M.S. Narasimhan – quintessential mathematician

TIFR and the world of mathematics is rendered the poorer by the passing of Mudumbai Seshachalu Narasimhan (1932 — 2021), mathematician *par excellence*, who was the last survivor among the early group of pioneers who built up the formidable Department of Mathematics in the Institute. M.S. Narasimhan, as he was widely known, did his Ph.D. from TIFR and was a member of the Faculty of Mathematics from 1960 till his retirement in 1992. He was made an Honorary Fellow of TIFR in 1994 and continued to hold the position as long as he lived.

Narasimhan was born on June 7, 1932 in a small town called Tandarai, in Tamilnadu. He did his schooling at Tandarai and then joined the Loyola College in Chennai, where he was deeply influenced by the inspiring Professor of Mathematics, Father Charles Racine. It was Fr. Racine who introduced Narasimhan and his classmate and later collaborator, C.S. Seshadri, to the advances being made by French mathematicians of the day. Both joined the nascent Mathematics Department at TIFR in 1953. It was here, under K. Chandrasekharan, that Narasimhan eventually completed his Ph.D. in 1960. During this time, he attended lectures given in TIFR by Laurent Schwartz and also began to read up the works of Bourbaki. He then moved to Paris for three years. At Paris, his interests were mostly in analysis and partial differential equations and he was mentored by Laurent Schwartz, but he also interacted with Henri Cartan, and many others, and met stalwarts like Armand Borel and Alexander Grothendieck. It was here that he mastered the new deformation-theoretic work of Kodaira and Spencer, as his interests turned to include algebraic geometry.

By the time he returned to TIFR in 1960, to take up a Reader's position, Narasimhan was already an accomplished mathematician. Soon after, he shot to international fame with his best-known work, in collaboration with his old friend and now colleague, C.S. Seshadri. The Narasimhan-Seshadri Theorem (1965) proved by them establishes the stability condition of a holomorphic vector bundle over a Riemann surface and its deep connection with group theory, thus making a deep and unexpected connection between two different areas of modern mathematics. This and the Harder-Narasimhan filtration (which was discovered in later work with German mathematician Günter Harder) have been vastly generalised in the decades following their first appearance, and stand as the fundamental examples of paradigms with wide applicability.

At TIFR, Narasimhan 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 work of the American algebraic geometer David Mumford. He and his collaborators (most notably Ramanan and Harder) and students were responsible for a major portion of the most basic and fundamental work in this area for some decades, as TIFR came to be recognised as one of the top centers of mathematics in the world. Some of his most famous work in this period came from 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 — K. Gowrisankaran, M.S. Raghunathan, S. Ramanan, M.K.V. Murthy, V.K. Patodi, G.A. Swarup, R.R. Simha, R. Parthasarathy, S. Kumaresan, T.R. Ramadas, N. Nitsure, S. Subramanian and F. Coiai — many of whom went on to become outstanding mathematicians in their own right .

In 1992, Narasimhan retired from TIFR and moved to the AS-ICTP at Trieste, where he headed the Department of Mathematics till 1999. He returned to India in 1999, and spent the next two decades promoting the study of mathematics. He 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, where he was able to help nurture mathematics in developing countries. He settled at Bengaluru, where he was a Distinguished Associate at the Department of Mathematics of the Indian Institute of Science. He remained associated with TIFR through its Centres in Bengaluru.

Not surprisingly, the author of such stellar work was showered with honours during his lifetime. These included the Shanti Swarup Bhatnagar Prize, the TWAS Prize for Mathematics, the Fellowship of the Royal Society of London, the Padma Bhushan, the French Order of Merit, the King Faisal International Prize for Science and — as recently as 2020 — the Spirit of Salam award of the AS-ICTP.

The late mathematician is survived by his wife Sakuntala, an eminent musician, journalist and consumer advocate, his daughter Shobhana, a physicist, and his son Mohan, a management professional.