

Seminar On

RF Hardware Field Reconfigurability for NextG Wireless Communications: Challenges and Opportunities

Professor Ammar Kouki

École de technologie supérieure, Montréal, Canada

Date : 16 April 2025 (Wednesday)

Time : 11:00 am – 12:00 nn

Onsite (with limited seats) is for City University of Hong Kong (CityUHK) staff and students only
Online (Zoom) is for the participants outside CityUHK

Onsite : Room 15-202, 15/F, State Key Laboratory of Terahertz and Millimeter Waves,
Venue Lau Ming Wai Academic Building, City University of Hong Kong

Online : <https://cityu.zoom.us/j/88650535668?pwd=E3cXrMNvY7eGljVdiSR39kTTFk59v7.1>
Meeting ID: 886 5053 5668; Passcode: 159877

Abstract

The way we develop, deploy and use wireless communications is shaped in large part by our ability to control signaling and to use and manage the electromagnetic spectrum. On the digital/baseband side, field programmable hardware allows for real-time adaptive signaling, which in turn enables highly agile and flexible software-radio-type communications. By contrast RF front-ends are highly static, must often be duplicated or repeated in the same radio to accommodate different discrete frequencies or services and offer little to no hardware reuse with no field programmability. As such, they place an important restriction on how we can make use of the electromagnetic spectrum.

In this talk, we start by examining the fundamental challenges that underpin the development of field programmable RF front ends. These cover hardware abstraction and functional representation, reconfigurable hardware technologies and techniques and embedded self-measurement and control. We then present a framework under which these challenges can be addressed and highlight our team's recent progress in this area. We close with some thoughts on the potential impact of field reconfigurable RF hardware on future wireless technologies and the opportunities that lie ahead.

Biography



Ammar Kouki received the B.S. (Hons.) and M.S. degrees in Engineering Science from Pennsylvania State University, in 1985 and 1987, respectively, and the Ph.D. degree in electrical engineering from the University of Illinois at Urbana–Champaign in 1991. He is currently a Full Professor of Electrical Engineering and the Founding Director of the LTCC@ETS Laboratory at École de technologie supérieure, Montréal, Canada. His research interests are in the areas of modeling, simulation and design of active and passive microwave and mm-wave devices and circuits, reconfigurable and energy-efficient RF front-ends, 3-D circuits and sensors in LTCC, applied computational electromagnetics and antenna arrays, and radio-wave propagation modeling. He has extensive collaboration with industry in Canada and has successfully completed multiple technology transfers to companies. His research work has led directly to the creation of four start-ups (ABBK PhysicsWorks, EMWorks, ISR Technologies and AmpliX) and has netted over 300 publications as well as 8 granted patents, with one licensed. Dr. Kouki is a co-founder and the current president of the non-profit North American Tunisian Engineering Group (NATEG).

*** ALL ARE WELCOME ***

Enquiries:

Prof. Chi Hou Chan, State Key Laboratory of Terahertz and Millimeter Waves, City University of Hong Kong
Email: eechic@cityu.edu.hk