The Most Inspiring Engineer of the Year

Chauhan recognized for humanitarian technology

Sunita Chauhan, winner of the 2010 IEEE Asia Pacific Women in Engineering (WIE) Most Inspiring Engineer of the Year Award, and associate professor, division of mechatronics and design at the school of mechanical and production engineering at Nanyang Technological University (NTU), Singapore, calls her career "very enriching and satisfying," especially when it inspires others.

Chauhan was declared the winner, out of five other nominees, on the basis of her inspiring contributions to the advancement of technology for humanitarian purposes. Her minimally invasive biomechatronic approach for breast cancer surgery is based on the objectives of developing minimally invasive and non-invasive surgery for breast cancer treatment using a robotic approach. Chauhan holds four international patents granted on these systems and in 2006 was awarded the public sector innovation award by TEC (the Prime Minister's Office, Singapore). According to Chauhan, women are a minority in engineering disciplines in all parts of the world, and because of that she believes it's important to inspire young girls to adopt a career in engineering and to give them opportunities to learn from role models.

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As an academic counselor and mentor, Chauhan says she is frequently asked by students and their parents which career or field of engineering they should choose to ensure a solid job in the future. "My answer to them is always to follow their passion because that propels you to achieve and give your best," she says "And there are no limits or bars for exceptional, outstanding work in any area of engineering. There is no area in engineering that is considered obsolete for exceptional students. If students can be in the top 1% in any engineering discipline of their choice, ample jobs will flow their way."


Sunita Chauhan

And proof of that is that Chauhan was also at the top of her class growing up. Chauhan says she was brought up in the northern Indian states of Delhi and Haryana, however she and her family moved across India and abroad almost every two to three years because of her father's job. Calling it a bit uncomfortable and disruptive for schooling, Chauhan says it also challenged her to find ways to rise to the top in her classes, while being exposed to a wide spectrum of values, cultures, and traditions. "I am in dearth of words to thank my parents and teachers for their firm belief and confidence, which not only hugely encouraged and guided me in my studies but was also a reminder to me to be a role model to my younger siblings by setting examples. That helped shape my life in the most positive ways," she says.

As to why she chose engineering as her field of study, Chauhan says it was her curiosity and passion to learn the "what, how, and why?" of things that led her on the engineering path. "I have liked tackling new mathematical riddles and challenges since childhood, and I cherished physics in solving many of my queries, especially the 'why' part," she says. "However, I must admit that becoming an engineer wasn't always my dream profession. I aspired to be a medical doctor first. Then, when enthralled by the teacher at my school, I wished to be a teacher. Later in school, learning about various scientists and their inventions, I was utterly fascinated and the only woman that shared a space in that chapter, none other than Marie Curie, enthralled me and assured a possibility as a perfect role model." Chauhan says she learned early in life that her only limit was her imagination and that she could pursue any and all career paths that she wanted. "And I am very happy with my career now. I'm at the interface of many engineering, medical, and scientific disciplines," she says. "I have all the wonderful ingredients on my plate, and I'm able to invent so many novel fusion recipes."

Recipe for Success

After earning her master's in instrumentation and control engineering, Chauhan says she worked for about five years in national scientific organizations and institutions such as the Central Scientific Instruments Organization

The research conducted by Sunita Chauhan (second from the left) aids many different clinical disciplines at Nanyang Technological University in Singapore.

(CSIO), in Chandigarh, India, and the Indian Institute of Technology (IIT), in Delhi. Chauhan says she also held concurrent academic visiting positions at the University of Delhi, India, as well as being the director of research and development at an educational robotics company in New Delhi. Afterwards, she received the commonwealth scholarship award from the British government, the only women candidate to receive this scholarship award in engineering that year, and then went on to earn her doctorate degree in medical robotics from the Imperial College of Science and Technology, in London. Chauhan says at Imperial College she worked with one of the world's best medical robotics research team with many pioneering feats, at the top of which is the world's first active medical robot for prostatectomy [robotic prostatectomy is a treatment for prostate cancer]. Chauhan says her doctorate at Imperial in 1999 was one such pioneering effort for a noninvasive robot using high intensity focused ultrasound (HIFU) and was well covered by media in the United Kingdom. Chauhan continued with her efforts and says Imperial now has a team of minimally invasive and noninvasive robots.

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Since April 1999, Chauhan has been working at NTU at the school of mechanical and aerospace engineering. She was assistant professor in the systems and engineering management division until September 2005 and then went on to become associate professor at the mechatronics and design division where she works today. Chauhan's research aids numerous clinical disciplines such as neurosurgery, urological applications (kidney, liver, lung, and prostate among others), breast cancer management, and transabdominal route surgical interventions. In 2003, Chauhan says she initiated a new research impact group named biomechatronics at the robotics research center, NTU. Following this, she was also appointed at NTU as focus-group lead for biomedical and biorobotics, a subfield of robotics that studies how to make robots that emulate or simulate living biological organisms mechanically or even chemically. Chauhan says she is happy that a part of her research is concentrating on treatment technologies for women-related diseases such as breast cancer—the most common cancer affecting hundreds of thousands lives worldwide.

When asked what she enjoys most about her job, Chauhan says, "teaching keeps me energetically alive through interactions and exchange of knowledge with the most enthusiastic group of society—students. It has never stopped amazing me. I have a child's excitement to learn and impart new knowledge, to find solutions to technically challenging problems that will positively impact people's lives and to reinvent myself at each and every stage."

And even though there are challenges in the engineering field, one being the fact that it is primarily male oriented, says Chauhan, it is also a benefit to women. According to Chauhan, because there are many more men than women in the field, this imparts opportunities for very high visibility to women engineers and their work. "This in itself is an enabling force for women to put in extra effort before their peers and to gain recognition for their contributions. I see this as the most rewarding aspect for women, albeit challenging. Visibility is almost instant."

—Nancy Salim