

## Space Science and Instruments at NASA

Talk by Dr. Goutam Chattopadhyay, NASA-Jet Propulsion Laboratory, California Institute of Technology

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NASA's Jet Propulsion Laboratory, which completed eighty years of its existence in 2016, builds instruments for NASA missions. Exploring the universe and our own planet Earth from space has been the mission of NASA. Robotics missions such as Voyager, which continues to go beyond our solar system, missions to Mars and other planets, exploring the stars and galaxies for astrophysics missions, exploring and answering questions such as, "are we alone in this universe?"

Fundamental science questions drives the selection of NASA missions and innovative instrument development. We develop instruments to make measurements that can answer those science questions. In this presentation, we will present an overview of the state of the art instruments that we are currently developing and layout the details of the science questions they will try to answer. Rapid progress in multiple fronts, such as commercial software for component and device modeling, low-loss circuits and interconnect technologies, cell phone technologies, and submicron scale lithographic techniques are making it possible for us to design and develop smart, low-power yet very powerful instruments that can even fit-in a SmallSat or CubeSat. We will also discuss the challenges of the future generation instruments in addressing the needs for critical scientific applications.

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Goutam Chattopadhyay is a Senior Scientist at the NASA's Jet Propulsion Laboratory, California Institute of Technology, a Visiting Professor at the Division of Physics, Mathematics, and Astronomy at the California Institute of Technology, Pasadena, USA, a BEL Distinguished Visiting Chair Professor at the Indian Institute of Science, Bangalore, India, and an Adjunct Professor at the Indian Institute of Technology, Kharagpur, India. He received the Ph.D. degree in electrical engineering from the California Institute of Technology (Caltech), Pasadena, in 2000. He is a Fellow of IEEE (USA) and IETE (India) and an IEEE Distinguished Lecturer.

His research interests include microwave, millimeter-wave, and terahertz receiver systems and radars, and development of space instruments for the search for life beyond Earth. He has more than 350 publications in international journals and conferences and holds more than twenty patents. He also received more than 35 NASA technical achievement and new technology invention awards. He received the IEEE Region-6 Engineer of the Year Award in 2018, Distinguished Alumni Award from the Indian Institute of Engineering Science and Technology (IEST), India in 2017. He was the recipient of the best journal paper award in 2020 and 2013 by IEEE Transactions on Terahertz Science and Technology, best paper award for antenna design and applications at the European Antennas and Propagation conference (EuCAP) in 2017, and IETE Prof. S. N. Mitra Memorial Award in 2014.