

M. S. Narasimhan (1932–2021)

M. S. Narasimhan, who passed away in Bangalore on Saturday, 15 May 2021, was a world-renowned mathematician of extraordinary depth and breadth. He made fundamental contributions to diverse areas of modern mathematics – algebraic geometry, differential geometry, representation theory and partial differential equations.

Narasimhan, together with his most famous collaborator and long-time friend, C. S. Seshadri, was among the first graduate students of the School of Mathematics, Tata Institute of Fundamental Research (TIFR), Mumbai. The School, then recently established, and headed by the visionary K. Chandrasekharan, provided its students with a thorough and eclectic education in modern mathematics, often via lectures delivered by guest faculty from around the world.

Narasimhan began his research career in analysis and partial differential equations. During a three-year postdoctoral stay in France, he was mentored by Laurent Schwartz. After a health crisis, Narasimhan spent a six-month recuperative sojourn reading a manuscript of Kodaira–Spencer on deformation theory, given to him by Schwartz. His background in analysis and geometry had prepared him well to read this pioneering work. After his return to TIFR as a faculty member in 1960, he turned to differential geometry, and then algebraic geometry.

In 1965 Narasimhan and Seshadri published a result (later named the Narasimhan–Seshadri Theorem) that makes a deep and unexpected connection between two different areas of modern mathematics.

The Narasimhan–Seshadri Theorem and the Harder–Narasimhan filtration (which was discovered in later work with German mathematician G. Harder) have been vastly generalized in the decades following their first appearance, and stand as fundamental examples of new paradigms with wide applicability.

Narasimhan worked in TIFR till his retirement in 1992. He led a group of researchers in the new field of moduli of vector bundles on curves, which emerged out of his work with Seshadri, and from the seminal work of David Mumford on geometric invariant theory. Narasimhan and his collaborators (notably S. Rama-

nan and G. Harder) and students were responsible for a major portion of the most basic and fundamental work in this area for some decades, and TIFR came to be recognized as major centre of mathematics in the world.

Some of the most famous work by Narasimhan in this period came from his collaborations with mathematicians such as Kotake (analysis), Ramanan (algebraic and differential geometry), Okamoto (representation theory) and Harder (algebraic geometry). He was an inspiring advisor and guided a number of graduate students – among them M. S. Raghunathan, S. Ramanan, V. K. Patodi and R. Parthasarathy.



Narasimhan received the Shanti Swarup Bhatnagar Prize in 1975. He was a Fellow of major academies, including the Indian National Science Academy, the Indian Academy of Sciences, and the Royal Society. He was a recipient of the TWAS Prize in Mathematics in 1987, and the King Faisal International Prize for Mathematics in 2006. Narasimhan was named a ‘Chevalier de l’ordre national du merite’ by the French Government in 1989, and in 1990 the Government of India conferred on him the Padma Bhushan. The Tata Institute made him an Honorary Fellow in 1994.

After his retirement from TIFR, Narasimhan joined the International Center for Theoretical Physics (ICTP) at Trieste, and served as the Head of the Mathematics group, where he mentored a number of talented young mathematicians. After his retirement from ICTP, he settled in Bangalore. There he was associated with the Centre for Applied Mathematics of

TIFR, the Indian Institute of Science and ICTS.

Narasimhan was the Founder-Chairman of the National Board for Higher Mathematics (NBHM) of the Government of India, and played an important role in the International Mathematical Union, including a term as the President of the Commission on Development and Exchange.

All along, he continued his role as a guide and a mentor for the Indian mathematical community. Coming within a year of the death of C. S. Seshadri, Narasimhan’s passing signals the end of an era for Indian mathematics.

Narasimhan is survived by his wife Sakuntala, an eminent musician, journalist and consumer advocate, daughter Shobhana, a distinguished physicist at the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, and son Mohan, a management professional.

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Editor’s note: An account of M. S. Narasimhan’s life and work appeared in the series ‘Living legends of Indian Science’: Ramadas, T. R.: M. S. Narasimhan, *Curr. Sci.*, 2014, **107**(4), 2014, 694–701.

We are lucky that some years ago Narasimhan sat down for a long interview conducted by Gadadhar Misra and M. S. Raghunathan, where he recounted his early life and influences, his career as a student and young researcher, and his later involvement in the development of Mathematics at TIFR, and in India and the world at large. These interviews, the work of Robin Reels Productions, are available on YouTube in four parts (here is the link to the first part: <https://youtu.be/1PgmthHAK4w>) under the title: ‘A Mathematician by choice: Conversations with Prof. M. S. Narasimhan’. An equally interesting encounter, with Gauhar Raza, is this one on the Rajya Sabha YouTube channel: <https://youtu.be/MZZvmVFerro>.