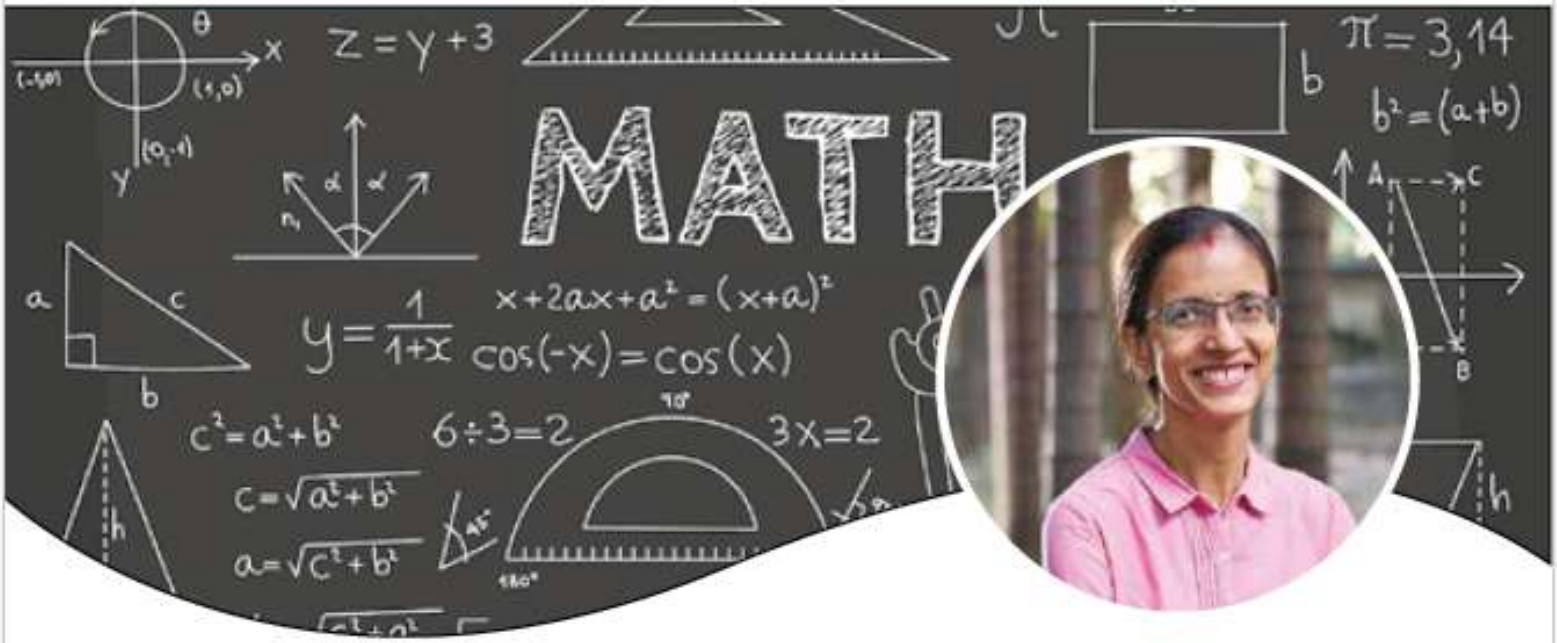


Dr. Neena Gupta

Our country has always been a land that encouraged education - mathematics, literature, observational astronomy, metallurgy, Ayurveda, Siddha and many other branches of indigenous knowledge. Even *Sangam* period boasts of women poets, thinkers, scholars and advisors to kings. Separated by time and distance, but connected by the ethos of the soil, no wonder we find the Ramanujan prize awardee Dr. Neena Gupta resonating the same sentiment, "it doesn't matter if you are a boy or a girl; God has given the same abilities to both; it's up to us to recognize our abilities, do the hard work, be patient and taste the success, be it mathematics, space science, cooking or nursing."

Born on 24th November 1984 in a modest Indian family in Kolkata, Neena completed her B.Sc. Honours in Mathematics at Bethune College (Kolkata) in 2006. "Most girls in our community get married right after graduation. But, my dad let me get a PhD. He never questioned my life choices—and my husband continues to extend the same support." says Dr. Neena thanking her family for their support and consistent encouragement. Neena recollects her mother teaching them and her father spending most of his family time with Neena and her brothers shooting mental maths questions and puzzles when they were in school. This informal learning honed her capacity to face intriguing problems and gave her joy to solve challenges.

Neena came to know of the ambitious MMath (Master of Mathematics) programme at ISI Kolkata and got selected after a tough all India admission test. Neena identifies her admission to this programme as the definitive turning point in her becoming a mathematician. Prof. Amartya who taught her algebra, commutative algebra and algebraic geometry then and guided her through doctoral research writes, "I have been a witness to the swiftness with which she assimilated the course requirements in a short time. During her second year, she even attended some of our expository research seminars in algebra during vacations or when she did not have classes. At ISI, Neena had a glimpse of the world of higher mathematics and felt the urge to belong to it as a researcher. Her parents too encouraged her to pursue her passion."

