

CONFERENCE PROGRAM AND ADVANCE REGISTRATION INFORMATION

Conference on Lasers and Electro-Optics
Quantum Electronics and Laser Science Conference

CLEO | 07 QELS



WHERE TECHNOLOGY IS BORN

CLEO/QELS TECHNICAL CONFERENCE

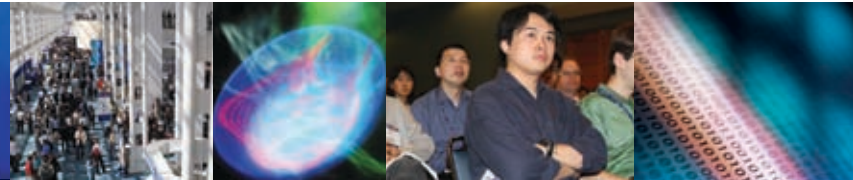
May 6–11, 2007

EXHIBIT

May 8–10, 2007

Baltimore Convention Center
Baltimore, Maryland, USA

WWW.CLEOCONFERENCE.ORG



The Conference on

**Photonic
Applications
Systems
Technologies™**

Plenary Speakers:

John Ambroseo, Coherent, Inc., USA

Alan Heeger, Univ. of California at Santa Barbara, USA

John Pendry, Blackett Lab, Imperial College London, UK

PhAST CONFERENCE
May 7–10, 2007

CLEO | 07 QELS



Conference on Lasers and Electro-Optics
Quantum Electronics and Laser Science Conference

CLEO/QELS are two of the most highly regarded programs in their fields. With more than 1,500 talks on the latest cutting-edge optics research, CLEO/QELS is the source of the most innovative new technologies for the photonics industry. Collocated with Photonics Applications, Systems and Technologies (*PhAST*), CLEO/QELS attendees have the opportunity to experience three conferences in one.

DON'T MISS OUT ON THIS OPPORTUNITY to join nearly 6,000 fellow researchers, educators, engineers, business leaders and students from around the world to learn about the latest breakthroughs in the laser science community.

WHERE TECHN



CLEO/QELS FEATURES:

- World-renowned, peer-reviewed technical programming
- 80+ invited speakers
- 35 Short Courses
- 300+ exhibiting companies
- Nearly 1,200 technical sessions over five days
- Dynamic plenary speakers sharing their vision on current topics
- 21 tutorials, five special symposia and a panel discussion on laser beam combining
- Programming for the student to early-career professional audience
- Receptions, poster sessions, career center, networking opportunities and more!

PhAST FEATURES:

- Industry experts providing previews of new applications areas in:
 - Lasers in Manufacturing
 - Photonics in Homeland and National Security
 - Commercialization of Applied Research
 - BioPhotonics and Applications
 - High-Power Lasers
 - Solid State Lighting
 - Ultrafast Laser Processing and Applications
- 30+ invited speakers
- Innovation Awards program (co-sponsored by *Laser Focus World*) for presentations highlighting products and services at the forefront of industry
- Power lunch, business programming, market overviews, government funding presentations, networking opportunities and more!

PHOTONICS TECHNOLOGY IS BORN

REGISTER BY APRIL 12, 2007 FOR SIGNIFICANT DISCOUNTS!

CONFERENCE HIGHLIGHTS INCLUDE:

THREE TECHNICAL PROGRAMS – invited speakers, tutorials, peer-reviewed presentations, posters and postdeadline presentations – full conference registration provides access to all three programs (CLEO, QELS and *PhAST*)

TWO PLENARY SESSIONS – four esteemed speakers share their vision on cutting-edge topics

ONE COMPREHENSIVE EXHIBIT – more than 300 exhibiting companies representing all areas of laser science, research and applications

SHORT COURSES – a wide variety of topics, taught by world-class instructors, for all technical levels

BUSINESS PROGRAMMING – discussions on key industry topics and business trends

PhAST/LASER FOCUS WORLD INNOVATION AWARDS PROGRAM – highlighting products and services at the forefront of the industry

CAREER CENTER – job seekers and employers connect online and on-site

NETWORKING OPPORTUNITIES – receptions, poster sessions and exhibit hall activities to make and maintain professional contacts

TOPICS TO BE COVERED INCLUDE:

Laser Processing and Optical Instrumentation

Solid-State Lasers

Semiconductor Lasers

Applications of Nonlinear Optics

Terahertz Technologies and Applications

Optical Materials, Fabrication and Characterization

Ultrafast Optics, Optoelectronics and Applications

Components, Interconnects and Signal Processing

Medical and Biological Applications

Fiber and Guided-Wave Amplifiers, Lasers and Devices

Lightwave Communications and Networks

Active Optical Sensing

Optical Metrology

LEDs, Organic LEDs and Solid-State Lighting

Micro- and Nano-Photonics **NEW FOR 2007**

Quantum Optics and Quantum Atom Optics

Quantum Information

Fundamentals of Metamaterials, Periodic and Random Media

Ultrafast Dynamics

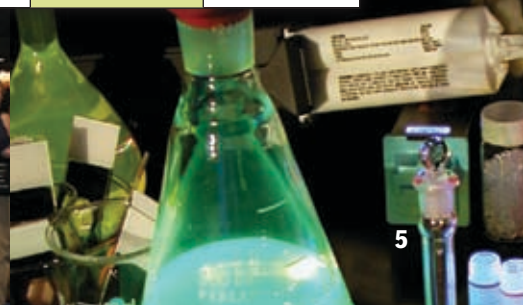
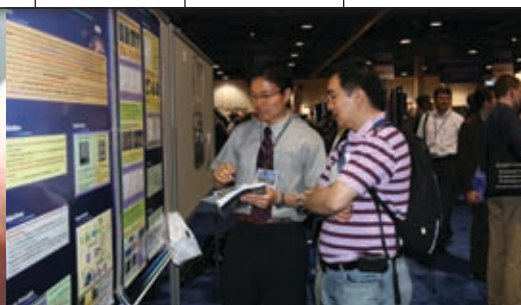
Nonlinear Optics and Novel Phenomena

Nano-Optics and Plasmonics

High-Field Physics and High-Intensity Lasers



EVENT	SUNDAY MAY 6	MONDAY MAY 7	TUESDAY MAY 8	WEDNESDAY MAY 9	THURSDAY MAY 10	FRIDAY MAY 11
Registration	✓	✓	✓	✓	✓	✓
Short Courses	✓	✓	✓			
Plenary Sessions		✓		✓		
CLEO/QELS Technical Sessions		✓	✓	✓	✓	✓
PhAST Sessions			✓	✓	✓	
Exhibit			✓	✓	✓	
Innovation Presentations		✓				
Business Programming			✓	✓	✓	
Poster Sessions			✓	✓	✓	
Career Center			✓	✓		
Conference Reception			✓			
Postdeadline Paper Sessions					✓	



PLENARY SESSIONS



JOHN PENDRY

Blackett Lab, Imperial College, UK

METAMATERIALS AND NEGATIVE REFRACTION

The possibility of materials with a negative refraction index was first raised seriously by Veselago (1968), who showed that $\epsilon < 0$, $\mu < 0$ was a sufficient condition for this to happen. Further progress was stalled by the absence of any known material with this property, and it was only with the advent of metamaterials with $\epsilon < 0$ and $\mu < 0$ that this possibility could be realized. Smith et al., in 2000, were the first to combine these properties in a single structure and demonstrate negative refraction. In the same year, the then controversial concept of a perfect lens was proposed and has now been experimentally verified. Subsequent progress has been rapid, and our ability to make negatively refracting metamaterials function at RF frequencies is well developed. Applications in this region of the spectrum will be described, as well as progress on negative refraction at optical frequencies.

John Pendry is a condensed matter theorist. He has worked at the Blackett Laboratory, Imperial College London, since 1981. He began his career in the Cavendish Laboratory, Cambridge, followed by six years at the Daresbury Laboratory, where he headed the theoretical group. He has worked extensively on electronic and structural properties of surfaces, developing the theory of low-energy diffraction and of electronic surface states. Pendry is also interested in transport in disordered systems where he produced a complete theory of the statistics of transport in one-dimensional systems. In 1992, he turned his attention to photonic materials and developed some of the first computer codes capable of handling these novel materials. This interest led to his present research on metamaterials, which concerns the remarkable electromagnetic properties of materials where the normal response to electromagnetic fields is reversed, leading to negative values for the refractive index.



ALAN HEEGER

Univ. of California at Santa Barbara, USA

"PLASTIC" ELECTRONICS AND OPTO-ELECTRONICS

Semiconducting polymers are important as active materials in electronic and optical devices. This session will focus on progress in two areas:

- Field induced insulator-to-metal transition in polymer FETs.
- Plastic solar cells fabricated from semiconducting polymers.

Alan Heeger received his B.S. in physics and mathematics from the Univ. of Nebraska and his Ph.D. in physics from the Univ. of California at Berkeley. He has been a professor at the Univ. of Pennsylvania, where he served as the Director of the Laboratory for Research on the Structure of Matter and, subsequently, as Vice Provost for Research. Currently, he holds the Presidential Chair at the Univ. of California at Santa Barbara, where he serves as professor of physics and professor of materials. Widely known for his pioneering research in and the co-founding of the field of semiconducting and metallic polymers, Heeger is also the recipient of numerous awards, including the Nobel Prize in Chemistry in 2000, the Oliver E. Buckley Prize for Condensed Matter Physics, and the Balzan Prize for the Science of New Materials. He founded UNIAX Corporation in 1990 and serves on the Board of Directors of Konarka Technologies, Inc., and RitDisplay (Taiwan). He is a venture partner in NGen Partners, a materials-based venture capital firm in Santa Barbara, and Chairman of Diode Solutions, Inc., in Santa Barbara, a new start-up that is focusing on opportunities for printing "plastic electronics." He is Vice-Chairman of CytomX, a newly founded venture to exploit micro fluidics in cell sorting and related areas. Heeger is a member of the National Academy of Science (USA) and the National Academy of Engineering (USA). He has more than 700 publications in scientific journals and holds approximately 50 patents.

PLENARY SESSIONS



JOHN AMBROSEO

Coherent, Inc., USA

John Ambroseo is the President and Chief Executive Officer of Coherent, Inc. Ambroseo joined Coherent in August 1988. Since June 2001, he served in the role of Executive Vice President and Chief Operating Officer until becoming President and Chief Executive Officer in October 2002. During his 14-year tenure at Coherent, he held various positions in domestic and international operations, marketing, and sales. Ambroseo has also led several acquisitions for Coherent, including those for Microlase, DEOS, Crystal Associates, Molectron, Positive Light and Lambda Physik AG.

Ambroseo is the Past President of LEOMA (Laser Electro-Optics Manufacturers Association) and is a trustee with the Purchase College Foundation. He received his PhD in Chemistry from the University of Pennsylvania and his Bachelor's degree from the State University of New York College at Purchase.



VISIT THE CLEO/QELS WEB SITE AT

www.cleoconference.org

FOR ADDITIONAL INFORMATION ON PLENARY SPEAKERS, TECHNICAL SESSIONS,
SHORT COURSE INFORMATION AND UPDATES AS THEY HAPPEN.

