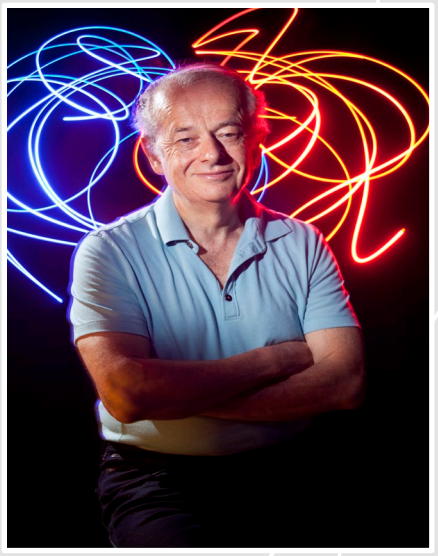
THE JEROME B. COHEN DISTINGUISHED LECTURE SERIES
IN MATERIALS SCIENCE AND ENGINEERING PRESENTS



Federico Capasso

Robert L. Wallace Professor of Applied Physics
Vinton Hayes Senior Research Fellow in Electrical Engineering
Harvard John A. Paulson School of Engineering and Applied Sciences
Harvard University

Monday, June 3 • 4 pm Tech LR3

Reception to follow | Willens Wing Atrium

Talk 1: Flat optics: Overcoming the limits of refractive and Fresnel Optics

Sub-wavelength scale artificially structured dielectric surfaces, known as metasurfaces, enable the redesign of optical components such as lenses into thin, planar, and multifunctional elements. This leads to a major reduction in thickness, footprint, and system complexity, and leads to ease of optical alignment and aberration control. As well, this leads to the introduction of new optical functions, thus circumventing the limitations of refractive and conventional diffractive optics. The planarity of flat optics facilitates the unification of semiconductor manufacturing and lens-making, where the planar technology to manufacture chips will be adapted to make CMOS compatible metasurface-based optical components for high volume markets and for a wider range of specialty applications.

Tuesday, June 4 • 4 pm Tech Ryan Auditorium – L165

Talk 2: Multifunctional Flat Optics

Metasurfaces enable arbitrary control of the wavefront of light by locally manipulating polarization in addition to amplitude and phase. As a result, multiple optical functions can be encoded with greatly reduced complexity that be accessed by changing the input polarization, wavelength and k-vector. Unique ways to generate structured light, a new polarization optics that greatly surpasses the capabilities of the standard and a new class of lenses that correct aberrations without requiring multiple stacked lenses have emerged from this approach. I will present spin-to-total angular momentum converters (J-plates) that create complex entangled states with applications in quantum optics and other fields, new polarimeters and polarization state generators and broadband achromatic lenses

Federico Capasso is a leader in nanophotonics and principal contributor to metasurfaces and Flat Optics since their beginnings. He pioneered bandgap engineering of artificially structured semiconductors which led him and his collaborators to the invention and development of the quantum cascade laser. He carried out fundamental studies of the Casimir effect including the first measurement of the repulsive Casimir force. He is the Robert Wallace Professor of Applied Physics at Harvard University, which he joined in 2003 after 27 years at Bell Labs where his career advanced from postdoctoral fellow to VP for Physical Research. He is a member of the National Academy of Sciences, the National Academy of Engineering and a fellow of the American Academy of Arts and Sciences (AAAS) and the National Academy of Inventors. He is the recipient of numerous international awards such as the Balzan Foundation Prize in Applied Optics, the King Faisal International Prize for Science, the Rumford Prize of AAAS, the Arthur Schawlow Prize of The American Physical Society (APS), the IEEE Edison Medal, The Optical Society of America (OSA) Wood Prize; the SPIE gold Medal, the Wetherill Medal of the Franklin Institute and the Materials Research Society Medal. He is a Fellow of the OSA, the IEEE, and the APS.