DEPARTMENT OF
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Online Webinar Series of the Department of Electrical & Computer Engineering

Title: *«Stacked Intelligent Metasurfaces: Communication, Computing and Sensing in the Wave Domain»*

Professor Marco Di Renzo, Paris-Saclay University, CNRS and Centrale Supelec

Thursday, 30 May 2024, 17:00 – 16:30 Gr Time (16:00-17:30 CET)
https://zoom.us/my/uowm.ece1

Abstract: Next-generation wireless networks are expected to utilize the limited radio frequency (RF) resources more efficiently with the aid of intelligent transceivers and wireless environments. To this end, the concept of stacked intelligent metasurfaces (SIM) was born. A SIM is constructed by stacking an array of programmable metasurface layers, where each layer consists of a massive number of low-cost passive meta-atoms that individually manipulate the electromagnetic (EM) waves. By appropriately configuring the passive meta-atoms, an SIM is capable of accomplishing advanced computation and signal processing tasks, such as multiple-input multiple-output (MIMO) precoding/combining, multi-user interference mitigation, and radar sensing, as the EM wave propagates through the multiple layers of the metasurface, which effectively reduces both the RF-related energy consumption and processing delay. Moreover, it is expected to become a key enabling technology for sensing in the wave domain.

Biography: Marco Di Renzo (Fellow, IEEE) received the Lau- rea (cum laude) and Ph.D. degrees in electrical engineering from the University of L'Aquila, Italy, in 2003 and 2007, respectively, and the Habilitation a` Diriger des Recherches (Doctor of Science) degree from University Paris-Sud (currently Paris-Saclay University), France, in 2013. Currently, he is a CNRS Research Director (Professor) and the Head of the Intelligent Physical Communications group in the Laboratory of Signals and Systems (L2S) at Paris-Saclay University – CNRS and Centrale Supelec, Paris, France. Also, he is an elected member of the L2S Board Council and a member of the L2S Management Committee, and is a Member of the Admission and Evaluation Committee of the Ph.D. School on Information and Communication Technologies, Paris-Saclay University. He is a Founding Member and the Academic Vice Chair of the Industry Specification Group (ISG) on Reconfigurable Intelligent Surfaces (RIS) within the European Telecommunications Standards Institute (ETSI), where he served as the Rapporteur for the work item on communication models, channel models, and evaluation methodologies. He is a Fellow of the IEEE, IET, and AAIA; an Academician of AIIA; an Ordinary Member of the European Academy of Sciences and Arts, an Ordinary Member of the Academia Europaea; and a Highly Cited Researcher. Also, he holds the 2023 France-Nokia Chair of Excellence in ICT, and was a Fulbright Fellow at the City University of New York (USA), a Nokia Foundation Visiting Professor (Finland), and a Royal Academy of Engineering Distinguished Visiting Fellow (UK). His recent research awards include the 2021 EURASIP Best Paper Award, the 2022 IEEE COMSOC Outstanding Paper Award, the 2022 Michel Monpetit Prize conferred by the French Academy of Sciences, the 2023 EURASIP Best Paper Award, the 2023 IEEE ICC Best Paper Award, the 2023 IEEE COMSOC Fred W. Ellersick Prize, the 2023 IEEE COMSOC Heinrich Hertz Award, the 2023 IEEE VTS James Evans Avant Garde Award, and the 2023 IEEE COMSOC Technical Recognition Award from the Signal Processing and Computing for

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Communications Technical Committee. He served as the Editor-in-Chief of IEEE Communications Letters during the period 2019-2023, and he is now serving on the Advisory Board. He currently serves as a Voting Member of the Fellow Evaluation Standing Committee and as the Director of Journals of the IEEE Communications Society.