# Shobana Narasimhan

## A scientist on a mission to address gender gap (16 .8.1963)

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Professor Shobana Narasimhan said, "Women find it difficult balancing their roles as a scientist, wife, mother and daughter. Find the strength not to give up within yourself. Talk to other people to help you find that strength. There is a need to create a platform where women could connect, share their challenges, and empower each other. External factors may make you feel that you are not good enough, but do remember you are not lacking anything. Once you realise this, you can achieve anything you dream of." She has been organising career development workshops for women in Physics for more than a decade at **International Centre for Theoretical Physics (ICTP), Italy.** For conceiving and organising such workshops and programmes that has a transformative effect on the trajectories of female physicists and recognising her significant contributions towards promoting diversity, combating discrimination in the physics community, American Physics Society has recognised her as a fellow recently.

Shobhana earned her B.Sc. in Physics from St. Xavier's College, Mumbai in 1983 and later joined MSc at IIT Bombay, where she was a silver medallist. With her passion for physics, she pursued PhD at Harvard University under the guidance Prof. David Vanderbilt. She did postdoctoral work at Brookhaven National Laboratory, USA and the Fritz Haber Institut, Berlin, Germany.

Her father Prof.M.S. Narasimhan, a world-renowned mathematician and her mother Shakunthala, an accomplished singer gave courage to their children to explore and follow their dreams. Shobana imbibed her love for reading, appreciating art forms, exploring languages and expressing thoughts boldly from her parents who facilitated conversations on various subjects.

"I was born prematurely and was very tiny, and my father used to call me epsilon. One of my earliest memories of my father is related to mathematics. I must have been about four years old; I was in his

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office at TIFR, and, standing on a chair, was writing numbers on his blackboard. I wrote, '0, 1, 2, 3,...' and then turned and asked him, 'Appa, what number comes before zero?' He got tremendously excited by this question, explained to me about negative numbers, and kept boasting about my precocity to everyone. 'I knew then,' he was to tell my students, many years later, 'that she would one day become a mathematician ...' There was then a small pause, before he continued, a little sadly, 'Or ... maybe ... a physicist'", recalls Shobana about how confident her father was about his little daughter becoming a notable woman in STEM someday. She became one and now mentors and guides many more women who actively work to bridge the gender gap in science.

Matter behaves differently at nanoscale level. In other words, when one or more dimensions of a material have nanoscale dimensions, novel properties emerge that are different from those of the corresponding bulk material. Prof Shobana uses computational techniques to understand the properties of matter at nanoscale. She uses the techniques of density functional theory for understanding these which is then leveraged to design novel nanomaterials for suitable applications like nano catalysts for clean energy, spintronics of magnetic materials for memory storage and many such. She is a scientist in computational nanoscience in the field of condensed matter physics.

Women in science have a tough time everywhere and those in developing countries have even more constraints. Lack of resources and a dearth of trained teachers act as deterrents, though there is a great urge and thirst for learning. **Shobana helps people overcome this by being a part of many open science initiatives and collaborative platforms helping scientists of developing countries from Asia and Africa.**

Shobhana teaches physics and mentors students from these countries through initiatives like Quantum ESPRESSO, ASESMA, ICTP-EAIFR. She gets into the field, understands the challenges through interactions, thinks through case by case and acts as a solution provider. **She gets to the core of the problem and advises the government on how policy should be changed to promote the cause of women scientists.** She has been on several national and international committees to promote women in science, including **National Task Force on Women in Science**, and the Standing Committee on Women in Science of our government, as well as the working group on **Women in Physics** of IUPAP.

### DO YOU KNOW ?

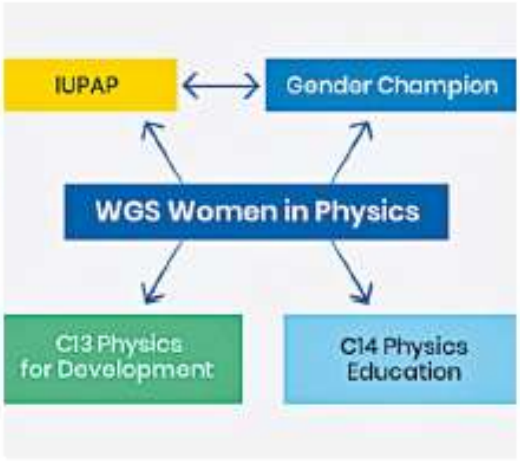
- **Quantum ESPRESSO** -The integrated suite of Open-Source computer codes for electronic-structure calculations and materials modelling at the nanoscale.
- **ASESMA (African School on Electronic Structure Methods and Applications)** introduces young African researchers to the theory of electronic structure and other atomistic simulation methods, with an emphasis on the computational methods for practical calculations.
- **ICTP-EAIFR** (International Centre for Theoretical Physics – East African Institute for Fundamental Research) is an international hub of advanced education and research institutes in Africa. It is a Category 2 UNESCO institute.

QUANTUM ESPRESSO FOUNDATION

The Abdus Salam International Centre for Theoretical Physics

Shobana stands tall through her exemplary efforts, with the mission to provide a safe and bias-free environment where women in science can share their experiences, gain self-confidence and acquire the skills they need to become successful in their professions.

She has also been teaching solid state physics and density functional theory worldwide, with a special focus on Africa. She is a visiting professor at many institutions, including the University of Cambridge and the Universite de Paris-Diderot and held the Marshak lectureship of the American Physical Society. She is currently an Anna Boyksen Fellow at the Institute for Advanced Study, Technical University Munich, Germany. Recognising her contribution towards research in materials science, innovations and teaching, she has been elected as a fellow of Indian Academy of Sciences and National Academy of Sciences of India. She was honoured with the Stree Sakthi Samman award for her original contribution to science through high quality research which is relevant and beneficial to society. Her popular science articles take research to the public and the series 'A (mostly) scientific crossword' in the Resonance journal of science education is something every science student and teacher would cherish!




She has not confined herself within the four walls of her laboratory as a researcher. She stands tall through her exemplary efforts, with the mission to provide a safe and bias-free environment where women in science can share their experiences, gain self-confidence and acquire the skills they need to become successful in their professions. **For her unstinted efforts in this direction, she has been elected as an international honorary member of American Academy of Arts and Sciences.**

"Women need to strive that they are not stuck with imposter syndrome. The same applies to men as well at times," says Prof. Shobana who is on a mission creating platforms to help them achieve what they are capable of.