With Shyama Prasad Mukherjee Fellowship of CSIR, Neena decided to join ISI Kolkata

for her PhD in 2008 under the supervision of Professor Amartya Kumar Dutta and completed her research by 2011. Some of her significant discoveries include **new algebraic characterisations of affine two and three spaces**. Soon, she started teaching at ISI as a DST-INSPIRE faculty in 2012 and was recognised as a visiting fellow at TIFR Mumbai for her extraordinary contribution towards research.

Zariski cancellation conjecture has been a fundamental problem in algebraic geometry posed by one of the most eminent founders of modern algebraic geometry, Oscar Zariski in 1949. In very simple terms, this can be rephrased as, "if you have cylinders over two geometric structures, and these have similar forms, can one conclude that the original base structures have similar forms?" This could not be solved for decades, though a few attempted it. Dr. Gupta's solution for solving this daunting problem is described as "one of the best works in algebraic geometry in recent years done anywhere."

She made history by being the first person to solve the world's most significant math problem. She became an associate professor at Indian Statistical Institute (ISI) at a very young age, thanks to her world-class accomplishment. Neena has won countless awards and honours for her innovative works that have a big impact in the field of algebraic geometry.

ACCOLADES

2013 - **Saraswathi Cowsik Medal** from the Tata Institute of Fundamental Research alumni association.

2014 - **Young Scientists Award** of the Indian National Science Academy.

2015

- **Ramanujan Prize** by the Ramanujan Institute for Advanced Study in Mathematics.
- **A.K. Agarwal Award** for the best publication by the Indian Mathematical Society

2017 - B. M. Birla Science Prize in Mathematics.

2019 - Shanti Swarup Bhatnagar award - the most prestigious prize of our country in the field of science and technology. She was the youngest recipient.

2021 - DST-ICTP-IMU Ramanujan Prize for Young Mathematicians from Developing Countries by International Centre for Theoretical Physics (ICTP), Italy. This was in recognition for her outstanding work in affine algebraic geometry and commutative algebra, in particular for her solution of the Zariski cancellation problem for affine spaces.

It is an extraordinary honour for Neena as she is the fourth Indian and third woman to win this prize.

2022

- **Nari Shakti Puraskar** by the President of India.
- **Ganit Ratna** award - a new prize in mathematics of the Professor Thakare Felicitation Institute.

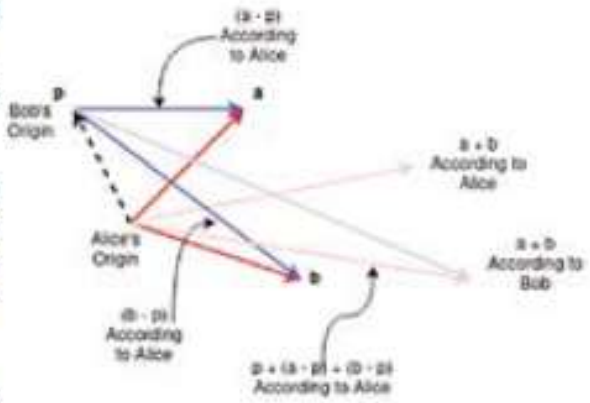
2023 - TWAS-CAS Young Scientist Award for Frontier Science, the first recipient in the category of 'Mathematics and Artificial Intelligence'.

2024 - The Infosys Prize

She has received almost all the awards in this field in the last two decades, as a Mathematician!

As a tribute to the great Emmy Noether who has shaped modern abstract algebraic thinking, the annual Emmy Noether Lecture series was established in 1980 by the Association for Women in Mathematics (AWM) to honour women "who have made fundamental and sustained contributions to the mathematical sciences". It is a matter of pride for the Indian mathematical community that Neena Gupta **delivered the Emmy Noether Lecture** in 2025. She is **the youngest** mathematician so far, and is also **the first from an Indian institution** and **the third of Indian origin** to be chosen for this honour.

Her mentor Prof. Dutta in his biographical note about his student observes, "Alongside her research and other mathematical duties, Neena has been performing all her family responsibilities, especially taking personal care of her little daughter. She is deeply religious, and personally I feel that rigour, dedication and intensity in her mathematical life have come to her naturally from the meticulousness, discipline and devotion in her religious life from early childhood. It has been deeply rewarding to be a witness to the rapid evolution in her maturity as a human being, alongside her rapid progress in mathematics".



Affine space is characterized by a notion of pairs of parallel lines that lie within the same plane but never meet each other (non-parallel lines within the same plane intersect in a point).