



## Office of the Principal Scientific Adviser to the Government of India

# Foreword

On the occasion of the 75th anniversary of India's Independence, we are thrilled to partner with Red Dot Foundation for the second book, *She Is—Women in STEAM*. The Office of the Principal Scientific Adviser (PSA) to the Government of India, established in 1999, aims to provide pragmatic and objective advice to the Prime Minister and the cabinet in matters of Science and Technology.

Indian women have long been actively involved in Science and Technology and have contributed to various disciplines of science. Anandibai Joshi was the first Indian woman physician with a Western Medicine degree in the United States of America. Janaki Ammal was the first Indian scientist to be honoured with the Padma Shri Award in 1977. She was the Director-General of the Botanical Survey of India. Kalpana Chawla has inspired many by being the first woman astronaut of Indian origin to go to space.

One cannot forget Tessie Thomas, the “Missile lady” who is the first Indian woman scientist to have headed a missile project. She was the Project Director for the Agni-IV and Agni-V missiles at the Defence Research and Development Organisation. When India successfully launched a satellite into orbit around Mars, the picture that captured the world was of several women celebrating at the Indian Space Research Organisation (ISRO) in Bangalore.

This book, *She Is—Women in STEAM*, is important because it showcases the incredible journeys of several women scientists across different disciplines. It spotlights their work and leadership. It acknowledges their enormous contributions to the S&T ecosystem of our country. We are proud of them and we hope their stories inspire many more girls in the country to take up science, mathematics, engineering, and technology. We also appreciate the contribution of those in the humanities discipline as it contributes to a holistic society.

At the Office of the PSA, we have many programs to bring science and technology to different parts of India and encourage our youth to design, develop, and innovate so that we can instill the scientific temper within our curriculum and ideology.

On this 75th anniversary of India's Independence, we would like to wish everyone a wonderful future. Together we can ensure the success and progress of our country to greater heights.

**Prof. Ajay Sood, Principal Scientific Adviser to Government of India**

# Dr. Archana Sharma

## Honest

Archana heads the Beam Technology Development Group (BTDG) at the Bhabha Atomic Research Centre (BARC). She is one of the top women leaders in the organisation and attributes her success to the encouragement, mentorship, and unconditional support of her family members, seniors, and colleagues. While her father, a mechanical engineer, encouraged her to do her PhD, her final year guide, Prof. M. S. Berde, showed her the way to BARC for her career.

In BARC, she found an environment that was unbiased and extremely supportive of women. It fosters innovative world-class solutions for issues covering wide-ranging sectors such as health, food security, waste management and national security. Some of her famous innovations include the multi-gigawatt pulsed power system, fast and repetitive switches, flash X-ray and magnetic pulse welding. Being an active team player lies at the core of her work ethic. Her group achievements include indigenous technological solutions for food preservation and, in recent times, a successful demonstration of indigenous development involving the process and technology for wastewater treatment to prevent chemical deterioration of soil and maintain clean river bodies. Her latest successful project with a multi-group collaboration is an indigenous cutting-edge cargo container scanner that can save government institutions millions of dollars spent on importing similar equipment from abroad.

Her zeal in finding sustainable solutions to technological challenges has won her several prestigious fellowships and numerous deputations abroad. She is grateful to her parent department for nurturing her academic growth. Her first senior, Dr. P. H. Ron, guided her when she was completing her master's degree and PhD program from the Indian Institute of Science, Bangalore. When Bharat Ratna Dr. Abdul Kalam visited BARC as a chief guest, Dr. Ron invited him to see Archana's developmental work on the Fast Surge Suppressor for NEMP (Nuclear Electromagnetic Pulse). Praising her work, Dr. Kalam stated, "Our country needs such innovations." His words kept her anchored to her task.

Archana has also been active in several committees for technical review, defence safety, Swachhata, sports, etc. She was instrumental in making the organisation's ecosystem more encouraging for young parents by advocating for suitable policies and creche facilities.

Being a taskmaster means she never takes "NO" for an answer; she reads it simply as an abbreviation for **Next Opportunity!** She has always strived to deploy her department's innovations to the indigenous and global market. She firmly believes that meaningful collaboration and cooperation between developers and users is integral for creating products that strengthen the vision of a self-reliant India. Hence, she advocates increased utilisation of in-house products among public institutions to reduce the dependence on import and taking pride in adopting indigenous technological substitutes.

Her advice is: "Be Positive, Proactive, and Persuasive. Everyone has at least one quality that can lead to success, if used properly." Most importantly, she advocates the path of *Mansa Vacha Karmana* which, in Sanskrit, means being pure and unified in mind, body, and action.

**Dr. Archana Sharma is Group Director of Beam Technology Development Group, Bhabha Atomic Research Centre (BARC), Mumbai.**