CLEO 2007

Invited Speakers by Topic

CLEO 01: LASER PROCESSING AND OPTICAL INSTRUMENTATION

Micro and Nanostereolithography for Production of Lab-on-a-Chip Devices; Shoji Maruo, *Yokohama Natl. Univ., Japan*

Subcellular Surgery and Nanosurgery; Eric Mazur, *Harvard Univ., USA*

Microfluidic Bead Array Device Using Laser-Machined Surface Microstructures on Silica Glass; Tadataka Sato, *Natl. Inst. of Advanced Industrial Science and Technology (AIST), Japan*

Femtosecond Laser Nanomachining Applications in Fused Silica; Rod S. Taylor, *Natl. Res. Council, Canada*

Tutorial:

Ultrafast Micro and Nanomachining; Gerard Mourou, *Ecole Polytechnique de Paris, France*

Short Course:

SC220 Diffractive Optics, Design, Analysis and Applications; James R. Leger, *Univ. of Minnesota, USA*



CLEO 02: SOLID-STATE LASERS

Synthesis and Performance of Advanced Ceramic Lasers; Akio Ikesue, *World Lab Co., Ltd., Japan*

Progress on the Development of High-Power Solid-State Lasers for Directed Energy Applications; Mark Niece, *HEL-JTO, USA*

Solid-State Laser Development Activities in China; Jianqiang Zhu, *Shanghai Inst. of Optics, China*

Tutorial:

Rod-Slab-Disc-Fiber, Design and Performance Comparison of High

Power Laser Architectures; Dieter Hoffmann, *Fraunhofer Inst. Lasertechnik ILT, Germany*

Short Course:

SC165 Laser Diode-Pumped Solid-State Lasers; Larry Marshall, *Arasor, USA*

CLEO 03: SEMICONDUCTOR LASERS

GaSb QW on Silicon VCSELs; Diana Huffaker, *Ctr. for High Technology Materials, USA*

Electrically Pumped Photonic Crystal Lasers; Yong Hee Lee, *KAIST, Republic of Korea*

Infrared Lasers Using Colloidal Quantum Dots; Edward Sargent, *Univ. of Toronto, Canada*

Interband Cascade Lasers; Rui Q. Yang, *JPL, USA*

Tutorial:

Mode-Locked Quantum Dot Lasers; Ian White, *Univ. of Cambridge, UK*

Short Courses:

SC167 Advances in VCSELs and Microactivity Lasers; Kent D. Choquette, *Univ. of Illinois, USA;* Weng Chow, *Sandia Natl. Labs, USA*

SC301 Quantum Cascade Lasers: From Band Structure Engineering to Commercialization; Federico Capasso, *Harvard Univ., USA*

CLEO 04: APPLICATIONS OF NONLINEAR OPTICS

Energy Harvesting in Silicon Amplifiers, Lasers and Wavelength Converters; Bahram Jalali, *Univ. of California at Los Angeles, USA*

Nano- and Microdomain Engineering in KTP and Its Application; Fredrik Laurell, *Royal Inst. of Technology, Sweden*

Advances in Mid-IR Materials; Peter G. Schunemann, *BAE Systems, USA*

New Nonlinear Electronic and Vibrational Spectroscopy to Study Liquid Interfaces; Tahei Tahara, *RIKEN, Japan*

New Light from Gallium Arsenide: Micro-Structured GaAs for Mid-IR and THz-Wave Generation; Konstantin Vodopyanov, *Stanford Univ., USA*

Tutorial:

Ultrafast X-Ray Studies; Roger Falcone, *Univ. of California at Berkeley, USA*

Short Courses:

SC149 Foundations of Nonlinear Optics; Robert Fisher, *R. A. Fisher Associates, USA*

SC153 Quasi-Phasematching for Wavelength Conversion and All-Optical Nonlinear Processing; Peter G. R. Smith, *Univ. of Southampton, UK*

SC163 Practical OPOs; Majid Ebrahim-Zadeh, *Inst. de Ciencies Fotoniques, Spain;* Malcolm Dunn, *Univ. of St. Andrews, UK*

CLEO 05: TERAHERTZ TECHNOLOGIES AND APPLICATIONS

Peter U. Jepsen, *Univ. of Freiburg, Germany*
Hartmut Roskos, *Johann Wolfgang Goethe Univ., Germany*

Terahertz Quantum Cascade Lasers: High-Power and High-Temperature Operation; Benjamin Williams, *MIT, USA*

Tutorial:

Terahertz Technology in Outer and Inner Space; Peter Siegel, *JPL, USA*

CLEO 06: OPTICAL MATERIALS, FABRICATION AND CHARACTERIZATION

Nanofabricated Negative Permeability Media; Alex Grigorenko, *Univ. of Manchester, UK*

Ferroelectric Photonic Structures: Characterization and Device Demonstration; A. H. Kung, *Inst. of Atomic and Molecular Sciences, Taiwan*

Integrated Semiconductor Chips for EIT; Holger Schmidt, *Univ. of California at Santa Cruz, USA*

Biomimetic Optical Polymers; James Shirk, *NRL, USA*

Directly Pumped Silicon Lasing; Jimmy Xu, *Brown Univ., USA*

Tutorial:

Organic Photovoltaics; Bernard Kippelen, *Georgia Tech, USA*

CLEO/QELS 07: HIGH-FIELD PHYSICS AND HIGH-INTENSITY LASERS

Probing Proton Dynamics in Molecules on an Attosecond Time Scale; Sarah Baker, *Imperial College, UK*

Laboratory Simulations of Astrophysical Blastwaves Using Intense Laser Interactions; Todd Ditmire, *Univ. of Texas at Austin, USA*

Attosecond Nonlinear Optics; Katsumi Midorikawa, *RIKEN, Japan*

High-Field Physics with XUV Light Pulses from a Free Electron Laser; Hubertus Wabnitz, *Saclay, France*

Tutorial:

Attosecond Technology and Wavefunction Tomography; Mauro Nisoli, *Politecnico di Milano, Italy*

CLEO 08: ULTRAFAST OPTICS, OPTOELECTRONICS AND APPLICATIONS

Ultrafast Imaging of Wakefields; Michael Downer, *Univ. of Texas at Austin, USA*

Generation of Terawatt Sub-10 fs Laser Pulses Using Optical Parametric Chirped Pulse Amplification; Kjeld S. Eikema, *Laser Ctr. Vrije Univ., FEW, Netherlands*

Actively Mode-Locked Optical Parametric Oscillator; Nicolas Forget, *Lab pour l'Utilisation des Lasers Intenses, France*

Complete Temporal Reconstruction of Attosecond Harmonic Pulses; Chang Hee Nam, *KAIST, Republic of Korea*

High Resolution Spectroscopy with Femtosecond Optical Combs; Jason Stalnaker, *NIST, USA*

Tutorial:

Optical Parametric Amplifiers: Towards Ultrashort Light Pulses of Extreme Power; Algis Piskarskas, *Vilnius Univ., Lithuania*

Short Courses:

SC155 Ultrashort Laser Pulse Measurement; Rick Trebino, *Georgia Tech, USA*

SC160 Microwave Photonics; Keith Williams, *NRL, USA*

SC164 THz Technology; Alan Cheville, *Oklahoma State Univ., USA*



CLEO 09: COMPONENTS, INTERCONNECTS AND SIGNAL PROCESSING

Geiger-Mode Avalanche Photodiodes for Near-Infrared Photon Counting; Mark Itzler, *Princeton Lightwave, USA*

InP Waveguide Optical Isolator for Photonic Integrated Circuits; Yoshiaki Nakano, *RCAST, Univ. of Tokyo, Japan*

Advances in Monolithic Integration of InP-Based Optoelectronics; David Robbins, *Bookham Technology, UK*

Artificial Compound-Eye Camera and Its Application to Visual Information Processing; Jun Tanida, *Osaka Univ., Japan*

Tutorial:

Microwave Photonic Signal Processing; Robert Minasian, *Univ. of Sydney, Australia*

Short Courses:

SC154 Quantum Well Devices for Optics and Optoelectronics; David A. B. Miller, *Stanford Univ., USA*

SC198 Packaging of Optoelectronic Components; Andreas Rose, *Ondine Biopharma Corp., USA*

CLEO 10: MEDICAL AND BIOLOGICAL APPLICATIONS

The Guiding Light: Holographic Manipulation of Mesoscopic Systems; David G. Grier, *New York Univ., USA*

Advances in Optical Coherence Tomography: Frequency Domain Technologies and Applications; Seok-Hyun (Andy) Yun, *Harvard Medical School and Massachusetts General Hospital, USA*

Tutorial:

Scot Kuo, *Johns Hopkins Univ., USA*

Short Course:

SC191 Tissue Optics: Fundamentals and Applications to Biomedical Optical and Laser Diagnostics; Valery V. Tuchin, *Saratov State Univ., Russian Federation*

CLEO 11: FIBER AND GUIDED-WAVE AMPLIFIERS, LASERS AND DEVICES

Pulse Compression Techniques Using Highly Nonlinear Fibers; Takashi Inoue, *Furukawa Electric Co., Ltd., Japan*

Fiber Laser Frequency Combs; Nathan R. Newbury, *NIST, USA*

Ultra-Large Modal Area Fibers for High-Power Lasers and Amplifiers; Siddharth Ramachandran, *OFS Labs, USA*

Quantum Optics in Microstructured Waveguides; John G. Rarity, *Univ. of Bristol, UK*

Fiber-Based All-Optical Sampling; Mathias Westlund, *Chalmers Univ. of Technology, Dept. of Microelectronics, Photonic Lab, Sweden*

Tutorial:

Photonic Crystal Fibers Tapers and Devices; Tim Birks, *Univ. of Bath, UK*

Short Courses:

SC123 Erbium-Doped Fiber Amplifiers and Raman Fiber Amplifiers; John Zyskind, *JDSU, USA*

SC192 Fiber Optic Sensors: Principles and Applications; Michel Dignonnet, *Stanford Univ., USA*

SC270 High-Power Fiber Lasers and Amplifiers; W. Andrew Clarkson, *Optoelectronics Res. Ctr., UK*

CLEO 12: LIGHTWAVE COMMUNICATIONS AND NETWORKS

Ultra-Long Distance Free Space Laser Communications; David Caplan, *MIT Lincoln Lab, USA*

Advanced Modulation Formats and Digital Signal Processing in Optical Communications; Joseph Kahn, *Stanford Univ., USA*

TECHNICAL PROGRAM, SHORT COURSES AND TUTORIALS

Advanced LiNbO₃ Modulation; Tetsuya Kawanishi, *Natl. Inst. of Information and Communications Technology, Japan*

Parametric Amplification; Stojan Radic, *Univ. of California at San Diego, USA*

Space-Based Lasercom Experiments in Europe; Zoran Sodnik, *European Space Agency, Netherlands*

Tutorial:

Scaling Packet Routers Using Optics; David T. Neilson, *Bell Labs, Lucent Tech., USA*

Short Courses:

SC147 Optical Fiber Communication

Systems; Alan Willner, *Univ. of Southern California, USA*

SC197 Radio over Fiber Communications; Dalma Novak, *Pharad, USA*

CLEO 13: ACTIVE OPTICAL SENSING

Recent Advances in Cavity Ring-Down Spectroscopy; Kevin Lehmann, *Univ. of Virginia, USA*

RADAR REMPI: A New Approach to Detection, Spectroscopy, and the Dynamics of Gases for Combustion, Fluid Dynamics and Homeland

Defense; Richard Miles, *Princeton Univ., USA*

Tutorial:

Rare-Earth-Doped Fiber Lasers for Spectroscopic Trace-Gas Detection; Dahv Kliner, *Sandia Labs, USA*

