

Engineering and Computer Science 2013



"It is not always money which makes many people happy. There are of course people who may be happy seeing a huge bank balance. But for many of us the satisfaction is in doing something which can change lives, which can improve the life of a common man in our own country."

V. Ramgopal Rao

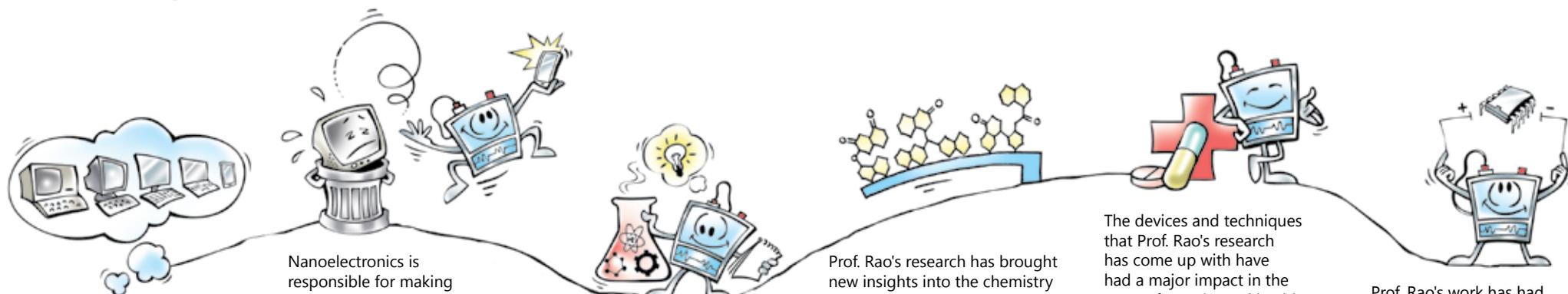
Institute Chair Professor in the Department of Electrical Engineering; and Chief Investigator, Centre of Excellence in Nanoelectronics, Indian Institute of Technology, Bombay

- B.Tech. from Kakatiya University, Warangal, Andhra Pradesh
- M.Tech. from the Indian Institute of Technology, Bombay
- Dr. Ingenieur from Universitaet der Bundeswehr, Munich
- Post-doctoral Fellow at the University of California, Los Angeles

Prof. V. Ramgopal Rao has made substantial contributions in the science and engineering of nanoscale electronic devices and their use in semiconductor integrated circuits, which has led to significant performance improvements and industrial impact. His leadership in nanoelectronics at the national level has enabled industry-academia partnerships that have led to growth of this industry in India.



Behind the magic of nanoscale electronics



Over the years, our devices have become more handy and portable. Gone are the days when a computer needed a whole room to hold it. Tablets and laptops have become ubiquitous. Our telephones have gotten smaller. Have you ever wondered about the technology responsible for making the devices around us smaller? This is just one instance where the discipline of nanoelectronics comes in.

Nanoelectronics is responsible for making our devices smaller and more efficient and is a field that is getting increasing attention. Nanoelectronics is responsible for the display screens on devices getting better by reducing their weight and thickness and improving their power consumption, for improving the density of memory chips, and reducing the size of transistors in integrated circuits.

Prof. Ramgopal Rao has made major contributions to the development of nanoscale electronics. His work integrates the disciplines of chemistry, mechanics and electronics to invent smarter and better functional devices.

Prof. Rao's research has brought new insights into the chemistry of selective binding between organic and organometallic molecules. Organic compounds are composed of carbon while organometallic compounds have a metal bound with carbon. Organometallic compounds containing lead, tin and mercury are commercially important. Prof. Rao has found ways of integrating these molecules with highly sensitive mechanical and electronic transduction in micro / nanodevices. This in turn has led to a new platform for chemical sensing.

The devices and techniques that Prof. Rao's research has come up with have had a major impact in the areas of security and health. This technology is used in effective drug delivery systems and in medical imaging technologies. Nanoscale devices could also detect toxic substances in the environment and in food. Nanostructures can be used to vastly improve existing sensor technologies such as radiation sensors. This could also be used in various security applications.

Prof. Rao's work has had a major impact especially on the semi-conductor industry. His work has helped in manufacturing significantly more efficient semi-conductor devices. The technologies and products that have been created using Prof. Rao's research are of tremendous value to society.