

## METASURFACE ANTENNAS

By Prof. Stephano Maci, Full Day course

Metasurfaces constitute a class of thin metamaterials, which are used from microwave to optical regime to create new antennas and microwave devices. We have recently proposed the use of variable-impedance metasurfaces for transforming surface or guided waves into a different configuration of wavefield with desirable properties. We will shortly refer to this metasurface-driven wavefield transformation as “Metasurfing”. Metasurfing can be obtained by an appropriate synthesis of inhomogeneous surface impedance that allows a local modification of the dispersion equation and, at constant operating frequency, of the local wavevector. The general effects of metasurface modulation are similar to those obtained in solid (volumetric) inhomogeneous metamaterial as predicted by the Transformation Optics, namely re-addressing the propagation path of an incident wave; however, significant technological simplicity is gained. This short course starts with the basic concept of metasurfing and next illustrates design procedure for designing metasurface antennas. Several examples will be shown: among them Luneburg lenses, Maxwell's fish eye, spiral lenses and isoflux circularly polarized antennas for low satellite orbits. Reconfigurability issues will be also faced.