UTC Research Institute

"Nonreciprocal Photonics: A New Paradigm for Quantum Optics and Computing"

given by **S. Ali Hassani Gangaraj**

Optical Scientist Quantum Technology Research at
Corning Research and Development

Wednesday, January 17, 1:30 p.m., ECS 426 (Maytag Room)*

Public Invited

The core of any quantum system is the interaction between a single photon and a quantum emitter. Modifying this interaction fundamentally transforms quantum device performance. Therefore, the idea of engineering the photonic reservoir is a central goal in quantum optics. This paves the way to develop techniques for complete control of light-matter interactions. Recent progress in nanophotonic fabrications, along with advanced photonic concepts (chirality, topology, nonreciprocity, etc.), can revolutionize photonic platforms that underpin applications ranging from light technologies to quantum computing and communication. In this talk, we aim to investigate advanced nanophotonic concepts (topology, nonreciprocity, chirality, etc.) to develop robust and reconfigurable quantum interfaces to achieve full control over photon-emitter interactions. For instance, we will show how nonreciprocity can be employed to overcome different challenges in quantum technology, such as enhancing quantum transport efficiency, generating, and controlling robust entanglement, and enhancing Casimir effects. Finally, we will briefly talk about photonic platforms for optical computing.

Ali is an Optical Scientist at Corning Research and Development. Before joining Corning, he was a Research Scientist in Prof. Zongfu Yu's group at the University of Wisconsin-Madison and prior to that, he conducted his Postdoctoral research with Prof. Francesco Monticone at Cornell University. He did his PhD with Prof. George Hanson in the Electrical Engineering Department at the University of Wisconsin-Milwaukee in 2017. Ali's doctorate is in the field of quantum and classical optics of plasmonic systems and topological photonics.

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