CLEO/QELS 2005

Technical Conference: May 22-27, 2005

Exposition: May 24-26, 2005

Baltimore Convention Center, Baltimore, MD, USA

CLEO/QELS & *PhAST* 2005 were a resounding success! These three conferences showcased 1,609 talks on the latest breakthroughs in research and applications, with many of the sessions greeting standing-room only audiences.

These conferences have a strong core audience each and every year, and this year, they saw a hefty 5,281 attendees. Most notably, the conference is growing in its student attendance with a healthy increase of 7% in this key area. Additionally, technical attendance remained steady with last year and experienced an increase over the 2003 Baltimore show.

Programming was developed to attract the needs and interests of various audiences. For the first time this year, the conferences hosted two plenary sessions, providing additional renowned keynote talks. Through *PhAST*, there also was a strong emphasis on business programming and presentations highlighted funding opportunities and market overviews.

The exhibition also experienced growth this year, with 320 exhibiting companies, up 13% over last year. The show really is an international must-attend event, with approximately 20% of companies coming from outside the United States and a large number of companies attending from Europe and the Pacific Rim.

CLEO/QELS and *PhAST* had a strong year in 2005. We're looking forward to seeing you in Long Beach in 2006!

Conference Program

Postdeadline Papers

CPDA—Solid-State and Semiconductor Lasers, Optical Materials and Components, Medical & Biological Optics, Active Optical Sensing, Nonlinear Optics, and Lightwave Communications

CPDA1	Ripin	**300-W Cryogenically Cooled Yb:YAG Laser**
CPDA2	Huang	**Novel Piezoelectrically Actuated MEMS Tunable VCSEL**
CPDA3	Holub	**Spin Injection and Polarization Switching in a Vertical-Cavity Surface-Emitting Laser: A Spin-VCSEL**
CPDA4	Shwartz	**Light Induced Symmetry Breaking and Related Giant Enhacement of Nonlinear Properties in CdZnTe:V Crystal**
CPDA5	Shi	**High Responsivity and High Power Performance of Si/SiGe Based Avalanche Photodiode for 10-Gb/s Short-Reach Fiber Communication**
CPDA6	Sakurai	**160 nm Continuous Wavelength Tuning of Tunable Hollow Waveguide Bragg Reflector**
CPDA7	Scheuer	**Ultra-Sensitive Biochemical Sensor Based on Circular Bragg Micro-Cavities**
CPDA8	Ben-Yakar	**Nerve Regeneration in *C. elegans* after Femtosecond Laser Nano-Surgery**
CPDA9	Chow	**Ultra Resolution Fiber Sensor Using a Pre-Stabilized Diode Laser**
CPDA10	Scaccabarozzi	**Highly Efficient Birefringent Second Harmonic Generation in Submicron AlGaAs/Al x O y Waveguides**
CPDA11	Tzankov	**Generation of High-Energy Femtosecond Pulses in the Vacuum Ultraviolet at 1 kHz Repetition Rate**
CPDA12	Xiao	**4-User, ~3GHz-Spaced Sub-Carrier Multiplexing (SCM) Using Optical Direct-Detection via Hyperfine WDM**

CPDB—Ultrafast Lasers, Precision Optical Metrology, Fibers and Guided Waves

CPDB1	Shah	**12 ÂµJ, 1.2 W Femtosecond Pulse Generation at 346 nm from a Frequency-Tripled Yb Cubicon Fiber Amplifier**
CPDB2	Kim	**1.4kW High Peak Power Generation from an All-Semiconductor MOPA System Based on eXtreme Chirped Pulse Amplification (X-CPA) Concept**
CPDB3	Quraishi	**Generation of Sub-Hertz level CW Radiation in the Terahertz Regime**
CPDB4	Moses	**High Energy Pulse Compression to the Few-Cycle Regime with a Frequency Doubling Crystal**
CPDB5	Khazanov	**25% Efficiency 14 J Optical Parametric Chirped-Pulse Amplifier Based on KD*P Crystal**
CPDB6	Palinginis	**Ultra-Slow Light (<200 m/s) in a Semiconductor Nanostructure**
CPDB7	Gohle	**A Frequency Comb in the Extreme Ultraviolet**
CPDB8	Hoyt	**Observation and Precision Frequency Measurements of the 1 S 0 - 3 P 0 Optical Clock Transition in Ytterbium**
CPDB9	Rong	**Silicon Laser and Amplifier Based on Stimulated Raman Scattering**
CPDB10	Wong	**Robust Single-Mode Propagation in Optical Fibers with Record Effective Areas**
CPDB11	Polynkin	**Single-Frequency, Linearly Polarized Fiber Laser with 1.9 W Output Power at 1.5 um Using Twisted-Mode Technique**
CPDB12	Röser	**106 W 220 fs Fiber Laser System**

