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EMPHASIS RESEARCH CENTRE

Πανεπιστήμιο Κύπρου
University of Cyprus

EMPHASIS NEWS

NEWS AND ANNOUNCEMENTS:

1 NEW PROJECT: Development of a breath analysis method for early cancer detection

Emphasis members Dr. Chrysafis Andreou and Dr. Agapios Agapiou, in collaboration with Dr. Yiorgos Apidianakis from the Department of Biological Sciences, have secured funding for a new project focused on early cancer detection. The grant will provide an individual fellowship for an incoming postdoctoral researcher through a Marie Skłodowska-Curie Action. It has a duration of two years.

The goal of the project is to identify how biochemical markers vary in the exhaled breath of individuals with different stages of colorectal cancer. To this end, the researcher will develop nanosensors for biomolecular detection of cancer-related volatile organic compounds in exhaled breath. Once completed, this work will demonstrate the feasibility of early cancer detection using breath screening instead of invasive colonoscopies. This methodology could help screen for other cancer types.

MARIE CURIE ACTIONS

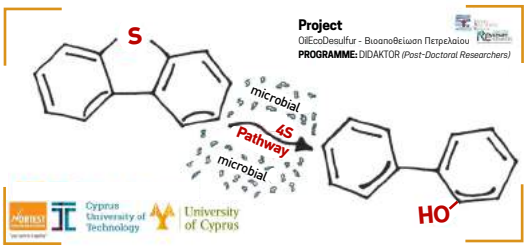
2 NEW PUBLICATION: Oil biodesulfurization: A review of applied analytical techniques

The review, published in the Journal Chromatography B, addresses the detection of sulfur components in liquid fuels. The main highlights of the review are:

- Environmental and health issues regulate the sulfur content in liquid fuels
- A review of applied analytical techniques for oil biodesulfurization is presented
- The major chromatographic methods are summarized
- The importance of chromatography and mass spectrometry is highlighted
- Green analytical technologies need to be further explored

The authors of this study are Dr. Marinos Stylianou and Dr. Agapios Agapiou, from the Department of Chemistry from UCY, and Dr. Ioannis Vyrides from the Cyprus University of Technology.

The work was co-funded by the European Regional Development Fund and the Republic of Cyprus through the Research Promotion Foundation (OilEcoDesulfur: POST-DOC/0916/0121).



CLICK HERE FOR MORE

3 NEW PUBLICATION: Profiling soil volatile organic compounds after N fertilization in a soil grown with Rosmarinus officinalis

The paper, published in Applied Soil Ecology journal, addresses the biogenic volatile organic compounds (BVOCs) emissions from cultivated plants-soil systems and N fertilization's role on these emissions. The latter work, is a research collaboration of Volatolomics Research Laboratory with Agricultural Research Institute.

CLICK HERE FOR MORE

FEATURED LAB:

Microwaves and Antennas Laboratory

Message from the lab director

OUR MISSION

To design novel electromagnetic structures, such as antennas and RF/microwave/mm-wave circuits and systems, which exhibit new phenomena and/or demonstrate superior performance characteristics compared to their conventional counterparts.

We aim to make valuable contributions to the fields of wireless communications, biomedical devices and imaging, radio-frequency identification, space/satellite systems, and wireless power transfer systems.

My work on adaptive antennas for 5G networks will pave the way for a completely interconnected world. THE FUTURE IS IN A WIRELESS INTERNET-OF-THINGS.

Marco Antoniades PhD, SMIEEE
Director Microwaeves and Antennas Laboratory,
Department of Electrical and Computer Engineering

OUR TECHNOLOGIES

Compact reconfigurable metamaterial antennas and devices for next-generation broadband wireless communication systems. Designed for placement on realistic platforms (e.g., mobile phones, tablets), and are reconfigurable based on the demands of adaptive 5G networks.

Adaptive reconfigurable metasurfaces for the implementation of beam steering and absorption functionalities. Novel methods to reconfigure the adaptive metasurfaces are being investigated, including electronic, photonic and microfluidic techniques, in order to achieve active beam steering (user tracking) and interference mitigation in advanced wireless networks.

