

Leading and Inspiring by Example

Joan Steitz radiates a passion for science. Whether she's teaching an undergraduate course, mentoring a grad student or post-doc, or speaking at a scientific conference, her enthusiasm and curiosity for all things RNA is infectious. Joan, the recipient of the 2018 Lasker-Koshland Special Achievement Award in Medical Science, spoke with *Cell* editor (and her former post-doc) Lara Szewczak about how she came to be an advocate for women in science and shared advice for young scientists entering the research community today. Annotated excerpts from this conversation are presented below, and the full conversation is available with the article online.



Lara Szewczak: The question that I have for you is—was there a moment in your career where you made a conscious decision to become an advocate for women in science?

Joan Steitz: Oh gosh. I don't think so. I think you can't help but be an advocate for women in science if you're a woman scientist.

LS: The reason that I ask is because certainly you've set an example through everything that you've done, but I do think there's a difference between running a lab, being a prominent member of a community, participating actively in the university, and then stepping out and participating in other activities that are specifically directed around the question of women in science.

JS: Well, one thing that I find fascinating about myself is that I know that when I was starting out, I had all the same hidden biases about women in science that the society did and that men did. I really didn't think as highly of women in science as I thought of men in science at the very beginning. And I thought that prizes for women were sort of silly and were being given as sort of secondhand goods. At the beginning, I didn't want to have anything to do with those things because my mindset was just exactly what the culture said it should be. I had been brainwashed.

I wanted to do science, I wanted to do a good job of doing science, I wanted to be respected—that was what really drove me. I wanted to feel that I had made certain contributions to science and that other people would recognize those and respect me for it. But in terms of being an advocate for science, I think I slowly grew into the realization that one needs to be a little bit more activist about it. And the real turning point came

when I was asked to be on the committee that wrote the Beyond Bias and Barriers report from NAS [the National Academy of Sciences] in 2005—I think it was published in 2006.

That was the first time that I'd ever been asked to be part of a sort of national committee on this particular subject. And I just learned so much because that was the time in which the whole unconscious bias thing was really coming out, and there were examples, and counter examples, and what to do about it, and so on. So that was a real eye opener for me, as it was for everybody, I think, because the whole psychological phenomenon was just being recognized and documented.

LS: Were there changes that you made—either to the lab, to the way you taught, to the way that you mentored—as a result of that?

JS: I like to think that the lab has always been pretty egalitarian and that people are treated pretty much the same way regardless. I hope that's the case. One thing that I have always noticed, and this goes way back, is that women graduate students or post-docs are much more anxious to have their own project than the men are. And I think it's because they're being defensive and subconsciously realize that if they're doing a project with somebody else that that other person might end up getting credit that they deserve, and it's much better just to have your own project. It's really interesting. That I have noticed. And of course, I supported that once I realized—I would have supported it anyhow because I'm a firm believer that people should have their own projects, but it's interesting.

LS: What about recommendation letters?

“When I was starting out, I had all the same hidden biases about women in science that the society did and that men did”

JS: Well, yes, okay. So one of the papers that we read for Beyond Bias and Barriers was a famous study where a sociology group had gone through letters of recommendation and had documented all the differences between letters written about women by either women or men. And it turned out that there was no difference between who the letter writer was. Where the differences were was whether the subject was a woman or a man.

And I confess, when I first read this paper, I almost literally went scurrying to my own files to see whether I’d fallen into these traps that are so obvious. I mean, I don’t think I’d been terribly guilty of this sort of stuff, but I’m much more keenly aware of the traps that people fall into.

LS: And so when you now are talking with young faculty, either at Yale or other places, and they’re asking you for advice about how to advance their career and how to be good mentors, because that’s not something you’re trained in a post-doc generally, what are the key things that you pass along to them?

