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An Interview with

Dr. Jayshree Seth

3M "Hall of Fame" Scientist, Inventor, and Author

Page 2

Also in this issue:

Insights from DOE Leader Dr. Geraldine Richmond

Four Ways to Think Like an Investor

AWIS Members Innovate at Bayer, Google, and Tesla

An Interview with
Dr. Jayshree Seth
Meet the "Hall of Fame" Scientist, Inventor, and Author

By Shelley O'Brien, Chief Marketing Officer, AWIS

Jayshree Seth, PhD, *is a corporate scientist and chief science advocate for 3M Company, where she has worked for over 28 years. Her work focuses on developing new technologies and environmentally sustainable industrial products. She received her bachelor's degree in chemical engineering from the National Institute of Technology, Trichy, in India, and then earned her MS and PhD in the same field from Clarkson University in New York. Dr. Seth currently holds 72 patents, with several pending. She was the fourth woman and first female engineer to be inducted into the Carlton Society, 3M's "Hall of Fame." She also received a 2020 Achievement Award from the Society of Women Engineers, which coincided with the launch of her book,* The Heart of Science: Engineering Footprints, Fingerprints, & Imprints*, in 2020.*

I had an opportunity to connect with Dr. Seth to talk about several of the book's themes, the 3M State of Science Index survey (SOSI), and her role in fostering science appreciation.

Tell us about the 3M State of Science Index and why your role as the company's first-ever Chief Science Advocate was created? What has changed since you took on the role in 2018?

We are all about science at 3M. It is our most distinguishing characteristic, it's what ties our businesses together, and it's the foundational strength behind our brand: as we say, "3M Science. Applied to Life."

Because science matters to us, we wanted to understand the global perception around science. We didn't find any studies that were relatively recent and global in nature, so we commissioned one. We surveyed 14 countries, including 1,000 respondents per country. When we studied the results, they clearly indicated that science needs champions—science has been underappreciated, has been quite invisible to and taken for granted by the global public. So the decision was made to share our research with the world and to foster a global conversation around this topic. We launched the results of the first 3M SOSI in 2018, and my role as the company's first-ever Chief Science Advocate was also announced.

Since then, we have done the survey every year, and with the rise of the global pandemic, science skepticism has actually gone *down*, and trust in science and scientists is up. This is a reassuring reminder that the science skeptics, though loud, are just the vocal minority.

Overall we have found that globally, science is actually having its moment! After all, science has played a prominent role in the story of the pandemic. Science has been the hero, in the forefront, offering preventative measures, new treatments, and effective vaccines, all developed using sound, data-driven scientific methodology employed by a diverse community of dedicated professionals. And that's what science needs, a diverse community, so we can solve problems and improve lives. The uptick in science appreciation continues, based on our results from surveying 17 countries in 2021 (sidebar). Hope is currently the defining sentiment around science.

What has been your strategy in advocating for science, and what kind of initiatives have you been involved with in this role?

After reviewing data from the first round of the 3M SOSI, reading about the topic of science and the public, and reflecting upon my own experiences, I broke down the problem into what I simply call A, B and C.

'A' is about raising awareness, appreciation, and acknowledgement of science, so we can move people away from a place of apathy.

'B' is about breaking down the biases, boundaries, and barriers to science careers, beliefs such as, "*I am not a genius so I can't do science*," or the left brain-right brain neuro-myth that leads to thinking, "*I am just not wired for science*" and to believing the misconception, "*I am a girl ... science is not for me.*" These are all real issues—some I have experienced myself. For instance, despite having two PhD scientists at home, my daughter said she didn't want to do science because it was "for geeks." We see that the portrayal of science in the media—the images of nerds, loners, mavericks, and "evil geniuses"—isn't going to inspire little girls or boys for that matter. So, we have to address that.

And finally, 'C': we have to focus on the context and champion science. We need to communicate that scientists solve problems and that science can improve lives. I know from my own experiences how important *context* was to my daughter, whereas the content was sufficient to motivate my son.

As 3M Chief Science Advocate, Dr. Seth is regularly featured in local, national, and international media.

State of Science Index

Each year, 3M's State of Science Index explores global attitudes about science. In 2021, science has inspired a sense of optimism around the world.

91% agree that scientists are critical for our future well-being

89% agree we should follow science to make the world more sustainable

88% say it is essential to increase diversity and inclusion in STEM fields

75% say they defend science when someone is questioning it

59% believe increased science appreciation will continue beyond the pandemic

See more data online.

