

# Webinar on Next Generation IoT

## The First Edition

IEEE Communication Society

Technical Committee Communications Software: Special Interest Group on "NFV and SDN Technologies"



Prof. **Walid Saad**

Bradley Department of Electrical and  
Computer Engineering,  
Virginia Tech, USA

**Title:** Extended Reality over 6G Networks: A Tale of Two Rs

**Abstract:** Unleashing the true potential of extended reality (XR) applications, encompassing virtual reality (VR), augmented reality (AR), and mixed reality, requires providing them with seamless and pervasive connectivity over wireless cellular networks such as 5G and 6G. However, deploying wireless XR applications will impose new visual and haptic requirements that are directly linked to the quality-of-experience of XR users. These requirements can only be met by wireless 6G connectivity that offers high-rate and high-reliability low latency communications (HRLLC), unlike the low rates usually considered in vanilla 5G ultra-reliable low latency communication scenarios. Therefore, in this talk, after a brief overview on our vision on the role of XR in 6G systems, we will explore the potential of using wireless 6G networks operating at the terahertz (THz) frequency bands for meeting HRLLC requirements of VR applications. We first quantify the risk for an unreliable VR performance through a novel and rigorous characterization of the tail of the end-to-end (E2E) delay. Then, we perform a thorough analysis of the tail-value-at-risk to concretely characterize the behavior of extreme wireless events crucial to the real-time VR experience. We use this analysis to derive system reliability for scenarios with guaranteed line-of-sight (LoS) as a function of THz network parameters. We then present simulation results that show how abundant bandwidth and low molecular absorption are necessary to improve the VR application reliability, although their effect remains secondary compared to the availability of LoS. Subsequently, we summarize some of our key results in two related areas: a) the reliability of AR over THz systems and b) the role of machine learning can play in enabling wireless VR applications. We conclude our talk with an overview on other key open problems in the areas of THz and cellular-connected XR.



Prof. **Mohamed-Slim Alouini**

Electrical and Computer Engineering,  
KAUST, Saudi Arabia

**Title:** Towards Connecting the Remaining 3+ Billion

**Abstract:** It goes without saying that we suffer from severe gaps in global internet connectivity. We tend indeed to forget that we still have about half of the world population (or about 4 billion people) without broadband connectivity. And it is expected that 5G (in its current initial deployment stages) will further accentuate this connectivity divide. Actually, the Covid 19 pandemic also showed that the connectivity divide is in a way becoming one of the modern faces of inequality, deepening the economic and social unbalances between the 'Haves' and 'Have Nots' in a digital context. To achieve digital inclusiveness, we need to develop and deploy new technological solutions that help connecting the unconnected/under-connected in an affordable fashion. In this context, this talk aims to (i) provide an envisioned picture of 6G, (ii) serve as a research guideline in the beyond 5G era, and (iii) go over the recently proposed solutions to provide high-speed connectivity in under-covered areas in order to serve and contribute to the development of far-flung regions.



Prof. **Deep Medhi**

School of Computing and Engineering  
University of Missouri - Kansas City

**Title:** TBA

**Abstract:** TBA

Principal Host: **Prof. Sudip Misra, IIT Kharagpur, India**  
Co-Host: **Dr. Arijit Roy, University of Luxembourg, Luxembourg**  
Co-Host: **Dr. Ayan Mondal, IIT Indore, India**

More details can be found [here](#)

Date: **November 15, 2021**

Time: **6:30 PM - 8:30 PM, Indian Time (IST)**



All participants need to pre-register by November 14, 2021 by filling-up the following form: [Registration Link](#)  
Zoom sign-in details will be shared with the registered participants using the email address provided in the registration form.