

Vinod J. Modi

Vinod J. Modi, professor (emeritus) of mechanical engineering at the University of British Columbia, Vancouver, honorary professor at the National Institute of Advanced Studies (NIAS), and a distinguished alumnus of the Indian Institute of Science, passed away on 12 February this year. Modi was an exceptionally inventive engineering scientist, known internationally for his extensive work on a wide variety of problems in applied fluid dynamics and related areas in aerospace and other technologies; many of which were concerned one way or the other with flow control. He was also a distinguished and passionate photographer and a generous philanthropist.

Vinod Modi was born on 15 December 1929 in Bhavnagar, Gujarat. His father was a lawyer who, in his early career, was a partner in legal practice with Mohammed Ali Jinnah, later to become the founder of Pakistan, and had to go to jail for his participation in the freedom movement as a prominent member of the Congress. Vinod's fascination with aeronautics seems to have started as he grew up within sight of Bombay airport, and a prize-winning essay he wrote earned him his first flight on a plane. As a young man he showed great promise in track athletics and cricket as well; but he declined an invitation to join the 1948 Olympics team, and one fine day tossed his cricket bat into the Arabian Sea, signalling his decision to devote himself to science and engineering. He got a bachelor's degree in mechanical and electrical engineering from the University of Bombay in 1953, and took a postgraduate diploma in aeronautics from the Indian Institute of Science (IISc) in 1955 (this was when I first got to know him, as we were both students in the same batch). He then completed a master's degree at the University of Washington in Seattle and a doctorate in aeronautical engineering from Purdue. During 1959–61 he worked as a research physicist at Cessna Aircraft Company. He moved thereafter to the University of British Columbia where he was a professor till 1995 (emeritus after that year). He was both a Satish Dhawan professor at IISc and an honorary professor at the NIAS in the year 2000.

His professional work in engineering science was marked by great inventiveness, of a kind that is very unusual in an

academic. He did outstanding work on flow control, showing how boundary layers could be managed by moving surfaces, such as, for e.g. a rotating cylinder mounted at the leading edge of an aerofoil (which can give dramatic improvements in the aerodynamic characteristics of the aerofoil). He then transferred some of these and other similar ideas to devise novel and practical vibration control systems on buildings responding to wind. These systems have been widely used, especially on some tall buildings in Japan. The other major area of his research was space technology: spacecraft stability, flexible body dynamics and control, tethered systems and space-based robotics. He also worked on heart



valves, on off-shore platforms, on V/STOL planes, on windmills, on ground vehicle aerodynamics, on the space station, on mobile robotic manipulators, and many other subjects. All of this work typically had specific applications in mind, and often led to real-life operating systems. These included manipulator arms for the space station, liquid-filled dampers for tall structures as well as deep-sea platforms, windmills that were used in Indonesia, etc. However Modi never patented his inventions; instead he distributed his intellectual property generously, saying 'I believe knowledge should be free'. During his visits to India he always talked about space technology

with engineers at the ISRO Centres, and about many of his other interests at different centres elsewhere in the country.

Apart from his international reputation as an aerospace engineer, Modi gained worldwide recognition as a consummate photographer. As early as 1957 he received the President Eisenhower's Prize for the use of photography to promote international understanding. His photographs have been exhibited around the world, including at the famous Nikon Center in Japan. He was invited to arrange an exhibition of his photographs in honour of Queen Elizabeth's visit to Vancouver in 1983. In 1985, he was invited by the Council of Museums and Art Galleries of Los Angeles to make a presentation on the Evolution of Buddhist Architecture. The foyer of the JRD Tata Auditorium at NIAS is still adorned with several beautiful pictures from an exhibition arranged there during December 2000. The exhibition was titled *This Moment has Twenty-one Days*, recalling the time he spent in the rural community of Karla, near Lonavala in Maharashtra, where, he said, 'reality lives . . . in this moment'.

He was also interested in calligraphy and music, and held a pilot's licence. There was a strong spiritual streak in his mental make-up, and he was a great admirer of Vinoba Bhave and of Sri Aurobindo's philosophy.

I personally lost a close friend of fifty years standing. The 1955 aeronautics batch at IISc had only 12 students, and we quickly got to know each other very well. Modi (as all of us called him at that time) was my frequent companion at table tennis, at which he was a professional and I, a novice. Photography had already become a passion with him, and I remember how he used to make photographic expeditions to Belur and Halebeedu, often cycling all the way to those places from Bangalore. He took beautiful pictures of those ancient and celebrated temples, and this passion continued throughout his life. One of the treasured gifts I have from him is a picture from the Lingaraj temple in Orissa. His pictures reflect a deep sense of beauty in nature and art, a meticulous attention to detail, and a professionalism in production that made no compromises, aesthetic or technical. He ran a sumptuously equipped photogra-

phic studio and laboratory in the basement of his house in Vancouver.

I believe he had a special relationship with Japan. He loved the country and its people, admired their sense of national discipline and determination, was deeply impressed by their art and architecture, shared their passion for photography, and perhaps felt a kinship with their values. I believe that the Japanese in turn returned his affection, and admired him for his technological achievements, for the solutions he invented to problems on vibrations in buildings, for his photographic art (he was permitted to take pictures at the Emperor's Garden), and for his human and Indian values. He was elected an Honorary Member of the Japanese Rocket Society in 2001.

Modi was widely honoured for his work in science and engineering. He was a Fellow of the Royal Society of Canada, the American Institute of Aeronautics and Astronautics (AIAA) and numerous other professional and learned societies. He was awarded the Gold Medal of the Science Council of British Columbia in 1986 and the Dirk Brouwer Award of the

American Astronautical Society in 1991. Among the numerous awards he won from AIAA were the Mechanics and Control of Flight Award in 1996, the Pendray Aerospace Literature Award in 1999, and Control Authority Award, Fluids 2000. He also won the John V Breakwell Memorial Lectureship and Plaque of the International Astronautical Federation in 1996. He served on the NASA Advisory Committee for Application of Tether in Space, the Astrodynamics Committee of the International Astronautical Federation, and on various AIAA committees and editorial boards.

Modi was a victim of lung cancer. He leaves behind his wife Mira Gandikota, a physicist whom he first met at a partial differential equations class at Purdue – on her first day in the campus; they were married in 1960. Their daughter Amita is a medical doctor, also known for her poetry, married to another doctor John Shandro.

It was characteristic of Modi that whatever money he made from the sale of his pictures he gave away to a wide variety of noble and charitable causes. He do-

nated \$ 32,000 to the National Association for the Blind, and helped the Community Endowment for South Asian Studies in Vancouver. Among his many beneficiaries is NIAS, to which he contributed a sum of Rs 10 lakhs towards the Library building and the proceeds of the sale of his pictures during the exhibition held there. He instituted the 'Jaya Jayawant Award' (in the name of his parents) for best teaching at IISc. He often returned the prize-money he won to his award-givers – sometimes with a supplementary matching contribution from himself; so his wife Mira is reported to have complained that they could no longer afford her husband's prizes!

Above all, Modi was a perfect gentleman, kind and considerate, meticulous and serious in everything he did, and generous in spirit to the rest of the world. It was a privilege to have known him.

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