As a corporate scientist in 3M's Industrial Adhesives and Tapes Division, Dr. Seth collaborates to develop products that solve customer problems.

In my role, I travel around the world presenting the findings and raising awareness about the initiatives we have undertaken as the SOSI data from this research becomes available every year. I interact with students, educators, parents, mentors, academicians, government officials, and professionals and present findings at conferences, consortia, and events. I also write a lot about topics of relevance to our advocacy platform.

We want to create a positive world with science and to inspire others to join us, so we also create programs at 3M to advocate for STEM. Our most recent one is a docuseries, *Not the Science Type*, which aims to shatter stereotypes by highlighting the stories of diverse women in STEM.

In response to the pandemic, we have created *Science at Home*, a program through which I, along with colleagues and some special guests, have taped videos of easy-to-do science experiments that students, teachers, parents can follow along with.

In years prior, we released *Science Champions*, a podcast in which we picked apart the 3M SOSI results with thought leaders, and *Beyond the Beaker*, a video series that portrays diverse scientists as real people. We also compiled a *Scientists as Storytellers Guide* to help scientists communicate with the lay public. We are always looking to make an impact across the STEM spectrum.

In terms of achieving gender equity in STEM/ advancing women in STEM, what do you think we need to focus on in 2022 and beyond?

More than half of the respondents to 3M SOSI say that the pandemic is inspiring a new generation to pursue science-based careers and that the public agrees that girls and women in STEM still face obstacles relating to their gender. Moreover, 7 in 10 people around the world agree that there will be negative consequences to society if the science community fails to attract more women and girls.

In order to encourage more girls to pursue STEM education and more women to persist in STEM careers, in my view we need to "CAST" off the Constructs, Archetypes, Stereotyping, and Typecasting associated with science and scientists, which hinder the engagement, participation, and success of women in these fields.

Instead, I want girls to know that there are many paths, myriad prospects, and multiple perspectives in science: you don't have to be a specific race or gender or ethnicity or nationality; you don't have to be a child who tinkered; and you don't have to have a degree to be the "science type." You can bring in your interests, shape your role, and pursue your passions. You can blaze trails with potential that is exponential.

Dr. Seth regularly speaks to school and college students about her educational path and career journey.

You lead a prolific career as a corporate scientist, holding 72 patents, with many more pending. What does the innovation process look like for you? How do you keep innovating?

For me the inspiration often starts with understanding needs and trends. Gaining perspective around where the market is going and what the customers will need helps me to identify opportunities to deliver innovation. Many times, the process starts with building a compelling narrative, to first convince myself that the problem is worth solving. I call this the "mosaic building" process—assembling the story tile by tile to see the picture that emerges. I look at the products and solutions that are available, customers' journeys and their pain points, the market evolution and current drivers, the technology landscape and emerging breakthroughs, etc., and from there, new ideas and concepts emerge. I then work to identify the gaps we have to overcome to bring this new idea to fruition, and then I collaborate with others to develop the technological building blocks to ultimately deliver an innovative product that solves our customers' problems and satisfies a market need.

Inspiration for innovation abounds, especially during times of change like we are currently living through. It can come from focusing on your own internal strategic drive for innovation, or it can come from customer feedback on concepts and prototypes, or from understanding their unarticulated needs, or from improving opportunities for existing offerings. It's also important to observe evolving external factors that can create or change customer requirements. Of course, ideas can come from serendipity, and gut and intuition do play a role, but as the famous quote goes, "Chance favors the prepared mind." In all cases, the ideas and implementation of the innovation is most effective when it is backed with good contextual information, sound customer insights, and rigorous science.

What inspired you to write your book, *The Heart of Science: Engineering Footprints, Fingerprints, & Imprints*, which came out in November 2020?

2020 was a totally unprecedented year. Virtually all of humanity faced the same challenges, confronted the same fears, and awaited the gift of science in the form of a vaccine. It was also a year that unmasked the pervasive nature of another virus: systemic racism. This social awakening was catalyzed and crystallized by raw and revealing events, including those that unfolded in our state of Minnesota, as well as by the disproportionate impact of coronavirus on communities of color.

