**Renae Ryan – STEMM-inism and beyond**

>> Welcome to the podcast series of "Raising the Bar Sydney," raising the bar in 2017, so 20 University of Sydney academics take their research out of the lecture theatre and into bars across Sydney, all on one night. In this podcast you'll hear Renae Ryan's talk, "STEM-inism and Beyond." Enjoy the talk.

[ Applause ]

>> Okay. So thank you all for coming tonight. Hope you've all got a drink. I'm just going to move this out of the way so I don't trip over. Tonight I'm going to be talking to you about STEM-inism. But first of all I'd like to start off with a quote. And this is quote from something I've read recently, and I think this is really important. This is going to follow me, I'm sure. "Men and women are biologically different. Women are more directed towards feelings and aesthetics, rather than ideas. They have a stronger interest in people, rather than things, which is why women prefer jobs in the social or artistic areas, rather than scientific or technical ones." You know one, Linda [phonetic]. "Women also have high levels of anxiety and a lower tolerance to stress, which is why there are fewer women in high stress jobs and leadership positions." Now, I'm going to stop there because my blood's beginning to boil. [Laughter] Does anyone know where that's from? Yes? [Inaudible Comment] Yes; the Google guy. So this is from a young software engineer that used to work at Google. [Laughter] And he decided to write a ten-page manifesto that he felt confident enough to share with -- oh, sorry, I think you're being directed over there. He felt confident enough to share with the whole of Google, and has since been shared with the world. In his manifesto, he described the issue that the women in the tech industry are not underrepresented due to discrimination and bias, but instead due to inherent biological differences between men and women. Now, when I first read about this, I was really angry and shocked. But after I calmed down a bit, and got over the fact that this guy was so confident he felt he could write a ten-page manifesto on this filled with very bad science that he shared with the whole of Google, I realised that this guy is actually not so rare. And in my line of work as a woman and a scientist, I actually come across these kinds of people more often than I'd like. This guy is not a lone wolf. And while I'm the first to admit these biological differences between men and women, I have ovaries, and not everyone here does, I don't think an individual sex determines their interests or abilities. And if we let these notions of difference persist, if we let these toxic attitudes persist, we're really losing out as a society. So I stand before you today as a woman in science, but really just as a woman who's sick to death of these attitudes, and sick of the slow change that we're seeing. So tonight, I hope to convince you that we need a revolution. We need a STEM-inist revolution, and we need it now. So what is "STEM-inism?" It's not a word I made up, but I really like it. It combines "feminism," obviously, with "STEMM," which as Deirdre said, stands for "science, technology, engineering, maths, and medicine." And I may also just refer to it as "science," and it's the same thing. And I take "STEM-inism" to mean that all people should have the opportunity to pursue and flourishing in STEMM careers and fields, regardless of their gender or sexual orientation. Now, you might think that this already exists; in a developed country like Australia, everyone already has the opportunity to pursue a STEMM career if they wish. But unfortunately, that's not the case, because we see across the board in STEMM fields that women are woefully underrepresented, particularly in leadership positions. So I'm a biomedical scientist. I study little proteins that they're on the surface of all of our cells in our body. They're little pumps, and they control what moves in and out all of our cells, including nutrients, waste, and chemical messengers. [Laughs] And we try and figure out what these little pumps look like, how they work, and what goes wrong in disease. And then we try and design drugs to target these pumps -- and some of my students are here today, so we can treat diseases like chronic pain and cancer. And I work with an amazing group of students and scientists. And we are what you might think as "typical scientists," in that we wear white lab coats, safety glasses, and we work at the lab bench. But we're not what you would think of as nerdy typical scientists, because we're actually pretty cool. [Laughter] So I've always been interested in science, for as long as I can remember. And like a lot of people that pursue a career in science, I had a great science teacher in high school that really got me interested in science. His name was actually "Mr. Ryan," although no relation to me. And he was an odd guy; he used to fart and burp a lot, that was his kind of joke and all the girls would laugh at him. But he actually really got me interested in science, and also convinced me that science was something that I could choose, and a career that I could pursue. So I went to university and enrolled in a science degree. I didn't know what I wanted to do, I just knew I liked science. Now, I wasn't the best student. I wasn't really engaged with my degree. I couldn't really see where it was taking me, and I spent way too much time at the pub. It wasn't until right at the end of my degree that I finally realised that I loved science, because I started working in a real lab, and doing real science. And I've never really looked back. So science is