USC Viterbi School of Engineering
Ming Hsieh Department of Electrical and Computer Engineering

Seminar

Microphotonics for tailored infrared emission and secure data encryption

PhD Candidate: Romil Audhkhasi
Ming Hsieh Department of Electrical and Computer Engineering

Date: Tuesday, February 14, 2023
Time: 9:00am PST
Location: EEB 132

Abstract: The ability to control light-matter interactions is of paramount importance for the advancement of a wide variety of applications ranging from chemical and biological sensing to thermal management and energy harvesting. To this end, artificially engineered microstructures have received considerable attention from the scientific community. Unlike bulk materials that interact with light according to the laws of geometrical optics, microstructures harness resonant interactions with light waves. This allows such structures to achieve a richer suite of functionalities in a more compact size than their bulk counterparts. Light-matter interactions in microstructures come under the purview of microphotonics. In this talk, I will discuss the applications of microphotonics to two of the most exciting research areas in the field of optics: *infrared emission tailoring* and *secure data encryption.* The first part of the talk will present photonic devices with customizable optical properties in the infrared for applications in chemical sensing, photodetection and thermal emission control. The second part will explore the utility of microstructures in secure data storage with a discussion of a data-multiplexing based encryption scheme followed by its experimental implementation. The results presented in this talk will illustrate the potential of microstructures in efficiently manipulating optical waves, thereby providing intriguing opportunities for advancing the state-of-the-art for a broad class of applications.

Bio: Romil Audhkhasi is a PhD candidate in the Electrical and Computer Engineering Department at USC, advised by Prof. Michelle L. Povinelli. He received his bachelor's degree in Engineering Physics from the Indian Institute of Technology, Delhi. His current research focuses on the design of complex microphotonic devices for infrared emission control and encrypted data storage. During his time at USC, he has been the recipient of the Annenberg fellowship and has served as an MHI Scholar during 2020-21.

Defense committee: Prof. Michelle L. Povinelli (Chair), Prof. Wei Wu and Prof. Andrea M. Armani