everyone.

So, shifting the default here meant having all researchers list gender and race of their populations, even when their research questions were not about diversity, and not only including demographic information when they were about diversity. So, then we can really see how much engineering education research is really about white men instead of about everyone. Those were the two key points.

➤ *Alice, you've just told us a little bit about how you came to think about writing this piece. Could you give us a little bit more of the backstory of when did you approach the editor, what were your thoughts about how best to make your point, were there a variety of iterations you had to go through?*

❖ So, I was having a bit of an existential crisis at the time. I had just come back from a conference, it's actually an unconference called EDfoo, which is, "foo" stands for "Friends of O'Reilly" and there was a Scifoo, Science FOO which is put on by O'Reilly Publishing along with people like Google and

Macmillan Publishing, and Sesame Street Workshop, and Fred Rogers Company.

And they had amassed this amazing group of people that had to do with education but were not necessarily academics, there were a couple of us, or classroom teachers. There were people who ran art installations, there were people who ran subscription boxes for kids to receive science books and then build stuff. There were people who did outreach at national parks, there were people who did public television. It was amazing. There were entrepreneurs in this space. It was amazing to see.

And, I came back from that event asking myself the question, “Why have I been satisfied until now with writing things that mmm . . . it’s not clear anybody reads, or makes any actual difference in anybody’s classrooms?” Like, I can see a difference, I can see a way that it makes a difference in the classroom or could make a difference. And, I was not doing a good enough job drawing a line between the things that I thought were important to say and how it mattered out in the world. And here were all of these amazing people doing stuff. I was just . . . I had this crisis.

At the same time, I had just come off sabbatical and I had been reading lots of new things, particularly about critical race theory. And, I was asking myself how do I serve as a better . . . I’m a white person, how do I serve as a white ally to people doing social justice work in engineering education around race and helping translate the insights that critical race theory can help us learn from into engineering education?

So, I thought, “Well amplifying people of color,” that’s a thing, and so, I’m working on that. But, I was also really cognizant of sort of exhortations I was reading in media and social media at the time of, “White people, come get your people.” And so I thought, “Okay, I’m a white person how do I write about whiteness in ways that support the overall goal of social justice and engineering education, from a critical and feminist perspective? And helping those of us who identify as white in engineering education start to see how we are acting as though we don’t receive unearned privileges based on skin color while the overwhelming consensus of the research is that we do.

So, I started doing this professional development program called, “Playing Big,” I did a mini workshop on the op-ed project that was offered through the National Center for Faculty Development and Diversity,” which Purdue is an institutional member of. So, I thought, “Well, clearly I should write an op-ed, that’s obvious.”

But, every time I started I would write a draft and the ideas were so muddled; I had so many things that I wanted to get out. And so, I had a friend read a draft at ASEE and she said, “Yeah, you have a lot of things in here,” which I think was a really nice way of her saying, “No, this is terrible.”

And then I ran into Alan Cheville, actually I seemed to run into a whole bunch of folk and then sort of have this moment of, “And, there’s this other thing, and what about this other thing, and this other thing over here?” And he was very nice and said, “You sound like you need to work all of this out. So, you should just write the stuff that’s in your head; do a big brain dump.

Don't write any of these papers that you have goals for, op-eds or whatever, just write all the argument out until it's done and then send it to me."

I don't know if he ever read it but it took me about a week to do that. And, at the end of that week I had this clarifying moment where I thought, "Okay, here are two things that are sort of actionable that JEE [Journal of Engineering Education] could care about.

But, I didn't know how you got an editorial. I thought as far as I knew people offered them to you, and so we just had the new change of editor. I emailed Lisa [Benson] and I said, "How does one do this? Tell me about this." And she said to send her some solid ideas.

