



# Columbia Optics and Quantum Electronics IGERT Seminar



## “Novel silicon-based nonlinear optical devices”

Date/Time: February 13th (Monday), 11 am to 12 noon

Location: 644 Mudd

*Professor Alexander Gaeta,  
Applied and Engineering Physics, Cornell University*

**Abstract:** Since the birth of nonlinear optics, researchers have continually focused on developing efficient nonlinear optical devices that require low optical powers. Silicon nanophotonics has emerged as a highly promising platform for such devices and for enabling massively parallel, integrated optical and electronic devices on a single chip. The key feature for nonlinear photonics in Silicon is the strong light confinement that enables both a high effective nonlinearity and tuning of the dispersion, which is essential for phase matching of parametric nonlinear optical processes such as four-wave-mixing (FWM). We demonstrate a wide range of devices based on FWM in Silicon chips that offer the potential for ultrahigh bandwidth all-optical processing, CMOS-compatible multiple-wavelength sources, and all-optical clocks.

**Biography:** After receiving his doctoral degree in optics, Gaeta remained at the University of Rochester for two years as a postdoctoral research associate. He joined the Cornell faculty in 1992. He received Young Investigator Awards from the Office of Naval Research in 1993, and from the Army Research Office in 1995. He was a recipient of the College of Engineering Teaching Award in 1997 and 2000. He is a fellow of the Optical Society of America and of the American Physical Society. Gaeta has served as the director of the Center for Nanoscale Systems since 2007.