

UNIVERSITY OF CALIFORNIA, IRVINE

THE DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING

Is Proud to Host a Seminar by:

**ASSOCIATE PROFESSOR  
MATTHEW T. SHELDON**

Department of Chemistry  
University of California, Irvine



***SHINING A LIGHT ON NANOPHOTONIC HEAT ENGINES***

DATE:

Thursday, March 7, 2024

TIME:

2:00 - 3:20 PM

LOCATION:

McDonnell Douglas Engineering Auditorium

**Abstract:** The ability to perform work using broad classes of energy conversion devices (e.g. batteries, solar cells, thermoelectric generators, fuel cells, etc.) depends on the energy provided by electrons as they transition from initial states to final states during a power cycle. Our laboratory investigates the performance of such heat engines when they are powered by non-equilibrium nanoscale optical phenomena, allowing us to reassess fundamental tenets in thermodynamics, photochemistry, and device physics. This talk will highlight several of our recent advances understanding and manipulating mechanical interactions between radiation and nanoscale systems, for the goal of optimizing a variety of heat engines that are powered by sunlight.

**Bio:** Matthew T. Sheldon received his BA from Carleton College (Chemistry), PhD from UC Berkeley (Chemistry), and performed his postdoc at Caltech (Mat.Sci./App.Phys.). He is the recipient of the 2015 Air Force Office of Scientific Research Young Investigator Program (AFOSR YIP) Award, the Kaneka Junior Faculty Award (2017), and was selected as a 2017 Inventor Fellow by the Gordon and Betty Moore Foundation. In 2019 he was elected to the executive committee of the American Physical Society (APS) Topical Group on Energy Research and Applications (GERA), and in 2021 he was awarded the Early Career award from the journal Nanophotonics. He started his independent career at Texas A&M University (Chemistry) and moved to the University of California, Irvine (Chemistry) in January 2024.

