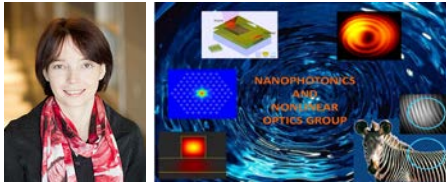


Department of Electrical Engineering

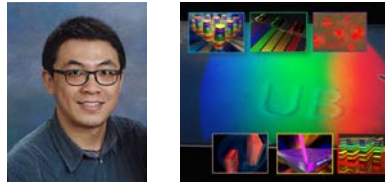
Optics & Photonics

Natalia Litchinitser



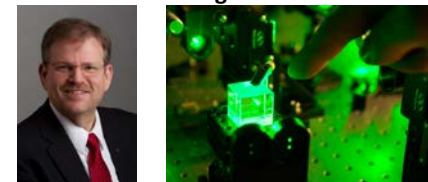
Nonlinear and guided-wave optics, metamaterials and plasmonics, singular and quantum optics, light filamentation, quantum and classical chaos, photonic bandgap structures, biological sensors, and optical communications.

Qiaoqiang Gan



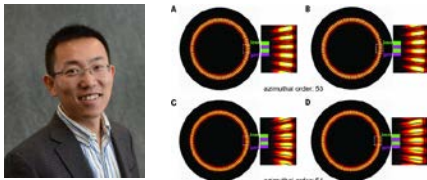
Nano-optics and Nanoplasmonics for Optoelectronics and Energy; Biosensing and Environmental Sensing

Alexander Cartwright



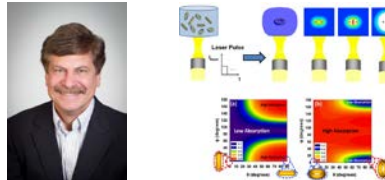
Ultrafast Optical Properties of III-Nitride Materials and Devices; Semiconductor Quantum Dots and Hybrid Inorganic/Organic Materials and Devices; Biophotonics: Biological and Chemical Sensors, Optical Non-Destructive Testing of Stress and Strain for Device Reliability, Nanophotonics and Nanoelectronics.

Liang Feng



Nanophotonics and Integrated Photonics, Active Optoelectronics in Lasers and Detectors, Quantum Optics, Terahertz Generation, Nanofabrication

Edward Furlani



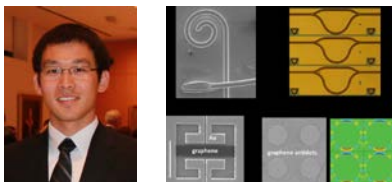
Computational Physics/Multidisciplinary Modeling: Nanophotonics; Plasmonics and Metamaterials; Optofluidics; MEMS/MOEMS Simulation; Microfluidics; Computational Fluid Dynamics; Inkjet Systems; Applied Magnetics; Biomagnetics

Pao-Lo Liu



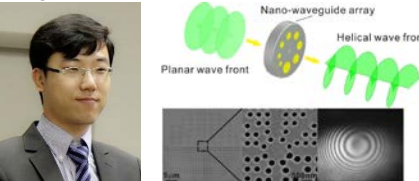
Computational Photonics; Secure Communications; Distance Learning

Peter Liu

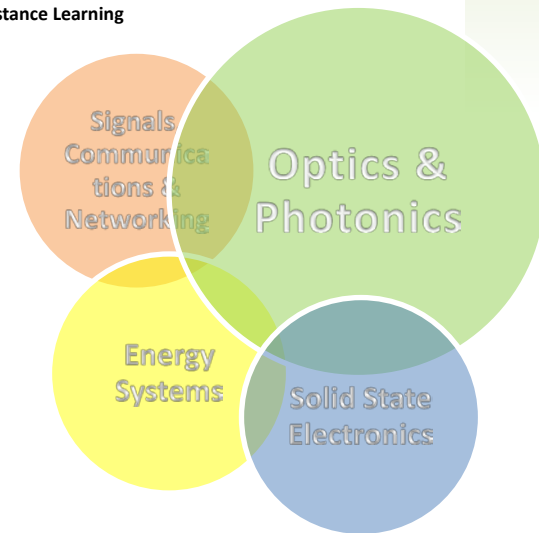


Mid-infrared and THz optoelectronics and photonics; graphene and other 2D materials based devices and systems; strongly correlated electron materials; quantum optics; quantum cascade lasers; chemical and biological sensing.