Short Courses:

SC200 Laser Remote Sensing; Philip Gatt, *Timothy Carrig, Lockheed Martin Coherent Technologies, USA*

SC219 Understanding Laser-Based Sensors; Shaoul Ezekiel, *MIT, USA*

SPECIAL SYMPOSIA

QELS SYMPOSIUM ON DEGENERATE FERMI GASES

Rudi Grimm, *Univ. of Innsbruck, Austria*

Randall Hulet, *Rice Univ., USA*

Wolfgang Ketterle, *MIT, USA*

CLEO/QELS JOINT SYMPOSIUM ON SELF-PHASE MODULATION IN ITS 40TH YEAR

Self-Phase Modulation: The Formative Years; T. K. Gustafson, *Univ. of California at Berkeley, USA*

Self-Phase Modulation in Optical Fiber Communications: Good or Bad?; Govind P. Agrawal, *Inst. of Optics, Univ. of Rochester, USA*

From Supercontinuum Generation to Carrier Shocks: Consequences of SPM in Ultrafast Pulse Propagation in Photonic Crystal Fiber; John Dudley, *Univ. de Franche-Comté, France*

Better and Bigger: The Critical Role of Self-Phase Modulation in Ultraprecise Optical Frequency Combs; Scott Diddams, *NIST, USA*

CLEO SYMPOSIUM ON ULTRAFAST LASER PROCESSING AND APPLICATIONS

Micro and Nanostereolithography for Production of Lab-on-a-Chip Devices; Shoji Maruo, *Yokohama Natl. Univ., Japan*
Subcellular Surgery and Nanosurgery;

Eric Mazur, *Harvard Univ., USA*

Microfluidic Bead Array Device Using Laser-Machined Surface Microstructures on Silica Glass; Tadafake Sato, *Natl. Inst. of Advanced Industrial Science and Technology (AIST), Japan*

Femtosecond Laser Nanomachining Applications in Fused Silica; Rod Taylor, *Natl. Res. Council of Canada, Canada*

Tutorial: Ultrafast Micro and Nanomachining; Gerard Mourou, *Ecole Polytechnique de Paris, France*

CLEO/PhAST JOINT SYMPOSIUM ON BIOPHOTONICS AND APPLICATIONS Advances in Fourier Domain Optical Coherence Tomography; Eric Buckland, *Biophtigen, USA*

Multi-Functional Video-Rate Optical Coherence Tomography Microscopy; Alex Cable, *Thorlabs, USA*

In vivo Imaging Using Harmonic Generation Microscopy; Sun Chi-Kuang, *Natl. Taiwan Univ., Taiwan*

Laser Capture Microdissection in Prostate Cancer; Angelo De Marzo, *Johns*

Hopkins Univ., USA

Optical Breast Imaging: Clinical Applications and Challenges; Mario Khayat, *Advance Res. Technologies, Canada*

Intraoperative Near-Infrared Fluorescence Imaging; Sivash Yazdanfar, *GE Global Res., USA*

Terahertz Imaging; David Zimdars, *Picomatrix, USA*

Upcoming Commercial Applications of Biomedical Optical Spectroscopy: Applications to Heart Disease and Gynecology; Andres Zuluaga, *Remicalm LLC, USA*

CLEO/QELS JOINT SYMPOSIUM ON NANOPHOTONICS
Anvar Zakhidov, *Univ. of Texas at Dallas, USA*

Si QCSE Modulator; David Miller, *Stanford Univ., USA*

Micro- and Nano-Photonics for Chip-Scale Solid-State and Atomic Cavity QED; Oskar Painter, *Caltech, USA*
Jean-Claude Weeber, *Univ. of Bourgogne, France*

ADDITIONAL SHORT COURSES

PHOTONICS BASICS

SC136 Understanding Lasers and Critical Optical Components; Shaoul Ezekiel, *MIT, USA*

SC143 Introductory and Intermediate Topics in Polarized Light; Robert Fisher, *R. A. Fisher Associates, USA*

SC157 Laser Beam Analysis, Propagation and Shaping Techniques; James R. Leger, *Univ. of Minnesota, USA*

SC199 Micro- and Nano-Machined Optics; Ernst-Bernhard Kley, *Friedrich-Schiller-Univ. Jena, Inst. of Applied Physics, Germany*

CLEO 14: OPTICAL METROLOGY

Accurate Optical Clocks Based on Single Trapped Ion; Jim Bergquist, *NIST, USA*

GEO600; Karsten Danzmann, *Max-Planck Inst., Germany*

Precision Measurement of Rydberg State Wave-Packet Dynamics; Robert Jones, *Univ. of Virginia, USA*

Quantum Metrology (Including Both Ions and Atoms); Fritz Riehle, *PTB, Germany*

Tutorial:

Attosecond Metrology; Paul Corkum, *Natl. Res. Council of Canada, Canada*

CLEO 15: LEDs, ORGANIC LEDs AND SOLID-STATE LIGHTING

OLED Displays Based on Phosphorescent Chromophores; Vadim Adamovich, *Universal Display Corp., USA*

100 Years of LEDs; George Craford, *Lumileds, USA*

Visible Light Communications; Masao Nakagawa, *Keio Univ., Japan*

Organic Lasers; Ifor Samuel, *Univ. of St. Andrews, UK*

Tutorial:

OLEDs Based on Quantum Dots; Vladimir Bulovic, *MIT, USA*

Short Course:

SC196 Solid-State Lighting; Ghassan Jabbour, *Arizona State Univ., USA*; E. Fred Schubert, *Rensselaer Polytechnic Inst., USA*

CLEO 16: MICRO- AND NANO-PHOTONICS

III-V/Silicon Integrated Photonics; John Bowers, *Univ. of California at Santa Barbara, USA*

Metamaterial Nanophotonics; Nader Engheta, *Univ. of Pennsylvania, USA*

High-Q Photonic Crystal Cavities; Susumu Noda, *Kyoto Univ., Japan*

Tutorial:

Silicon Nanophotonics and Its Applications in Sensing; Roel Baets, *Ghent Univ.-IMEC, Belgium*

Short Course:

SC300 Silicon Photonics; Bahram Jalali, *Univ. of California at Los Angeles, USA*

QELS 2007

Invited Speakers by Topic

QELS 01: QUANTUM OPTICS AND QUANTUM ATOM OPTICS

Alexander Kuzmich, *Georgia Tech, USA*

Jun Ye, *JILA, Univ. of Colorado and NIST, USA*

Tutorial:

Jeff Kimble, *Caltech, USA*

QELS 02: QUANTUM INFORMATION

Tolerable Noise in Scalable Quantum Computing; Manny Knill, *NIST Boulder, USA*

Entanglement in Atomic Ensembles; Eugene Polzik, *Kobenhavns Univ., Denmark*

Tutorial:

Entanglement; Carlton Caves, *Univ. of New Mexico, USA*

Short Course:

SC189 Quantum Technologies; Ian Walmsley, *Univ. of Oxford, UK*

QELS 03: FUNDAMENTALS OF METAMATERIALS, PERIODIC AND RANDOM MEDIA

Claudio Andreani, *Univ. degli Studi di Pavia, Italy*

Graeme W. Milton, *Univ. of Utah, USA*

Tutorial:

Lute Maleki, *JPL, USA*

Short Courses:

SC302 MetaMaterials; Vladimir M. Shalaev, *Purdue Univ., USA*

SC194 Photonic Crystal Fibers and Devices; Benjamin J. Eggleton, *Univ. of Sydney, Australia*

QELS 04: ULTRAFAST DYNAMICS

Adaptive Control in Ultrafast Nano-Optics; Tobias Brixner, *Univ. Würzburg, Germany*

Alexey Kimel, *Radboud Univ. Nijmegen, Netherlands*

Tutorial:

Ultrafast Spectroscopy on Photonic

Metamaterials; Martin Wegener, *Karlsruhe Univ., Germany*

QELS 05: NONLINEAR OPTICS AND NOVEL PHENOMENA

Quantum Limit in Nonlinear Optics; Gerd Leuchs, *Inst. fur Optik, Information und Photonik, Germany*

Synchronization and Chaos; Rajarshi Roy, *Univ. of Maryland, USA*

Laser Cooling in Solids; Mansoor Sheik-Bahae, *Univ. of New Mexico, USA*

Tutorial:

Temporally Focused Pulses; Yaron Silberberg, *Weizmann Inst. of Science, Israel*

QELS 6: NANO-OPTICS AND PLASMONICS

Alexandra Boltasseva, *COM, Denmark*

Nabil Lawandy, *Solaris Nanosciences, USA*

Anatoly V. Zayats, *Queen's Univ. of Belfast, UK*

Short Courses:

SC166 Photonic Crystal Devices and Integrated Circuits; Dennis Prather, *Univ. of Delaware, USA*

SC221 Nano-Photonics: Physics and Techniques; Axel Scherer, *Caltech, USA*

CLEO/QELS 07: HIGH-FIELD PHYSICS AND HIGH-INTENSITY LASERS

Probing Proton Dynamics in Molecules on an Attosecond Time Scale; Sarah Baker, *Imperial College, UK*

Laboratory Simulations of Astrophysical Blastwaves Using Intense Laser Interactions; Todd Ditmire, *Univ. of Texas at Austin, USA*

Attosecond Nonlinear Optics; Katsumi Midorikawa, *RIKEN, Japan*

High-Field Physics with XUV Light Pulses from a Free Electron Laser; Hubertus Wabnitz, *Saclay, France*

Tutorial:

Attosecond Technology and Wavefunction Tomography; Mauro Nisoli, *Politecnico di Milano, Italy*

The Conference on



PHOTONICS IN HOMELAND AND NATIONAL SECURITY

A Robust Laser Diode-Based Fluorescence Trigger for Bio-Aerosol Detection; Sarjit Bains, *TSI Inc., USA*

Development of a LIDAR Controlled Airspace Scanner for Bio-Aerosol Detection; Jack Bufton, *Science & Engineering Services Inc., USA*

Optical Measurements Used for BW Aerosol Detection: Current Methods; Jay D. Eversole, *NRL, USA*

Application of Photonic Sensor Systems to an Indoor Chemical and Biological Attack; Kenneth Ewing, *Northrop Grumman, USA*

Deep UV Lasers for UV Resonance Fluorescence and Raman Spectroscopy of Biological and Chemical Agents; William Hug, *Photon Systems Inc., USA*

Photonics for Biological-Agent Sensors; Thomas Jeys, *MIT, USA*

Photonic Crystal Components: New Tools for Stand-off Detection and Tracking; Ed Johnson, *Ion Optics, USA*

AlGaIn Based Compact UV Light Emitting Diodes for Fluorescence Applications; Tom Katona, *Sensor Electronic Technology, Inc., USA*

BAND Sensor for BioDefense; David Robbins, *SAIC, USA*

Developing High-Brightness Semiconductor Lasers for Homeland Security and Defense Applications; Paul Rudy, *QPC Lasers, Inc., USA*

A Real-Time Biothreat Simulation Process for Detect-to-Warn Sensor Architectures; Dave Silcott, *S3I, USA*

Detection of Bio-Aerosol Threats with a UV Scattering Trigger and Rapid DNA- and Antibody-Based Confirmation; Roland Stoughton, *GHC Technologies, USA*

Hyperspectral Imaging Detection of CBE Threat Materials; Patrick Treado, *ChemImage Corp., USA*