QPDA—QELS Postdeadline Session

QPDA1	Belkin	**Quasi-Phase Matching of Second-Harmonic Generation by Modulation of Electron Population Density in Quantum Cascade Lasers**
QPDA2	Stuhler	**Observation of Magnetic Dipole-Dipole Interaction in a Bose-Einstein Condensate**
QPDA3	Longdell	**Stopped Light with Storage Times Greater Than 1 Second Using EIT in a Solid**
QPDA4	Fan	**Efficient Generation of Correlated Photon Pairs in a Microstructure Fiber**
QPDA5	Tanabe	**Fast On-Chip All-Optical Switches and Memories Using Silicon Photonic Crystal with Extremely Low Operating Energy**

QPDA6	Zhang	**Fabrication and Characterization of a Near-IR Negative-Index Metal-Dielectric Composite Material**
QPDA7	Smirl	**Injection of Ballistic Pure Spin Currents in Semiconductors by a Single-Color Linearly-Polarized Beam**
QPDA8	Callard	**Direct Observation and Spectroscopy of Optical Modes in Photonic Crystal Microcavity**
QPDA9	Jones	**High-Harmonic Generation at 100 MHz Repetition Frequency: Efficient Production of a VUV Frequency Comb**
QPDA10	Sansone	**Phase-Stabilized Polarization Gating of Harmonic Radiation Down to Isolated Attosecond Pulse Regime**

CLEO/QELS 2005 Committees

CLEO Sub-Committees

1. Laser Applications and Optical Instrumentation
Xinbing Liu, Boston Lab, **Chair**
Kiyoshi Asakawa, Femtosecond Technology Res. Assn., Japan
Corey Dunsky, Coherent, Inc., USA
Detao Du, General Atomics, USA
Donald Harter, IMRA America, USA
Jing-Jiao Liu, Shanghai Inst. of Technology, China
Yong-Feng Lu, Univ. of Nebraska, USA
Robin Marjoribanks, Univ. of Toronto, Canada
Bernd Schaefer, Laser Lab Gottingen, Germany
Narasimha Prasad, NASA Langley Res. Ctr., USA

2. Solid-State Lasers
Clifford R. Pollock, Cornell Univ., USA, **Chair**
Camille Bibeau, LLNL, USA
Steven Bowman, NRL, USA
Timothy Carrig, Coherent Technologies Inc., USA
Allister Ferguson, Univ. of Strathclyde, UK
Uwe Hommerich, Hampton Univ., UK
Susumo Konno, Mitsubishi Electronic Corp., Japan
Rüdiger Paschotta, ETH Zürich, Inst. of Quantum Electronics, Switzerland

3. Semiconductor Lasers
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Peter Blood, Cardiff Univ., UK
Weng W. Chow, Sandia Natl. Labs, USA

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Goetz Erbert, Ferdinand Braun Inst., Germany
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Toshiro Hayakawa, Fuji Photo Film, Japan
John McInerney, National Univ. of Ireland, Ireland
Jerry Meyer, NRL, USA
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Rajeev Ram, MIT, USA
George W. Turner, MIT, USA

4. Applications of Nonlinear Optics
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Mark Bowers, Aculight Corp., USA
Benoit Boulanger, Hewlitt Packard Labs, USA
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Emmanuel Rosencher, ONERA, France
Ramesh Shori, Univ. of California at Los Angeles, USA
William Torruellas, Fibertek, USA
Ruifen Wu, DSO Natl. Lab., Singapore
Jean-Jacques Zondy, Observatorie de Paris, France

5. Holography, Wavemixing, Photorefractives and Storage
Frederic Davidson, Johns Hopkins Univ., USA, **Chair**
George Barbastathis, MIT, USA
Demetrios Christodoulides, Univ. of Central Florida, CREOL, USA
Jean-Pierre Huignard, Thales Res. and Technology, France
Yeon H. Lee, Sungkyunkwan Univ., South Korea
David Pepper, HRL Labs, LLC, USA
Kelvin Wagner, Univ.of Colorado, USA
David A. Waldman, Aprilis, Inc., USA

6. Optical Materials, Fabrication & Characterization
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Kenji Kitamura, Natl. Inst. for Materials Science, Japan
Stefan Kueck, PTB, Germany
Carmen Menoni, Colorado State Univ., USA
John D. O'Brien, Univ. of Southern California, USA
Dennis Prather, Univ. of Delaware, USA
Armand Rosenberg, NRL, USA

7. CLEO/QELS Joint Subcommittee:High Field Physics and High-Intensity Lasers

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George Gibson, Univ. of Connecticut, USA, **Co-Chair**
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Chang Hee Nam, KAIST, South Korea
Robert Lehmberg, NRL, USA
Karl Krushelnick, Imperial College London, UK
Gerhard Paulus, Texas A&M Univ., USA
Justin Peatross, Brigham Young Univ., USA
Douglass Schumacher, Ohio State Univ., USA
Antonio Ting, NRL, USA
Barry Walker, Univ. of Delaware, USA