Just like many others in 2020, I went through a cycle of shock, numbness, denial, anger, fear, panic, guilt, gratitude, hope, and then an intense desire to help and be productive with purpose. I had this visceral compulsion to do something myself, so I dug deep into what I call my own "pockets of privilege" and took some actions. One of them was to put all my essays on work, life, career,

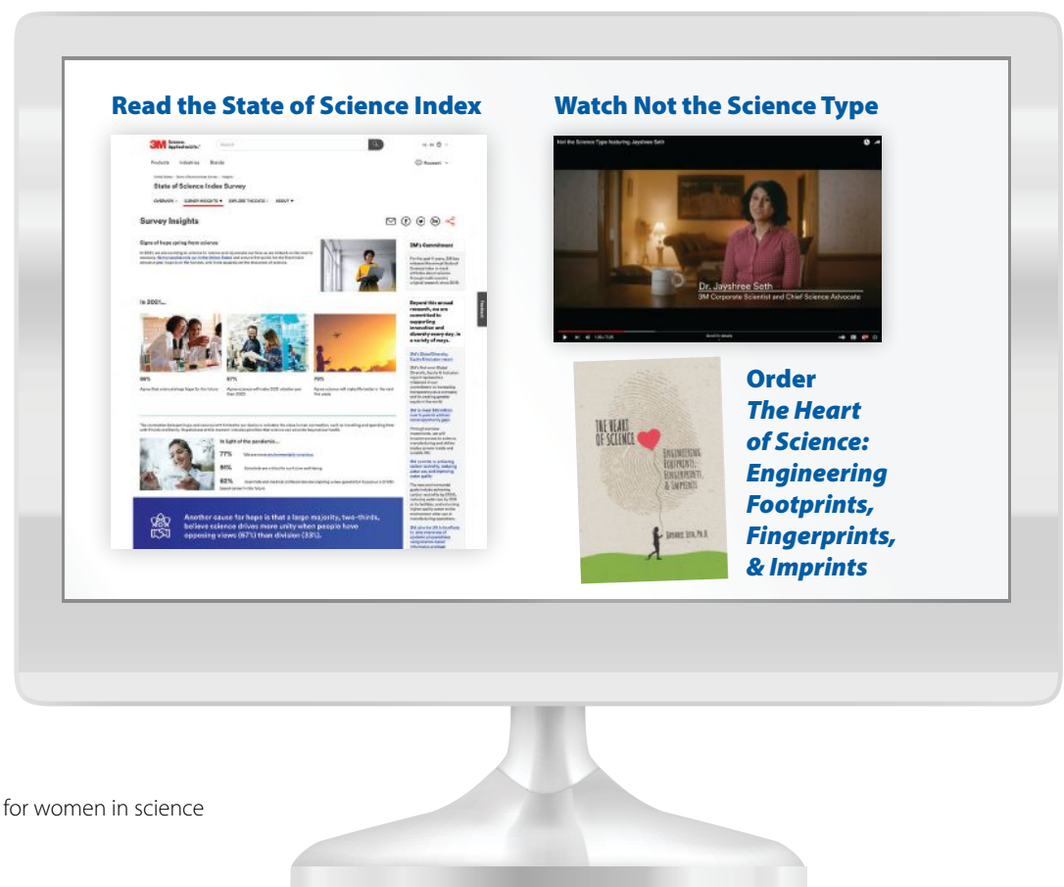
leadership, women, science, and parenting into my book, which was published by Society of Women Engineers. I titled it *The Heart of Science: Engineering Footprints, Fingerprints & Imprints*, because in my view, a career journey isn't just about where you go and what you do. It's also about the community and the imprints you can leave in hearts and minds. And, by the way, all the proceeds from this book support a scholarship for underrepresented minority women in STEM.

I strongly feel that those in the STEM professions have a strong role in shaping the future of the world, and we can't fail to have adequate representation from women and minorities. I am very excited to let readers know that the first scholarship recipient, a young Black woman, has started her own STEM journey, funded by sales proceeds from my book. I hope more readers will support the cause by ordering the book from Amazon, so we can all be at the "heart" of starting a STEM chapter in someone's life and can truly engineer our collective future. It's not just about what people take away from my book; when they buy it, they are giving something as well.