Jingbo Sun



Microwave metamaterials and devices; Anisotropic materials; Structured light



Current Research Projects in Optics and Photonics:

The Hybrid Integration of Plasmonic Interferometer Sensors and Active Optoelectronic Devices on a Single Microfluidic Chip • Circular Plasmonic Mach-Zehnder Interferometer for Low cost and Multiplexed Biosensing • Graded polymeric photonic bandgap gratings for compact multispectral analyzers • On-chip super absorbers for ultra-high speed photodetectors and ultra-thin-film photon harvesting applications • Electronics Laboratory in Distance Learning Environment • Spin-Optics in Metamaterials • Submicron Remote Imaging using Specialty Fiber Coupled Hyperlens • Light Filamentation Science • Photonic Metamaterials Enabled Multidimensional Quantum Communication • Chaotic Metamaterial Cavities • Development of direct laser writing and patterning of planar polymer-based metamaterials with subwavelength resolution • Development of microfluidic-based biosensors, optical and magnetic functionality • Design of optical-based methods for separating and sorting particles and biologics in microfluidic systems, laser tweezing • Optimization of pulsed-laser photothermal heat generation and transport in micro-and nanoscale materials with applications to cancer therapy • Development of Inkjet-based methods for highthroughput patterned deposition of functional materials e.g. printed electronics • Magnetic applications: design of rear-earth magnet devices, bioapplications of magnetic particles •

Sample of Research Contributions:

"Orbital angular momentum microlaser" P Miao, Z Zhang, J Sun, W Walasik, S Longhi, NM Litchinitser, L Feng, *Science* 353 (6298), 464-467, 2016.

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A. Pandey and N. M. Litchinitser, "Nonlinear light concentrators," *Optics Letters* Vol. 37, Issue 24, pp. 5238-5240, 2012.

Jingbo Sun, Xi Wang, Tianboyu Xu, Zhaxylyk A. Kudyshev, Alexander N. Cartwright, and Natalia M. Litchinitser, "Spinning Light on the Nanoscale," *Nano Lett.* 14, 2726, 2014.

S. Shukla, E. P. Furlani, X. Vidal, M. T. Swihart and P. N. Prasad, "Two-Photon Lithography of Sub-Wavelength Metallic Structures in a Polymer Matrix," *Adv. Mat.*, 22, 3695–3699, 2010.

Q.Q. Gan, H.F. Hu, H.N. Xu, K. Liu, S.H. Jiang, A.N. Cartwright, "Wavelength-Independent Optical Polarizer Based on Metallic Nanowire Arrays," *IEEE Photonics Journal*, 3(6), 1083-1092, 2012.

Q. Gan, F. J. Bartoli, Z. H. Kafafi, "Plasmonic-Enhanced Organic Photovoltaics: Breaking the 10% Efficiency Barrier," *Adv. Matter*, 2013.

K. Liu, H. Xu, H. Hu, Q. Gan, A. Cartwright, "One-step fabrication of graded rainbow-colored holographic photopolymer reflection gratings," *Adv. Mater.* 24, 1604, 2012.

Q. Gan, Y. Gao, K. Wagner, D. Vezenov, Y. Ding, F. Bartoli, "Experimental verification of the "rainbow" trapping effect," *Proceedings of National Academy of Sciences* 108, 5169, 2011.