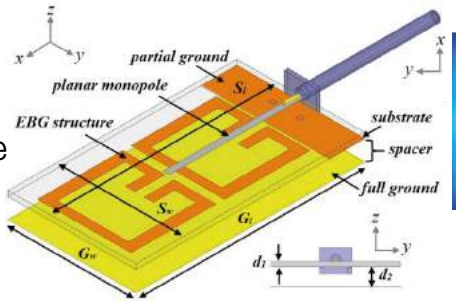
Compact and highly-efficient metamaterial antennas for implantable and wearable devices that form a part of larger bio-sensory networks. These can be used to wirelessly monitor data such as body temperature, heart rate, pH levels, blood oxygen levels and blood pressure.

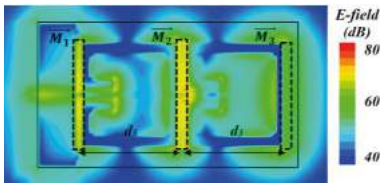
FOR RECENT PUBLICATIONS PLEASE **CLICK HERE**

PROJECTS

1 Metamaterial-Based Antenna for Wearable Applications

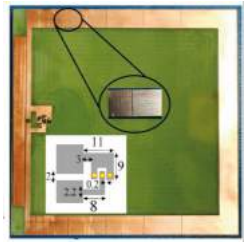
Designed on a semi-flexible substrate that allows structural deformation and platform-independent placement on the human body.

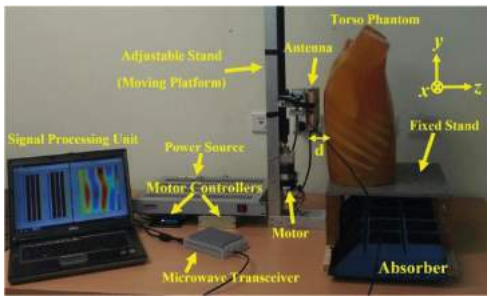




2 Metamaterial-Loaded Antenna for Microwave Imaging

Compact and unidirectional antennas for radar-based microwave imaging system for torso imaging applications in the UHF frequency range of 0.5 – 1 GHz.

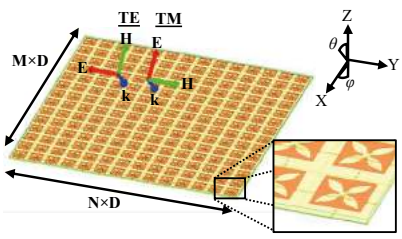


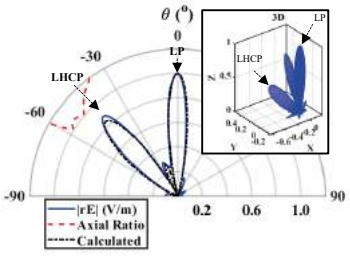


3 Programmable Metasurfaces

Holistic Electronics Research Lab
University of Cyprus

A multifunctional metasurface design, enabled by a chip co-developed with the Holistic Electronics Research Laboratory of UCY. The chip programmatically loads the metasurface to produce multiple pencil beams.





COLLABORATORS

Aalto University School of Electrical Engineering
FORTH
Fraunhofer IZM
SignalGeneriX
UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH
The University Of Queensland AUSTRALIA

