भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद

Physical Research Laboratory, Ahmedabad

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49_PRL Ka Amrut Vyakhyaan

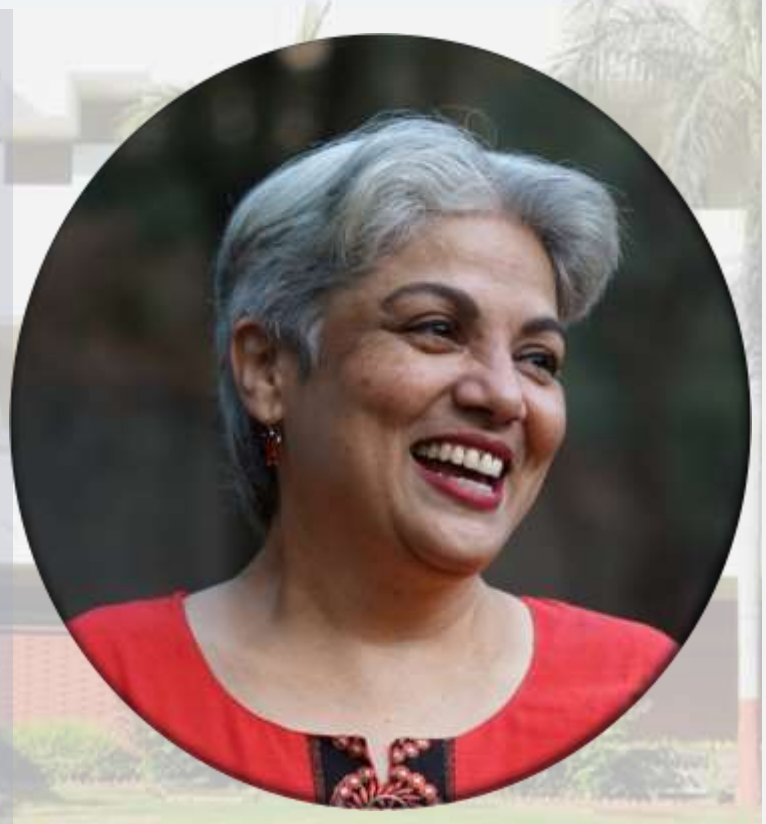
Wednesday, 06 July 2022

@ 04:00 PM (IST)

"The Circuits of Sensation: How We Perceive the World"

Prof. Shubha Tole

Department of Biological Sciences,
Tata Institute of Fundamental Research, Mumbai



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49_PRL ka Amrut Vyakhyaan

Title: "The Circuits of Sensation: How We Perceive the World"

Speaker: Prof. Shubha Tole

Department of Biological Sciences, Tata Institute of Fundamental Research, Mumbai

On Wednesday, 06 July 2022

Abstract

The world outside is brought to our brains by our five senses. We experience the world by processing information brought to our brains via sensory devices; we remember and learn from our experiences; we execute actions based on them. Proper functioning of this system requires that each brain structure is formed in its correct location during embryonic development and that the growth of nerve connectivity to and from each structure is properly organized. This setting up the hardware is an engineering challenge that needs to be reliably executed in order to produce a functioning brain. In this colloquium, we will examine the regulatory processes by which brain structures and circuits are created using the mouse embryo as a model system.

In mice, the whiskers on the snout act as "fingers" to sense the environment, providing an ideal model system to examine how the circuitry underlying sensory resolution is created. We identified a central regulator of sensory circuit formation in the brain by examining a mutant mouse in which this circuitry is profoundly defective. This same regulator, transcription factor Lhx2, also plays a fundamental role in designing the "blueprint" of where specific structures are to form in the brain.

The speaker will present this work in a manner accessible to a wide non-specialist audience and also bring out the approaches and techniques used to explore the early development of the brain.

The Speaker

Prof. Shubha Tole obtained her BSc in Life Sciences and Biochemistry from St. Xavier's College, Mumbai (1987). Her M.Sc. and Ph.D. are from Caltech, USA. She worked as a post-doctoral fellow at the University of Chicago and then joined the Tata Institute in Mumbai, India as a faculty member in 1999.

Prof. Tole is a recipient of the Infosys Science Foundation Award for Life sciences (2014); the Shanti Swarup Bhatnagar Award (2010); the Research Award for Innovation in Neurosciences (RAIN) from the Society for Neuroscience (2008); the National Woman Bioscientist award from the Department of Biotechnology, Govt. of India (2008); the Swarnajayanti Fellowship awarded by the Department of Science in Technology, Govt. of India (2005); and the Wellcome Trust Senior International Fellowship (1999).

Prof. Tole believes that communicating science is as important as pursuing it, actively engages in public outreach via workshops in schools and colleges, and writes blogs aimed at helping students and postdocs plan their careers.

About PRL

The Physical Research Laboratory (PRL), known as the “cradle of space science” in India, is one of the premier research institutes founded in 1947 by Prof. Vikram Sarabhai, a renowned Cosmic Ray Scientist, a great visionary and institution builder. PRL played a seminal role in producing a highly motivated cadre of space scientists and the technologists of highest international repute. The first scientific rocket launched from Thumba on 21st November-1963 and many other rockets launched thereafter contained payloads developed at PRL. Dr. Sarabhai initiated many of these scientific and technical activities at PRL which eventually led to the formation of the Indian Space Research Organization (ISRO). Therefore, PRL is known as the “cradle of space science” in India. Further, the research in the area of Plasma Physics expanded to the formation of the Institute of Plasma Research (IPR).

As an institution PRL is unique in that it conducts fundamental research in a wide range of research areas from the Earth to the cosmos, and comprising Astronomy and Astrophysics; Solar Physics; Space and Atmospheric Sciences; Theoretical Physics; Geosciences; Atomic, Molecular and Optical Physics, Astrochemistry; and Planetary Sciences and Space Exploration. PRL is one of the rare research institutes of international repute wherein research in such diverse fields of sciences is carried out using several state-of-the-art experimental facilities that exist under one umbrella.

Along with the ongoing research, several new initiatives have been taken up during the last few years. The Multi-Application Solar Telescope (MAST) at Udaipur Solar Observatory has been operationalized. PRL initiated scientific programmes in frontier areas of research, which include a search for exo-planets, laboratory studies of interstellar grains, laboratory synthesis of cold astromolecules and experimental studies in the field of quantum optics. PRL is also developing several scientific payloads as a part of ISRO’s larger vision and contributing to roadmap for competitive scientific exploration of the solar system and beyond. In particular, PRL has been contributing significantly not only in building instruments for space missions, such as Chandrayaan-1, Chandrayaan-2, AstroSat and upcoming Aditya-L1, Chandrayaan-3 and planetary and space missions, but also by bringing out new and insightful science results.

PRL contributes to several national and international research programmes and to human resource development through its Doctoral and Post-Doctoral Programmes, capacity building programmes, such as UN Course on Space Science, and science and engineering internship programmes. PRL contributes significantly to society through its Outreach Programmes by periodically organizing science exhibitions and Open Houses, planned visits of students of various school and college to PRL, and popular talks at various institutions to not only share the excitements of the advancements of contemporary scientific findings but also to encourage students to take up sciences as their research career.

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