

DR. TAPASH CHAKRABORTY

is developing theoretical models to explain the novel phenomena shown by nanoscopic systems.



As the relentless drive for miniaturization of electronics continues, nanoscience promises to usher in new technologies that will affect every aspect of our lives. This rapidly expanding field explores the physical properties of systems on a scale of a few nanometers. A nanometer, to jog your memory, is 10^{-9} metres, which is so small that this comma, is half a million nanometers across. And only after we fully understand the physical properties of nanosystems, will the development of applications be able to proceed at full throttle.

Chakraborty's research involves explaining the physical properties of the nanostructured systems. His focus is broad and includes novel electronic and magnetic properties of DNA molecules, and spin transport in semiconductors – an important step in developing spintronic devices. (Spintronics is an emerging field of technology in which the spin of electrons is exploited.) He is also a leading researcher in the rapidly developing field of graphene, a single layer of carbon atoms first isolated in 2004 that, given its many unique electronic properties, is poised to replace today's silicon microelectronics, as the prowess of silicon is gradually pushed to the limit.

Chakraborty grew up in India and began his academic studies there, receiving both his master's and doctorate degrees from Dibrugarh University. He completed those by 1978 and the following year took up the prestigious Alexander von Humboldt Foundation fellowship at the University of Cologne in Germany, where he later became a Scientific Assistant.

In 1982 he went to the University of Minnesota to work as a Research Associate for two years, after which he went back to Europe. He spent several years building a research group in theoretical physics and supervising a number of graduate students at the University of Oulu in Finland. Part of that collaboration still exists today.

Chakraborty joined the Max Planck Institute Stuttgart, Germany in 1987 at the invitation of Dr. K. von Klitzing (Nobel laureate). Subsequently, he joined the National Research Council, Ottawa, and in 1992 returned to India to accept a professorship at a leading research institute. While in India, he frequented the Max Planck Institute in Dresden, and was briefly a visiting Professor at the University of Hamburg (2003). He earned a 'docent' from the University of Oulu in 1995 and was also honored with a Doctor of Philosophy honoris causa by that University in 1998. In 2003, he was offered a Tier 1 Canada Research Chair and settled in at the University of Manitoba.

He has written no fewer than five books, two book chapters, about 150 refereed journal articles and eight review articles, and given talks at 40 international conferences. His books were published by the two largest scientific publishers in the world, Springer-Verlag, Heidelberg, and Elsevier, Amsterdam. He is also the Editor of the international journal *Physica E: Low-Dimensional Systems & Nanostructures* (Elsevier, Amsterdam) and is on the editorial board of *Physics in Canada*.

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