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RESEARCH & INNOVATION FOUNDATION
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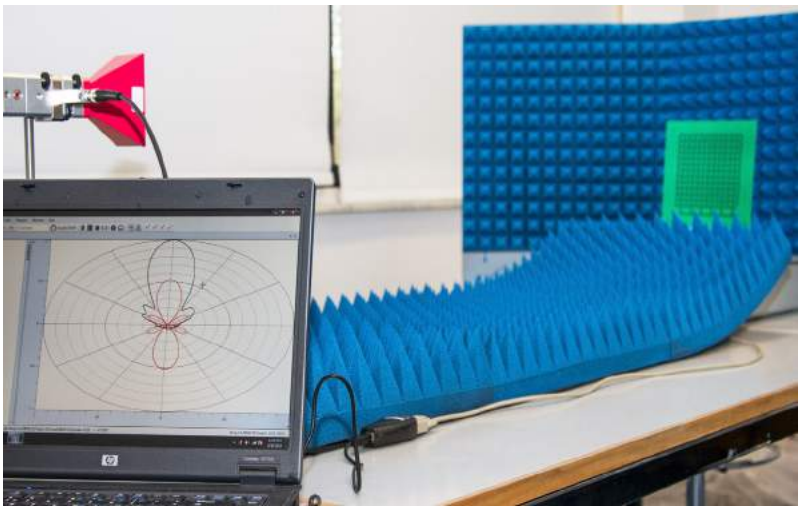
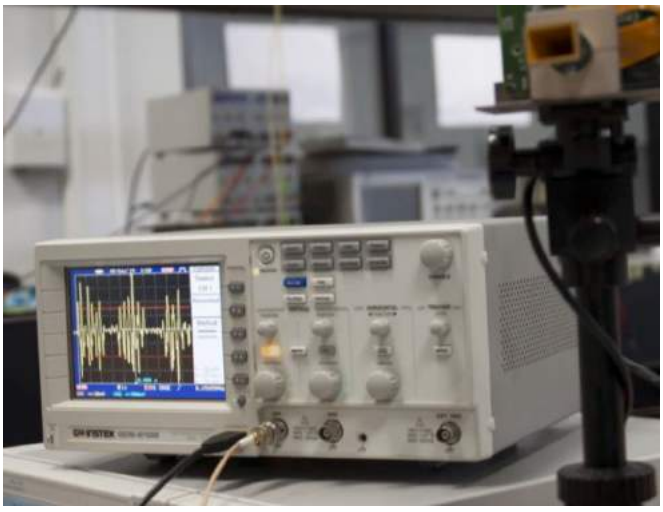
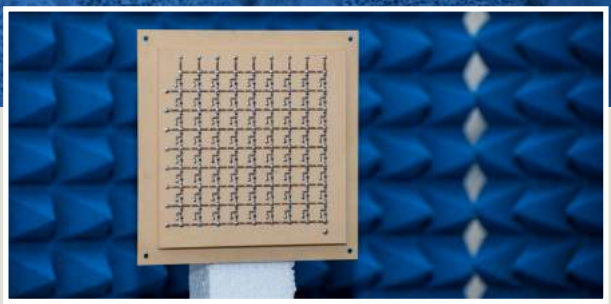




FEATURED PROJECT:

RF-META

RF-META – Advanced RF Electronics for Adaptive Metamaterials



ABOUT:

The goal of the RF-META project is to establish a distinct research unit focusing on the development of advanced RF electronics for use in adaptive metamaterial technology. Wireless is a critical and ubiquitous technology that is constantly evolving through generations (currently in its 5th), and in doing so has established itself as a vial pillar of the world economy. Given the continued trends in increased data volumes (Big Data), increased bandwidth and massive connectivity, there will be challenging requirements placed on hardware, and in particular on antenna design. This in turn requires a paradigm shift as in that proposed in this project, which is focused on the development of novel structures based on metasurfaces. Our aim is to establish a local eco-system in this disruptive technology that aligns with S3Cy priorities. This will allow Cyprus to develop a centre of excellence in this key enabling technology that will leverage future funding opportunities and provide scope for IP generation and spin-off company formation.

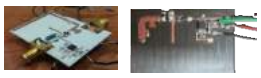
Research Areas and Equipment

Satellite Communication

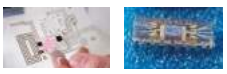
5G MIMO Front End

Wearable and Ingestible Sensors

Energy Harvesting Ckts



Green Sensors for IoT



Fabrication

Inkjet Printer

Laser Milling

3D Printer

Testing

Chamber

RF Probe Station

VNA

RF-META is in the process of establishing a modern design and test facility, where key infrastructure targeting the mm-wave region is being acquired and will be installed in the new Faculty of Engineering building at the University of Cyprus. This will provide a significant new contribution to the research facilities of Cyprus, and will enable research to be conducted in the emerging fields of wireless and photonic communications (including 5G networks and beyond), broadband satellite communications, radar imaging systems, and sensing applications.

LAB MEMBERS

PhD students:

Kypros Kossifos
Kyriakos Neophytou
Chrysovalantis Avraam
Asif Bilal

Masters students:

Panayiota Antoniou
Charalambos Pavlou

Affiliated researchers:

Abdul Quddious (post-doctoral fellow)
Haris Votsi (post-doctoral fellow)

FOR MORE INFORMATION PLEASE VISIT OUR WEBSITE OR CONTACT US: