

# ULTRAFAST & BROADBAND PHOTONIC SIGNAL PROCESSING

by Prof. Andy Weiner

## About the lecture

A first theme comprises generation of high repetition rate frequency combs and pulse trains from continuous-wave lasers, either by strong electro-optic modulation or nonlinear optics. Line-by-line pulse shaping is employed to compress such combs into bandwidth-limited pulses, to form optical arbitrary waveforms, and to manipulate combs generated via parametric oscillation in microcavities. Techniques related to electro-optic comb generation have also been employed to demonstrate a temporal “cloak” operating at telecommunications rates. A second theme involves application of ultrafast optical techniques for ultrabroadband radio-frequency signal processing. Specific topics include radio-frequency arbitrary waveform generation and photonically assisted spatial and temporal focusing of ultrabroadband wireless signals distorted by antennas or multiply scattering indoor propagation environments. Finally, pulse shaping can be applied to noncoherent sources. In our most recent research we operate in the quantum optics regime, manipulating the wave functions of correlated photon pairs.

## Biography of Prof. Andy Weiner



Andrew M. Weiner graduated from M.I.T. in 1984 with an Sc.D. in electrical engineering. Upon graduation he joined Bellcore, first as Member of Technical Staff and later as Manager of Ultrafast Optics and Optical Signal Processing Research. Prof. Weiner moved to Purdue University in 1992 and is currently the Scifres Family Distinguished Professor of Electrical and Computer Engineering. His research focuses on ultrafast optics signal processing and applications to high-speed optical communications and ultra-wideband wireless. He is especially well known for his pioneering work on programmable femtosecond pulse shaping using liquid crystal modulator arrays.

Prof. Weiner is a Fellow both of the Optical Society of America and of the Institute of Electrical and Electronics Engineers (IEEE) and is a member of the U.S. National Academy of Engineering. In 2009 Prof. Weiner was named a U.S. Dept. of Defense National Security Science and Engineering Faculty Fellow. Prof. Weiner has served as Co-Chair of the Conference on Lasers and Electro-optics and the International Conference on Ultrafast Phenomena, as Secretary/Treasurer of the IEEE Lasers and Electro-optics Society (LEOS), and as a Vice-President of the International Commission on Optics (ICO). He has also served as Associate or Topical Editor for Optics Letters, IEEE Journal of Quantum Electronics, and IEEE Photonics Technology Letters. Prof. Weiner is currently serving as Chair of the National Academy of Engineering’s U.S. Frontiers of Engineering Meeting.

**November 21<sup>st</sup> , 4:30 pm, MSEE B012**

Food and beverage will be provided.

