

Innovative Microwave Microscopy Techniques for Quantitative Measurement and Electromagnetic Characterization

Speaker: **Gianluca Fabi, Università Politecnica delle Marche (Ancona, Italy)**



Cornell University
School of Electrical and
Computer Engineering

Abstract :

The Near-field Scanning Microwave Microscopy (NFSMM or simply SMM) employs the microwave near-field interaction between a probe (source) and a sample to image and characterize materials with atomic resolution. The microscope measures the local properties of the sample by collecting the response signal originated from this interaction, and the probe dimension mainly determines the resolution rather than the excitation wavelength. The usage of microwave frequencies is advantageous due to the relatively low energy of microwave radiation that allows low-invasive and non-destructive measurements. Moreover, the SMM senses not only surface structures, but also electromagnetic properties up to a few micrometers below the sample surface due to the microwave penetration. In this context, the seminar presents recent advances for the quantitative characterization of samples by SMM, an innovative SMM structure that enhances the microscope performance, and new methodologies to remove parasitic and unwanted effects in captured data. We will explore the electromagnetic characterization of a wide variety of samples and surfaces by this tool, ranging from materials for electronic applications, such as low-dimensional or ferroelectric materials, up to biological structures like live cells and sub-cellular elements.

Bio:

Gianluca Fabi received his B.S. degree in 2015 from Università Politecnica delle Marche, Ancona, Italy, and his M.S. degree in 2017 from Politecnico di Torino, Torino, Italy, both in Electronics Engineering. Since 2017 he is a Ph.D. student at the Department of Information Engineering of Marche Polytechnic University, Ancona, Italy. His current research focuses on the investigation of local electrical properties of soft and hard matter using scanning microwave microscopy techniques. His recent studies are mainly focused on the high-frequency characterization of biological samples and solid materials for electronic applications.



Virtual Talk
Friday, Feb. 26th, 2021

Talk begins: **12:00pm**

Zoom ID:
982 9679 4006

PW: CornellEDS

Sponsored by:
School of ECE,
Cornell University
Partially funded by GPSAFC

Open to all students, faculty, and
staff



ATTENTION!!!

Please join the email list to receive
the Zoom link for future talks

To join, send an email to
eds-l-request@cornell.edu
with no subject and "join" (no
quotes) as the body