

Plenary Talk

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Are We Alone? NASA Technologies to Find Life beyond Earth

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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 the question, "are we alone in this universe?" has been the driving force for NASA scientists for more than six decades.

Fundamental science questions drive the selection of NASA missions. 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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Author Bio Data



Goutam Chattopadhyay is a Senior Research Scientist at the NASA's Jet Propulsion Laboratory, California Institute of Technology, a Visiting Associate at the Division of Physics, Mathematics, and Astronomy at the California Institute of Technology, Pasadena, USA, BEL Distinguished 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 300 publications in international journals and conferences and holds more than fifteen 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 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.