UC San Diego
JACOBS SCHOOL OF ENGINEERING
NanoEngineering

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Virtual SEMINAR SERIES

Wednesday, May 11th, 2022

Seminar Presentation: 11:00am – 12:00pm PDT

"Structural color from total internal reflection interference in microstructures"

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Abstract: A variety of physical phenomena create color, such as selective absorption by dyes, optical dispersion, plasmonic effects, and structural color from light interference. Here, I will discuss an optical mechanism for creating iridescent structural color that is accessible in microscale geometries. In this mechanism, light traveling by different trajectories of total internal reflection along a concave interface interferes to generate patterns of color. The interference effect is accessible using interfaces with dimensions that are orders of magnitude larger than the wavelength of visible light and is observed in materials as simple as sessile water droplets. We further exploit this phenomenon in more complex systems, including multiphase droplets, solid micro-particles, and 3D patterned surfaces to create colors that are consistent with theoretical predictions. We expect that the design principles and predictive theory outlined here will be of interest for fundamental exploration in optics and application in colloidal paints, films, displays, and sensors.

Biosketch: Lauren is an assistant professor at Penn State with appointments in the Department of Chemistry and the Department of Materials Science and Engineering. Prior to Penn State, Lauren earned a B.A. in chemistry and a B.S. in economics from the University of Pennsylvania, a Ph.D. in chemistry from Harvard University, and completed a postdoc at MIT. Her group's research interests include the study of responsive systems and active matter, laser direct writing for synthesis and patterning of nanomaterials, and micro-optics.