LASERS IN MANUFACTURING

Technological Platform for Cell Micro Array Based Biochips; Udo Klotzbach, *Fraunhofer Inst. Material and Beam Technology, Germany*

An Overview of Laser Technologies Used in Medical Devices; Arzu Ozkan, *Abbott Vascular, USA*

Emerging Industrial Laser Applications in Japan; Kunihiko Washio, *Paradigm Laser Res. Ltd., Japan*

A View from a Leading Chinese Laser System Manufacturer; Rangda Wu, *Wuhan Chutian Laser Group Corp., China*

JOINT CLEO/PhAST SYMPOSIUM ON ULTRAFAST LASER PROCESSING AND APPLICATIONS

Microfabrication with High-Power Picosecond Fiber Laser; Harry Asonen, *CORELASE, Finland*

Double Pulse Laser Machining; Andrew Forsman, *General Atomics, USA*

Industrial Applications Worldwide of Laser Direct Writing (LDW); Andrew Holmes, *Imperial College, UK*

Compact, High Performance Femtosecond Laser Ablation System; Eric Mottay, *Amplitude Systems, France*

COMMERCIALIZATION OF APPLIED RESEARCH

Funding at NCI and NIH for Early Stage Medical Product; Houston Baker, *Natl. Cancer Inst./NIH, USA*

A Case Study in Bringing a Medical Technology from Academia to Industry to the Patient; Jay Eastman, *Lucid, Inc., USA*

A Primer on Commercialization; MaryAnn Feldman, *Univ. of Georgia, USA*

QED Technologies: Bringing a Radical Innovation to the Precision Optics Market; Don Golini, *QED Technologies, Inc., USA*

Moving Research into Practice; Pat Jones, *Univ. of Arizona, USA*

Affordable Diagnostics – Changing the Paradigm through Innovation; Bala Manian, *ReaMetrix, USA*

Aggressive Commercialization in a Sub-Critical Market; Marion J. Soileau, *Univ. of Central Florida, USA*

Panel Discussion

SOLID-STATE LIGHTING

Lighting Systems; Jack Curran, *Dialight, USA*

GaN Substrates; Vladimir Dmitriev, *TDII, USA*

Development of GaN Substrates for GaN Based Laser Diodes; Keith Evans, *Kyma, USA*

Thermal Management; Samuel Graham, *Georgia Tech, USA*

LEDs; Volker Haerle, *Osram Opto Semiconductors GmbH, Germany*

Development of High-Efficiency Green and Deep Green Light Emitters in Piezoelectric Group-III Nitrides; Christian Wetzel, *Rensselaer Polytechnic Inst., USA*

Organic LEDs; Chung-Chih Wu, *Natl. Taiwan Univ., Taiwan*

LEDs; C. C. Yang, *Natl. Taiwan Univ., Taiwan*

JOINT CLEO/PhAST SYMPOSIUM ON BIOPHOTONICS AND APPLICATIONS

Advances in Fourier Domain Optical Coherence Tomography; Eric Buckland, *Bioptigen, USA*

Multi-Functional Video-Rate Optical Coherence Tomography Microscopy; Alex Cable, *Thorlabs, USA*

Laser Capture Microdissection in Prostate Cancer; Angelo De Marzo, *Johns Hopkins Univ., USA*

Optical Breast Imaging: Clinical Applications and Challenges; Mario Khayat, *VP Optical Products, USA*

In vivo Imaging Using Harmonic Generation Microscopy; Chi-Kuang Sun, *Natl. Taiwan Univ., Taiwan*

Intraoperative Near-Infrared Fluorescence Imaging; Siavash Yazdanfar, *GE Global Res., USA*

Terahertz Imaging; David A. Zimdars, *Picomatrix, Inc., USA*

Upcoming Commercial Applications of Biomedical Optical Spectroscopy: Applications to Heart Disease and Gynecology; Andres F. Zuluaga, *Remicalm, LLC, USA*

HIGH-POWER LASER SYSTEMS

High-Power Lasers for Generation of Extreme UV Light; Vivek Bakshi, *Sematec, USA*

Laser Peening of Aerospace Metals; Brent Dane, *Metal Improvement Co., USA*

Operational Implications of Laser Weapons; Richard Dunn, *Northrop Grumman, USA*

High-Power Fundamental Mode Lasers for Gravitational Wave Detection; Maik Frede, *Laser Zentrum Hannover, Germany*

The Big Bang Observer: High Laser Power for Gravitational Wave Astrophysics; Gregory Harry, *LIGO Lab, USA*

ZEUS Highly Mobile Laser Ordnance Neutralization System; Owen Hofer, *Sparta, USA*

Structure Loaded Vacuum Laser-Driven Particle Acceleration Experiments at

SLAC and Possible Applications; Tomas Plettner, *E. L. Ginzton Labs, USA*

Laser Coating Removal: The Modern Alternative to Sandpaper; James Thomas, *General Lasertronics, USA*

Program subject to change.

Check www.phastconference.org for invited speaker updates.

PhAST SHORT COURSES

SC182 Biomedical Optical Diagnostics and Sensing; Thomas Huser, *Univ. of California at Davis, USA*

SC245 New Directions in Nanoscale Lithography and Pattern Transfer; Steven Brueck, *Univ. of New Mexico, USA*

SC271 Quantum Information – Technologies and Applications; Prem Kumar, *Northwestern Univ., USA; Matthew Goodman, Telcordia Technologies, USA*

SC272 Biological and Chemical Sensing for Homeland Security; Stephen Lane, *Lawrence Livermore Natl. Lab/Univ. of California at Davis, USA; Thomas Huser, Univ. of California at Davis, USA*

ADDITIONAL PhAST PROGRAMMING

POWER LUNCH AND PANEL DISCUSSION TUESDAY, MAY 8

Join us for two dynamic sessions as leaders from academia, government and industry discuss their success stories and lessons learned. This is a unique opportunity to meet them one-on-one in a collegial setting to talk and network. The Power Lunch is followed immediately by the Panel Discussion to facilitate participation in both executive sessions.

POWER LUNCH 12:00 p.m. – 1:00 p.m.

ORGANIZER: Milton Chang, Managing Director, *Incubic Venture Fund, USA*

In this always sold-out session, prominent industry leaders will discuss keys to success in the optics field. You will have the opportunity to speak one-on-one with individuals who are involved in optics applications and can provide details on how to maneuver through the business world.

Ten distinguished guests will share details of their accomplishments in areas such as government, start-ups, mature companies, and working with venture capitalists.

The session includes a sit-down lunch with the experts. Tickets are \$25 each and advance registration is required. Attendance is limited, so sign up when you complete your registration form!

BUSINESS AND MANAGEMENT INSIGHTS – PANEL DISCUSSION 1:00 p.m. – 3:00 p.m.

ORGANIZER: Milton Chang, Managing Director, *Incubic Venture Fund, USA* [complimentary with your registration]

Hear experts in business strategy, management techniques, start-up issues, and how best to navigate the business environment. All who are involved or interested in business should plan to attend this informative panel discussion.

PhAST/LASER FOCUS WORLD INNOVATION AWARDS PROGRAM

Presented by exhibiting companies, the Innovation Awards Program provides an opportunity to preview future technologies as well as comprehensive overviews of the latest applications in the optics and photonics industries. Companies will address areas such as a product's impact on the optics industry, the life expectancy of such applications and how the service will benefit the industry in a unique way.

SHORT COURSE PROGRAM AND SCHEDULE

PROGRAM

With a strong commitment to continuing technical education, CLEO/QELS offers a variety of Short Courses to enhance and strengthen your knowledge. Distinguished instructors from both academia and the industry provide attendees with cutting-edge information, helping you advance your research or career goals. New Short Courses for 2007 cover high-power fiber lasers and amplifiers, quantum information, applica-

tions of biological and chemical sensing, and quasi-phase matching. See page 16 for information about new courses.

CONTINUING EDUCATION UNITS

Attendees are eligible to receive continuing education units (CEUs). The CEU is a nationally recognized unit of measure for continuing education and training programs that meet established criteria. To earn CEUs, the participant must complete

a CEU credit form and course evaluation and return it to the course instructor at the end of the course. CEUs will be calculated and certificates will be mailed to participants.

REGISTRATION

Register early to take advantage of advanced registration savings! See page 19 for registration details.

SUNDAY, MAY 6

9:00 a.m. – 5:30 p.m.

SC136 Understanding Lasers and Critical Optical Components; Shaoul Ezekiel, *MIT, USA*
Category: Photonics Basics

SC200 Laser Remote Sensing; Philip Gatt and Timothy Carrig, *Lockheed Martin Coherent Technologies, USA*
Category: CLEO 13 Active Optical Sensing

12:30 p.m. – 3:30 p.m.

SC164 THz Technology; Alan Cheville, *Oklahoma State Univ., USA*
Category: CLEO 8 Ultrafast Optics, Optoelectronics and Applications

SC189 Quantum Technologies; Ian Walmsley, *Univ. of Oxford, UK*
Category: QELS 2 Quantum Information

SC197 Radio over Fiber Communications; Dalma Novak, *Pharad, USA*
Category: CLEO 12 Lightwave Communications and Networks

SC300 Silicon Photonics; Bahram Jalali, *Univ. of California at Los Angeles, USA*
Category: CLEO 16 Micro- and Nano-Photonics

4:30 p.m. – 7:30 p.m.

SC199 Micro- and Nano-Machined Optics; Ernst-Bernhard Kley, *Friedrich-Schiller-Univ. Jena, Inst. of Applied Physics, Germany*
Category: Photonics Basics

SC271 Quantum Information – Technologies and Applications; Prem Kumar, *Northwestern Univ., USA*; Matthew Goodman, *Telcordia Technologies, USA*
Category: PhAST

SC272 Biological and Chemical Sensing for Homeland Security; Stephen Lane, *Lawrence Livermore Natl. Lab/Univ. of California at Davis, USA*; Thomas Huser, *Univ. of California at Davis, USA*
Category: PhAST

SC301 Quantum Cascade Lasers: From Band Structure Engineering to Commercialization; Federico Capasso, *Harvard Univ., USA*
Category: CLEO 3 Semiconductor Lasers

MONDAY, MAY 7

9:00 a.m. – 5:30 p.m.

SC219 Understanding Laser-Based Sensors; Shaoul Ezekiel, *MIT, USA*
Category: CLEO 13 Active Optical Sensing

9:00 a.m. – 12:00 p.m.

SC147 Optical Fiber Communication Systems; Alan Willner, *Univ. of Southern California, USA*
Category: CLEO 12 Lightwave Communications and Networks

SC165 Laser Diode-Pumped Solid-State Lasers; Larry Marshall, *Arasor, USA*
Category: CLEO 2 Solid-State Lasers

SC221 Nano-Photonics: Physics and Techniques; Axel Scherer, *Caltech, USA*
Category: QELS 6 Nano-Optics and Plasmonics

SC302 MetaMaterials; Vladimir M. Shalaev, *Purdue Univ., USA*
Category: QELS 3 Fundamentals of Metamaterials, Periodic and Random Media

1:00 p.m. – 5:00 p.m.