8. Ultrafast Optics, Optoelectronics and Applications
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Govind Agrawal, Univ. of Rochester, USA
Andrius Baltuska, Univ. of Vienna, Austria
Manuel Joffre, Ecole Polytechnique, France
Theodore Norris, Univ. of Michigan, USA
Alphan Sennaroglu, Koc Univ., Turkey
David Spence, Spectra-Physics Lasers, USA
Kenji Torizuka, Res. Inst. of Photonics, AIST, Japan

9. Optical Components, Interconnects and Processing
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Jang-Joo Kim, Seoul Natl. Univ., South Korea
Patrick LiKamWa, Univ. of Central Florida, USA
Geert Morthier, Ghent Univ., Belgium
Richard Penty, Cambridge Univ., UK
Julian Soole, TriQuint Optoelectronics, USA
G. Alan Vawter, Sandia Natl. Labs, USA
Paul Yu, Univ. of California at San Diego, USA

10. Medical and Biological Applications
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Vadim Backman, Northwestern Univ., USA
Costas Balas, Technical Univ. of Crete, Greece
Alberto Diaspro, Univ. of Genova, Italy
Xingde Li, Univ. of Washington, USA
Anita Mahadevan-Jansen, Vanderbilt Univ. USA
Judith Mourant, Los Alamos Natl. Lab, USA
Thomas Joshua Pfefer, FDA/CDRH/OST, USA
Peter So, MIT, USA
Guillermo J. Tearney, Massachusetts General Hospital, USA

11. Fiber and Guided-Wave Lasers and Amplifiers
Benjamin J. Eggleton, Univ. of Sydney, Australia, **Chair**
Justin Blows, Univ. of Sydney, Australia
Anatoly Grudinin, Fianium NewOptics Ltd., UK
John Harvey, Univ. of Auckland, New Zealand
Clifford Headley, OFS Labs, USA
Jonathan Knight, Univ. of Bath, UK
Karl Koch, Corning Inc., USA
Thomas Kringlebotn, Optoplan AS, Norway
Francois Ouellette, Kromatech, Canada
Colin McKinstrie, Lucent Technologies, USA

12. Lightwave Communications and Networks
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Ivan Andonovi, Univ of Strathclyde, UK
Julius Goldhar, Univ. of Maryland, USA
Vladimir Grigoryan, Northwestern Univ., USA
Palle Jeppesen, Univ. of Denmark, Denmark
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Igor Khrushchev, Aston Univ., UK
Pavel Mamyshev, Mintera Corp., USA
David Moss, Univ. of Sydney, Australia
Christopher Richardson, Univ. of Maryland, USA
Michael Vasilyev, Univ. of Texas at Arlington, USA
S.J. Ben Yoo, Univ. of California at Davis

13. Active Optical Sensing
Mark G. Allen, Physical Sciences, Inc., USA, **Chair**
Douglas Baer, Los Gatos Res., Inc., USA
Philip Hargis, Sandia Natl. Lab, USA
Myung K. Kim, Univ. of Florida, USA
Mark Linne, Lund Inst. of Technology, Sweden
David Nelson, Aerodyne Res. Inc., USA
Brian Orr, Macquarie Univ., Australia
Barbara Paldus, Piccarro Inc., USA
Markus Sigrist, ETH Zürich, Switzerland
Frank Tittel, Rice Univ., USA

14. Optical Metrology
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Serge Dubovitsky, Jet Propulsion Lab, USA
Zuyuan He, Univ. of Tokyo, Japan
Ronald Holzwarth, Menlo Systems GmbH, Germany
Brian Kolner, Univ. of California at Davis
Motonobu Kourogi, Optical Comb Inst., Inc., Japan

Jeffrey Nicholson, OFS Labs, USA
David Reitze, Univ. of Florida, USA
Kent Rochford, NIST, USA
Harald Telle, Physikalisch Technishche Bundesanstalt, Germany
Theo Tschudi, Darmstadt Univ. of Technology, Germany
James Wyant, Univ. of Arizona, USA
Jun Ye, JILA/Univ. of Colorado and NIST

15. LEDs, Organic LEDs, and Solid-State Lighting
E. Fred Schubert, Rensselaer Polytechnic Inst., USA, **Chair**
Anil Duggal, General Electric Co., USA
Marek A. Osinski, Univ. of New Mexico, USA
Steve Stockman, Lumileds Lighting, USA
Claude Weisbuch, Ecole Polytechnique, France
Christian Wetzel, Rensselaer Polytechnic Inst., USA
Chung-Chih Wu, Natl. Taiwan Univ., Taiwan
Shin-Tson Wu, Univ. of Central Florida, CREOL, USA

