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PEOPLE & IDEAS

BethAnn McLaughlin: Protecting neurons and women in science

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McLaughlin studies how neurons respond to acute and chronic stress.

In the era of #MeToo, a movement against sexual assault and harassment founded by Tarana Burke, scientist BethAnn McLaughlin is becoming as well known for her intrepid advocacy efforts as for her work on neural stress responses and brain injury. Born in Boston and raised in St. Louis and New Hampshire, McLaughlin was using her voice to mobilize others and create change well before starting her career in research. Throughout her graduate and postdoctoral training at the University of Pennsylvania and the University of Pittsburgh, respectively, she was emboldened by female mentors who reinforced the importance of hard work and an unshakeable moral compass. In her laboratory at Vanderbilt University, McLaughlin's team is focused on understanding the molecular mechanisms that underlie neuronal stress responses, particularly those that occur upon oxygen deprivation, and works to develop neuroprotective therapeutic interventions. She takes an interdisciplinary and collaborative approach to science while fostering independence and tenacity in her trainees.

We contacted McLaughlin to learn more about her current research and political engagement.

What first sparked your interest in science?

I was always very interested in nature and science, but not at all interested in formal science classes. My brother is incredibly gifted, particularly in math, and my mom really pushed him academically. That looked miserable, so I played a bunch of sports and never studied. I loved working though. I was a heck of a waitress in high school and college. I did the high school newspaper editor thing rather than math club. It gave me my first taste of how awesome it was to find a narrative that ran counter to what was accepted and have it resonate.

In college I spent a year in Africa studying wildlife management. When I came back, I organized with friends a campus Teach-In, a concert, lectures, and art installations for Earth Day. All these professors and artists, the founder of Earth Day, and thousands of people from campus and the surrounding community turned out wanting to learn more about science, economics, and lobbying. It was pretty amazing. At that point, I was hopelessly committed to causing good trouble.

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Where and with whom have you studied?

I went to grad school at the University of Pennsylvania and did my fellowship at the University of Pittsburgh. At Penn I had these two powerhouse female mentors who were totally different. Marie Francoise Chesselet is French and intense and ran a giant group. Maria Erecinska is Polish and ran a small laboratory. She's still one of the people on the planet I love the most. She taught me a lot about self-discipline, focus, and love of mitochondria. At Pitt, I worked with Elias Aizenman, who figured out the redox sensitivity of the N-methyl-D-aspartate receptor, which still blows me away. He is responsible for getting me on this path of looking at proteins that integrate biochemically distinct signals.

What is your laboratory currently working on?

My laboratory is interested in understanding circuits of cells and proteins that make decisions about whether neurons live or die

BethAnn McLaughlin. Image courtesy of BethAnn McLaughlin.

(1). Amy Palubinsky in my laboratory has this super cool story about how neurons triage proteins damaged by mitochondrial failure. My other student, Britney Lizama, just had a paper out in the *Journal of Neuroscience* looking at these very interesting mice that lack a HSP70 interacting protein and die really young (2). The mitochondria are really bizarre and she found the chaperone-deficient mice can't clean up their mitochondria. This mouse model is unlike anything we see with other proteins involved in mitochondrial failure and neurodegenerative disease. They die really young and I'm now becoming a bit of an aging literature fan girl.

My interest has historically been stroke, but I'm seeing the aging literature as a place where there's a deep commitment from scientists who study worms and DNA to deliver healthy outcomes for patients. I like how intensely collaborative the aging field is and they do a fantastic job of pulling up young researchers. I'm increasingly drawn to that.

What kind of approach do you bring to your work?

I'm a big fan of student independence. I try to huddle with the laboratory every morning

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Lab members Cozette Kale, BethAnn McLaughlin, Jessica Cohen, and Britney Lizama finishing the Spartan Warrior Race in Manchester, TN. Photo by Pate Young.

so they don't have to hunt me down and I can see what's new. Britney just defended her thesis and it wasn't until that moment I realized, "Wow! That's a lot of papers!" My students are collaboration machines and I hope they stay that way.

I particularly like to talk science with researchers outside the neuroscience field. I have collaborations with folks in physics and chemistry and we're making organoids for drug screening, studying cholesterol in the brain, and making super sensors for metabolic signaling. My laboratory's bread and butter work is identifying new pathways that protect neurons and then we do these out of the box things with our collaborators. How we think about neurons and what cells do when there aren't enough resources is constantly evolving.

What did you learn during your training that prepared you for running a laboratory?

I have been incredibly fortunate as Maria and Elias taught me to do the work. It doesn't matter how you feel, what you get paid, or where you are if you don't get the work done. They have a very strong sense of moral certainty that's tremendous and I admire it enormously. Knowing what is right and what is wrong never seemed like a big deal, but it's sort of rare. I really hit the karmic jackpot in finding these two people and attracting students who are just like them.

What has been the biggest challenge in your career so far?

Tackling how we deal with sexual harassment and assault of women in science. It happens to more women than not. We have the numbers. They are bad. It was my lived experience, but seeing the numbers when the National Academies of Sciences, Engineering, and Medicine (NASEM) published their study this summer was a total gut punch.

What hobbies do you have?

