3M Transcript for the following interview: Ep-18-The STEM Struggle

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Welcome to the 3M Science of Safety podcast presented by 3M Australia and New Zealand Personal Safety Division. This is a podcast that is curious about the signs and systems of all things work, health and safety, that keep workers safe and protect their health. I am Mark Reggers, an occupational hygienist, who likes to ask the questions Why, How, and Please Explain. Whether you are a safety professional, occupational hygienist, or someone with any level of WHS responsibility in the workplace, maybe you are a user of safety products or maybe you are a bit of a safety nerd who finds this stuff really interesting, then this is a podcast for you.

(R) Today we are talking a bit broader than just Work, Health, and Safety as we are talking about STEM and the struggle of STEM with Jayshree Seth. Welcome Jayshree.

(S) Hello.

(R) Welcome all the way from Minnesota Skyping in to Sydney.

(S) Yes, isn't that amazing, science allows us to do that.

(R) Technology, I love it. So, can you please introduce yourself? Where are you from and what do you do?

(S) So, my name is Jayshree Seth. I am a corporate scientist at 3M and I actually work in the lab. I work on product and technology development for sustainable industrial products, and I work in 3M's Industrial Adhesives and Tapes Division. I am also 3M's Chief Science Advocate, so that is a new role that was recently created, and the role is all about advocating for science.

(R) Fantastic. So, we are talking about STEM today, and I think it is probably a term that a lot of people may be familiar with, but for those that aren't that familiar with it, what is STEM?

(S) STEM is basically an acronym, so it stands for Science, Technology, Engineering, and Mathematics.

(R) And how is it used in today's, I guess, society when you talk about STEM. Where is it usually applied, or people are talking about STEM?

(S) Well, mostly in education, because people are realising that in order to solve all the problems that we are going to face as a result of a growing population and constrained resources and things like that, that, you know, more and more students will have to be interested in STEM-type professions and careers and education, so science, technology, engineering, and math are sort of put together to emphasise some of these career choices and scientific pursuits.

(R) So, science, technology, engineering, and maths. What is the difference between science and technology, because a lot of the time those two words get used together or they are interchanged, but what is the difference between them?

(S) That's an interesting question. So, if you think about it at a very basic level, technology is the application of science, and science is where you gather the

information in an organised manner, you know, about the world around us. It is a systematic study, so science is behind the technology, and technology is the application of science. And it is interesting now, science obviously fuels technology, but technology has advanced also now that it helps scientific concepts, so they help each other, science fuels technology and technology can help science.

(R) And that knowledge of engineering and mathematics all gets bundled up in that whole process, I guess, which is why it is bundled together with the acronym STEM.

(S) Certainly.

(R) So Jayshree, you mentioned about this new role Chief Science Advocate. So, what does it actually involve to be spreading the word about STEM and science, how do you go about doing that?

(S) Yeah, that is interesting. So, we did a survey which is called the 3M State of Science Index, and from that what we found is that there are a lot of misperceptions about science, there are a lot of barriers. It gave us a lot of information that crystallised in our minds that you need to advocate for science. So, the way I have broken down my role as Chief Science Advocate is as simple as what I like to call ABC. A is about appreciation and awareness of science because the survey told us that people aren't even aware of science in their daily lives. Science is so seamlessly integrated into everything we do that it is almost invisible, and people fail to recognise its importance, so A is about awareness and appreciation. B is in my mind breaking down barriers, because the survey also uncovered a number of things that told us that people think either it is for genius, or it is for a particular gender, or you have to be a certain type that you can pursue science, and it is not for me, it impacts society but doesn't impact me, so B is about

breaking down these boundaries, barriers, biases, etc. And then C is about championing and in a context that is important to people. So we talk a lot about science, but if we talk about it in a very science-y way, if you will, we miss a lot of people who won't understand why the science was done, what it impacts, how it makes the world a better place, how it solves problems, and we found it particularly important for children to understand that, because it made a better connection for them not to the what but to the how or the why behind it, so C is all about championing and contextual understanding of science and scientific pursuits and how they solve problems. So what we are trying to do basically is foster a dialogue around those, so I write articles, I have a podcast, we also have a number of media events, we do presentations and keynotes, interact with students, work with college students, interns, career issues, women's issues in STEM, and try to get this dialogue going and advocate for science.

