

## IEEE MTT-S MEMBERSHIP DRIVE IN REGION 9

Miércoles 24 de mayo  
9:30 hs

Sala de Conferencias 1 - Departamento de Electrotecnia  
Facultad de Ingeniería - Universidad Nacional de La Plata

### INTRODUCTION

- MTT-S Brief Introduction (Nuno Borges Carvalho)
- MTT-S MGA Brief Introduction (Goutam Chattopadhyay)
- MTT-S Latin America Brief Introduction (José Rayas-Sánchez)

### TECHNICAL PRESENTATIONS

#### NASA Technologies for Space Exploration

Dr. Goutam Chattopadhyay

NASA's Jet Propulsion Laboratory, which completed eighty years of its existence in 2016, builds spacecraft and instruments for NASA missions. Exploring the universe and our own planet Earth from the 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 exploration since its inception.

Fundamental science questions drive the selection of NASA missions. We develop new technologies and innovative instruments to make measurements that can answer these science questions. In this presentation, we will present an overview of the state-of-the-art radar, spectrometers, radiometers, and other 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.

The research described herein was carried out at the Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, USA, under contract with National Aeronautics and Space Administration.

#### Energy Sustainability for Net Zero Radio Communications

Prof. Nuno Borges Carvalho

Energy is central to all our activities, especially now, as electricity is needed for basic human survival. Nevertheless, the resources are limited. On certain occasions, we must rely on the opportunity to have specific energy availability and energy on demand so that sensors, emergency communications, and ICT will continue operating even if the energy grid is not there.

This talk will discuss the electricity generation problem and how to cope with the massive demand for ICT (Information Communication Technologies) technologies. We will address new paradigms for radio communications and alternatives to make energy available when needed and where needed. It is expected that Net Zero Radio alternatives will be available on the market in the future.

## SPEAKERS BIO



**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), Associate Editor of the IEEE Transactions on Antennas and Propagation, 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 (IIST), 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.



**Nuno Borges Carvalho** (S'97–M'00–SM'05–F'15) was born in Luanda, Angola, in 1972. He received his Diploma and Doctoral degrees in electronics and telecommunications engineering from the University of Aveiro, Aveiro, Portugal, in 1995 and 2000, respectively.

He is currently a Full Professor and a Senior Research Scientist with the Institute of Telecommunications, University of Aveiro, the director of the Department of Electronics, Telecommunications and Informatics at UA, and an IEEE Fellow. He coauthored *Intermodulation in Microwave and Wireless Circuits* (Artech House, 2003), *Microwave and Wireless Measurement Techniques* (Cambridge University Press, 2013), *White Space Communication Technologies* (Cambridge University Press, 2014) and *Wireless Power Transmission for Sustainable Electronics* (Wiley, 2020). He has been a reviewer and author of over 400 papers in magazines and conferences. He is the Editor in Chief of the Cambridge Wireless Power Transfer Journal, an associate editor of the IEEE Microwave Magazine, and former associate editor of the IEEE Transactions on Microwave Theory and Techniques and IET Microwaves Antennas and Propagation Journal.

He is the co-inventor of six patents. His main research interests include software-defined radio front-ends, backscatter communications, wireless power transmission, nonlinear distortion analysis, and measurements in microwave/wireless circuits and systems. He has been involved in the design of dedicated radios and systems for newly emerging wireless technologies.

Dr. Borges Carvalho is a member of the IEEE MTT ADCOM, the past chair of the IEEE Portuguese Section, TC-20 and TC-11, and also belongs to the technical committees, TC-25 and TC-26. He is also the Chair of the URSI Commission A (Metrology Group). He was the recipient of the 1995 University of Aveiro and the Portuguese Engineering Association Prize for the best 1995 student at the University of Aveiro, the 1998 Student Paper Competition (Third Place) of the IEEE Microwave Theory and Techniques Society (IEEE MTT-S) International Microwave Symposium (IMS), and the 2000 IEE Measurement Prize.

He is a Distinguished Lecturer for the RFID Council and was a previous Distinguished Microwave Lecturer for the IEEE Microwave Theory and Techniques Society. In 2022 he is the IEEE-MTT President-Elect.



**José Ernesto Rayas-Sánchez** received the B.Sc. degree in electronics engineering from ITESO, Guadalajara, Mexico, the Master's degree in electrical engineering from Monterrey Tec, Monterrey, Mexico, and the Ph.D. degree in electrical engineering from McMaster University, Ontario, Canada. He is *Profesor Numerario* (honorary distinction) with ITESO – The Jesuit University of Guadalajara, where he was Chair of the Doctoral Program in Engineering Sciences from 2013 to 2019. Since 2004, he leads the Research Group on Computer-Aided Engineering of Circuits and Systems (CAECAS) at ITESO. He is a member of the Mexican National System of Researchers (SNI, for its initials in Spanish), Level II. His research focuses on computer-aided and knowledge-based modeling, design and optimization of high-frequency electronic circuits and devices.

Dr. Rayas-Sánchez serves as reviewer for many scientific publications, including IEEE Transactions on Microwave Theory and Techniques, IEEE Transactions on Antennas and Propagation, IEEE Microwave and Wireless Components Letters, IET Microwaves, Antennas & Propagation Journal, International Journal of RF and Microwave Computer-Aided Engineering, and International Journal of Numerical Modelling: Electronic Networks, Devices and Fields. He is member of the Technical Program Reviewers Committee of the IEEE MTT-S International Microwave Symposium (IMS). He was Chair (2018-2019) and Vice-Chair (2016-2017) of the Technical Committee on Computer Aided Design (MTT-1) of the IEEE Microwave Theory and Techniques Society (MTT-S). Since 2019, he is the MTT-S Representative for IEEE EDA Council. He was the General Chair of the First IEEE MTT-S Latin America Microwave Conference (LAMC-2016, Puerto Vallarta, Mexico, Dec. 2016). During 1994-1996, he was the IEEE Guadalajara Section Chair. During 2004-2005, he was the IEEE Mexican Council Chair, as well as the IEEE Region 9 Treasurer. Since 2013, he is IEEE MTT-S Regional Coordinator for Latin America. He has been an elected AdCom member of the IEEE MTT-S for the years 2016-2024.