



Indian National Science Academy

INSA-SERB Future Scoping and Social Responsibility Initiative

Foreign Fellow Lecture Series

The Neural Architecture Of Cognition

A talk on
How The Brain Creates
The Mind



Professor Mriganka Sur, FNA

Newton Professor of Neuroscience
Director, Simons Center for the Social Brain
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Panelists

Dr. Neeraj Jain, Director, NBRC (Chair)
Prof. S. Sinha, HOD, Biochemistry, AIIMS
Former Director, NBRC
Prof. Vidita Vaidya, DBS, TIFR, Mumbai
Dr. Arun Sripati, CNS, IISc, Bengaluru

Webinar

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<https://www.youtube.com/c/INSASince1935>



The neural architecture of cognition



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Summary

The human brain has 80 billion neurons or brain cells organized into discrete processing systems. Each neuron connects with hundreds of other neurons via thousands of connections or synapses. Yet neurons do not connect indiscriminately: synaptic connections between specific sets of neurons create pathways and circuits that enable the brain's remarkable information processing capabilities and give rise to cognition. The brain's processing circuits are created during development, and are sharpened by plasticity and learning. Brain architectures, especially those of the cerebral cortex, are far from rigid, however, flexible reconfigurable networks are essential for cortical dynamics underlying cognition. Understanding the underlying principles is fundamental to understanding how the brain gives rise to the mind.

Speaker Biodata

Mriganka Sur is the Newton Professor of Neuroscience and Director of the Simons Center for the Social Brain at MIT, which he founded after 15 years as head of the MIT Department of Brain and Cognitive Sciences. His laboratory studies the development, plasticity and dynamics of the cerebral cortex of the brain using experimental and theoretical approaches. His work on cortical plasticity induced by rewiring visual projections to the auditory pathway overturned an innate labeled-line hypothesis of cortical function. His group has discovered fundamental principles by which neuronal networks of the cerebral cortex are wired during development and change dynamically during learning. Mriganka received the B. Tech. degree in Electrical Engineering from the Indian Institute of Technology, Kanpur, and the PhD degree in Electrical Engineering from Vanderbilt University, Nashville. He is a Fellow of the Royal Society of the UK, and a member of the US National Academy of Medicine, the American Academy of Arts and Sciences, and the Indian National Science Academy. His recent awards include the Krieg Cortical Discover Prize and Doctor of Science *honoris causa* from IIT Kanpur.