JS: Okay. So this doesn’t really fall into that category, but one of the main things I say to new faculty starting their own lab is—remember that you are the best scientist in your lab when you start out, and you should keep the important projects for you and your technician, if you happen to have one. Don’t hand them out to second-year graduate students that are just starting to learn how to do science and then be disappointed that they don’t make faster progress. I mean, that’s just something that is terribly important for people to realize—that they have to be there in the lab actually showing everybody else what to do, because they’re the person that knows the most and that can convey this sort of information.

“In terms of being an advocate for science, I think I slowly grew into the realization that one needs to be a little bit more activist about it.”

LS: Trying to come back a little to your role as an advocate for women in science, we talked a little about how that translates into your lab. What do you think about the field, the RNA field broadly defined, which has a lot of women in very senior roles?

JS: Absolutely. This is just so great and I’m so pleased, and in a sense proud that I’m part of this field because I think it’s really, really good. And then this goes back to the stereotype threat or social identity threat phenomenon, which is different from the unconscious bias. You know about this, right?

LS: Why don’t you explain it to me.

JS: As I was saying earlier, unconscious bias—by about 2006, when we were writing this report—was something that had been fairly well documented by the cognitive psychologists. But then, [there is] a more newly identified phenomenon that they have also come up with—and I think the first paper was in 2007 from a group at Stanford in the psychology department—called “social identity threat.”

And this is the phenomenon, and boy is this impactful. And I tell every group, whenever I meet with a group of women about science, I make sure that I tell them about this, because I think it’s so important. This is basically the phenomenon where anybody who feels that they are a member of an undervalued minority reacts in certain ways. And they’re both physiological and cognitive ways in which they react. Physiological—I’m sure [it includes] high blood pressure, greater heart rate, etc., etc. But cognitively, there’s a paper in *PNAS* about the fact that this state affects long-term learning. And it’s really powerful, and the thing is that the studies that are out there—some of them say that if your group gets up to 40%, it’s more or less okay, and others say that your group has to be at 50% in order for people to really feel comfortable being in the “minority group.”

And so women in science are always in the minority group, and I realized that so much of my behavior before I found out about this was totally shaped by this phenomenon. I’d be on an important committee, I’d be the only woman in the room, and I wouldn’t dare say anything because I was scared stiff because of precisely this phenomenon. So this is sort of saying the problem of underrepresentation of women in science is a problem—it feeds back on itself.

The other thing that I wanted to say that’s also in this paper is emphasizing that this is not just women that undergo this phenomenon, because they quote in the discussion studies that have been done where the subject matter is athletics and white men versus black men. And if the white men are in a minority group relative to the black men, all the same physiological and cognitive characteristics are manifested. Another study was done where the subject was mathematics, and it was Caucasian versus Asian Americans. And again, the Caucasian Americans—if they were in a minority group relative to the Asian Americans—exactly the same stuff can be measured.

It’s a general human phenomenon, and it puts all women in science, I think, at a real disadvantage. And the reason that I talk about it is that if you don’t realize what’s going on and why you’re reacting in certain ways—to feel sort of part of the out group and that you don’t quite belong, imposter syndrome, all that sort of crap—if you don’t realize that this is a standard physiological phenomenon that everybody undergoes, then

“Remember that you are the best scientist in your lab when you start out, and you should keep the important projects for you and your technician, if you happen to have one.”

you can't do anything about it. If you at least realize what going on, you can try to do something about it.

And that's why I think that the RNA field is so great, because it does have almost enough women so that women don't have to feel that way or don't end up feeling that way as much of the time as they do in other fields. This is just so valuable, I think, for the progress of the field. It means that there have been many more people participating that wouldn't have participated at all or fully if the situation had been different.

LS: And so what set that up? What made RNA welcoming or a home for [women]?

JS: I think most of the people in the RNA field are really good people. They care about their science, they care about where the field's going, they care about other people in the field. Some fields, and I don't know really know why, have these reputations which are true, where everybody's out there sniping at one another, everybody's trying to do a one-up on everybody else. And the RNA field has just never been that way—it's been much more of a cooperative venture. And I can't really tell you why, but I'm pretty sure that having a lot of women in the field has helped.