QELS Sub-Committees

1. Cold Atoms
Paul D. Lett, NIST, USA, **Co-Chair**
Eite Tiesinga, NIST, USA, **Co-Chair**
Christoph Westbrook, Inst. d'Optique, France
Mark Raizen, Univ. of Texas at Austin, USA
Donatella Ciampini, INFM, Italy
Scott Bergeson, Brigham Young Univ., USA

2. Quantum Optics
James Franson, Johns Hopkins Univ., USA, **Chair**
Rainer Blatt, Univ. of Innsbruck, Austria
Michael Chapman, School of Physics, Georgia Tech, USA
Klaus Mølmer, Univ. of Aarhus, Denmark
Steven L. Rolston, Univ. of Maryland, USA
Yanhua Shih, Univ. of Maryland, USA
Anton Zeilinger, Univ. of Vienna, Austria

3. Fundamental Optics in Periodic and Random Media
Evgenii Narimanov, Princeton Univ., USA, **Chair**
Jeremy J. Baumberg, Univ. of Southampton, UK
Paul Scott Carney, Univ. of Illinois at Urbana-Champaign, USA
Francesco Stellacci, MIT, USA
Mikhail Noginov, Norfolk State Univ., USA

Zeev V. Vardeny, Univ. of Utah, USA
Yurii Vlasov, IBM Res., USA

4. Ultrafast Dynamics
Daniel Mittleman, Rice Univ., USA, **Chair**
Sarah Bolton, Williams College, USA
Jean-Yves Bigot, Univ. of Strasbourg, France
David Jonas, Univ. of Colorado, USA
Rolf Binder, Univ. of Arizona, USA
Ingrid Wilke, Rensselaer Polytechnic Inst., USA

5. Nonlinear Optics
Mordechai Segev, Technion–Israel Inst. of Technology, **Chair**
Jacob Khurgin, Johns Hopkins Univ., USA
Lluis Torner, ICFO, Spain
Alexei Sokolov, Texas A&M Univ., USA
Xi-Cheng Zhang, Rensselaer Polytechnic Inst., USA
Marin Soljacic, MIT, USA
Gennady Shvets, Univ. of Texas at Austin, USA
Wieslaw Krolikowski, Australia National Univ., Australia

6. Nano-Optics
Lukas Novotny, Univ. of Rochester, USA, **Chair**
Joerg Wrachtrup, Univ. of Stuttgart, Germany
Mark Stockman, Georgia State Univ., USA
Michal Lipson, Cornell Univ., USA
Selim Ünlü, Boston Univ., USA
Michel Orrit, Univ. of Leiden, Netherlands
Victor Klimov, Los Alamos Natl. Lab, USA
Hailin Wang, Univ. of Oregon, USA
Stephan Stranick, NIST, USA
Maria Garcia-Parajo, Univ. of Twente, Netherlands

Invited Speakers

CLEO Invited Speakers

1. Laser Applications and Optical Instrumentation

Widely Tunable Two-Frequency Nd:YAG Laser, *Loic Morvan, THALES R&T, France*
Multispectral Multiphoton Fluorescence Lifetime Imaging Microscopy Based on a Synchroscan Streak Camera, *Hanben Niu, Inst. of Optoelectronics, Shenzhen Univ., China*

***Advanced 3-D Laser Imaging**, Michael Perry, General Atomics, Inc., USA*
Size-, Position-, and Separation-Controlled One-Dimensional Alignment of Nanoparticles Using an Optical Near Field, *Takashi Yatsui, Japan Science and Technology Corp., Japan*

2. Solid-State Lasers

195 W Injection-Locked Single-Frequency Laser System, *Maik Frede, Laser Zentrum Hannover , Germany*
High Power Scalable Nd:YAG Laser Architecture, *Hagop Injeyan, Northrop Grumman Space Technologies, USA*
***Self-Imaging Waveguide Lasers**, Iain McKinnie, Coherent Technolgies, Inc., USA*
High-power, Diode Edge-pumped, Single-crystal Yb:YAG / Ceramic YAG Composite Microchip Yb:YAG Laser for Material Processing, *Masaki Tsunekane, Inst. for Molecular Science, Japan*

3. Semiconductor Lasers

Photonic Crystal and III-N Quantum Dot Lasers, *Yoshinobu Aoyagi, RIKEN and Tokyo Inst. Technology, Japan*
TeraHertz Quantum Cascade Lasers, *Qing Hu, MIT, USA*
Dilute Nitride Lasers, *Luke Mawst, Univ. of Wisconsin, USA*
InAs/AlSb Quantum Cascade Lasers, *Keita Ohtani, Hideo Ohno, Tohoku Univ., Japan*
In-Phase Coherently Coupled 2-Dimensional Arrays of Defect Cavities within a Photonic Crystal VCSEL, *James Raftery, Univ. of Illinois at Urbana-Champaign, USA*