SC123 Erbium-Doped Fiber Amplifiers and Raman Fiber Amplifiers; John Zyskind, *JDSU, USA*
Category: CLEO 11 Fiber and Guided-Wave Amplifiers, Lasers and Devices

FOR COMPLETE SHORT COURSE DESCRIPTIONS, VISIT WWW.CLEOCONFERENCE.ORG

SC149 Foundations of Nonlinear Optics; Robert Fisher,
R. A. Fisher Associates, USA

Category: *CLEO 4 Applications of Nonlinear Optics*

**SC157 Laser Beam Analysis, Propagation and Shaping
Techniques;** James R. Leger, *Univ. of Minnesota, USA*

Category: *Photonics Basics*

SC160 Microwave Photonics; Keith Williams, *NRL, USA*

Category: *CLEO 8 Ultrafast Optics, Optoelectronics and Applications*

SC167 Advances in VCSELs and Microcavity Lasers; Kent D.
Choquette, *Univ. of Illinois, USA*; Weng Chow, *Sandia Natl. Labs, USA*

Category: *CLEO 3 Semiconductor Lasers*

SC194 Photonic Crystal Fibers and Devices; Benjamin J.
Eggleton, *Univ. of Sydney, Australia*

Category: *QELS 3 Fundamentals of Metamaterials, Periodic and
Random Media*

TUESDAY, MAY 8

8:30 a.m. – 12:30 p.m.

SC163 Practical OPOs; Majid Ebrahim-Zadeh, *Inst. de Ciencies
Fotoniques, Spain*; Malcolm Dunn, *Univ. of St. Andrews, UK*

Category: *CLEO 4 Applications of Nonlinear Optics*

**SC166 Photonic Crystal Devices and Integrated
Circuits;** Dennis Prather, *Univ. of Delaware, USA*

Category: *QELS 6 Nano-Optics and Plasmonics*

**SC191 Tissue Optics: Fundamentals and Applications to
Biomedical Optical and Laser Diagnostics;** Valery V. Tuchin,
Saratov State Univ., Russian Federation

Category: *CLEO 10 Medical and Biological Applications*

**SC192 Fiber Optic Sensors: Principles and
Applications;** Michel Digonnet, *Stanford Univ., USA*

Category: *CLEO 11 Fiber and Guided-Wave Amplifiers, Lasers and Devices*

SC196 Solid-State Lighting; Ghassan Jabbour, *Arizona State
Univ., USA*; E. Fred Schubert, *Rensselaer Polytechnic Inst., USA*

Category: *CLEO 15 LEDs, Organic LEDs and Solid-State Lighting*

**SC220 Diffractive Optics, Design, Analysis and
Applications;** James R. Leger, *Univ. of Minnesota, USA*

Category: *CLEO 1 Laser Processing and Optical Instrumentation*

SC270 High-Power Fiber Lasers and Amplifiers; W. Andrew
Clarkson, *Optoelectronics Res. Ctr., UK*

Category: *CLEO 11 Fiber and Guided-Wave Amplifiers, Lasers and Devices*

1:30 p.m. – 5:30 p.m.

**SC143 Introductory and Intermediate Topics in
Polarized Light;** Robert Fisher, *R. A. Fisher Associates, USA*

Category: *Photonics Basics*

**SC153 Quasi-Phasematching for Wavelength
Conversion and All-Optical Nonlinear Processing;**

Peter G. R. Smith, *Univ. of Southampton, UK*

Category: *CLEO 4 Applications of Nonlinear Optics*

**SC154 Quantum Well Devices for Optics and
Optoelectronics;** David A. B. Miller, *Stanford Univ., USA*

Category: *CLEO 9 Components, Interconnects and Signal Processing*

SC155 Ultrashort Laser Pulse Measurement; Rick Trebino,
Georgia Tech, USA

Category: *CLEO 8 Ultrafast Optics, Optoelectronics and Applications*

**SC182 Biomedical Optical Diagnostics and
Sensing;** Thomas Huser, *Univ. of California at Davis, USA*

Category: *PhAST*

SC198 Packaging of Optoelectronic Components;
Andreas Rose, *Ondine Biopharma Corp., USA*

Category: *CLEO 9 Components, Interconnects and Signal Processing*

**SC245 New Directions in Nanoscale Lithography and
Pattern Transfer;** Steven Brueck, *Univ. of New Mexico, USA*

Category: *PhAST*

NEW SHORT COURSES FOR 2007!

SUNDAY, MAY 6

12:30 p.m. – 3:30 p.m.

SC300 Silicon Photonics; Bahram Jalali, *Univ. of California at Los Angeles, USA*

Category: *CLEO 16 Micro- and Nano-Photonics*

Benefits and Learning Objectives:

- Understand unique attributes of the silicon photonics technology.
- Compare properties of silicon photonics with other integrated optics technologies.
- Identify main technical challenges that remain on the path to wide-scale commercialization.
- Justify investment in silicon photonics.
- Define the most promising applications of silicon photonics.

Intended Audience:

Engineers, engineering managers, graduate students and private equity investors who are interested in research and commercialization of silicon photonics.

4:30 p.m. – 7:30 p.m.

SC301 Quantum Cascade Lasers: From Band Structure Engineering to Commercialization;

Federico Capasso, *Harvard Univ., USA*

Category: *CLEO 3 Semiconductor Lasers*

Benefits and Learning Objectives:

- Understand the rudiments of band structure engineering, including the quantum design of the key types of QC lasers, which have entered real-world applications.
- Discuss experimental device performance, including physical limits, design constraints and comparison with theory.
- Discuss the basics of QC laser device technology: fabrication process, materials growth options.

- Illustrate the basics of a chemical sensing system.
- Discuss applications of state-of-the-art mid-infrared QC lasers to sensing and present several examples of QC laser commercialization.
- Discuss the current research frontier of QC lasers: multi-wavelength and broadband devices, nonlinear optical QC lasers; terahertz QC lasers, ultrashort pulse QC lasers, optofluidic and photonic crystal QC lasers.
- Summarize a comprehensive future outlook on QC laser physics, device performance and system applications.
- Assess QC laser technology market.

Intended Audience:

Researchers in industry, academia and government labs; technical managers; graduate students; qualified undergraduates; and (mostly senior level) majoring in EE or physics/applied physics.

MONDAY, MAY 7

9:00 a.m. – 12:00 p.m.

SC302 MetaMaterials; Vladimir M. Shalaev, *Purdue Univ., USA*

Category: *QELS 3 Fundamentals of Metamaterials, Periodic and Random Media*

Benefits and Learning Objectives:

- Understand the fundamentals of Metamaterials.
- Learn more about optical magnetism.
- Learn more about applications of negative-index Metamaterials (NIMs).
- Understand the nature of a negative refractive index.
- Learn approaches for scaling NIMs to the optical range.

Intended Audience:

Students, researchers and high-tech industry people.

Here's what attendees had to say about last year's Short Courses:

"I finally fully understand. The instructor was great – interesting and exciting!"

—Attendee of SC136 Understanding Lasers and Critical Optical Components instructed by Shaoul Ezekiel

"The course exceeded my expectations! I highly recommend this course to others."

—Attendee of SC194 Photonic Crystal Fibers and Devices instructed by Benjamin J. Eggleton

"Excellent course. The instructors are very knowledgeable and answered all questions in depth."

—Attendee of SC200 Laser Remote Sensing instructed by Philip Gatt and Timothy Carrig

STUDENT ACTIVITIES



Students, recent graduates and early-career professionals who want to improve their networking skills and the quality and effectiveness of their job searches should attend these events.

OSA

NEW FOCUS/BOOKHAM STUDENT AWARD

Students are encouraged to submit applications for this joint award presented by the Optical Society of America and New Focus/Bookham, Inc. The award recognizes and encourages excellence in research and presentation skills, in addition to leadership in the optics community. To apply for this award, visit www.osa.org/aboutosa/awards/osaawards/awards_desc/newfocusbookhamstudent/default.aspx

WOMEN IN OSA "WOSA" LUNCHEON

The WOSA luncheon is a great opportunity for students to meet and network with women working in the optics field. This year's luncheon will feature Rachel Ivie, Ph.D., Statistical Research Center, American Institute of Physics, who will discuss highlights from AIP's report *Women Physicists Speak Again*. She will report on women physicists' experiences in education and careers as well as offer comparisons between women from developed and developing countries. To attend the WOSA Luncheon, please RSVP to wosa@osa.org by April 13, 2007.

IEEE/LEOS

CLEO STUDENT TRAVEL GRANTS

LEOS will provide grants of up to \$2,500 each to enable students who present papers at CLEO to travel to the conference. A recipient should be a full time degree-seeking student, sponsored by a LEOS member, who is the first author and presenter of the paper. Applications are due

approximately 2-3 months before the particular meeting and preference will be given to LEOS student members. The LEOS Student Travel Grants committee will notify the recipients about six weeks prior to the conference date.

For more information, contact leosconferences@ieee.org.

APS/DLS

For information on the DLS student travel grants, visit the "DLS Student Travel Grant Program" at <http://units.aps.org/units/dls/> in January 2007.

ADDITIONAL CLEO/QELS STUDENT ACTIVITIES PROFESSIONAL DEVELOPMENT WORKSHOP ON "PRESENTATION POWER"

This free session focuses on public speaking skills. Targeting your message and the elements needed to keep an audience engaged will be two of the featured topics. Join us and learn how to capture and keep an audience's attention. There will be a question and answer period at the end of the session.

CAREER SERVICES

The CLEO/QELS Career Center features free on-site and on-line services, including resume posting, job listings, a career workshop and on-site interview opportunities.

Career Workshop: Join us for this free session that focuses on employment trends and the career-building skills that are needed in today's market.

To learn more, visit www.cleoconference.org, or contact Angela Davis at adavis@osa.org.

WWW.CLEOCONFERENCE.ORG

2006 EXHIBITOR LIST

4AD Enterprises, Inc.

—A—

AA Opto Electronic
Access Laser Co.
Acton Research Corporation
Adtech Optics, Inc.
Advanced Thin Films
AdvR
Aerotech, Inc.
AF Optical, Inc.
Agiltron, Inc.
AIM Specialty Materials
Alfalight
Alnair Laboratories
Corporation
Alpes Lasers
Altos Photonics, Inc.
American Physical Society
Amplitude Technologies
Andor Technology
APE GmbH
Applied Optronics
Arden Photonics, Ltd.
Arete Associates
Ariel Optics, Inc.
Arroyo Instruments
ASML
ASML Optics, LLC
Asphericon
Avantes, Inc.
Axcel Photonics

—B—

B&W Tek, Inc.
Bandwidth Semiconductor, LLC
Boston Electronics Corporation
Brimrose Corporation of
America
Bristol Instruments, Inc.
Burleigh (an EXFO Company)

—C—

Calmar Optcom, Inc.
Cambridge Technology, Inc.
Cambridge University Press
Canon U.S.A.
Cascade Optical Corporation
Cascade Technologies
CASIX, Inc.
Central Intelligence Agency
CeramOptec Industries
Chroma Technology Corp.
Cleveland Crystals, Inc.
Cobolt
Coherent, Inc.
Continuum
CorActive High-Tech, Inc.
Cristal Laser
Crosslight Software, Inc.
CrystaLaser
Crystal Fibre A/S
Crystal Systems, Inc.
Crystal Technology, Inc.

—D—

DataRay, Inc.
Daylight Solutions, Inc.
Del Mar Photonics
Denton Vacuum, LLC
Diamond Wire Technology
Directed Energy Professional
Society
Discovery Semiconductors, Inc.
DrS Data + Imaging Systems,
Inc.