Tennessee is awesome. There are so many beautiful places and kind people. It's given me an opportunity to do a lot of outreach and live three minutes from hundreds of acres of protected lands. I love biking and competing in obstacle races like Muddy Buddy. People chasing you with electrified sticks is good training for science, but I'm getting older now. Most of my social life revolves around politics. I'm not sure politics is a hobby, but I moved here thinking it would be great to effect real change in a part of the country that most academics run away from. It's been tough to love these kind people and see the beauty here, and know you can still get fired in Tennessee for being gay.

"This is where my career ends because this powerful guy is going to destroy me. But I'm not lying. We aren't lying."

Was there a critical moment you decided to become involved in advocacy?

I was faculty for a very short time before we were out at dinner and two full professors asked my partner who was on top during sex. They thought it was hilarious because we were both scientists. At that point, I thought, "I'm done going to these stupid dinners, having an extra cocktail, and pretending this is okay." I took a lot of flak for having my boss call them out. They were powerful and petty and I hurt their egos. But I don't care, I would do it again.

Many years later, a faculty member wearing a gun threatened to "destroy a student" who had a lawsuit for harassment against him. I had a huge fight with him with other faculty around. I remember really clearly thinking, "This is it. This is where my career ends because this powerful guy is going to destroy me. But I'm not lying. We aren't lying." Seeing firsthand how the Title IX process wasn't going to help anyone, even a witness, was brutal. It is still brutal. It happens everywhere. I'm no hero. I'm just saying something true and it has been true for too long. We are better than this.

Has your involvement in advocacy changed anything for your laboratory?

The struggle to maintain funding and be present for students while you are sucked into some years-long process where your safety is always at risk, it's the worst. The impact on my funding and program have been real. I also ask my students all the time if they are okay with my advocacy. If you've trained with me, you were selected because you are already tough. I gravitate toward taking underrepresented minorities and women in the laboratory. I want to be a safe home for them. My post docs, grad students, and undergrads are unwavering giants. I wouldn't do any of this if it weren't for them. I'm just the screaming harpy in the front clearing their path so they can do the great things I know they are made for.

What can scientists do to fight discrimination and sexual harassment?

Call it out. Put two slides from NASEM with the statistics on harassment at the end of every talk you give. Invite a speaker to your department once a semester to talk about #MeTooSTEM, mental health, or issues faced by people of color, things that matter. Have women and underrepresented minorities tell their own stories. Under no circumstances get shuffled off into a working group or committee to study the problem. NASEM already studied it. Now it's time for action. Demand that your institution ask job candidates if they have been found guilty of Title IX violations. Tell your invited speakers that you won't host them if they have been found guilty. You know, something simple like, "Hey, we are considering you as someone we'd like to have, but require that outside speakers don't have any history of misconduct including sexual harassment findings. If you don't want to be considered, we understand." Know who you are voting into elected office in your science society. Candidates should be asked to sign integrity forms and have their administration verify them.

Dr. McLaughlin with her two adorable children, Amelia (left) and Colin (right), who need to clean their rooms. Photo by Dana Miller.

How can the scientific community mitigate the damage caused by harassment?

Collaborate with women. No victim of harassment wants to pretend it didn't happen. It's like not mentioning that someone died. It may make you more comfortable, but it sucks when you are a victim and no one is talking about it. I want to collaborate. I want good science and opportunities for my trainees. I've demonstrably lost promotions, funding, and students because I've pulled awards out of the hands of harassers. If you love neuroscience and mitochondria and saving cells, I will science the crap out of new ideas. Invite me or someone from my team to speak. I'll give a killer science talk on how neurons protect themselves if they see a stress coming, and then I'll throw in a free talk later in the day on #MeTooSTEM.

How do you empower students and young trainees to advocate for themselves?

I'm in the process of setting up a #MeTooSTEM nonprofit to help fill in the gaps, especially for students. We want to give them solid advice, write letters on their behalf when their mentoring teams fail, and raise awareness nationally and internationally. This harassment crap ends with our generation.

Are you encouraged by the changes you've been able to effect?

No. I am not a "baby steps" kind of person. We aren't children. We are grownups. And there is an enormous amount of work needed to restore the careers of women who have been hurt. Let's do that work. The business of getting people who have been found guilty of sexual misconduct off training grants, of taking away travel money and study section service, that should be easy. The leaders of some of our biggest societies and funding bodies are making it hard. They study it and say they're going to do something. Then two years later, say they'll study it again. What a load of bull. The science house is on fire for women and they're doing a commentary on it. This limp noodle approach to the safety issues of women has cost hundreds of women in science their jobs. It has damaged our health, our long term financial stability. It nearly cost me everything. They're my next problem, and they know it.

Other science societies are doing this work. We have used social media to call out harassers accepting awards from small herpetology and physical science meetings and societies. Literally getting the awards rescinded the next day. Three years ago, I got patted on the head by the Society for Neuroscience when I asked them to vet officers for harassment findings. For this year's Society for Neuroscience meeting, Rick Huganir gave us a protected space, an evening gathering, and everything I asked for on behalf of #MeTooSTEM. I bet they will have something substantive in place in a year for vetting candidates.

1. Lizama, B.N., et al. 2018. *Neurochem. Int.* 117:139–155.
2. Lizama, B.N., et al. 2018. *J. Neurosci.* 0699–18. https://doi.org/10.1523/JNEUROSCI.0699-18.2018