Okay, so I got that email and another sort of Playing Big tool is to recognize when you're hiding; when you have got some ideas you want to say but you spend endless amounts of time at the whiteboard trying to write the perfect thing so that you will avoid criticism. And that's not going to happen if you have something provocative to say it will engender criticism. So, what are then the strategies of getting out of your sort of good schoolgirl habits of, "Oh, I just have to prepare enough. I have to get enough people to give me feedback. And then, then no one will criticize me." No, you have to figure out how to just send out something that you think has meaning out into the world; something that needs to be said and find ways to unhook from criticism so that when the criticism happens you don't take it so personally and go back into hiding.

So, the Playing Big structure helped me develop some tools to do that. And

so, the one I sort of adopted here was, “Just send it out.” So, I wrote it in four days. I did not have anyone else read it. Even just talking about it now I’m reminded of how terrifyingly exciting that was. Like, I didn’t have my mom read it; she reads everything. I just sent it out.

➤ *You sent it to Lisa?*

- ❖ I sent it to Lisa as a pitch, like here was the idea. Like it doesn’t actually have to be this; this is the gist. And sort of giving myself that frame, sort of the Advice for New Faculty document talks about like, “If you’re stuck writing, all you have to do is say, ‘Well, what could I be writing about?’” So, I wrote about what I could say in an editorial as opposed to “it.”

And she got back to me and she said, “Well, this seems to hit the mark in terms of a solid idea. I’ll get back to you.” And then three weeks later she came back to me and she said, “In a nutshell, let’s get this into the October issue.” I was like, “What?”

➤ *Wow. So, what time was that, right after the summer, right?*

- ❖ It was August.

➤ *Mmm . . . quick.*

- ❖ It was so fast. It was terrifyingly fast. It was exhilaratingly fast. And that was her inaugural issue, so I really felt that was a huge honor. And so, we had a couple of back-and-forths with it. It was the editorial team that made

comments. I remember people being anxious about me using the term, “White Supremacy,” in this editorial. And then there were page proofs and it was posted online in I think it was November. So, it was the October issue but it was a little delayed. And then seeing it in print was a real thrill.

➤ *So, what has been the impact of the guest editorial so far? And, what would you hope the longer-term impacts would be?*

❖ So, I learned in February that Lisa had decided to make an editorial shift in JEE based on my piece. And, she wrote about it in her editorial for the January issue which that was also a little delayed coming out, so I learned about it in February and it hadn’t yet come out. And, the editorial shift that she made was that researchers, my understanding starting with that issue, now need to include demographic information for study populations and the extent to which those demographics reflect their local context; so, their institution, their region of the United States, the body of people that they serve, the country they’re in. So, they need to give both the demographics of their population and then something about the context. Which was amazing. Like I convinced somebody to make a change.

And then the longer-term impacts that I hope for is to see what the outcome of this shift is. So, do people start working harder to do research; they want to be sort of generalizably, sort of applicable on more diverse populations. And, can we push this kind of expectation of identifying gender and race of populations irrespective of whether the research question is about it to other journals? Problematizing how we assume that white and male are defaults and therefore invisible it can be receding into the background. And

so, the long-term consequence there is that we come to develop both a language to talk about masculinity and whiteness in engineering education rather than having that be sort of the “normal” how things are. So that we can start to problematize it and to then start developing a language around that and develop a culture that acknowledges the problems of developing a system around whiteness and masculinity when you’re looking for a more diverse population.

➤ *So, here comes the big question five, because this is of course what everybody’s going to ask you: As researchers we have a responsibility to protect the identity of our study participants. What counter do you have to the argument that research participants who are not white or not male need to be kept invisible in order to protect their anonymity?*

❖ So, I’ll note that the editorial does not necessarily say, “You should go name all those folks.” But I have a couple of responses. One is that you can actually note the counter argument; if the number of women and people of color is too small to protect their identities then our current situation is collapse them all into one group and then talk about them as a monolithic category of diverse folk. But, the theory does not support doing that.