—E—

Edmund Optics
EKSPLA/EKSMA
Electro-Optical Products
Electro-Optics Technology, Inc.
Elforlight, Ltd.
Elliot Scientific, Ltd.
ELS Elektronik Laser System
Engineering Synthesis Design,
Inc.
EOSPACE, Inc.
Eptron Technology, Inc.
Exciton, Inc.
EXFO

—F—

Fabrinet
FASTLITE
Femtochrome Research, Inc.
Femtolasers, Inc.
Fianium, Ltd.
Fiberguide Industries, Inc.
FiberPro
Flir Systems, Inc.
Fujian Castech Crystals, Inc.
Furukawa America, Inc.

—G—

General Photonics Corp.
Gentec Electro-Optics, Inc.
Gooch and Housego, PLC
Goodrich Corporation
GWU Lasertechnik Vertriebs-
GmbH

—H—

Hamamatsu Corporation
Harvard University
Healthy Bacs
Hellma International, Inc.
Heraeus Quartz America
High Finesse GmbH
High Power Devices, Inc.
High Q Laser (US), Inc.
Hinds Instruments, Inc.
Horiba Jobin Yvon, Inc.

—I—

Ibsen Photonics A/S
IEEE/LEOS
II-VI, Inc.
IKO International, Inc.
ILX Lightwave Corp.
Imagine Optic
IMRA America, Inc.
Incubic, LLC
Innolas GmbH
INO
Institute of Optics
International Radiation
Detectors Inc.
IPG Photonics Corp.
ITF Optical Technologies
Ixfiber

—J—

JJ Slevin & Associates
JT Ingram Sales and Marketing
Judson Technologies, LLC

—K—

Kaleido Technology
Kepteyn-Murnane Laboratories
Keopsys, Inc.
Kimmon Electric US, L.P.
Kinetic Systems, Inc.

KLASTECH-Karpushko Laser
Technologies GmbH
Koheras A/S
Konoshima/Baikowski Group

—L—

L-3 PHOTONICS
Lambda Research Optics, Inc.
LAS-CAD GmbH
Laser 2007 - Munich
International Trade Fairs
Laser-compact Co., Ltd.
Laser Components Instrument
Group, Inc.
Laser Drive, Inc.
Laser Focus World
Laser Innovations
Laser Line, Inc.
Laser Materials Corporation
Laser Quantum
Lasertel
Lattice Electro Optics, Inc.
Leptis Technologies
Leybold Optics USA, Inc.
Liekki
Light Age, Inc.
Light Conversion
Lightspeed Technologies
Lincoln Laser
LINOS Photonics, Inc.
Logitech Product Group
LxSix Photonics, Inc.
Lydall, Inc.

—M—

Market Tech, Inc.
mechOnics ag
Megaopto Co., Ltd.
Melles Griot
MEMS Optical, Inc.
Micro Laser Systems, Inc.
Micon Optics, Inc.
Mildex, Inc.
Mindrum Precision, Inc.
Minus K Technology
Missile Defense Agency SBIR
MPB Communications Inc.

—N—

NanoLayers GmbH
Nanonics Imaging, Ltd.
National Reconnaissance
Office
National Research Council of
the National Academies
Nature Publishing Group
NEOARK Corporation
NEOS Technologies, Inc.
New Focus, Inc.
New Source Technology
New Wave Research, Inc.
Newport Corporation
NL Nanosemiconductor GmbH
nLight Corp.
NoIR Laser
Northrop Grumman Cutting
Edge Optronics, Inc.
Northrop Grumman Space
Technology
Northrop Grumman Synoptics
Nova Phase, LLC
NP Photonics
NTT Electronics Corporation
Nuferr
Nuphoton Technologies, Inc.
Nutfield Technology

Nuvonix Inc.

—O—

Ocean Optics, Inc.
OFR, Inc.
OFS
Ohara Corporation
Ondax, Inc.
Onyx Optics, Inc.
Ophir Optronics, Inc.
OPN
OPOTEK, Inc.
Optica Software
Optical Research Associates
OptiGrate
Optimax Systems, Inc.
Optiphase, Inc.
Opto Diode Corp.
OptoSci Limited
OptoSigma Corporation
The Optronics Co., Ltd.
Optronis
Orbits Lightwave, Inc.
OSA
OSI Optoelectronics
Oxford University Press
Oxide Corporation
OZ Optics Ltd.

—P—

Paradigm Lasers, Inc.
PD-LD, Inc.
PHASICS
Photon Control, Inc.
Photon Design
Photon, Inc.
Photon Systems
Photonics Industries
Photonics Spectra
Photonics.com/The Photonics
Directory
Photop Technologies
PI (Physik Instrumente) L.P.
PicoQuant GmbH
piezosystem jena, Inc.
PolarOnyx, Inc.
Polymicro Technologies, LLC
Power Technology, Inc.
Precision Ferrites and
Ceramics, Inc.
Precision Glass & Optics
Precision Photonics
Princeton Lightwave, Inc.
Princeton University-Mirthe
Center
PriTel, Inc.
PROSystems, Inc.
PTAP - Photonics Technology
Access Program

—Q—

QPhotonics, LLC
Quality Thin Films, Inc.
Quantronix Corp.
Quintessence Photonics
Corporation

—R—

Radiant Dyes Laser GmbH
Raicol Crystals, Ltd.
Rainbow Research Optics, Inc.
Raydiance, Inc.
Research Electro-Optics, Inc.
RoMack, Inc.
RPMC
RSoft Design Group

—S—

Sabeus, Inc.
Sacher Lasertechnik GmbH
SAES Getters, S.p.A.
Santec USA Corporation
Schott North America, Inc.
Schott North America, Inc.-
Fiber Optics
Scientific Materials Corp
Sensors Unlimited Goodrich
Corporation
Simax Technologies, Inc.
Siskiyou Design Instruments
Solid State Cooling Systems
Sparkle Optics Corporation
Special Optics
Spectrum Thin Films
SPIE
Spiricon, Inc.
Springer
Srico, Inc.
STANDA
Stanford Photonics Research
Center (SPRC)
Stanford Research Systems
Surface Finishes
SUSS MicroTec
Sutter Instrument Co.
Swamp Optics, LLC
Symphotic T.I.I. Corporation

—T—

Taylor & Francis
Tec5USA, Inc.
Technical Manufacturing Corp.
TecOptics
Telops, Inc.
Tempo Clean Room Foam
TeraXion, Inc.
TeraXion, Laser Modules
Thales Laser S.A.
ThermoTek, Inc.
Thorlabs
Time-Bandwidth Products, Inc.
Toptica Photonics, Inc.
Trinity Technologies
TwinStar Optics, Coatings &
Crystals

—U—

UltraVolt, Inc.
Unioriental Optics Co., Ltd.
University of Arizona Optical
Sciences Center
University of Central Florida
U.S. Army Research Laboratory
U.S. Naval Research
Laboratory

—V—

Vacuum Process Technology
Vigo Systems SA
Virtual Industries, Inc.
VitreCom
VLOC Incorporated

—W—

WaveFront Sciences, Inc.
Wordingham Technologies

—Z—

Zygo Corporation

Final 2006 exhibitor list.

GENERAL INFORMATION

PRE-REGISTRATION DEADLINE: APRIL 12, 2007

REGISTRATION

Registrations received after 11:59 p.m. (03.59 GMT) Thursday, April 12, 2007, will be charged the on-site rate. Payment must be received with your registration form. No forms will be processed without payment. All payments must be in US dollars and drawn on a US bank.

CONFIRMATIONS

Upon receipt of your registration and payment, a confirmation letter will be emailed, faxed or mailed (depending on your method of registration) to each registrant within three days. **PAYMENT PROBLEMS WILL DELAY PROCESSING OF YOUR REGISTRATION.**

BADGE CREDENTIALS

Your registration confirmation will include a bar code, which you will scan on-site at a Quick Registration Station in order to print your badge. Should you forget to bring the bar code with you, your badge can be obtained at the Pre-registration Counters. Please note: **BADGES WILL NOT BE MAILED.**

REFUND AND CANCELLATION POLICY

All requests for refunds must be received in writing by Thursday, April 19, 2007. A service charge of US\$50 will be assessed for processing refunds. A letter requesting the refund should state the registrant's name, amount of payment and to whom the refund should be made payable. All registrations received after Thursday, April 19, 2007, will be non-refundable.

Requests for refunds should be directed to:

Email: cleoregistration@osa.org

Mail: CLEO/QELS and PhAST 2007
c/o Conference Registration
60 Industrial Parkway, PMB 650
Cheektowaga, NY 14227

Fax: +1.905.479.9297

All requests for refunds must be made in writing. Please allow four to six weeks for processing.

PAYMENT

Credit cards are accepted. Payments made by check or money order must be made payable to the Optical Society of America in US funds and drawn on a US bank.

Payment must accompany your registration form in order to process your badge/ticket order. Forms received on or before April 12, 2007, 11:59 p.m. (03.59 GMT) will be charged the pre-registration fee. Forms received after April 12, 2007, will automatically be charged the on-site registration fee.

SHORT COURSE REGISTRATION

Register early, seating is limited.

Each Short Course requires a separate fee. Advance registration is advisable as each course has limited seating. There will not be a waiting list for sold out courses. Tickets are required for admission to Short Courses and for *Short Course Notes*, which are distributed on-site. Additional materials are not available for purchase.

REGISTRATION TYPES

CLEO/QELS and PhAST Conference Registration

Includes:

- One copy of the *Conference Program*
- One copy of the *Technical Digest* on CD-ROM
- One copy of the *CLEO Buyers' Guide*

Admission to:

- CLEO/QELS and PhAST Technical Sessions
- Plenary Sessions
- Exhibit Hall
- Career Center
- Poster Sessions
- Conference Reception

CLEO/QELS and PhAST Conference One-Day Registration

(offered Monday through Friday)

Includes:

- One copy of the *Conference Program*
- One copy of the *CLEO Buyers' Guide*

Admission to:

- CLEO/QELS and PhAST Technical Sessions
- Plenary Session
- Exhibit Hall
- Career Center
- Poster Sessions

Short Course Only

Includes:

- One copy of the *Short Course Notes* (distributed on-site)
- One copy of the *CLEO Buyers' Guide*

Admission to:

- Selected Short Course(s)
- Plenary Sessions
- Exhibit Hall (opens Tuesday)
- Career Center (opens Tuesday)

Please note: Each Short Course requires a separate fee and ticket. Seating is limited. Advance registration is recommended. There will be no wait list for sold out courses, and Short Course Notes are not available for purchase.

Exhibit Only Pass

Includes:

- One copy of the *CLEO Buyers' Guide*

Admission to:

- Exhibit Hall
- Career Center
- Plenary Sessions

GENERAL INFORMATION

CONFERENCE MATERIALS

Technical Digest

The *CLEO/QELS and PhAST 2007 Technical Digest CD-ROM* is a compilation of the two-page summaries submitted by all authors. Attendees will receive one CD-ROM containing the *Digest*. Additional copies will be available for purchase at the meeting for a special conference price. The *Digest* will be available after the conference from OSA and IEEE/LEOS offices at a higher price.

Postdeadline Papers Book

CLEO/QELS 2007 Postdeadline Papers book includes the two-page summaries of accepted postdeadline papers. The book will be included with your registration materials and be available to all conference registrants. The papers will be presented Thursday, May 10, 2007, from 8:00 p.m. to 10:00 p.m.

