

“Material-by-Design for Synthesis, Modeling, and Simulation of Innovative Systems and Devices.”

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Abstract

Several new devices and architectures have been proposed in the last decade to exploit the unique features of innovative artificially-engineered materials (such as metamaterials, nanomaterials, biomaterials) with important applications in science and engineering. In such a framework, a new set of techniques belonging to the Material-by-Design (MbD) framework [1]-[5] have been recently introduced to synthesize innovative devices comprising task-oriented artificial materials. MbD is an instance of the System-by-Design paradigm [6][7] defined in short as “How to deal with complexity”. More specifically, MbD considers the problem of designing artificial-material enhanced-devices from a completely new perspective, that is "The application-oriented synthesis of advanced systems comprising artificial materials whose constituent properties are driven by the device functional requirements".

The aim of this seminar will be to review the fundamentals, features, and potentialities of the MbD paradigm, as well as to illustrate selected state-of-the-art applications of this design framework in sensing and communications scenarios.

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His research work is mainly focused on electromagnetic direct and inverse problems, system-by-design and metamaterials, compressive sensing techniques and applications to electromagnetics, and antenna array synthesis. Dr. Oliveri serves as an Associate Editor of the IEEE Antennas and Wireless Propagation Letters, the International Journal of Antennas and Propagation, of the Microwave Processing journal, and of the International Journal of Distributed Sensor Networks. He is the Chair of the IEEE AP/ED/MTT North Italy Chapter.

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