

UNIVERSITY OF HOUSTON  
CULLEN COLLEGE OF ENGINEERING  
Center for Integrated Bio and Nano Systems  
**SPEAKER SERIES**

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**PRESENTS**

## The Mid-Infrared as an Optical Playground



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**Friday, March 23, 11:15 am**

**Classroom and Business Building, Room 122**

### LECTURE ABSTRACT

The mid-infrared (mid-IR) spectral range (loosely defined as the wavelengths between 3-30 $\mu$ m) has become a burgeoning and dynamic field of research for a variety of technologically vital applications. Nonetheless, the development of the mid-IR optical infrastructure still trails behind that of the shorter, more mature, telecom and visible wavelength ranges. This can be viewed as a drawback of mid-IR photonics research (more expensive, limited efficiency components and materials), or alternatively, as an opportunity. In particular, the mid-IR provides a design space where a wide range of engineered and intrinsic light matter interactions can be harnessed to develop a new generation of optical materials. In this talk, I will discuss recent work developing novel optoelectronic, all-dielectric, plasmonic and phononic devices and structures for mid-IR wavelength applications. In particular, I will discuss the range of phenomena which can be leveraged to demonstrate unique designer materials and mid-IR devices. I will cover work on new types of mid-IR sources, ENZ materials and waveguides, mid-IR filters, engineered thermal emitters, and designer plasmonic materials and structures for strong absorption and subwavelength confinement. Ultimately, I will make an effort to demonstrate that the mid-IR provides a unique materials playground for the exploration, and implementation, of a range of light-matter interactions.

### SPEAKER BIOSKETCH

Dan Wasserman is an Associate Professor of Electrical and Computer Engineering at the University of Texas Austin, where he is affiliated with the Microelectronics Research Center. Prof. Wasserman earned his Sc.B. degree in Engineering/Physics and History from Brown University in 1998, graduating Summa Cum Laude, Phi Beta Kappa, with Honors. He attended graduate school at Princeton University, earning a National Science Foundation Graduate Fellowship, and receiving his Master's and Doctorate in Electrical Engineering in 2000 and 2004, respectively. Upon completion of the Ph.D. program, Dr. Wasserman was awarded a Princeton University Council on Science and Technology Post-Doctoral Fellowship, and spent the next years working on quantum cascade lasers and developing a hands-on optics course at Princeton. In 2007, Dr. Wasserman joined the University of Massachusetts Lowell faculty as an Assistant Professor in the Department of Physics and Applied Physics. In 2007, Prof. Wasserman joined the faculty of the Electrical and Computer Engineering Department at the University of Illinois Urbana Champaign, in the Micro and Nanotechnology Lab, becoming an Associate Professor in 2015. In 2016, Professor Wasserman joined the University of Texas at Austin. Prof. Wasserman is the recipient of the NSF CAREER award and the AFOSR Young Investigator Award, as well as the UIUC Distinguished Promotion Award, and Teaching and Advising awards and commendations at UMass and Illinois.

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