



**Helen and John C. Hartmann Department  
of Electrical & Computer Engineering  
323 Martin Luther King Blvd.  
Newark, NJ 07102  
Phone: 973-596-6594**

**Seminar:  
Dr. Hany Elgala, SUNY (Albany)  
Get Connected Through Light  
Wednesday, April 13, 12:00 PM, ECEC 202**

**Abstract:** The growth of Internet-connected and multimedia-capable mobile devices has been exponential and the challenge to cope with the increasing demand of bandwidth-intensive services is expected to continue. Existing RF wireless technologies suffer from the spectrum scarcity, however focusing on spectrum alone to grow capacity is limited and unlikely to solve the expected network congestion. Approaches to add capacity including multiple antennas and heterogeneous networks (HetNets) are considered. Visible light communications (VLC) is an emerging technology and a potential solution to the wireless spectrum shortage. VLC uses the existing lighting infrastructure to offer wireless access combined with high-quality illumination.

In this talk, we give an overview on the current VLC research status and discuss the emerging research challenges. We articulate the potential of optical orthogonal frequency-division multiplexing (OFDM) and explore existing research activities to improve power and spectral efficiency of OFDM-based VLC systems. We will also introduce our proposed OFDM solution to address the challenges of incorporating broadband VLC with lighting state control and RF in a hybrid network. Finally, we will highlight the potential applications of VLC including indoor localization, Internet-of-Things (IoTs) and connected health.

**Bio:** Dr. Hany Elgala is an Assistant Professor in the Department of Computer Engineering at the University at Albany - State University of New York (SUNY). Before moving to SUNY Albany, he was a Research Professor at Boston University and the Communications Testbed Thrust leader at the National Science Foundation (NSF) Smart Lighting Engineering Research Center (ERC). During 2010–2012, Prof. Elgala was the co-leader of the Cellular and Wireless Communications (CWC) Lab at Jacobs University in Germany. There, he coordinated two industrial projects with Airbus Germany and the European Aeronautic Defense and Space Company (EADS) to realize high-speed and cellular optical wireless networks in airplane cabins. He received the Ph.D. degree in 2010 from Jacobs University under the direction of Prof. Harald Haas at the University of Edinburgh. He has authored and co-authored over 50 journal and conference publications. His main research interests are in wireless communications and networks with a particular focus on the visible light communications (VLC) or the Li-Fi technology, orthogonal frequency division multiplexing (OFDM) modulation, multiple-input and multiple-output (MIMO) transmission and hybrid networks combining RF and optical technologies.