4. Applications of Nonlinear Optics

Orientation-Patterned GaAs and Its Applications, *Marty Fejer, Stanford Univ., USA*
Surface-Emitted Continuous THz-Wave Generation from PPLN, *Hiromasa Ito, Tohoku Univ./RIKEN, Japan*
Entangled Cavity Optical Parametric Oscillators: OPO Supreme for Spectroscopy in the Mid-IR, *Michel Lefebvre, ONERA, Chemin de la huniera, France*
Tunable All-Optical Delays via Brillouin Slow Light in an Optical Fiber, *Yoshitomo Okawachi, Cornell Univ., USA*
Integrated Optical Parametric Oscillators with Ti:PPLN Waveguides, *Wolfgang Sohler, Univ. Paderdorn, Germany*

5. Holography, Wavemixing, Photorefractives & Storage

From Stopping Light to All-Optical Signal Processing: Leveraging Coherent Light-Matter Interaction, *Connie Chang-Hasnain, Univ. of California, USA*
Time Reversal and Phase Conjugation with Acoustic Waves: Industrial and Medical Applications, *Mathias Fink, Univ. of Paris at Jussieu, France*
Adaptive Optics Technologies for Industrial and Medical Applications, *Alan Greenaway, Heriot-Watt Univ., UK*

6. Optical Materials, Fabrication & Characterization

High Quality Factor Semiconductor Microresonators for Photonic Integrated Circuit Applications, *P. Daniel Dapkus, Univ. of Southern California, USA*
III-Nitride Ultraviolet Micro- and Nano-Photonics, *Jingyu Lin, Kansas State Univ., USA*
Optical Waveguides in Hard Crystalline Materials, *Markus Pollnau, Swiss Fed. Inst. of Technology, Switzerland*
3-D Photonic Bandgap Templating Using Holography and Direct Laser Writing, *Martin Wegener, Univ. Karlsruhe, Germany*

7. CLEO/QELS Joint Subcommittee on High-Field Physcis and High-Intensity Lasers

Generation of XUV Supercontinuum and Single Attosecond Pulses, *Zenghu Chang, Dept. of Physics, Kansas State Univ., USA*
Laser Wakefield Acceleration of 180 MeV Quasi-Monoenergetic E-Beams, *Jerome Faure, LOA, France*
Laser-Driven Wakefield Acceleration of Electrons in a Plasma Channel, *Cameron Geddes, Lawrence Berkeley Natl. Lab, USA*
First Demonstration of a Staged Optical Injection and Laser Wakefield Acceleration, *Dmitri Kaganovich, NRL, LET Corp., USA*
Monoenergetic Electron Pulses from Intense Laser-Plasma Interactions, *Stuart Mangles, Blackett Lab, Imperial College London, UK*
Carrier Envelope Phase Effects on Electron Quantum Paths in High Harmonics Generation by Few-Cycle Pulses, *Paolo Villoresi, Univ. of Padova, Quantum Electronics Lab - D.E.I. & INFM Inst. Nazionale per la Fisica della Materia, Italy*

8. Ultrafast Optics, Optoelectronics & Applications

Ultrabroadband Self-Phase-Stabilized Pulses by Difference Frequency Generation, *Giulio Cerullo, Politecnico di Milano, Italy*
Femtosecond Electron Diffraction: An Atomic-Level View of Condensed Phase Dynamics, *Jason Dwyer, Univ. of Toronto, Canada*
High Energy Mid-IR Pulse Generation and Characterization, *James Fraser, Queen's Univ., Canada*
Monolithic Device for Carrier-Envelope Phase Stabilization, *Takao Fuji, Vienna Univ. of Technology , Austria*
The Physics and Limits of Femtosecond Laser Micromaching, *Alan Hunt, Univ. of Michigan, USA*
A Single-Material Glass-Web Optical Fiber, *Nicolas Joly, Univ. of Bath, UK*
High Power Optical Parametric Chirped Pulse Amplifier and Their Applications, *Ruxin Li, Shanghai Inst. of Optics and Fine Mechanics, China*
A Programmable On-Chip Ultrashort-Pulse Shaper Using a Micromachined Actuator Array and a Chirped Fiber Bragg Grating, *Kai-Hsiu Liao, Univ. of Michigan, USA*
Short Pulse High Power Fiber Laser Systems, *Johann Nilsson, Univ. of Southampton, UK*
Applications of Ultrashort Pulses in Quantum Mechanics, *Ian Walmsley, Univ. of Oxford, UK*

9. Optical Components, Interconnects & Processing

True Time Delay with 3D MEMs, *Roger Helkey, Calient, USA*
100 Gb/s (10 x 10Gb/s) DWDM Photonic Integrated Circuit Transmitters and Receivers, *Fred Kish, Infinera, USA*
Photonic Time-Domain Electromagnetic Arbitrary Waveform Generation, *A.M. Weiner and J.D. McKinney, Purdue Univ., USA*