challenging. It can be very technical, but it's also very creative. You have to be able to focus in on the smallest of details, but also step back and think about how your research or your findings fit into the breadth of research that's out there. So I'd found what I loved, I was going to be a scientist. So I did a Ph.D., and then I went overseas, because one of the best things I think about science is that it's truly global. We are expected to travel to work overseas, to network and collaborate with people all over the world. I had a great time overseas; I did some really cool science, and I came back to Australia, and everything was looking rosy. I was in my early 30s and I started thinking about having a family. Now I look back, I see I was really naïve. I thought, "There's a few single women around. Some have kids, some don't; they seem to be going all right. There's a lot more men, but there's some women there. And hey, it's 2007, is there really still a problem for women in science?" Unfortunately, there was in 2007, and there still is now. One of the problems with an academic career, like most careers, is that as soon as you step out for a while, you fall behind. So we're always judged on what we've done most recently, how many papers we've published, how many conferences we've been to, how many grants we've won. So as soon as you step out, you appear to be less competitive than the people around you that have not. So after I had my first order, I returned to work, and I was really struggling to kind of get back on track, as most people do because it's pretty hard when you're sleep-deprived. And I started talking to more and more women. And I became a bit of a magnet for women that were also really struggling. And these were women that had had kids, some that were thinking about kids, and some that weren't at all. Really, they were just women. And that's when it hit me that something had changed; something very subtle had changed. And all of the sudden, we didn't feel like we belonged as we did before. There wasn't a clear career path for us at a career we'd been working at for years, some of us ten, 12, 14 years. So then women started leaving. I didn't obviously, I'm still here, but a lot of my colleagues started leaving. And these were amazing women, very successful scientists that had planned to stay in science for their career. Now, don't get me wrong, men leave too. People change careers all the time. But -- and actually there was a study from the World Society in the UK that showed -- that estimate only .1% of people who get Ph.D.s will actually become a professor. So it's not the path for everyone, but the problem is of those .1%, only 20% of those are women. And it's important to people that are trained in science to go out into other careers. They need to be teachers, work in government, work in policy, work in business, and that's great. But the issue is of the people who stay, women drop out at a faster rate than men. So when I look at my lab group, or my department, because I don't want to focus on you guys, as amazing young men and women that are at the early stages of their career, the current state of play tells me that the men are more likely to stay in science, and they're also more likely to stay to rise to the top. And that to me is just unacceptable. So why is this important? Why does it matter to you guys if women leave science, or women never enter science to begin with? There's a few reasons, but I'm just going to focus on two tonight. The first thing is that at least in my area of biomedical science -- and it's different some of the harder sciences, as they're referred to like maths, physics and engineering, have much lower participation of women. But at least environmental sciences for the last 30 years, we've had equal number of men and women getting PhDs. But when we look at the top levels across the country, only 20 to 25 percent of the professors in this country are women. So if we can agree, and I think we can, that there's no inherent difference in the ability of men and women to do science, then logic tells us we don't currently have the best and brightest minds in this country doing science, especially at the top levels. By not providing everyone equal opportunity, we actually just don't know what we're missing out on when these people leave. The loss of women from science is also important because diversity matters. Diversity is really important. Diverse opinions and experiences enrich our interactions. And there are so many studies that show diverse groups make better decisions, and have better outcomes. So not only are we losing these great minds, and as I said, we really don't know what we're missing out on when these people leave. But the people that are left behind may not be working in the best environment. And they themselves might not be working to their full potential. So imagine for a second if all of us here worked for NASA. So has anyone seen "Hidden Figures?" Yes; okay well if you haven't you should see it, [laughs] because it's an amazing movie. But we'll do our little role playing [inaudible] on whether you've seen it. So imagine all of us worked for NASA. We've been brought together, this whole group of us, to answer a really technically difficult and complex problem. We have engineers, mathematicians, chemists, physicists, and biologists. And we've got to figure out how to get a rocket back to Earth that's carrying an astronaut. Now, there's, what, about 40, 50 of us here, so we'll start working together on this really complex problem. It's going to take months or even years for us to sort this out. We're all getting