



DIPARTIMENTO DI INGEGNERIA INDUSTRIALE

## Introduction to electromagnetic metamaterials and metasurfaces

**Abstract:** Metamaterials, along with their two-dimensional counterpart referred to as metasurfaces, are artificially engineered media, possessing unique properties that go beyond the ones achievable when using natural materials. In this seminar, I will describe the basic concepts of electromagnetic metamaterials and metasurfaces and explain how these structures enable a wide range of revolutionary applications in various fields, including telecommunications, aerospace, defense, sensing, imaging, optics, and photovoltaics. After reviewing the fundamentals of electrodynamics, the seminar will explore some of the exciting novel possibilities offered by metastructures for tailoring wave-matter interactions almost at will. Several unprecedented effects will be discussed, including electromagnetic invisibility, perfect lensing, non-reciprocity and unconventional beam-steering.



**Speaker bio:** Prof. Alessio Monti received the B.S. degree in electronic engineering (summa cum laude), the M.S. degree in telecommunications engineering (summa cum laude) and the Ph.D degree in biomedical electronics, electromagnetics and telecommunications engineering from ROMA TRE University, Rome, Italy, in 2008, 2010 and 2015, respectively.

From 2013 to 2021, he was with the Niccolò Cusano University, Rome, Italy, while, since November 2021, he is with the ROMA TRE University where he serves as an Associate Professor in Electromagnetic Field Theory in the Department of Industrial, Electronic, and Mechanical Engineering.

His research interests include varied theoretical and application-oriented aspects of metamaterials and metasurfaces at microwave and optical frequencies, the design of functionalized covers and invisibility devices for antennas and antenna arrays and the electromagnetic modelling of micro- and nano-structured artificial surfaces. His research activities resulted in 120+ papers published in international journals, conference proceedings and book chapters. Prof. Monti has been also involved as leader or senior researcher in the activities of 30+ research projects funded either by national and international bodies or by private companies.

Prof. Monti has been the recipient of several national and international awards and recognitions, including the IEEE Senior grade (2019), the URSI Young Scientist Award (2019), the outstanding Associate Editor Award of the IEEE Transactions on Antennas and Propagation (for four consecutive years, from 2019 to 2022), the Finmeccanica Group Innovation Award for young people (2015), the 2nd place award at the student paper competition of the Metamaterials' conference (2012), and has been selected as a finalist of the student paper competition of IEEE Antennas and Propagation Symposium (2012).

### Program:

Date: 4th July 9.00-13.00

Where: room TA-09, via Terracini 28, Bologna ([Teams link](#))

Date: 5th July 9.00-13.00

Where: room TA-09, via Terracini 28, Bologna ([Teams link](#))