



2019

Rebecca Roesner and Advancing Diversity in the Chemical Sciences

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Charlie Schlenker: Culture is hindered in all sorts of ways by a lack of diversity. The missing voices in policy making, too many white men running the justice system, even the movies that never get made but a lack of diversity in the hard sciences impacts the world in big ways. The questions about the building blocks of life that don't get asked, the problems that don't get solved. GLT's Ryan Denham speaks with Illinois Wesleyan University Chemistry professor, Becky Roesner about the lack of diversity in her field and what she is trying to do to fix it.

Becky Roesner: If you look at the U.S. population as a whole, it's about 18% Hispanic and Latino and about 13% black. If you look at the membership of American Chemical Society, which is the professional organization for chemists that includes both industrial chemists and educators, you will find that it's only about 2% black and 4% Hispanic and Latino so that speaks to the extent of the disparity that we see in the sciences. In terms of women in chemistry, if you look at those earning the bachelor's degree, things are pretty equitable. About 49% of bachelors degree earners in chemistry are women but if you look at the Ph.D. degree it's only 37% who are women and then if you go on even further than that and look at who is tenured professors at major research universities or who's in leadership roles in industry, you find that the number of women dwindle as you move up that hierarchical ladder of management and so forth in chemistry.

Ryan Denham: What are some of the big reasons for this?

Roesner: I think it's a complex set of reasons. Part of it is what happens before young people reach the higher education area. Different systematic disadvantages and biases that disproportionately impact women and members of underrepresented groups when they are going to school in terms of what people believe they can do and the encouragement and mentoring that they're receiving and the resources that they have as they go through their earlier education but higher education shares responsibility for this as well. Our decisions haven't always been as welcoming as they should be to members of underrepresented groups and that's one of the things we're trying to work at right now at Illinois Wesleyan.

Denham: Is this something in the culture of professional sciences that can be off putting or not welcoming to certain groups of people? And if so, can you be more specific about what that might be?

Roesner: One of the challenges we see with our beginning students is that we're mixing students from all different backgrounds who've had all different prior opportunities and for student who maybe haven't had all the science opportunities in high school either because they weren't available to them or because they didn't see themselves doing it or their mentors didn't see themselves doing it. it can be pretty overwhelming to be in a classroom where it feels like the

other students know this already and have done this before and you feel like if a shot of water that those around you – that somehow you haven't had the same experiences. So one of the things that we try to do with some of the new programs that we're initiating is to create a sense of community for all our students who are coming in and especially for students who we think might have some of those disadvantages, the kind that stack the deck in their favor in terms of building community so they don't feel like they're alone when they navigate this new place.

Denham: What are some of the examples of the things you have done at Illinois Wesleyan that you feel have been successful at reaching some of these folks?

Roesner: The first thing I think I'd like to share is the program that we started in 2014. We call it SPLICE. It stands for Summer Program for Leadership, Inquiry, and Campus Engagement. And what we've been doing there is inviting 12 or so students to campus each summer, students who we think would benefit from an extra boost in getting started, to have a smooth transition. These are often students who are the first in their generation to go to college or maybe students who come from poorly researched sourced high schools or students who maybe didn't have all the chances to take the advanced and AP science courses when they were in high school. And so we've been bringing those students to campus for a week in the summer and the main purpose of that is, first of all, to get them to form a community with one another, a community of people who share their interest in science. We also get them started in the laboratory doing mini research projects so they can see some of the opportunities that lie ahead. And we set them up with some online general chemistry preparation work so that hopefully they feel more confident and comfortable when they get in their chemistry classroom in the fall.

Denham: And what is the STEM scholarship program you have there?

Roesner: So the NexSTEM scholarship program is really exciting. It is a partnership between Illinois State, Heartland Community College and Illinois Wesleyan, and members of the community, not-for-profit organizations and folks like the Chamber of Commerce and the Bloomington-Normal advantage group, and what we've done is we've applied to the National Science Foundation and we've secured \$4.6 million in funding to offer scholarships to Central Illinois students who have high financial need, students who are eligible for the Federal Pell Grant, for example. And if those attend Illinois State, Illinois Wesleyan or Heartland and they are studying an eligible discipline and they apply to our program, they could be eligible for up to \$10,000 a year in financial aid for 4 years of working on their bachelor's degree in STEM.

Denham: This is Sound Ideas. I'm Ryan Denham. I'm speaking with Becky Roesner, chair and professor of Chemistry at Illinois Wesleyan University. She recently earned the Stanley C. Israel regional award for advancing diversity in the chemical sciences from the American Chemical Society. It was for her work furthering diversity and promoting inclusivity in the sciences. I read a comment of yours that you said the professional science world is a field too often rewards intensity over balance and diversity of interests. What did you mean by that?