You have been at 3M for nearly three decades! So many women in STEM exit the workforce for various reasons. How did you balance your career with being a mother?
Yes I am lucky to have landed in a culture of empowerment at 3M which was the perfect environment for me. As far as work-life balance goes, I can give you one simple tip that has worked for me: it's called "work-life semblance." I talk about this in my book as well. For many of us, work is such an integral part of our life now, and we work hard to have a sense of purpose at work. So, work and life certainly aren't at odds with each other, as the two parts of a balance would imply. For a better work-life balance and lower associated stress, I just acknowledge work-life semblance – the similarities between work and life!

If you think about it at a high level, our home-life is typically so much more about process over outcomes, about trust and candid conversations, about higher-context decision-making and a longer-term focus. These elements can, oftentimes, be at odds with our typical corporate work-life functioning. But what I've found is that embracing these concepts for work can help avoid the mental fatigue of switching from work-life mode to home-life mode. The more aligned the two are, the more natural and authentic alternating between them will feel, thereby lowering stress. Our home-life is certainly more under our direct control, and at times can be less multifaceted, compared to work-life. Still, many parallels can be drawn between home-life and work-life for a more seamless integration between the two spheres.

Of course, this approach may not work for everyone. But I have personally benefitted from acceptance of work-life semblance. It has helped me to stay truly authentic to who I am as a person, resulting in lower anxiety. It has tied together my principles and values, the culture I was raised in, and my desire to be accepted for who I am—a linkage that, for me, has been an important requirement for



To all the young women who wonder if they should consider science or perhaps leave science, because humanities may feel more intuitive: you can do both in a STEM career!

contentment and success. Allowing myself to be honest, transparent, and vulnerable has helped me to develop and also to build a deeper level of trust and collaboration with my colleagues, as a result of more candid communications with management, peers, and my teams.

Now that work and life are so inextricably intertwined, the similarities between work-life and home-life can be embraced even more to lower stress related to the work-life-balance. I feel that the recognition, acceptance, and even the incorporation of work-life semblance are the next frontier in the ever-evolving work-life story for women in STEM.

What advice would you give other women seeking fulfilling and impactful careers in science?

This is a generalization, but over the years I have come to realize that the way women may assess our own capabilities can result in us being unfavorably compared to men in science. My advice is to stay true to your style and to find your own "virtuous cycle." For me, my virtuous cycle is *action, success, confidence!* Start by taking small steps that give you the feeling of success, and this will give you confidence to take the next step, which will give you more success and build your confidence even further.

Don't fall prey to a vicious cycle rooted in self-doubt, overthinking, and paralysis. I can attest to feeling anxious every time I embark on a new endeavor. Most such new endeavors are, in fact, initiated by me, and yet, at times I feel a lack of self-assuredness at first. However, that feeling is not to be misconstrued as a lack of confidence. On the contrary, this initial processing actually fuels me to gain enough knowledge to reduce my anxiety and to be extremely well prepared to handle challenges. This virtuous cycle has really worked for me: I proactively seek out learning experiences that can give me success and confidence.

I believe for many women, it is important to have a multitude of diverse experiences that can help them stitch together the narrative, "I have done that before." In many cases this starts with taking action, which gives them success and leads to confidence. For many men, on the other hand, it is their confidence that leads them to take to action, which then can lead them to success. But women must undergo experiences that make them more and more comfortable in their own abilities and equip them to have more impactful and fulfilling careers in the field.

Is there anything else you would like our readers to know?

I hope your readers get a chance to view my story on the 3M docuseries, *Not the Science Type*. I am honored to be one of the scientists featured in it. With this docuseries, we intend to inform, to influence, and, hopefully, to inspire. Science needs more young girls who want to change the world and to solve real problems that matter. We need more people with community-oriented goals and aspirations in STEM than even before, with all the sustainability challenges we have ahead of us.

To all the young women who wonder if they should consider science or perhaps leave science, because humanities may feel more intuitive: you can do both in a STEM career! STEM fields can allow you to collaborate with others to solve problems and help people. I like to expand the acronym to SHTEM: Science, Humanities, Technology, Engineering, and Math. This multifaceted mindset is much needed.

For all the professional women in STEM, or those who are poised to start and are wondering if they can succeed in a corporate career, I like to tell them that you can change the rubric: when you alter the metrics yourself, you will transform the optics of who enters, persists, and excels in STEM. Don't let pervasive stereotypes deter you.

The last two years have shown us that many things need to change. But to change the field of science, you don't need to change. Science needs you to be you! We need all the diversity we can muster in science to creatively unlock the secrets to a sustainable future. We are all the "science type." ✪