

# Invitation to lecture

## Unconventional Array Design - Fundamental and Advances

presented by IEEE AP-S Distinguished Lecturer:  
**Professor Andrea MASSA**

Co-organized by:

**IEEE AP-S Distinguished Lecturer Program**

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**Prof. Andrea MASSA**

**ELEDIA Research Center  
(ELEDIA@UniTN - University of Trento)  
Italy**

**ELEDIA Research Center  
(ELEDIA@L2S - UMR8506)  
France**



### Talk Abstract:

Antenna arrays are a key-technology in several Electromagnetics applicative scenarios, including satellite and ground wireless communications, MIMO systems, remote sensing, biomedical imaging, radar, and radio-astronomy. Because of their wide range of application, the large number of degrees of freedom at hand (e.g., type, position, and excitation of each radiating element), the available architectures (fully populated, thinned, clustered, etc.), and the possible objectives (maximum directivity, minimum sidelobes, maximum beam efficiency, etc.), the synthesis of arrays turns out to be a complex task which cannot be tackled by a single methodology.

Despite this wide heterogeneity, most of the synthesis approaches share a common theoretical framework which is of paramount importance for all engineers and students interested in such a topic. Moreover, this is also true for innovative methodologies aimed at the design of "unconventional arrays" (i.e., based sparse, thinned, conformal, clustered, overlapped, interleaved architectures, both in the frequency and in the time domain), which are currently receiving a great attention from the academic and industrial viewpoint.

The objective of the talk is therefore firstly to provide the attendees the fundamentals of Antenna Array synthesis, starting from intuitive explanations to rigorous mathematical and methodological insights about their behavior and design. Recent synthesis methodologies aimed at "unconventional architectures" (i.e., architectures close to the real-applications and operative non-ideal constraints/guidelines) will be then discussed in detail, with particular emphasis on innovative layouts for very large arrays.

### Biography:

Andrea Massa received the "laurea" degree in Electronic Engineering from the University of Genoa, Genoa, Italy, in 1992 and Ph.D. degree in EECS from the same university in 1996. From 1997 to 1999, he was an Assistant Professor of Electromagnetic Fields at the University of Genoa. From 2001 to 2004, he was an Associate Professor at the University of Trento. Since 2005, he has been a Full Professor of Electromagnetic Fields at the University of Trento.

At present, Prof. Massa is the director of the ELEDIA Research Center with a staff of more than 40 researchers located in the network of federated laboratories in Brunei, China, Czech Rep., France, Italy, Japan, Peru, Tunisia. Moreover, he is Adjunct Professor at Penn State University (USA), Professor @ CentraleSupélec, and holder of a Senior DIGITEO Chair developed in co-operation between the Laboratoire des Signaux et Systèmes in Gif-sur-Yvette and the Department "Imagerie et Simulation for the Contrôle" of CEA LIST in Saclay (France). Prof. Massa serves as Associate Editor of the "IEEE Transaction on Antennas and Propagation".

His research activities are mainly concerned with inverse problems, analysis/synthesis of antenna systems and large arrays, radar systems synthesis and signal processing, system-by-design and material by design (metamaterials and reconfigurable materials), and theory/applications of optimization techniques to engineering problems (telecoms., biology, medicine).

Prof. Massa published more than 270 scientific publications on international journals, 350 in international conferences (> 70 invited contributions). He has participated to several technological projects in the European framework (20 EU Projects) as well as at the national level (>100 Projects/Grants).

**Date:** Thursday, November 3, 2016

**Time:** 2:30 – 3:30 PM

**Location:** Room 309,

Faculty of Electrical Engineering,  
Czech Technical University in Prague,  
Technická 2, 166 27 Prague,  
Czech Republic



### Contact:

Prof. Andrea MASSA

ELEDIA Research Center,  
DISI @ University of Trento  
Via Sommarive 9  
38123 Trento, ITALY

E-mail: [andrea.massa@unitn.it](mailto:andrea.massa@unitn.it)

Web: [www.eledia.org](http://www.eledia.org)

Director DIGITEO Chair

L2S UMR8506 (CNRS-CentraleSupélec-UPS)  
3, rue Joliot-Curie  
91192 Gif-sur-Yvette, FRANCE