

Materials Science Seminars

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Department of
Materials Science
and Engineering

UC San Diego
Jacobs School of Engineering



Samueli
Materials Science & Engineering

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Title: Organic small molecule integrated photonics

Presenter: Dr. Andrea Armani
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Time:

10:00 AM - 11:00 AM (Pacific time)

Connection:

Zoom meeting ID: 842 506 6501
Password: 587901

The initial, landmark integrated photonic devices relied on silicon and III-V materials, and recent advances in material fabrication and deposition methods have enabled a plethora of new technologies based on materials with higher optical nonlinearities, including 2D materials and organic polymers. However, nonlinear optical (NLO) organic small molecules have not experienced similar growth due to a perceived environmental instability and to challenges related to intra and intermolecular interactions. Because NLO small molecules have NLO coefficients that are orders of magnitude larger than conventional optical materials, developing strategies to fabricate optical devices could enable significant performance improvements. In recent work, we combined conventional top-down fabrication methods with bottom-up techniques to develop on-chip optical devices that incorporate NLO optical small molecules. These hybrid systems provide access to optical behavior and performance not attainable with conventional material systems. In this seminar, I will discuss a couple examples of NLO small molecule integrated resonators, including Raman lasers and all optically-switchable devices.

Andrea Armani received her BA in Physics from the University of Chicago and her PhD in Applied Physics with a minor in Biology from the California Institute of Technology. She is currently the Ray Irani Chair of Engineering and Materials Science and a Professor of Chemical Engineering and Materials Science at the University of Southern California. She is the Director of the two USC nanofabrication cleanrooms: the W. M. Keck Photonics Cleanroom and the John D. O'Brien Nanofabrication Laboratory. She is on the Editorial Board of ACS Photonics and APL Photonics, Feature Editor of Optics Letters, member of Sigma Xi and NAI, a senior member of IEEE and AIChE, and a Fellow of OSA and SPIE. She has received several awards, including the ONR Young Investigator Award, the PECASE, the NIH Director's New Innovator Award, and she was named a Young Global Leader by the World Economic Forum. In addition, her dedication to mentoring the next generation of scientists and engineers has been recognized with the USC Mellon Mentoring Award for Undergraduate Mentoring and the Hanna Reisler Award for Mentoring.

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