along really well, going along really well solving this problem. Then all of a sudden about a quarter of us just leave; quarter of the women just step out. They go for one month, two months, even six months. The rest of us keep working. We're not going as well, but we're working at the problem. And then imagine those women come back to work after just disappearing for a while. But all of the sudden, they don't really feel like they fit in. Everyone else has moved on, formed different relationships. They're only able to work nine to four, and everyone else is annoyed at them. They've got other stuff going on in their lives, and they're not really focussed on the problem at hand. So they think, "Look, I've got too much going on in my life. This is too difficult. I don't feel welcome here. I'm just going to leave." So a quarter of our group just goes for good. Now, we might still be able to solve the problem. It might take us longer. But what if the answer to our problem was in the heads of one of those women who left, and we can never answer it? And this is what would have happened if Katherine Goble, who was the mathematician in "Hidden Figures," was not allowed to enter that room that day. So this was a room where women were not allowed, let alone women of colour. But she was invited into that room that day, and she was crucial in figuring out the calculations that allowed that rocket to reenter safely, and that astronaut to survive. How much have we missed out by excluding women from science? How much will we continue to miss out by excluding women from science? So as I said, I'm a scientist and an academic, so I do think about equity and diversity in the higher education sector. But really none of the things I talk about or think about are unique to science or academia. We see the same trends playing out across all professions and industries. There were reports released regularly talking about the glacial pace of progress, and the number of women that are leading companies, the number of women in senior management, closing the gender pay gap, which still sits at over 50% in Australia. And while all of these things are important, and we should be thinking about them and talking about them, for me the rate of change is just way too slow. I believe if we're going to make real progress, we have to have real systemic, change not only in our organisations, but also in our culture. We need structured programmes that implement and monitor change in a gender equity space. And once such programme that has been running in the UK for about 15 years is called the "Athena SWAN Charter." And you don't need to worry too much about it, but what it is is a gender equity accreditation programme in the higher education sector in the UK. And what's good about this programme is that it makes institutions really honestly look at themselves and identify where the issues are in the gender equity space. And then not only do they have to recognise their issues, they have to come up with an action plan to address these issues and solve the problems. And they won't get an award, or maintain an award unless they show real progress. And while these programmes aren't perfect, it's had a huge impact in the UK. And the feedback is that not only has it improved the promotion and retention of women in the science areas, but it's actually improved workplace satisfaction, and workplace engagement for all staff, because it's really just about making processes more transparent and more fair; and that kind of stuff benefits to everyone.

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>> So we're currently piloting this programme in Australia, and over a half of the institutions in Australia, that's 48 out of the 82 I think eligible institutions have signed up. So it's a huge movement. And this is in the pilot phase. So to me that's really promising because it shows the tide's turning. I'm leading this programme at the University of Sydney. And in this role, I get lots of feedback, mostly positive, but I do get some negative feedback as well. There are people who are really angry about this. There are people who think that it's a complete waste of time and liken these structured programmes to affirmative action and positive discrimination. I hear the same tired excuses time and time again, "Look around you, Renee, there's heaps of young women. We've just got to wait for them to rise up through the ranks." Wrong. As I said earlier, there's been the same number of men and women at PhD level since the early '80s, and nothing has changed. We've actually gone backwards slightly. "Women are just aren't as ambitious as men. They choose to drop out or stay at lower levels. They don't want leadership positions." Again, wrong, and this is where I disagree with our Google friend. There is no real evidence that ambition is gendered or has anything to do with an individual's sex. There are just as many ambitious men as there are women, and unambitious, or whatever the opposite of that is. So the problem, though, is not that women aren't ambitious, but how ambition is perceived in women, and it's usually in a negative light. We've all heard ambitious women described as aggressive and bossy, where those kind of traits are usually applauded in men. The other one, which is my favourite, is the myth of merit. So this is where people really believe they're giving the job, the award, the promotion to the best person. "The problem is the man are just more competitive than the women. And hey, if we start giving awards to women just because they're women, then good men will miss out." When I think of the myth of merit, I