Short Course Notes

Each Short Course has a unique set of notes, which are distributed on-site to registered course attendees only. Notes typically include a copy of the presentation and any additional materials provided by the instructor. Notes are not available for purchase, either individually or in sets.

CLEO 2007 Buyers' Guide

The *CLEO 2007 Buyers' Guide* is composed of the 50-word descriptions and contact information for exhibiting companies, a cross-referenced product-category index, general conference services information and exhibit floor activities. Guides will be given to all CLEO/QELS and PhAST attendees as part of their registration, but will also be available for sale after the conference for US\$75 each. Contact cleosales@osa.org or +1.202.416.1974 for an order form.

NETWORKING OPPORTUNITIES

Conference Reception

The conference reception will be held on Tuesday, May 8, 2007, from 6:30 p.m. to 8:00 p.m. This reception is included with all conference registrations. Additional tickets may be purchased for US\$50.

Student Programming

Students, recent graduates and early-career professionals who want to improve their networking skills and the quality and effectiveness of their job searches should attend these events.

PhAST Power Lunch and Discussion

Attend these sessions to hear industry leaders discuss their insights and visions for future business opportunities and market trends.

REGISTRATION TYPES

For information on what is included with each registration type, please see descriptions on page 19.

	On or before April 12, 2007	After April 12, 2007
CLEO/QELS		
Conference Registration Member.....	US\$555	US\$655
Conference Registration Non-Member	US\$760	US\$865
Conference Registration Student Member.....	US\$160	US\$235
Conference Registration Student Non-Member	US\$235	US\$305
One-Day Registration.....	US\$495	US\$595
Exhibit Only Pass.....	US\$0	US\$0

Each Short Course requires a separate fee and ticket.

HALF-DAY SHORT COURSES

Member	US\$250	US\$300
Non-Member.....	US\$315	US\$375
Student.....	US\$100	US\$125

Course Numbers:

SC123	SC154	SC164	SC189	SC197	SC245	SC301
SC143	SC155	SC165	SC191	SC198	SC270	SC302
SC147	SC157	SC166	SC192	SC199	SC271	
SC149	SC160	SC167	SC194	SC220	SC272	
SC153	SC163	SC182	SC196	SC221	SC300	

FULL-DAY SHORT COURSES

Member	US\$320	US\$370
Non-Member.....	US\$400	US\$465

Course Numbers:

SC136	SC200	SC219
-------	-------	-------

Registration Form

CLEO/QELS 2007 • Collocated with *PhAST* 2007

Technical Conference: May 6-11, 2007

Exhibit: May 8-10, 2007

Baltimore Convention Center, Baltimore, Maryland, USA

ADVANCE REGISTRATION DEADLINE: April 12, 2007

A. BADGE INFORMATION (One registrant per form. Please copy form for each additional registrant.)

FIRST NAME _____

LAST NAME (FAMILY NAME) _____

BADGE NAME (FIRST NAME AS IT SHOULD APPEAR ON BADGE) _____

COMPANY/AFFILIATION _____

ADDRESS _____

CITY _____ STATE/PROVINCE _____ POSTAL CODE _____ COUNTRY _____

TELEPHONE _____ FAX _____ EMAIL _____

I want this as my preferred address for all OSA correspondence and subscriptions.

SOCIETY MEMBERSHIP (select all that apply and provide ID numbers)

APS IEEE/LEOS OSA

YOU MUST BE A MEMBER OF APS, IEEE/LEOS OR OSA TO QUALIFY FOR MEMBER RATES.

B. CONFERENCE REGISTRATION – REGISTER FOR ONE CONFERENCE AND ACCESS ALL THREE

CHECK THE CONFERENCE THAT YOU ARE REGISTERING FOR: CLEO QELS *PhAST*

	On or before April 12	After April 12	
Conference Registration Member.....	US\$ 555	US\$ 655	\$ _____
Conference Registration Non-Member.....	US\$ 760	US\$ 865	\$ _____
Conference Registration Student Member.....	US\$ 160	US\$ 235	\$ _____
Conference Registration Student Non-Member.....	US\$ 235	US\$ 305	\$ _____
ONE DAY Circle day (Mon Tue Wed Thu Fri).....	US\$ 495	US\$ 595	\$ _____
C. EXHIBIT ONLY PASS REGISTRATION	US\$ 0	US\$ 0	\$ _____

D. SHORT COURSE REGISTRATION (Circle selected Courses)

HALF-DAY SHORT COURSES	No. of Courses	On or before April 12	After April 12	
Member.....	X _____	US\$ 250	US\$ 300	\$ _____
Non-Member.....	X _____	US\$ 315	US\$ 375	\$ _____
Students*.....	X _____	US\$ 100	US\$ 125	\$ _____

*To be eligible for the student rate, you must be enrolled in a full-time undergraduate, masters, or PhD program. Student identification must be shown on-site.

COURSE NUMBERS: (Circle selected courses)

SC123 SC149 SC155 SC163 SC166 SC189 SC194 SC198 SC221 SC271 SC301
 SC143 SC153 SC157 SC164 SC167 SC191 SC196 SC199 SC245 SC272 SC302
 SC147 SC154 SC160 SC165 SC182 SC192 SC197 SC220 SC270 SC300

FULL-DAY COURSES	No. of Courses	On or before April 12	After April 12	
Member.....	X _____	US\$ 320	US\$ 370	\$ _____
Non-Member.....	X _____	US\$ 400	US\$ 465	\$ _____

COURSE NUMBERS: (Circle selected courses)

SC136 SC200 SC219

E. ADDITIONAL CLEO/QELS AND *PhAST* PRODUCTS & SERVICES

	No. Ordered	On or before April 12	After April 12	
Conference Reception (Included with Paid Conference Registration only)	X _____	US\$ 50	US\$ 50	\$ _____
<i>PhAST</i> Power Lunch (Box lunch included. Limited seating!)	X _____	US\$ 25	US\$ 25	\$ _____
CLEO/QELS and <i>PhAST</i> Technical Digest on CD-ROM (Included with Paid Conference Registration only)	X _____	US\$ 100	US\$ 100	\$ _____

TOTAL PAYMENT \$ _____

F. PAYMENT INFORMATION

Payment must accompany form to complete processing. Your full name and address should be typed or printed clearly on your check or bank draft.

METHOD OF PAYMENT:

Make payable to the **Optical Society of America** in US dollars drawn on a US bank.

Check # _____ Money Order # _____ Bank Draft # _____
 VISA MasterCard American Express Diners Club

CARD NUMBER _____

EXP. DATE _____

CARD HOLDER'S NAME AS IT APPEARS ON THE CARD


I authorize the Optical Society of America to charge the total payment fee indicated on this form to my credit card. If the registration fee is received by OSA after April 12, 2007, I authorize OSA to charge the on-site registration fee.

CARD HOLDER'S SIGNATURE _____ DATE _____

REFUND POLICY: All requests for refunds must be made in writing and include full name and address of registrant. A US\$ 50 service charge will be assessed for processing refunds. Refund payments will be issued in the same manner as they were received. Requests for refunds must be received no later than April 19, 2007 to be honored. Email refund requests to cleoregistration@osa.org. Please allow four to six weeks for processing.


NOTE: Registration for CLEO/QELS and *PhAST* implies consent that management may use any pictures taken during CLEO/QELS and *PhAST* events, which may include your likeness, without remuneration.


G. ADDITIONAL INFORMATION


- Check here if you do not wish to receive mail from CLEO exhibiting companies.
-  Check here if you will require special assistance. Please describe in space provided or by e-mail (cleoregistration@osa.org). Or Call 202-416-1999.

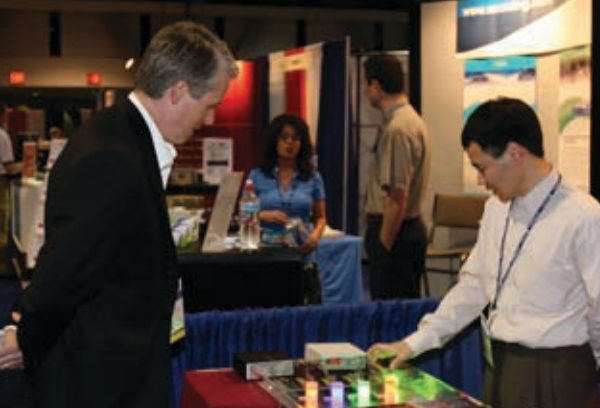
FOUR EASY WAYS TO REGISTER!

 **ONLINE:** www.cleoconference.org

 **FAX:** +1.905.479.9297

 **MAIL:** CLEO/QELS and *PhAST*
 2007 Registration
 60 Industrial Parkway
 PMB 650
 Cheektowaga, NY 14227

 **OVERNIGHT COURIER SERVICE:**
 CLEO/QELS and *PhAST*
 2007 Registration
 2770 14th Ave., Suite 201
 Markham, ON L3R 0J1 CANADA



HOTEL AND TRAVEL INFORMATION

HOTEL RESERVATIONS

NEW HOUSING PROVIDER FOR 2007!

Convention Management Resources (CMR) is the official housing contractor for CLEO/QELS and PhAST 2007.

Book early for the best hotel availability and rates!

For a complete list of hotels and descriptions, visit the official CLEO/QELS Web site www.cleoconference.org or the official PhAST Web site www.phastconference.org.

When making hotel reservations, please provide your room and bedding preferences in the arrival, departure and room-type section of the hotel reservation form. Hotels will assign specific room types upon check-in, based on availability. All rates are per room night and are subject to a 12.5% tax (subject to change). Some hotels may charge additional fees for rooms with more than two occupants.

To secure a room reservation, requests must be received with a credit card guarantee or a check in the amount of US\$175 per guest room.

Problems or delays with your payment may affect your hotel request.

Housing confirmations for reservations made by fax or by mail will be sent within 24 hours of receipt. Your confirmation will be sent to your email address, if provided. If no email address is provided, your confirmation will be sent to the fax number supplied. If no email address or fax number is provided, your confirmation will be sent to the address provided. If you do not receive a confirmation, please contact CLEO/QELS and PhAST Housing Services at +1.800.619.7689.

Each of the conference hotels is within walking distance of the Baltimore Convention Center. No shuttle service will be provided.

HOUSING RESERVATION DEADLINE: APRIL 3, 2007

After the housing deadline date, April 3, 2007, the official CLEO/QELS and PhAST 2007 blocks may be released, and hotels may charge to significantly higher rates.

All cancellations and changes must be made by contacting the CLEO/QELS & PhAST Housing Services during operation hours of 9:00 a.m. to 9:00 p.m., EST. To receive a deposit refund, the reservation must be canceled according to CLEO/QELS and PhAST cancellation Policy.

DEPOSITS/GUARANTEES

All reservations must be accompanied by a credit card guarantee or a deposit check in the amount of the US\$175 per guest room. Make checks payable to Convention Management Resources. Some hotels may charge your credit card prior to your arrival for one night's

room charge plus tax. In the event that you cancel prior to the cancellation deadline or fail to arrive on your confirmed arrival date, your check deposit will be forfeited or your credit card will be charged for one night's room charge plus tax, if it was not charged prior to your arrival.

CHANGES/CANCELLATIONS/REFUNDS

Changes and cancellations must be made by contacting the CLEO/QELS and PhAST Housing Service at +1.800.619.7689 (toll-free US and Canada) or +1.415.979.2273 (local and international) during hours of operation 9:00 a.m.–9:00 p.m. EST. Cancellation or changes must be submitted in writing to the CLEO/QELS and PhAST Housing Service by fax to +1.415.979.2250 or by email to cleo.qels2007housing@cmrus.com. To receive a refund of deposit, the reservation must be canceled according to each individual hotel's cancellation policy.

