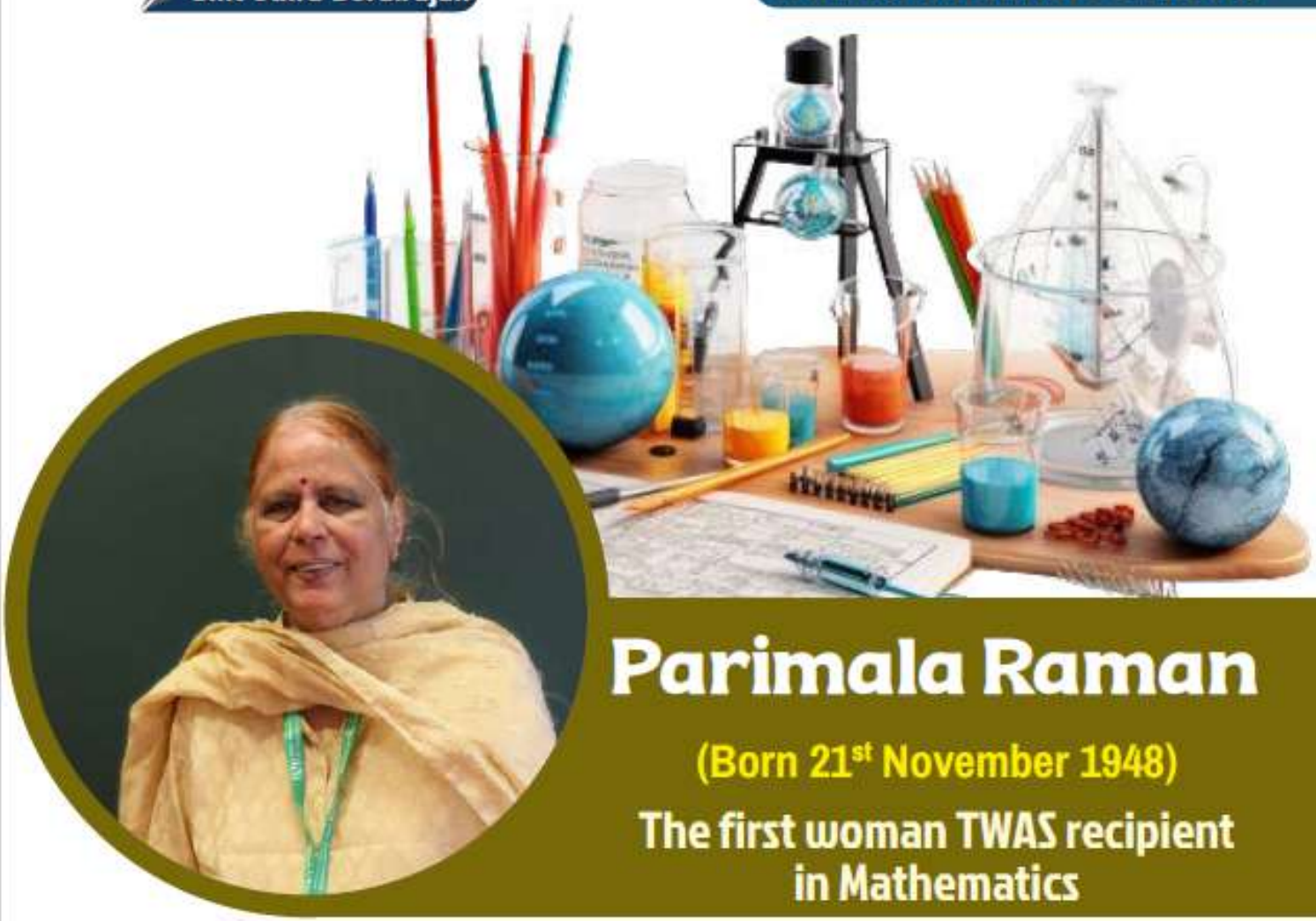


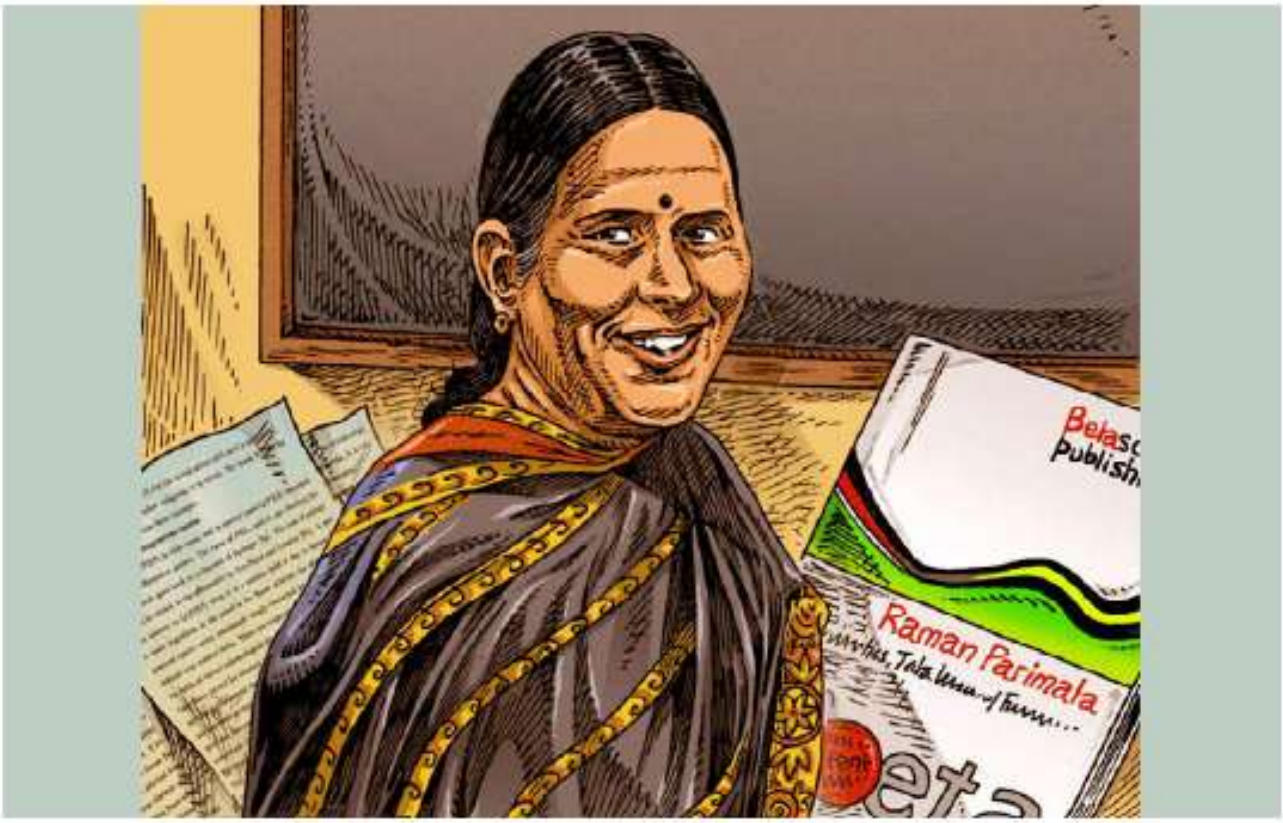
Parimala Raman

(Born 21st November 1948)

The first woman TWAS recipient in Mathematics

Tata Institute of Fundamental Research (TIFR) in Mumbai provides a great environment for research with total academic freedom, an excellent library and a vibrant visitor's programme. Mathematicians from all over the world expose the latest developments through lecture series. I gained a lot through interaction with visiting mathematicians. Prof. Sridharan instilled in me the responsibility of dissemination of knowledge to youngsters. I have had the privilege to interact with students – working with each one of them led to my exposure to new areas. I am proud to say that some of my students have outperformed me," says Prof. Parimala while sharing her personal story in *Lilavati's daughters,* a collection of biographical sketches of influential Indian women scientists. Described as a supreme and powerful algebraist, this teacher par excellence has made outstanding contributions to this field using tools of **number theory, algebraic geometry and topology.**

Young Parimala studied at Sri Ramakrishna Mission Sarada Vidyalaya, Chennai started by Sister Subbulakshmi fulfilling the call of Swami Vivekananda to nurture women as real lionesses through education. She later pursued her B.Sc. and M.Sc. Mathematics (1970) at Stella Maris College, Chennai. A standard career path for many women in those days, she too wanted to take up a teaching job. "My ending up with a research career in mathematics was something of an accident. Though I had heard about the famous Tata Institute, I preferred to stay in Chennai to continue my studies. After considering various options, I decided to pursue research studies at Ramanujan Institute, University of Madras. Professors like Bhanumurthy and Rama taught me mathematics with great enthusiasm. After a year, I moved to the Tata Institute to work with Professor Sridharan for my Ph.D. degree,"



reminisces Prof. Parimala, a Fellow of all three Indian Academies of Science!

Growing up in a household environment where academic performance was the highest priority, young Parimala understood the importance of dedication and perseverance. "My father instilled in me the discipline to work towards excellence in whatever I took up. I was fortunate to have excellent teachers, both in school and in college, who nurtured my interest in mathematics. When I was due to finish school, my father wanted to know what I wanted to study in college.