Roesner: Well, as someone who went to a liberal arts college and now teaches at one, I've sort of always grown up around the idea that it's good to have a variety of academic interests and personal interests and things like that. and the chemistry world and the science world does sort of favor people who have extreme intensity of purpose. And indeed some of the biggest breakthroughs in science and engineering have come as a result of that intensity of purpose, so it's certainly not an all bad thing but it also sometimes discourages young people from going into the sciences because they feel like it's such an all-or-nothing endeavor.

Denham: And it doesn't have to be?

Roesner: I don't think it has to be. There are certainly a lot of careers where you can have – be deeply involved in science but maintain other interests and have balance so science doesn't have to be an all-or-nothing kind of endeavor and that's one of the things I – messages I like to get across to young people who are thinking about going into it.

Denham: What about you personally as a grow-or young woman growing up, how did you become interested in science as a career path?

Roesner: I think it really started with a love of the outdoors. Not that I particularly wanted to be a biologist but I loved being outside, exploring things, building things, that was the sort of kid I was. And I certainly had encouragement from my family. My mom was a medical technologist and I have an aunt on my father's side who's a chemistry, physics, math teacher. So certainly when I expressed interest in those things, there was a lot of encouragement at home and I think that made a big difference.

Denham: And did you, as you're moving up the ladder of professional science and obviously reaching the position you are now as chair and professor of chemistry at Illinois Wesleyan, did you have strong female mentors who were looking out for you and that you learnt from throughout that time?

Roesner: I certainly did have some strong female mentor and maybe even more so some wonderful male mentors who were committed to equity in the sciences and encouraging women and that meant just as much as the female mentors.

Denham: Yeah. What does chemistry and professional sciences lose when there is a lot of lack of diversity in the people that are performing those jobs? What are the things that are not pursued – the questions that are not asked, the things that are not done as a result of those people not being in the room?

Roesner: Well, I think there can be a lot of things. For one, just, science sets out to solve problems, often time and when you have more people at the table, you have more people suggesting the sorts of problems that ought to be solved and there are certainly a lot of unmet needs with regard to science and technology and when we broaden the group of people who are

thinking about what problems to tackle next, I think we can have some major breakthroughs. We also lose the diversity of experiences that people bring to the problem solving table, so people who've had different paths in life in terms of different jobs before they became scientists, in terms of different cultural expectations, might think of creative solutions that I wouldn't and so I think that's very important. From the point of view of specifically gender and things, what good for women in science in terms of family-friendly workplace and flexibility and life balance is also equally good for men so these improvements in a welcoming and flexible work environment are to everyone's benefit, not just to those who might be underrepresented right now.

Denham: You've done some very tangible things at Illinois Wesleyan to address this issue. You talk about the SPLICE program over the summer where you bring a dozen or so students for a week of really cool work. You've got a part of this broader scholarship program for area students going into some of these STEM fields, but what if you had a magic wand and you could waive a magic wand in a bigger way, in a broader way to maybe affect this issue on a national level. What are the 1, 2, 3 things that you'd do to address this issue, big picture?

Roesner: Really the most important things would be some intensive work to keep young students from falling behind and things like reading and mathematics because the path to these STEM fields is so much easier if you're up to grade level in math and reading and things and the yearly grades. And end up being one of those students who takes algebra in 8th grade and takes Calculus when you're still in high school, and gets into those second layer science courses, the advanced placement courses or second year of Chemistry, or physics or biology – those sorts of advantages make a huge difference when you start at the university and you can only get there if you start early in the educational process in not letting folks fall between the cracks.

Denham: So Becky, you recently earned the Stanley C. Israel regional award for advancing diversity in the chemical sciences from the American Chemical Society. That was for your work furthering diversity and promoting inclusivity which is all the things that we've been talking about today. What did it mean to you to earn that recognition for this?

Roesner: Well, it was certainly an honor and I'm grateful to my colleagues who nominated me. First, I'd like to say the why we received the award, all of these efforts that I received it for have been team efforts. The SPLICE program has been a team effort along with several of my colleagues in chemistry and biology at Illinois Wesleyan and I wanna make a shout out to them. And the NexStem program is an even larger effort that extends to several colleagues at Illinois State and Heartland Community College and in the community and to current informer administrator at Illinois Wesleyan and so, a shout out to them as well. None of this would have been possible if it weren't for that teamwork. The other thing is it is certainly sobering to look at the list of people who earned these awards in the past for diversity and to still see all the work that we have to do, so it's a call for all of us to work harder, to bring people along and to try to lessen some of these disparities

Denham: That's Becky Roesner, chair and professor of Chemistry at Illinois Wesleyan University talking with GLT's Ryan Denham. By the way, there are still some of those NexSTEM scholarships available to Illinois college students going into the STEM fields even for the fall 2019 semester. Find out more at nextstem.org.