10. Medical and Biological Applications

Applications of Time-Resolved Fluorescence Spectroscopy to Atherosclerotic Cardiovascular Disease and Brain Tumors Diagnosis, *Laura Marcu, Cedars-Sinai Medical Ctr., USA*
Dynamic Monitoring of Sub-Cellular Morphology with Light Scattering Spectroscopy, *Lev Perelman, Harvard Medical School, USA*
TBA, *Tony Wilson, Univ. of Oxford, UK*

11. Fiber and Guided-Wave Lasers, Amplifiers

Tapered PCF and Nanowires, *Tim Birks, Bath Univ., UK*
Photonic Crystal Fibers: Progress and Applications, *Anders Bjarklev, Res. Ctr. COM, Denmark*
Dynamic Control of Liquid-Core/Liquid-Cladding Optical Waveguides, *Richard Conroy, Harvard Univ., USA*
Fiber Laser Fiber, *David DiGiovanni, OFS Labs, USA*
High Q-Chip Based Microlasers, *Kerry Vahala, Caltech, USA*

12. Lightwave Communications and Networks

Multichannel Wavelength Conversion of DPSK Signals Using Four-Wave Mixing in Highly-Nonlinear Fiber without Cross-Gain-Modulation Penalty, *Preetpaul Devgan, Northwestern Univ., USA*
Experimental Demonstration of Code Translation in Spectrally Phase Coded O-CDMA, *Zhi Jiang, Purdue Univ., USA*
Broadband Access Using Wireless Over Fiber Systems, *Alwyn Seeds, Univ. College London, UK*
640 Gb/s OTDM Transmission and Demultiplexing Using a NOLM with Commercially Available Highly Nonlinear Fiber, *Andrei Siahlo, Technical Univ. of Denmark, Denmark*
Rapidly Reconfigurable 8-bit Chip-Scale True-Time-Delay Module for High-Bandwidth-Preserving, Multi-Aperture, Free-Space Laser-Communication Transmitter, *David Sumida, HRL Labs, LLC, USA*
Optical System Performance of Large-Scale Photonic Integrated Circuits, *David Welsh, Infinera , USA*
Networkings Future, *Alan Willner, Univ. of Southern California, USA*

13. Active Optical Sensing

Evanescent Wave Cavity Ring-Down Spectroscopy, *Andrew Pipino, NIST, USA*
Shining Infrared Light on Isotope Ratio Measurements in Applications from Earthbound to the Atmospheric, *Erik Kerstel, Univ. of Groningen, The Netherlands*
Trace Gas Analysis in Exhaled Human Breath for Disease Diagnosis, *Terence Risby, Bloomberg School of Public Health, Johns Hopkins Univ., USA*

14. Optical Metrology

Measurement of Standard and Microstructured Fibers with Fourier Domain Optical Coherence Tomography, *Jayesh Jasapara, OFS Labs, USA*
Optical Systhesis of Femtosecond Comb, *Yohei Kobayashi, AIST, Japan*
Optical Frequency Standard Using Ca Atom, *Uwe Sterr, Physikalisch-Technische Bundesanstalt, Germany*
CARS Microscopy: Seeing the Vibrational Contrast in Live Cells, *Xiaoliang Sunney Xie, Harvard Univ., USA*

15. LEDs, SLDs and Solid-State Lighting Devices

Displays Based on Organic Materials, *Ghassam Jabbour, Arizona State Univ., USA*
Ultra-Wide Spectrum Quantum Dot Superluminescent Diodes Emitting at 1.3 Âµm, *Marco Rossetti, EPFL Lausanne, Switzerland*
Solid-State Lighting: Lamps, Chips and Materials for Tomorrow, *Jeff Y. Tsao, Sandia Natl. Labs, USA*

QELS Invited Speakers

1. Cold Atoms, Coherent Atoms and Atom Optics

Long-Range Interactions in a Cold Rydberg Gas, *Phillip Gould, Univ. of Connecticut, USA*
Results on Inertial Measurements with a Raman Interferometer, *Arnaud Landragin, Systemes de Reference Temps-Espace, France*
Disruption of Bose-Einstein Condensates on Classical and Quantum Reflection, *Robin Scott, Univ. of Nottingham, UK*

2. Quantum Optics

All Optical Quantum Dot Spin Manipulation, *Atac Imamoglu, Ecole Polytechnique Fed. de Lausanne, Switzerland*
TBA, *Nobu Imoto, School of Advanced Sciences, SOKEN, Japan*
Quantum Information Processing with Optical Fibers, *Prem Kumar, Northwestern Univ., USA*
Highly Efficient Single-Photon Detection at Communication Wavelengths Using Upconversion in Reverse Proton Exchanged PPLN Waveguides, *Carsten Langrock, Stanford*

