

ECE Colloquium Lecture

2019 ECE SPEAKER SERIES

Prem Kumar

Professor

McCormick School of Engineering
Northwestern University

Thurs. Nov. 14, 2019 @2:00 PM

8 St. Mary's Street, PHO 906

Faculty Host: Milos Popovic

*Light refreshments will be available
inside of 906 at 1:45 PM*



ALL-OPTICAL SWITCHING FOR PHOTONIC QUANTUM NETWORKS

Abstract: Quantum Internet of the future will require device functionalities that implicitly respect the fundamental facts such as quantum information cannot be copied, and cannot be measured precisely. A quantum repeater, for example,—analog of an optical amplifier that enabled global reach of the ubiquitous Internet connectivity we enjoy today—is yet to be demonstrated, although recent years have seen tremendous progress. Many other device functionalities—switches, routers, format converters, etc.—would also be needed that do not unnecessarily disturb or corrupt the quantum information as it flows from one node of the Internet to another. In recent years, my group has engineered an all-optical quantum switch that fulfills many of the requirements for distributing quantum information in a networked environment. In this talk, I will present our motivation, design, construction, characterization, and utilization of such a switch in near-term networked quantum applications.

Bio: Prem Kumar is Professor of Information Technology in the McCormick School of Engineering at Northwestern University. His research focus is on quantum photonic devices and their applications: generation, distribution, and ultrafast processing of photonic entanglement for applications in quantum information networks; novel quantum light states for precision measurements, imaging, and sensing; and novel optical amplifiers and devices for networked optical communications. Ph.D. graduates from his research group (34 completed & 4 in progress) have gone on to build careers in academia, industry, and US national labs. His group has cumulatively published >500 research papers (h-index: 56). During 2013-2017, Dr. Kumar was a Program Manager at DARPA, where he created and managed a portfolio of programs in basic and applied sciences. He was selected Program Manager of the Year in 2015 and awarded the Secretary of Defense Medal for Outstanding Public Service in 2016. He is a Fellow of OSA, APS, IEEE, IoP (U.K.), AAAS, and SPIE. He has been a Distinguished Lecturer for the IEEE Photonics Society, Hermann A. Haus Lecturer at MIT, recipient of the Quantum Communication Award from Tamagawa University in Tokyo, Japan, and the Walder Research Excellence Award from the Provost's office at Northwestern University.