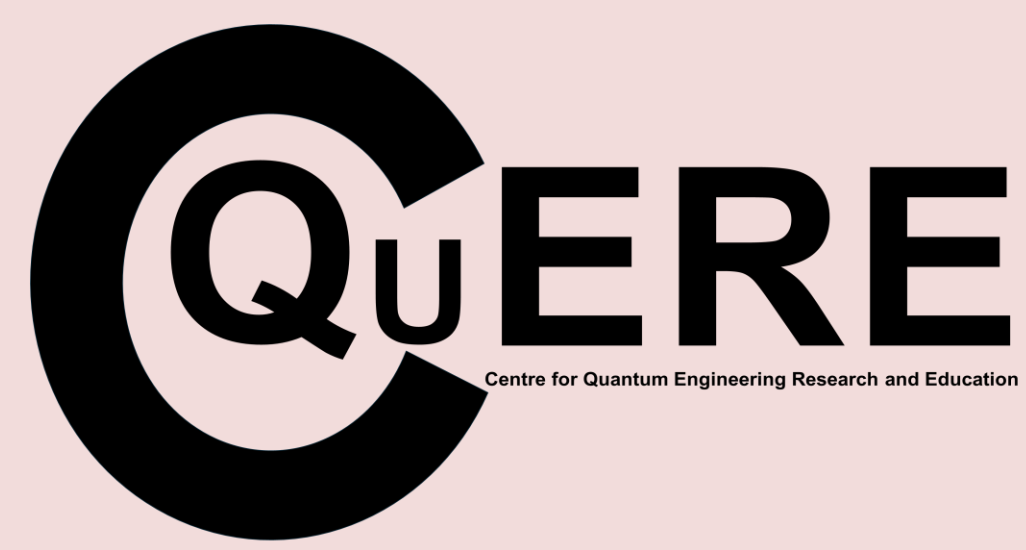




**International Year of Quantum Science and
Technology (IYQ), 2025
&
International Symposium on Quantum
Information and Communication (ISQIC), 2025**



Speaker

Prof. Prem Kumar

Prem Kumar is Professor of Information Technology in the McCormick School of Engineering at Northwestern University. His research focuses 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 (35 completed & 7 in progress) have gone on to build careers in academia, industry, and US national labs. His group has cumulatively published >500 research papers (Google Scholar h-index: 65). 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 Optica (formerly 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. Since 2020 he is serving as the Editor-in-Chief of Optica (2022 Impact Factor: 10.4; h5 index: 102), the flagship journal of the Optica Publishing Group for high-impact results across the whole spectrum of optics and photonics, pure and applied. Currently, he also co-chairs the US National Academies Committee on Atomic Molecular and Optical Physics.



Title: Engineering Challenges for the Emerging Quantum Networks

Abstract

Future quantum photonic networks will require device functionalities that implicitly respect 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 many quantum-optical tools and techniques that fulfill the requirements for distributing quantum photonic information in a networked environment. In this talk, I will present our motivation, design, construction, characterization, and utilization of some example techniques for near-term networked quantum applications.

Date & Time:

31st March 2025, 2.30 PM IST

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