So, here in this situation we have the unnamed male white majority. So, if you have a situation where you have too few women and people of color to actually write about them, then don’t. Write about the white men as white men; make the claims about whiteness and maleness and not presuming to talk about anybody else. So, that’s one thing; it’s not just the responsibility of the people of color and women to sort of have convenient identities so

that we can write about them, that they are identifiable demonstrates the need to talk about whiteness and maleness because there are so few of them, right?

➤ *Right.*

- ❖ The second is to ask the question, and this is a sincere question, in whose interest is anonymity serving? So, while IRBs [International Review Boards] encourage us, prompt us, expect us to pseudonomize participants, you can pseudonomize them in different ways. But, the first thing might be to ask participants to share the different risks that they take on being an identifiable person because just changing their name doesn't, in fact, necessarily mask their identity.

➤ *Correct, correct.*

- ❖ So, let's give up the fiction that it does and actually present authentic risks to participants and ask them how do they want to be identified? "Do you want to be identified as yourself with various different personal characteristics masked? Do you want to choose a pseudonym, which also gets away from the problems of white people choosing ethnically or racially appropriate pseudonyms?" So, presenting that as a decision for the participant to decide rather than presuming that the IRB knows better to take on that responsibility. So, there's that argument as well.

And so, in those situations what I talk about is an idea of community immunity; so that's a vaccination idea, right? The idea that most people get

vaccinated in a community, there are a few people who have immune compromised situations where they can't be vaccinated but they receive the protection of everyone. So, if you talk about a variety of ways in which you protect people's identities for the group, that affords some protection and without specifying, "Francine over here, is this kind of pseudonomized person," but you talk about it for the group that also provides some cover across participants. So, this is again looking at the small numbers of people. But there's always the question and sort of what I'm trying to push people to do is, you don't just have to study people of color and women to study diversity. You can study whiteness and maleness to understand why diversity is such an issue.

We can also continue to use tools that people have used for years to protect people's identities. We don't disaggregate at the group level by gender and race, those cell numbers are very small. But, that doesn't mean that in the rest of the document we can't sort of identify gender and race or other characteristics where salient, where it matters in the story. Intersectionality theory tells us how important it is to do that. So, we mask identities at the group level when we introduce a study population made of small numbers. And, we're authentic to participants about the risks they take on. And then we do what we can to stay authentic to the theoretical framework in the rest of the paper.

➤ *So, I'm not familiar with the idea of the group immunity. Could you say a bit more about that, so I can picture what that might look like?*

- ❖ **Sure, and I've kind of made that up. So, that's not anywhere else, that's not citable.**

So, in my career grant research which is called "Learning from Small Numbers," I invited participants to decide once they had had their interview, so they knew what they were going to say, they had said the stories, I invited them to decide whether they wanted their first name attached to their interview data or not. And, if they didn't they could choose a pseudonym. And, one always has to mask the identity of people that they refer to in their interview who did not give consent. So, if I had a participant talk about a family member I'd have to mask the identity of that family member whether or not the participant wanted to be authentically represented with their name or not.

And so, in that interview set and that data set, I have people who chose their names and people who chose pseudonyms; and I don't identify which is which. And so, I have a collection of people. They may have their real name or a pseudonym and by being in a group of people where we don't identify that everyone receives some protection that this could be a pseudonym or it could not be.

- *Alice, as you know, the purpose of Research Briefs is to expand the boundaries of engineering education research and you definitely have been doing that and have spoken about what it is like to know that you're going to create controversy. What advice do you have for people who are just beginning their efforts to change engineering education? And, what tips might you have for them how to continue to be*

courageous when you know you're going to get pushback?

- ❖ So, I was really thinking about how to answer that question. And, I think a Playing Big tool is really useful here too. In Playing Big they talk about how in the Bible, which is not my usual space, in the Bible they talk about two kinds of fear that the Hebrew word for “fear” can be translated in different ways. They talk about Pachad and Yirah.