Univ., USA
Efficient Polarization Squeezing as a Resource for Quantum Communication, *Gerd Leuchs, Inst. fur Optik, Information und Photonik, Germany*
Coherent Optical Manipulation of Quantum Dot Spins: A Path into Quantum Computing, *Duncan Steel, Univ. of Michigan, USA*

3. Fundamental Optics in Periodic and Random Media

High Refractive Index Photonic, *Toshihiko Baba, Yokohama Natl. Univ., USA*
Light Emitting Aperiodic Photonic Structures, *Luca Dal Negro, MIT, USA*
Statistical Properties of Optical Near-Fields, *Aristide Dogariu, CREOL & FPCE, USA*
Optical Quasi Crystals - Properties and Dynamics, *Barak Freedman, Technion, Israel*
Manifestation of Inherent Bandgap of Photonic Crystal in Disorder-Induced Specjle Pattern of Scattered Light, *Michael Raikh, Univ. of Utah, USA*

4. Ultrafast Dynamics

Unusual Properties and Control of the Initial Decoherence in Quantum Dots, *Martin Axt, Univ. of Munster, Germany*
Probing Electron Dynamics in Single-Wall Carbon Nanotubes, *Tony Heinz, Columbia Univ., USA*
Ultrafast X-ray Measurements of Inertial Atomic-Scale Motion, *Aaron Lindenberg, Stanford Linear Accelerator Ctr. , USA*
Terahertz Near-Field Microscopy, *Paul Planken, Delft Univ. of Technology, The Netherlands*
TBA, *Theo Rasing, Univ. of Nijmegen, The Netherlands*

5. Nonlinear Optics

Nonlinear Absorption and Dispersion in Fiber Coupled Silicon Photonic Crystal Microresonators, *Paul Barclay, Caltech, USA*
Fourier-Synthesis of Optical Waveforms, *Stephen Harris, Stanford Univ., USA*
Incoherent Solitons and Condensation Processes, *Antonio Picozzi, Lab de Physique de la Matière Condensée, France*
Reaching the Nonlinear Regime in Large Raman Amplification of Ultrashort, *Szymon Suckewer, Princeton Univ., USA*
Nonlinear Upconversion Interferometry, *Aaron VanDevender, Univ. of Illinois, USA*

6. Nano-Optics

Optically Pumping the Spin of a Single Quantum Dot, *Daniel Gammon, NRL, USA*
Design and Implementation of a Standalone Raman-Based All-Optical Nanosensor, *Naomi Halas, Rice Univ., USA*
Individual Single Wall Carbon Nanotube Photonics, *Todd Krauss, Univ. of Rochester, USA*
TBA, *Michael Levene, Cornell Univ., USA*
Single Molecule Imaging Using a Highly Confined Optical Field at a Triangular Aperture, *Andreas Naber, Univ. of Karlsruhe, Germany*

Tutorials

CLEO Tutorials

3. Semiconductor Lasers

Physics and Simulation of Semiconductor Lasers, *Stephan W. Koch, Univ. Marburg, Germany*

4. Applications of Nonlinear Optics

Nonlinear Beam Propagation in Quadratic and Semiconductor Nonlinear Materials, *George Stegeman, School of Optics/CREOL, USA*

6. Optical Materials, Fabrication & Characterization

Materials for GHz, Sub-1 volt Electro-Optic Modulation, *Larry Dalton, Dept. of Chemistry, Univ. of Washington, USA*

7. CLEO/QELS Joint Subcommittee on High-Field Physcis and High-Intensity Lasers

Laser-Driven and E-Beam Driven Plasma Accelerators, *Warren Mori, Univ. of California at Los Angeles, USA*

8. Ultrafast Optics, Optoelectronics & Applications

All Optical Histology Using Femtosecond Pulses, *Jeffrey Squier, Colorado School of Mines, USA*

11. Fiber and Guided-Wave Lasers, Amplifiers

TBA, *Anders Bjarklev, Res. Ctr. COM, Denmark*

12. Lightwave Communications and Networks

Sampling of Optical Waveforms Using Linear Optics, *Christopher Dorrer, Bell Labs, Lucent Technologies, USA*

14. Optical Metrology

Optical Clocks and Fundamental Physcial Measurements, *Leo Hollberg, NIST, USA*

15. LEDs, SLDs and Solid-State Lighting Devices

High-Power LED Packaging, *Robert Karlicek, USA*

CLEO/QELS Joint Symposium: Gravitational Wave Detection

Gravitational Waves: From Astrophysics to Optics, *David Shoemaker, MIT, USA*

QELS Tutorials

3. Fundamental Optics in Periodic and Random Media

Plasmonic Nanophotonics: Coupling Light to Nanoscale via Plasmons, *Vladimir Shalaev, Purdue Univ., USA*

6. Nano-Optics

Advances in Nanophotonics: Ultrafast and Ultrasensitive, *Niek van Hulst, Univ. of Twente, The Netherlands*

Available tutorial notes will be on the CLEO/QELS & *PhAST* Technical Digest CD-ROM provided to all registered technical attendees.

