

The jewels of electromagnetics engineering in India and for India

Jagadish Chandra Bose

- A man (30 November 1858 – 23 November 1937) whose great discoveries proved to be ahead of their time Sir Jagadish Chandra Bose was a visionary, biologist, botanist, physicist, and an author whose ideas led to such achievements as 'crystal' radio sets. IEEE (Institute of Electrical and Electronics Engineers) has honored him as "**Father of Radio Science**".
- Bose demonstrated to the Royal Institution in London in 1897, his research carried out in Calcutta at millimeter wavelengths (60 GHz), at a time when the western world was doing engineering at centimeter wavelengths.

Sir JC Bose with other scientists at Calcutta University in 1928



.... the photo with highest combined Indian IQ

Front row, left to right:

- Nikhil Ranjan Sen** (23 May 1894 – 13 January 1963): father of applied mathematics in India.
- Jnanendra Nath Mukherjee** (23 April 1893 - 10 May 1983): colloid chemist and Padma Bhushan recipient.
- Satyendra Nath Bose** (1 January 1894 – 4 February 1974): Bose–Einstein statistics and condensate.
- Debendra Mohan Bose** (26 November 1885 – 2 June 1975) made iconic contributions in the field of cosmic rays, artificial radioactivity and neutron physics.

Back row, left to right:

- Keshab Chandra Nag** +43#July 1893 – 6 February 1987): was a mathematician and author.
- Jnan Chandra Ghosh** (4 September 1894 – 21 January 1959): a chemist best known for his contribution to the development of scientific research, industrial development and technology education in India.
- Jadagish Chandra Bose**
- Meghnad Saha** (6 October 1893 – 16 February 1956): an astrophysicist famous for the Saha ionization equation
- Snehmoy Dutta** (20 October 1894 – 16 May 1955): a renowned physicist.

Siddheshwari Prasad Chakravarti

- The **father of electronics and telecommunications engineering in India** (3 November 1904 - 15 July 1981), Prof. Siddheshwari Prasad Chakravarti held multiple academic, research, and managerial positions related to electronics engineering in India.
- During his tenure at DRDO, he was responsible for the founding of three major research laboratories of DRDO, viz., Electronics and Radar Development Establishment (LRDE) Bengaluru, Defence Electronics Research Laboratory (DLRL) Hyderabad and the Defence Research and Development Laboratory (DRDL) Delhi.
- Some of his iconic research papers are on the topic of negative resistance for high-frequency oscillations, band-pass filtering circuits, radiowave and microwave propagation over the horizon, most of which were published in the pre-independence era of India.



Rajeswari Chatterjee

- One of the notable student of Prof. Siddheshwari Prasad Chakravarti, Prof. Rajeswari Chatterjee can be described as someone who revived microwave engineering research in India after around fifty years of gap from the revolutionary works of Sir JC Bose.
- Her (24 January 1922 – 3 September 2010) research work in the field of electromagnetics was focussed around dielectric properties of materials, open dielectric resonators, guided waves in dielectric coated and uniformly grooved metal wires, surface waves in dielectric media, radiation from dielectric-loaded elements, artificial dielectrics, etc.
- She built a microwave research laboratory and began research in the field of Microwave Engineering in IISC, the first of its kind in India. The Indian Ministry of Women and Child Development, in 2017 named her as one of "**the first women achievers of India**" for her work in microwave engineering and antennae engineering.

Govind Swarup

- Govind Swarup (March 23, 1929 – September 7, 2020), the man who put India on the world map of radio astronomy had a humble beginning of building the very first radio interferometer in India, to indigenously designing and building two of the most innovative and sensitive radio telescopes anywhere in the world – the Ooty Radio Telescope and the Giant Metrewave Radio Telescope, a famed IEEE Milestone.
- Govind Swarup had built up a team of astronomers and engineers (see the photo to the right side [Google Arts & Culture]) who shared his passion for building world-class instruments and to use them to do cutting-edge research at Radio Astronomy Centre right next to the giant Ooty radio telescope that he had built. Through the 1970s the group worked in Ooty and made many new discoveries with the Ooty Radio Telescope. For this monumental effort, Govind Swarup was awarded the Padma Shri (India's fourth highest civilian Award) in 1973.
- The Giant Metrewave Radio Telescope, or the GMRT is the most sensitive radio telescope in the world in the 30-1500 MHz frequency range and is making observation to the edge of observable Universe.



Some honourable mentions from left to right in the adjacent photos:

- Ayyagari Sambasiva Rao:** The founder of Electronics Corporation of India Limited, Hyderabad, India, he also represented India at UN conferences on peaceful uses of atomic energy. He was awarded the Padma Bhushan in 1972.
- Amarjit Singh:** The research and development of high power microwave tubes in India is accredited to him and for his monumental efforts in serving CEERI for about quarter of a century, he became a recipient of Padma Bhushan Award in 1985.
- Valarmathi Natarajan:** She was the project director of India's first indigenous active microwave remote-sensing satellite. She in 2015 became the first recipient of Dr. APJ Abdul Kalam Award.
- hope this list gets populated by more such icons, we are continuously on the lookout, let us know if we missed someone

