

# Hybrid Radio-over-fiber-wireless Networks: Integrating Optical and Wireless Technologies for Next-generation Infrastructure

**Date:** Tuesday, November 9, 2021  
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**Location:** Bldg. 59-2015

## Speaker:

**Dr. Mohammed Zahed M. Khan**

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## Abstract:

Millimeter-wave (MMW) wireless technology has been identified as a promising candidate for last/first-mile access applications due to its several advantages, mainly the unregulated MMW frequency spectrum. The MMW optical/wireless integration could also realize seamless wireless integration with the existing high-speed fiber-optic networks. This radio-over-fiber (RoF) is a potential technology for distributing MMW signals directly to the user end in a hybrid optical/wireless network infrastructure. This talk highlights various techniques for the optical generation of MMW signals and subsequent distribution utilizing the current C-band (1550 nm) wavelength band operations. In particular, the utilization of energy-efficient InAs/InP-based quantum-dash (Qdash) nanostructure-based semiconductor laser-based transmitters will be discussed. This waveguide-based laser has demonstrated a rule-changing broad multiwavelength lasing spectrum, thanks to the inherent wavelength-tunable broad gain profile offered by the Qdash active-gain region covering C- and L-band regions. The capability of this energy-efficient optical source in the C-band, and very recently, in the L-band (1600 nm) challenging window by our group, in achieving green optical and 5G wireless communication, will also be underlined since extending the wavelength operation window beyond C-band is under consideration for next-generation optical networks.

## Bio:

**Dr. Mohammed Zahed Mustafa Khan** received the B.E. degree in Electronics and Communication Engineering from Osmania University, India, in 2001, M.S. and Ph.D. degrees in Electrical Engineering from King Fahd University of Petroleum and Minerals (KFUPM) and King Abdullah University of Science and Technology (KAUST), Saudi Arabia, in 2004 and 2013, respectively. He joined Hafr Al-Batin Community College, Saudi Arabia, in 2005, where he worked as a lecturer in the Electrical and Electronics Engineering Technology Department for five years. From 2014 to 2015, he was a SABIC Postdoctoral Research Fellow with Photonics Laboratory, KAUST. He joined Electrical Engineering Department, KFUPM, in 2015, where he is currently an Associate Professor, and founder and director of “Optoelectronics Research Laboratory”. His prior research involved developing numerical models for integrated optical device simulation. Currently, his research focus is on the development of near infrared and visible semiconductor lasers and systems for applications in optical communications. Dr. Khan is a senior member of IEEE and OSA and member of SPIE.