think about [inaudible] a few years ago from Diana Rowe [phonetic] at a diversity council debate, which was actually on last time. And she said, "I won't be happy until there are as many mediocre women running this country as there are mediocre men." [Laughter] And the whole idea behind that is we've got to be kidding ourselves if we actually think that merit works now, that we have the best people running our government, our businesses, our universities, our government organisations. Yes, there are a lot of great people that are doing great things, but there are just as many mediocre, old white men, I'm not meant to say it, that have risen to positions of power and leadership, not on their skills or attributes, but on who they know, or how people perceive them. And I think we just have to look across to the USA at the moment to see a prime example of that. We really need to get better at differentiating between confidence and competence, and actually measuring success. So what do we need to do? How can you guys join the revolution? The first thing we need to do is empower girls; and really empower girls and boys. We need to stop telling kids what they should be interested in, or what they should be because of their sex. All kids should be allowed to build, destroy, care, nurture, explore, and experiment. A recent survey by Plan International Australia that surveyed teenagers in Australia of age ten to 17 found 91% of these girls felt that they would get ahead better in life if they were treated like boys. They also admitted that while they thought they had leadership skills, then they weren't going to have the same opportunities as boys as they move down to the workforce. And these are our teenage girls now. This is what they're thinking, 91% of them don't think they've got the same chance at life because they're female. And these kinds of stuff really need to change, because it's often ingrained in girls from a very young age that being bold or ambitious is unattractive and unfeminine. Girls are taught to be polite, to stand in line, while boys are told after to go after what they want and push in. And we see this go through into adulthood where women are much less likely to go for that job or go for that promotion unless they take 100%, or meet 100% of the criteria; when men are more likely to go when they meet three-quarters or even less of the criteria. We need visible role models. So the old saying, "You can't be what you can't see" I think is so important. All kids need to see men and women doing a range of jobs and a range of careers. There's actually a programme run by the [inaudible] called "Scientists in Schools," which is pretty self-explanatory, but it's where scientists go into schools and do experiments with kids. And I've been doing this for a few years at my daughter's school. And before that I used to go to her daycare as well and do science visits. So the kids absolutely love it. I love it. And if there are any scientists here tonight, I suggest you get involved. It's a great programme. Now, I was at this school a few months ago where we had an all-day science fair, so a whole day with the kids doing experiments and watching science demonstrations. A little boy that I've known for a long time came up to me. And he told me he had such a great day, he loved science and it was so exciting. I'm like, "That's great. Good on you." But he looked a little bit sad and I said, "What's wrong?" And he said, "Well, I really want to be a scientist, but I can't." And I said, "Why can't you?" And he said, "Well, because I'm a boy." [Laughter] And then I realised the only scientist he had ever met was me, and he didn't think that he could be a scientist because he thought girls were scientists. So although that's not great either and I quickly explained to him that he could be a scientist, it's really important what kids see, and the role models they have. We need to empower men, and not only to be allies to support their loved ones, and their colleagues, and are [inaudible], but we also need to empower men to fight for their own equality. Why can't men who want to participate in bringing up their children have that opportunity? Why can't men who want to contribute more to unpaid labour -- although who really wants to do that, but why can't they and why shouldn't they be able to? We need real flexible work, and we need everyone to be able to access it. Now, I know that there are a lot of organisations that do have flexible work options, and have great paternity leave options, but how many men actually take up these? So we need people to lead by example. We need to fight bias. So unconscious and conscious bias is real. We are all a product of how we've been brought up. We're all a product of this society in which we live. And we're all guilty of associating certain skills with men and women, and also with certain races. We need to slow down our thinking and really challenge ourselves when we make decisions, and also challenge others respectfully. Many studies reveal that bias exists in I'm sure different fields, but I've seen a lot of in academia. One example is where there was a CV that was sent to hundreds of academics across America. It was an identical CV for a research position. The only difference was that half of them had Jennifer as the name, and half of them had John. And both men and women -- so this is not just men, both men and women offered the job to John a lot more often, and also offered him a higher starting salary than Jennifer, even though they had exactly the same CV. And there are a lot of studies in academia that show that women have to have achieved much more to appear as competitive as men. So look, none of these things are easy. I know that. I'm struggling through it at the moment; that we really need some deep systemic change to our culture and our organisations. And there's going to be pushback; there always is. People don't like change. As Liz Broderick, the creator of Male Champions of Change, and the previous sex discrimination commissioner said, "Men created the system, and men benefit from the system. Change will make people feel uncomfortable, and people will feel like they're missing out, because when you're used to privilege, equality can feel like oppression. For real change to occur, we need buy-in from the top and the bottom. So of course, we need great leadership and we need real leaders living by example. But we also need a nucleus of believers on the inside. We need the ages of change." Now, let's go back to high school science and think of an atom. So an atom is the basic unit of all matter. And within an atom is a dense nucleus. So let's imagine that an organisation, or even our society is the nucleus. In a nucleus, we have protons, so the positive force, the "believers," I'll call them. We have electrons, or the naysayers. And we have neutrons, that kind of neutral a bunch of people who don't really think too much about equity and diversity, and could go either way. So there will always been the naysayers. There will always been the negative people, the electrons, that just don't believe there's an issue. They either like our Google friend actually don't think that men and women are equal and so we shouldn't be fussing over any of this, or they think the current sort of plays fine, and things are fixing themselves and we've just have to wait. We can think about them as the bottom 20%. And I don't think there's much point trying to deal with these people, or convince them of anything, because they're usually quite set in their ways. Then we've got the protons, or the believers, the positive force. And so these are the people that really get that diversity and equity are important. They get that if we give everyone an equal opportunity, then we're going to see great things, and we're going to all reap the benefits. Then we've got the neutrons, so those neutral groups that don't feel strongly either way. Most really never have had the thought about diversity and equity. And the neutrons, though, can be convinced. And so it's the job of the believers, or the protons, to bring the neutrons onboard, to provide them with the evidence, and really convince them that diversity and equity is important. Now, I have two kids who are completely different to each other. One wants to be a vet and absolutely loves animals, while the other one would rather stomp on an animal and see its insides. One goes quietly to the naughty when they're in trouble, while the other one will kick you in the shins and storm off and find a chocolate biscuit. [Laughter] One loves dressing up in clothes, while the other would wear pyjamas to school if they could. So maybe I'm being a bit harsh on the Google guy. Maybe he is right. Maybe there are differences between boys and girls, men and women. The only issue is both my kids are girls, and they are completely different. Now, when they get along, which is not often, but when they do get along and actually work together, it's pretty amazing to watch, because they really do bring completely different skills to solve a problem. Now, I know this is a silly example of it, but I think what it shows is that people who are really different can work better together, and also hopefully it points out to you that attributes and personality have nothing to do with the sex of an individual. So in 20 years when my daughters get going to the workforce, maybe 15 to 20 years when my daughters enter the workforce, I want them to have a level playing field. I don't only want them to have equal pay for equal work, but I also want them to have equal opportunity for equal work. And if our revolution is not successful, and we don't see real change in the coming years, the talents, the diverse talents of my daughters and many other girls may be lost. And I just think that is completely unacceptable. Because we're heading into really dangerous times. We have an increasing population, an ageing population, climate change, food, water, and resource shortages, potentially even World War III. Who the hell knows what's going to happen in the near future? So we really need everyone onboard. We need all of our talents and all of our smarts onboard. We need all of the diverse pieces of the puzzle to fit together, and to fit together well. These problems are massive, and really complex. So, my friends, the revolution starts tonight. The revolution starts with me, but more importantly, the revolution starts with you. We've got to stop being bystanders. We've got to stop being equity allies in private, but actually be allies in public. We've got to really be advocates for this very important problem. We've got to give all girls and women the opportunity to reach their full potential, and to be great and we've got to remove the barriers for women. We haven't got to fix the women, we've got to change the system and remove the barriers. We've also got to work every day to turn those neutrons into positive protons, because we just don't know that one of our newly converted advocates might be the person that provides the perfect environment for an amazing woman to find or contribute that piece of the puzzle that we all need. And that's it. Thank you.

[ Applause ]

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