METHODS TO RESERVE A ROOM FOR CLEO/QELS and PhAST 2007:

Internet

Visit the CLEO/QELS and PhAST 2007 Housing Services Web site for online hotel availability and to reserve housing at either www.cleoconference.org or www.phastconference.org.

Phone:

Call CLEO/QELS and PhAST 2007 Housing services to reserve your hotel. Housing Service is open Monday through Friday 9:00 a.m.–9:00 p.m. EST. Call +1.800.619.7689 (toll-free US or Canada) or +1.415.979.2273 (local and international).

Fax:

Fax the completed Hotel Reservation Form to +1.415.979.2250.

Mail:

Send the completed Hotel Reservation Form to:
CLEO/QELS and PhAST Housing Services
33 New Montgomery St., Suite 1420
San Francisco, CA 94105

Email:

cleo.qels2007housing@cmrus.com.

Exhibitors Please Note: There is a separate housing form for CLEO exhibitors. Obtain form online at www.cleoconference.org or call the Housing Service at the numbers listed above.



TRAVEL INFORMATION

AIRLINE TRAVEL

CLEO/QELS and *PhAST* Management has arranged discounted air travel with the American Airlines:

Pricing options are as follows:

- 5% discount off the lowest applicable discount fare, including First Class, purchased seven days in advance.
- Discounts apply on all American Airlines, American Eagle, American Connection or any of our more than 21 airline partners.

Either call American's toll-free number +1.800.433.1790 and refer to the **Meeting Authorization # 2057AB**, or go directly to www.aa.com to book your flight. After you have selected your flight under the "Enter Passenger Details" tab, go to the "AA.com Discount Code" field and enter in A plus the **authorization # 2057AB**. Please note that there are some fare restrictions.

RENTAL CARS

Avis Rent-a-Car is pleased to offer low rates with unlimited mileage to participants attending CLEO/QELS and *PhAST*. For reservations call +1.800.331.1600 and refer to Avis Worldwide Discount #D004076. Reservations may also be made online at www.avis.com.

AIRPORTS

Three major airports service Baltimore:

Baltimore-Washington International Airport (BWI) in Maryland

Washington Dulles International Airport (IAD) in Northern Virginia.

Ronald Reagan Washington National Airport (DCA) in Northern Virginia

TRAINS AND PUBLIC TRANSPORTATION

Trains arrive and depart from Penn Station, located at 1515 N. Charles Street in Baltimore. Penn Station offers enclosed waiting areas, paid short-term and long-term parking, a restaurant, snack bar, a taxi and transit service.

AMTRAK:

Penn Station
1515 N. Charles Street
Baltimore, MD 21201
Phone: +1.800.USA.RAIL
Web site: www.amtrak.com

Maryland Public Transportation

The Mass Transit Administration (MTA) operates bus, Metro, Light Rail and MARC train services. The local bus system, which operates seven days a week, covers the downtown neighborhoods and parts of Baltimore's suburbs. MTA operates weekday MARC train service between Baltimore and Washington, D.C. MTA also offers light rail and Metro Subway service around Baltimore. Call or visit the Web site for more information. Call +1.410.539.5000/+1.866.743.3682 or visit www.mtmaryland.com for schedules.

GROUND TRANSPORTATION

SuperShuttle

SuperShuttle can help you get to and from BWI and is easier than ever. For information on service to and from Baltimore's Inner Harbor Hotel District; Baltimore City; and Baltimore, Prince George's, Montgomery, Anne Arundel Counties and Annapolis, as well as Northern Virginia, phone +1.800.BLUE.VAN (258.3826).

LETTERS OF INVITATION FOR INTERNATIONAL ATTENDEES

In order to provide more accurate and timely service, CLEO/QELS and *PhAST* Management has improved the process for obtaining invitation letters. We will provide our international presenters with letters of invitation for use in the visa process. Non-authors, or non-presenting attendees may request a letter of support via the CLEO/QELS or *PhAST* Web sites: www.cleoconference.org www.phastconference.org.

Following your completion of the online form, the letter will be emailed in locked PDF format. This service will be available beginning December 1, 2006, and will remain available until April 20, 2007. Unfortunately, we can no longer send the completed document to you by FedEx, fax or other means.

Please note: The visa process can take up to six months, so we urge you to act immediately!



HOTEL DESCRIPTIONS AND AREA MAP

- 1 THE DAYS INN INNER HARBOR**
 100 Hopkins Place
 Baltimore, Maryland 21201
Rate: US\$ 125 sgl/dbl
- 2 THE HOLIDAY INN INNER HARBOR BALTIMORE**
 301 West Lombard Street
 Baltimore, Maryland 21201
Rate: US\$ 149 sgl/dbl, US\$ 159 triple
 Extra person charge US\$10
- 3 MARRIOTT INNER HARBOR**
 110 South Eutaw Street
 Baltimore, Maryland 21201
Rate: US\$ 169 sgl/dbl, US\$ 179 triple
 Extra person charge US\$ 10
- 4 THE RADISSON PLAZA LORD BALTIMORE**
 20 West Baltimore Street
 Baltimore, Maryland 21201
Rate: US\$ 135 sgl/dbl, US\$ 155 triple
 Extra person charge US\$20
- 5 THE SHERATON INNER HARBOR BALTIMORE**
 300 South Charles Street
 Baltimore, Maryland 21201
Rate: US\$ 166 sgl/dbl, US\$ 186 triple
 Extra person charge US\$20
- 6 THE WYNDHAM BALTIMORE INNER HARBOR**
 101 West Fayette Street
 Baltimore, Maryland 21201
Rate: US\$ 145 sgl/dbl, US\$ 165 triple
 Extra person charge US\$20





Hotel Confirmations should be sent to (please type or print clearly):

Contact for Confirmation: _____
 Company: _____
 Address: _____ City/State: _____
 Zip: _____ Country: _____ Phone: _____ Fax: _____
 Email: _____

Hotel Preferences (be sure to indicate four choices):

1st Choice: _____ 2nd Choice: _____
 3rd Choice: _____ 4th Choice: _____

If your preferred hotels are not available do you prefer your hotel assignment to be based on:

Location or Rate

If you are a member of a Hotel travel club and would like to receive appropriate credit, please indicate the hotel chain and number below:

Hotel Chain: _____ Membership Number: _____

Room Occupants:

Last Name, First Name: _____

Share with (list all occupants if applicable): _____

Arrival, Departure and Room Type:

Arrival Date: _____ Departure Date: _____

Share with Arrival Date: _____ Share with Departure Date: _____

Room Type: Single (1 bed / 1person) Double (1 bed / 2 persons) Double/Double (2 beds / 2 people)
 Suite (If checked a CLEO/QELS Housing consultant will contact you.)

Bed type, non-smoking and other preferences are on request and cannot be guaranteed.

Smoking Non-smoking Other _____

Special Needs (specify): _____

Guarantee Information:

Reservations may be cancelled without penalty 72 hours prior to arrival.

All reservations must be guaranteed by a credit card or check. Please indicate how you will guarantee your room: If you would like to guarantee with a check, please provide a credit card number below and CLEO/QELS Housing will provide you with an invoice once your hotel has been confirmed.

Check VISA MasterCard American Express Diner's

Credit Card Number: _____ Expiration Date: _____

Name as it appears on card: _____

Signature: _____

Don't be a no-show!

If you fail to arrive at your reserved hotel on your confirmed arrival date, the same cancellation policy penalties will apply and you will lose your room for all nights of your reservation. Please contact CLEO/QELS if you wish to change your arrival/departure dates.

✉ Mail to: **CLEO/QELS Housing, 33 New Montgomery, Suite 1420, San Francisco, CA 94105**
 📠 Fax to: **+1.415.979.2250**
 📞 To speak to a Housing Representative call **+1.800.619.7689 (US & Canada)** or **+1.415.979.2273 (Local & International)**;
 Monday – Friday 9:00 AM – 9:00 PM, Eastern Time

CAREER CENTER

Connect with employers and candidates from all areas of optics, photonics and laser science at the CLEO/QELS and PhAST Career Center



JOB SEEKERS

- Find optics and photonics employment opportunities
- Network with technical staff and human resource recruiters
- Post resumes and review open positions online
- Request interviews online and interview for positions on-site

RECRUITERS

- Showcase your company with a Recruitment Booth
- Advertise open positions and track job seeker interest online
- Review hundreds of resumes online
- Schedule interviews online and interview qualified job seekers on-site

The Career Center will be located in the Exhibit Hall of the Baltimore Convention Center in Baltimore, Maryland, during the following scheduled hours:

TUESDAY, MAY 8
10:00 a.m. – 5:00 p.m.

WEDNESDAY, MAY 9
10:00 a.m. – 5:00 p.m.

Companies and candidates are welcome to participate on-site or access our services online – whichever is more convenient. To pre-register for the Career Center, visit <http://cleo.workinoptics.com> by April 9, 2007.

FREE CAREER WORKSHOP!

The Career Center will hold a free Career Workshop for all interested conference attendees. The workshop provides information, advice and guidance to candidates seeking employment in the optics and photonics industry. Topics will include interview skills, resume writing, networking and much more.

Whether you are conducting a job search or recruiting, the Career Center is the place to be!

For more information concerning the Career Center and Career Workshop, call +1.202.416.1402 or email adavis@osa.org.

CLEO | 07
QELS

The Conference on

Photonic
Applications
Systems
Technologies™

CLEO
QELS | 07

WWW.CLEOCONFERENCE.ORG

The Conference on

Photonic
Applications
Systems
Technologies™

WWW.PHASTCONFERENCE.ORG

2007 CONFERENCE TIMELINE

MARCH 2	PhAST/LASER FOCUS WORLD INNOVATION AWARDS PROGRAM SUBMISSION DEADLINE
APRIL 2	CLEO/QELS POSTDEADLINE PAPERS DUE
APRIL 3	HOUSING DEADLINE
APRIL 12	PRE-REGISTRATION DEADLINE
MAY 6 - 11	CLEO/QELS TECHNICAL CONFERENCE
MAY 7 - 10	PhAST CONFERENCE
MAY 8 - 10	CLEO EXHIBIT

Program Planner available at www.cleoconference.org and www.phastconference.org beginning March 2007.

YOUR CLEO/QELS REGISTRATION INCLUDES *PhAST* CONFERENCE PROGRAMMING!

CONFERENCE ON LASERS AND ELECTRO-OPTICS
QUANTUM ELECTRONICS AND LASER
SCIENCE CONFERENCE
PHOTONIC APPLICATIONS, SYSTEMS
AND TECHNOLOGIES

CLEO/QELS TECHNICAL PROGRAM: MAY 6-11, 2007
EXHIBIT: MAY 8-10, 2007
PhAST CONFERENCE: MAY 7-10, 2007
BALTIMORE CONVENTION CENTER
BALTIMORE, MARYLAND, USA

CLEO
QELS | 07

The Conference on

Photonic
Applications
Systems
Technologies™

SPONSORED BY:



Optical Society of America
2010 Massachusetts Avenue, NW
Washington, DC 20036
USA

NON-PROFIT
ORGANIZATION
U.S. POSTAGE
PAID
PERMIT NO. 2896
MERRIFIELD, VA