LS: And so if you think about the individuals that you consider to be founding members of the RNA field...?

JS: Who are we talking about? Well I mean we're talking about I guess me, and people like John Abelson and Christine Guthrie, and people like Tom Cech and Olke Uhlenbeck, and Tim Nilsen, and all the other people.

LS: Do you think there was something about that group or the fact that really, questions about RNA biology were so wide open when it was coming together that there was a lot of space?

JS: That's really a good question. And that relates to the fact that fields that are on the edge between established fields are usually fields that are good for women and minorities. I think there the reason is that those people who are on the interface are probably more open minded, both in respect to their science, or they wouldn't be on the interface, and also with respect to their thinking and dealings about other people.

LS: If you think about yourself, the people that have come out your lab, the people that have come out of their labs, what do you think the biggest thing you've given to the scientific community in the way that you've been a leader and mentor is?

JS: I think it's an attitude about science that you have to be open minded and take in all these inputs and realize that serendipity is really important in science, and that things that you stumble across might turn out to be really important, because they certainly have been in the RNA field many, many times. Now, maybe it's no more true there than it is in any other field—I just don't know.

LS: You've had quite a distinguished career, you've made lots of contributions—what's left? Have you set goals for things you'd like to accomplish in the next three years?

JS: Very specific things that I'd like to know—the answers to particular questions that we happen to be working on in the lab at the moment that I'm hoping will materialize. More functions for more viral non-coding RNAs. Kazio [Tycowski] is working on some stuff that I think—if we can get crystals or if a new cryo approach works, if we can get some high-resolution structures—that I think is going to reveal a new type of interaction between poly(A) tails and just regular old RNA duplexes that's important in stabilizing RNA molecules through those interactions between the (poly)A tails and the 3' UTR. There's certainly stuff going on there.

LS: And what about beyond science?

JS: Oh, I confess that most of my life is pretty much focused on science.

LS: You talked about an awareness of unconscious bias starting thirteen years ago. Where do you see your role in that in the coming years?

JS: Well again, whenever I'm asked to talk to women's groups, I always say yes. And we talk about unconscious bias, and we talk about social identity threat and these things that I firmly believe disadvantage women in terms of attaining equity based on the belief that if you don't know about it, you can't do anything about it, but if you do know about it, you can at least try with respect to your own behavior, as well as the people you're interacting with.

LS: Given the way funding is for science in the US now, you have both men and women in your lab, and I'm assuming that many of them want to go on to careers as researchers. What advice are you sending them out the door with that you think is most relevant right now?

JS: It was so much easier when I was young to get funding, and I've also had the luxury of HHMI support, which is really liberating in terms of not making you have to fill in those specific aims with deliverables. It's tough, and I really admire the fact that some young people want to do this, because obviously there have to be teachers and academic scientists in order to nurture the next generation of scientists. So I just try to encourage them as much as possible and hope that they'll do well, and most of them do seem to do well.

LS: True enough, as having come out of your lab but not gone in that direction, I can say that everything I learned there has helped me along the way.

JS: Thank you. Is it relevant? It must be partially relevant, just judging the quality of science.

LS: When people ask me did I have any training to be an editor, I say that the best training was the example set in the lab that you went to all kinds of seminars. And you thought about what was going on. I give the example of C Wing Seminar [Ed.

note: a seminar series at Yale featuring students and post-docs from labs that were currently or had in the past been geographically located in the C wing of Sterling Hall of Medicine], where you went, and it wasn't relevant to your topic, but it was your peers, and it was what they were working on, and you learned to think constructively about it. That was key for what I do now.

JS: Right, and you got new ideas coming in from different directions that if you stick to your own field might be just ignored or not placed in front of you in a way that you would even think about them. And I think they contribute greatly to accomplishments in science.

WEB RESOURCES

Beyond Bias and Barriers, <https://www.nap.edu/catalog/11741/beyond-bias-and-barriers-fulfilling-the-potential-of-women-in>