

//////**SUMMER SHORT COURSES IN ELECTRO-OPTICS**//////

**ABOUT THE FACILITATORS**

**Partha Banerjee**  
Professor, EO and ECE  
FinstP, Fellow, OSA, SPIE

**Jian Gao**  
Research Scientist, EO

**Paul McManamon**  
Adjunct faculty, EO  
Fellow, IEEE, OSA, SPIE, MSS,  
AFRL

**George Nehmetallah**  
Clinical Asst. Professor,  
Catholic U. America.

**Peter Powers**  
Professor, EO and Physics  
Fellow, SPIE

**Andrew Sarangan**  
Professor, EO and ECE  
Director, Nanofab lab

**Ed Watson**  
Adjunct faculty, EO  
Tech staff UDRI  
Fellow, OSA, SPIE, AFRL, MSS

**SHORT COURSE CONTENT**

**DIGITAL HOLOGRAPHY**

JUNE 3-7  
*George Nehmetallah*  
*Partha Banerjee*

- Introduction to Analog and Digital Holography
- Phase Unwrapping
- Phase-shifting Digital Holography
- Analog and Digital Holographic Interferometry
- Multi-Wavelength Digital Holography
- Digital Holographic Microscopy
- Single-beam Holographic Tomography
- Compressive Sensing and Compressive Holography

**THIN-FILM ENGINEERING**

JUNE 10-14  
*Jian Gao*  
*Andrew Sarangan*

- Fundamentals of thin film design and deposition
- Physical vapor deposition
- Chemical vapor deposition
- Advances in thin film research: ultrathin films, nanostructured thin films
- Thin film metrology
- Application and case studies: photonic bandgaps, electrochromic films, window coatings

**NONLINEAR OPTICS**

JUNE 3-7  
*Peter Powers*

- Introduction to nonlinear susceptibility
- $X^{(2)}$  process
- Phase matching & quasi-phase matching
- Second harmonic generation, sum and difference frequencies, parametric oscillations
- $X^{(3)}$  processes
- Nonlinear refractive index & absorption
- Self-focusing & self-phase modulation
- Raman & Brillouin processes

**INTRODUCTION TO LADAR**

JUNE 10-14  
*Paul McManamon*  
*Ed Watson*

- Introduction to Ladar
- Ladar sources & waveforms
- Optical apertures & beam steering
- Energy transport
- Radiometry & range eqn.
- Receivers for coherent & direct detection
- Detection theory
- Single & multi-aperture ladars
- Applications & systems Ladar processing

All Classes start at 1 PM Monday,  
and end 12 Noon Friday

Electro-Optics short courses are for continuing education/professional development. Digital Holography and Thin-Film Engineering are also available for credit to degree seeking students. To register for this option, please contact the Registrar's Office at 937-229-4132.

**REGISTRATION**

Contact Teri at 937-229-4632 or  
TSTEMLEY1@udayton.edu

300 College Park  
Dayton, OH 45469