Department of Electrical and Computer Engineering

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr.
College *of* Engineering

Spring 2025 Seminar Series

Seminar Title: ***Optimizing Solar Energy Harvesting: Tailoring Optical Properties Through Surface Modifications and Textured Thin Films***

Time: 2:00-2:50 PM, Monday, Mar 31, 2025

Location: ECE 101

Speaker:
Sibin Kunhi Purayil
Virginia Tech

Abstract:
Light-matter interaction plays a key role in solar energy applications. Solar radiation consists of electromagnetic waves that interact with materials, leading to important optical properties such as transmittance, reflectance, absorptance, and thermal emittance. Understanding and controlling these interactions is essential for improving energy efficiency and reducing losses. This presentation dives into how material selection and surface modifications can fine-tune these properties to enhance solar energy harvesting. Through both theory and experiments, I will explore advanced coating strategies that push the limits of performance. Finally, I will discuss the future of solar energy technologies—how we can overcome challenges and take a bold step toward full solar energy utilization for a cleaner, more sustainable world.

Speaker Bio:
Dr. Sibin Kunhi Purayil is a Research Associate in the Advanced Materials and Technologies Laboratory at Virginia Tech. He completed his PhD at the National Institute of Technology, Karnataka, India. Following that, he pursued a postdoctoral position at the Indian Association for the Cultivation of Science, Kolkata, India, before joining the Virginia Tech in 2020. His research focuses on light interaction with materials and its manipulation through surface modification and the application of thin films for various uses. His work includes the development of transparent conductors for space applications, flexible transparent conductors, solar spectrum beam splitters, and textured solar absorber coatings for high-temperature concentrated solar power plants.