And Pachad is the fear you have of the unknown; it's like monsters, or echos of things past, pain that you have had in the past that prompts you to have fear moving forward. The other type of fear is Yirah, and it's the idea that you are in the presence of something Holy, or in space that is larger than yourself that you are unused to being in.

➤ *Kind of awestruck maybe?*

- ❖ Yeah, that's right. And, the idea is that you should spend as much time in that Yirah space as you can; that the sense of Yirah is a sign of some work that you need to be doing.

And so, the tools have you think about, “Okay, when I've experienced terror, what sort of terror is it? Is it Pachad, in which case there are strategies in actually handling that. Like, how do you actually get through of a fear of an unknown? You can process it, you can sort of delve into your past, you can try and go around it; whatever that is. And, how do you start to notice the places that bring you Yirah?

And so, I have started trying to be much more intentional about that as well as recognizing that I have things that need to be said. I think that is a strength I bring to academia is trying to say things that need to be said whether or not I screw it up. At least someone will have tried to say something so that that can be made available for discussion.

And then, taking on the idea that that work that makes people think will inevitably draw criticism. Do you take that as given? And how do you find ways to process it which is not about you regretting standing up and saying something, especially something that needs to be said, and going back into hiding? How do you do that? I don't do this very well, by the way. I still would much rather not have any criticism. But, the criticism can either be substantive, in which case it helps me progress in my thinking. Or, it can be horrifying and then it's easy to discard because there's nothing I can do about the horrifying, angry, whatever it is. Those folks are not going to be convinced by my argument so I need to let that go and work on the folks who can find something for their minds to chew on.

So, I also want to recognize I have a lot of privilege; I am white, I'm tall, I'm able-bodied, I'm cisgender, I'm upper-middle class, I was brought up in an academic household, I can speak that. I'm in engineering. I make a ton of money. I have had a good education, I'm in a prestigious career, I'm in a societally approved family, I'm married to a man with two kids, and I'm tenured. And, so what do I do to invest that privilege back into a system which produces it in the first place, as a privilege? In other words, how do I use that on behalf of people who don't have those privileges.

So, I don't want to be like the white savior at all, and I'm conscious of that. But I'm happy being the bumbling fool who gives people enough things to think about that it advances the cause in some way. Right? So, I can make a fool of myself, I can make mistakes and it might reflect badly on me, but it does not reflect badly on a race, on a gender (maybe a gender, I don't know, we'll have to see), on a profession. So then, how do I then use it to advocate on behalf of those who would experience graver consequences if they had said an identical thing towards some kind of more just action.

So, I have a career outcome, which I put at the front of my notebook. See here it is on the front of my notebook that my career outcome is, "To help engineering become a means to produce a more engaged citizen and to have people develop a more inclusive, engaged, and socially just vision of engineering education."

And the pillars that I see as sort of my core values are, "Say what needs to be said, community is my religion, waste is disrespect," and the last one is, "I see you and the things that look small but feel huge." And all of those four things come together to right the kind of things I'm now trying to right. To use my considerable privilege to sort of advance causes of social justice on behalf of folks who don't have that opportunity.

So, you have to take a deep breath and then go back for more.

And, this is what tenure is supposed to protect; that's the whole point, so we've got to make use of it while we still have it. It's under threat as an institution across the country. I'm from Wisconsin, I'm from Madison, which

claims to have invented tenure with its sifting and winnowing of ideas. And, if those of us who have tenure don't use it, I mean it's already being taken away from people, so we've got to exercise our right to use it while we still have it. And, when in doubt source everything to the hilt.

➤ *So, Alice you've inspired me. I know you'll inspire our listeners. Thank you so much for being on Research Briefs.*

❖ **Thank you so much for having me.**

➤ *Research Briefs is produced by the School of Engineering Education at Purdue.*

• *Thank you to Patrick Vogt for composing our theme music. The transcript of this podcast can be found by Googling "Purdue Engineering Education Podcast." And please check out my blog, RuthStreveler.Wordpress.com.*