

Recent advances in Microwave and Millimetre wave imaging at the LEAT (Laboratoire d'Electronique Antennes et Télécommunications) of Université Côte d'Azur, France

Abstract:

The study and understanding of the scattered field supports the development of radar and microwave and millimeter-wave imaging systems.

These are known as difficult problems. On one hand, the scattered field cannot be measured directly, but results from the subtraction between two measurements, which requires receivers with high sensitivity. On the other hand, once known, it can be used to determine the object's characteristics. The simplest stage is its localization. Under certain conditions, linear techniques such as back-propagation can be used to find its shape, but the knowledge of the dielectric properties requires the resolution of an ill-posed non-linear problem that is not straightforward to implement, can prove unstable and is not suited to real-time applications.

Radar and microwave imaging systems cover a wide range of applications: biomedical imaging, security, food safety, geophysics, civil engineering... In many of them, the user wishes to discriminate a group of objects from others, based on knowledge of the scattered field. This is known as classification. For the latter, it is generally a variation in permittivity that is sought rather than the value of the permittivity itself, as when trying to identify a stroke using microwave imaging. Over the past decade, the introduction Artificial Intelligence (AI) techniques has boosted research and developments in the fields of radar and microwave imaging. Real time operation starts to be possible since the complexity of the problem is shifted to the training phase.

In this talk, I will introduce microwave imaging, explain the challenges of measurements and modelling and present recent advances, including AI classification schemes, made by my research group at the LEAT (Laboratoire d'Electronique Antennes et Télécommuni-

About the speaker



Dr. Claire Migliaccio

Professor at Université Côte d'Azur

After an Engineer degree in 1993 and a PhD from INP Grenoble, France, in 1996, Claire Migliaccio was appointed as Assistant Professor at Université Côte d'Azur where she became Full Professor in 2007. Her research interests range from microwave to millimeter-wave systems for radar and imaging applications, including antenna design, measurements and imaging techniques. She has conducted or participated to more than 30 collaborative research projects involving academic and industrial partners at national and international levels. She has co-authored more than 100 scientific contributions. Her main achievements deal with mm-Wave radar for rescue helicopters or FOD detection and mm-Wave scanners for security, food safety and archaeological applications. Since 2012, she has held several leadership positions at university and national and international level, including the Direction of the IT Doctoral School (2017-2022), election at the University Academic Council (since 2020), the vice-presidency of the ASTRID committee of the French National Agency (2023-2025), elected member of the National Council of French Universities (2023-2027), elected AdCom member (2020-2022), founder and chair of the IEEE AP-S DEIB committee (Diversity, Equity Inclusion and Belonging), founder and Chair of the IEEE A-S Mojgan Daneshmand Grant for women, Track Editor of IEEE TAP (2017-2022), Associated Editor of IEEE TAP (2016-2017), of IEEE TRS since 2022 and AP- Magazine starting on January 1st 2024.

Date : Wednesday, 17 January 2024
Time : 6:00 pm—7:00 pm **GMT+4**

Location : Zoom: <https://rit.zoom.us/j/96547471909>