He suggested medicine or English literature since a career in medicine or in teaching is most suited for girls. Realising quickly that my interest was in mathematics, he promised to send me to the best possible institution for higher studies," mentions Parimala with gratitude.

Life is not always easy and everyone has to overcome the challenges thrown at them. Self-doubt and apprehension about one's own capacity do not exclude even the brightest minds. That is when family and friends play a huge role in supporting the individual. "When I finished writing up my thesis, I was diffident about continuing as a research mathematician.

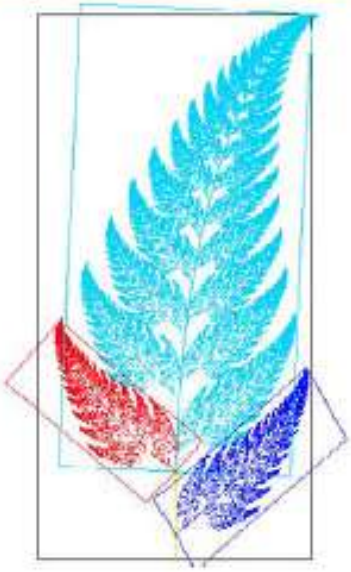
The presence of some of the greatest mathematicians of the world at the institute as well as some brilliant youngsters emerging as shooting stars on the horizon was truly daunting."

The world of mathematics is indeed lucky that Parimala's family was supportive and empathetic! Soon after completing her research, she got married to Raman who was a chief internal auditor with the Board of Internal Trade, Tanzania. She took leave from the TIFR for a year and accompanied him to Dar-es-Salaam, without much clarity about her future career. She longed to do mathematics, though she was happy with her life.

As the saying goes, "when you want something, all the universe conspires in helping you to achieve it." There were twists and turns that enabled her to get back to mathematics. In a few months, Raman took an extraordinary decision to quit his job, accompanied her to ETH Zurich so Dr. Parimala could do her post-doctoral work. She smiles reminiscing those days, "But for his support, I would have given up my career at some point. More than support, his enthusiasm for the research I do and rejoicing when I get recognition were steering forces for me to continue to this date in the profession. He is immensely proud of me." In Switzerland, she met mathematicians like M. Ojanguren and M.A. Knus with whom she had fruitful discussions on mathematics throughout her career.

Completing her post-doc, she returned to our country and served as a professor at TIFR, while she

- **Affine** - In Euclidean geometry, an affine transformation or affinity is a geometric transformation that preserves lines and parallelism, but not necessarily Euclidean distances and angles.
- **Topology** - a branch of mathematics concerned with the properties of geometric figures that do not change when the figure is twisted or stretched in certain ways.
- **Homology** – The state of have the same or similar relation, relative position or structure.
- **Cohomology** – A part of the theory of topology in which groups are used to study the properties of topological spaces. This is related in a complementary way to homology theory.



held visiting positions at the Swiss Federal Institute of Technology (ETH) in Zürich, the University of Lausanne, University of California-Berkeley, University of Chicago, Ohio State and the University of Paris at Orsay.

Early in her career, she published the first example of a **nontrivial quadratic space over an affine plane.** This result surprised many experts and has since led to further developments in the field. Her study of quadratic forms also led her to investigate real algebraic geometry as well as complex algebraic geometry and the cohomology theories that are linked to it.

Parimala has also brought light to the solution for the second Serre conjecture, expounded in 1962. In another piece of work that has been described as a tour-de-force, she has come closest to solving another long-standing conjecture in u-invariant of the function field.

She has been an eminent researcher, a role model, research guide and mentor for many youngsters, especially women aspiring to pursue a career in STEM. In 2005, Parimala was appointed as the Asa Griggs Candler Professor of Mathematics at Emory University in Atlanta, Georgia. Prof. Parimala has put her expertise to work in a series of elegant publications either supporting or refuting long-standing conjectures.

In her own words, "Looking back, it has been a highly satisfying profession. I immensely enjoyed interactions with like-minded mathematicians the world over. It is a world of 'make-believe', with great excitement from time to time. I only wish I had the lucidity of my father to convey to the outside world the immense beauty of mathematics!"

Awards / Accolades

1987 - Shanti Swarup Bhatnagar Prize for Science and Technology.

2005 - First woman recipient of the most coveted The World Academy of Sciences (TWAS) prize for mathematics.

2010 - Plenary speaker at the International Congress of Mathematicians.

2013

- Emmy Noether Lecturer by the Association for Women in Math (AWM)
- Fellow of American Mathematical Society (AMS).

Her views on the career prospects in mathematics- "It is full of challenges and rewards; it gives an opportunity for students with a passion for mathematics limitless possibilities for creative thinking. There are globe-trotting opportunities to meet with mathematicians world over. Imparting your knowledge through teaching and mentoring is part of the reward of this career."