



## IEEE International Mediterranean Conference on Communications and Networking

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### Workshop

## Reconfigurable Intelligent Surfaces: A Technology Enabler to catalyze 6G

*Organiser:* Angeliki Alexiou, University of Piraeus, [aalexiou@ieee.org](mailto:aalexiou@ieee.org)

*Length of the workshop:* half day

*Name and a short bio of the workshop organizer*

**Angeliki Alexiou** is a professor at the department of Digital Systems, ICT School, University of Piraeus. She received the Diploma in Electrical and Computer Engineering from the National Technical University of Athens in 1994 and the PhD in Electrical Engineering from Imperial College of Science, Technology and Medicine, University of London in 2000. Since May 2009 she has been a faculty member at the Department of Digital Systems, where she conducts research and teaches undergraduate and postgraduate courses in the area of Broadband Communications and Advanced Wireless Technologies. Prior to this appointment she was with Bell Laboratories, Wireless Research, Lucent Technologies, (later Alcatel-Lucent, now NOKIA), from January 1999-April 2009, in Swindon, UK, first as a member of technical staff and later as a Technical Manager. Professor Alexiou is a co-recipient of Bell Labs President's Gold Award in 2002 for contributions to Bell Labs Layered Space-Time (BLAST) project and the Central Bell Labs Teamwork Award in 2004 for role model teamwork and technical achievements in the IST FITNESS project. Professor Alexiou is the Chair of the Working Group on Radio Communication Technologies and of the Working Group on High Frequencies Radio Technologies of the Wireless World Research Forum. She is a member of the IEEE and the Technical Chamber of Greece. Her current research interests include radio interface advances for beyond 5G systems, with main focus on MIMO, Reconfigurable Intelligent Surfaces, THz wireless technologies, 'cell-less' architectures based on extreme resources sharing and machine learning for wireless systems. She is the project coordinator of the H2020 TERRANOVA project ([ict-terranova.eu](http://ict-terranova.eu)) and the technical manager of H2020 ARIADNE project ([ict-ariadne.eu](http://ict-ariadne.eu)).

#### ***Motivation, background and scope***

Sustaining a flexible and ubiquitously available network in the Tbit/s regime for backhaul and access in 6G systems will require the exploitation of THz frequency bands, the adoption of novel hardware technologies and advanced materials and the rethinking of Communication Theory framework and traditional design principles and architectures. In this way,

in the 6G era, the conventional system concept of a 5G network as a universal resources (physical and virtual) manager will be transformed into the system concept of a fully adaptive (to environmental characteristics, volatility and user requirements), power-efficient distributed computer and highly reliable connectivity provider.

Communications beyond the Shannon paradigm in 6G are expected to be catalyzed by research breakthroughs realized in the areas of electromagnetics and smart materials, commonly referred to as Reconfigurable Intelligent Surfaces. 6G systems will be equipped by intelligent surfaces, in order to account for NLOS/obstructed LOS connectivity and guarantee connectivity reliability. The 6G communication system, as a whole, will be fully reconfigurable, by going far beyond adaptivity to varying conditions, towards making the wireless environment itself reconfigurable. It will thus become possible to make the most out of the ultra-high bandwidth resources, e.g. made available in the THz regime, and, at the same time, overcome impairments associated with propagation characteristics, usage scenario topology, energy and complexity limitations.

The adoption of a RIS based system concept in 6G networks open up a wealth of research and technological opportunities and at the same time introduces several theoretical, algorithmic and hardware challenges. This workshop is expected to bring together academic and industrial researchers in an effort to identify and discuss the major technical challenges and recent breakthroughs related to RIS. Topics of interest include but are not limited to:

- Electromagnetic fundamental for RIS-based communications
- RIS based transceiver design and optimization
- Resources and power allocation and node placement optimization for RIS-based communication networks
- Channel measurements and modeling IN RIS based systems
- AI/ML methods for RIS design, configuration and optimization
- Artificial intelligence for RIS-based communications
- Experimental implementations and prototypes for RIS based systems
- Software controlled RIS
- Prototypes and test-beds for RIS-based communications

This workshop is hosted by the ARIADNE project consortium and is technically sponsored by the Wireless World Research Forum and intends to bring together academic and industrial researchers, in order to stimulate and shape further developments of RIS technology towards incorporation into 6G systems.