(R) I mean I guess probably I can understand, people think science, they probably think the lab coats, and their mind has got the blinkers on, purely and only that is what science is, but as you say, it is everywhere around us and we just take it for granted because it works so well most of the time.

(S) Absolutely, and I think that, you know, people don't see themselves in those lab coats and mixing those coloured liquids, if that is all the image of science that they have, it leads to all sorts of misperceptions, even the youngest kids. Sure, the kids see the image of a genius scientist or an evil scientist, or a loner scientist, or a maverick scientist, and if that is not what they want to be, then they disengage from science, so the stereotypes and the bias and the gender issues and all of that gets rolled in their ads as to, that is not who I am or that is not what I want to be. So it is sort of, you know, a disservice that we are doing to the science community by having those stereotypes, and we want to break down those barriers, and that is very exciting, because we want more kids to opt for science,

we want people to in general be science enthusiasts, and have higher science literacy, because it helps us all.

(R) So, you mentioned before about a podcast you are doing. Can you tell us more about that, and who you are speaking to in that podcast?

(S) Yeah, we have a variety of guests in that podcast, so we have actual people who are engaged in academic research, we have thought leaders in specific areas like energy or air pollution, we also have entrepreneurs who are taking science-based solutions and really helping the developing world, we have people working in corporations, we have had professors, so it is a mix of whole variety of science-minded people who are in a scientific pursuit and want to spread the word about science and misperceptions and address all the issues that we encountered as we did the State of Science index survey and examined the results.

(R) Fantastic, so that is the Science Champions podcast, so go and download it if you haven't started listening to it already. So, going back to yourself personally, how did you get interested in STEM? A lot of work that you are doing is about that outreach and advocacy, but what got you into the STEM field or science in general?

(S) So, I actually grew up in a university town in India, and that town had the premier engineering institute in the country, and my dad is an engineer, so it was very interesting, all of us kids, everybody just wanted to be an engineer because you were surrounded by engineers. And interestingly, even the girls, because it would be an easy route, you just go to the hometown school, and everybody thought that was, you know, a good thing to do. So we didn't have, at least I didn't have, that much of an interest in science at that point, but I knew that that was something that I would be looking at as a possible career path because that is what everybody did, it was just the thing to do, and I had strong parental support and

guidance and recommendation to kind of pursue that. So that is how I got into it, so I am very thankful that I did, because it worked out well for me.

(R) And where did that path take you, what are some of the interesting things that you've worked on, that you know, I guess, from a satisfying career, or a very engaging career, what stands out in your journey so far? I think I sound like a reality TV program, your journey so far, but what stands out for you when you look back?

(S) Well, I mean everything, it has been just, everything has led to the next thing, so I loved my graduate work which I moved to the US for, I did all sorts of different things in graduate school, I started to figure out that I really liked actually conducting experiments, analysing results, and writing up those results, so my natural inclination has been towards the arts and humanities, and bringing that creativity and that ability to write into my science is really what fuelled sort of my passion in doing science, and that is why I really think it is important to understand that it is not just an analytic and tedious, you know, work, and copious amounts of data, it actually requires a lot of creativity. And when I came to 3M it was just like the best place ever for me, because I could bring in that creativity and inject it into the wonderful science and our 46 technology platforms and do new and different things. So that is kind of what I have done in my career, lots of different platforms, lots of different products, lots of different technologies, and just mix-match, making uncommon connections, bringing in that creativity and relying on the experts to help make some of the vision that we have actually possible. And you know, 61 patents later, I feel like oh my god, there is so much more to do, so very exciting.

(R) So, you definitely haven't been sitting on your hands for the last how many years, and I guess that's the point of the whole thing, it is an exciting path, and I know for myself personally in the Work, Health, and Safety space, I was always

drawn to the Why. Yes, you do this thing, but why, and what is reliable and predictable as far as looking after workers' health, and I guess for every person who sort of works in the science or STEM field, their journey is very different, but very much the same as far as that passion, I would like to think, of people, why, and figuring things out. So, when we talk about the STEM struggle, what are we referring to, because I guess what we have been covering, science is everywhere, there is a level of excitement and passion and figuring things out, but why is it still a struggle for, I guess, this message to go out there?

(S) Yeah, I think there is many reasons, and what we are finding is that people are excited about science but when it comes to actually pursuing science-based careers and science-based training, people sort of self-select and say, well, I'm not good enough for that, it's too hard, it's only for the genius, oh I don't see many women in that, so it must not be for me. So, there is a lot of issues at hand that need to be addressed, because, you know, the way we like to think about it, in 2050 the population of the world is estimated to be 9 billion. We are going to need a lot of people with a lot of creativity and a lot of scientific knowledge to solve some of the problems we are going to face, so the struggle is essentially getting more and more people interested so they pursue STEM-based careers, and then also generally have much more of an interest, support, and interest around science from a science enthusiast and science literacy perspective. You know, we have a very strong population of sceptics around the globe and I think we need a lot more supporters, so we can do whatever it is that needs to get done, which is a lot considering the challenges we have ahead of us.

(R) I know in Australia there is obviously a lot of support when you look at the education system and funding that STEM promotion. What are some of those things that you are seeing around the globe that is trying to fuel that push and make STEM more accessible and aware to children, schools, of all ages, and all adults?

(S) Yes, I think there are schools, but I also believe in a lot of learning outside of school, and there is a lot of good things going on there too, and it is as simple as using your kitchen as a science lab. You know, there is so much that parents can do to help sort of develop that scientific mindset in their children, and people don't realise that there is so much they can do themselves in the kitchen and make the kids hypothesise and have them experiment in making cookies, or bread, or something that you do ordinarily. So, in addition to school there is outside of school, but there is after school programs, there is all sorts of STEM opportunities in schools these days, participating in science bowls, and Olympiads, and quiz contests, and things like that. And there is exposure to STEM professionals, and may people believe that if you show people who are actually living their STEM-based careers, kids get excited and inspired to do those things, and so media portrayals of scientists in a proper manner, not the stereotypical way, that certainly helps. My daughter is very excited to hear about women scientists because to them it is important to see women in those roles, because they typically don't come across that, so I think that is another thing that is going on, people are realising that you want to make sure that the media portrayals are accurate. And then teachers are trying really hard to get the kids interested in hands-on learning and things like that, so a lot of good work going on, we just need to keep that up, and add more too it to understand how the next generation can be inspired to be interested in science.

(R) I know I can vouch for a whole bunch of failed science experiments in the kitchen, so just ask my wife about my cooking. I know something we do in Australia is we are a sponsor of the Science Festival at the Australian Museum, and we do different workshops, and I guess it just follows on from what you have been talking about, is getting hands-on, and it is fun to figure things out and it's okay to not know things, but why is that the case, so I think it is fantastic and hopefully these efforts, I mean 3M are one tiny part, but are happening all over the place.

(S) Yes, and 3M wherever they are in their communities, they support a lot of STEM activities, in the school system, with the local museums, with teachers' groups, and all the time, we have visiting wizards that go out to schools and demonstrate cool stuff with science, we just had an event at the Minnesota State Fair, I mean, 3M and 3Mers are out there in the community really trying to do this. So, science advocacy isn't just for the Chief Science Advocate, all of us 3Mers are doing that.

(R) So, I guess in summing up STEM and the STEM struggle, what would be the message you want to leave for our listeners or they can go and spread to other people they work with, or their own children, or people they know?

(S) Science solves problems, so it is very important for people to understand, support, acknowledge, and appreciate science.

(R) Fantastic. Well we really appreciated your time this morning, Jayshree, I think we might have to have you back, I want to find out more about that State of Science Index, so thanks for your time.

(S) Thank you for having me.

(R) No worries, thanks Jayshree. Well thanks for listening, everyone, if you have any questions, comments, suggestions for future topics or guests you think it would be great to get into the studio, or having them over Skype, you can shoot us an email to scienceofsafetyanz@mmm.com. You can also contact us via that email if you need any information or help around PPE in your workplace, 3M are here to help. You can also visit our website, 3m.com.au/sospodcast which will have a transcript of today's chat as well as some of the resources and links around the STEM topic as well, plus all our other previous episodes you may have missed, and you want to catch up on. So be sure to subscribe to the podcast through Apple

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