Special Symposia

CLEO/QELS Symposium on Enabling Technologies for Quantum Communication

Organizers:

CLEO - Matthew Goodman and Robert Runser; *Telcordia Technologies, USA*
QELS - Carl Williams and Joshua Bienfang; *NIST, USA*

Invited Speakers

Recent Advances in Single Photon Detectors; *Danna Rosenberg, NIST, USA*

Nanophotonic Devices for Quantum Information Processing; *Jelena Vuckovic, Stanford Univ., USA*

The joint CLEO/QELS symposium on Enabling Technologies for Quantum Communication is a forum for the advance of Quantum Optics components critical to quantum information and quantum communication technology. Part of the focus will be on technologies for practical quantum information systems, particularly quantum cryptography and quantum computing. This includes novel single-photon sources, detectors, and low-loss optical switching systems and other components. Additionally, practical systems-level implementations, advanced testbeds, and

field trials of new quantum information applications will be emphasized. The symposium will also cover components for quantum information technologies, including sources, measurement, and processing of entanglement, squeezing and other non-classical states of light, Bell tests, quantum-enhanced measurements, and the application of quantum dots, BEC, and EIT to quantum information and communication.

QELS Symposium on Nonlinear Nanophotonics

Organizers:
Jacob Khurgin, *Johns Hopkins Univ., USA*
Mark Stockman, *Georgia State Univ., USA*
Yurii Vlasov, *IBM, TJ Watson Res. Ctr., USA*
Ulrike Woggon, *Univ. of Dortmund, Germany*

Invited Speakers

Nonlinearities in SOI Photonic Wires; *Richard Osgood, Columbia Univ., USA*

Nonlinear Photoelectron Imaging of Surface Plasmons in Nanostructures; *Hrvoje Petek, Univ. of Pittsburgh, USA*

Nonlinear Optics of Surface Plasmon Polaritons at the Planck Scale; *Igor Smolyaninov, Univ. of Maryland, USA*

The QELS Symposium on Nonlinear Nanophotonics is devoted to nonlinear optical phenomena occurring on subwavelength and nanometer scales in nanostructured systems, both synthesized and naturally occurring, and metamaterials (composites) consisting of metals, semiconductors, and dielectrics. Both fundamental phenomena and their applications in sensing, nonlinear spectroscopy of nanostructures, nanoimaging, nanolithography, optical computing on the nanoscale, limiters, and others are within the scope. Topics include, but are not limited to, enhancement of optically-nonlinear phenomena, nonlinear surface plasmons and polaritons, nonlinear photoelectron emission, surface plasmon lasers (spasers), locally-enhanced stimulated emission and superradiance, and coherent control of nanophotonic phenomena.

Plenary

The CLEO/QELS committees secured the following esteemed speakers for 2005:

Future Prospects for Solid-State Lighting, *Shuji Nakamura, Univ. of California, USA*
Professor Nakamura will present current research on GaN-based emitting devices and crystal growth. He will explain how a high-quality thick A, M-plain GaN epitaxial growth using a lateral epitaxial overgrowth (LEO) by hydride vapor phase epitaxy (HVPE) was achieved. Attendees will learn about challenges for new device structures such as micro cavity light-emitting diodes (MC-LED), cone-shaped surface LEDs and others.

Shuji Nakamura was born on May 22, 1954 in Ehime, Japan. He obtained B.E., M.S., and Ph.D. degrees in Electrical Engineering from the University of Tokushima, Japan in 1977, 1979, and 1994, respectively. He joined Nichia Chemical Industries Ltd. in 1979. In 1988, he spent a year at the University of Florida as a visiting research associate. In 1989, he started the research of blue LEDs using group-III nitride materials. In 1993 and 1995, he developed the first group-III nitride-based blue/green LEDs. He also developed the first group-III nitride-based violet laser diodes (LDs) in 1995. He has received a number of awards, including the Nishina Memorial Award (1996), MRS Medal Award (1997), IEEE Jack A. Morton Award, the British Rank Prize (1998) and Benjamin Franklin Medal Award (2002). Since 2000, he has been a professor in the Materials Department of the University of California at Santa Barbara. He holds more than 100 patents and has published more than 200 scientific papers in this field.

Optical Imaging of Stem Cell Fates and Function, *Christopher Contag, Stanford Univ., USA*
Stem cells face the dilemma of needing to self renew or differentiate. We are using optical imaging tools to reveal the factors that control the steps in this "decision" for hematopoietic stem cells.

Dr. Contag is Assistant Professor of Pediatrics in the division of Neonatal and Developmental Medicine. He has courtesy appointments in the Departments of Radiology and Microbiology & Immunology, and is the director of Stanford's Center for Innovation in *In Vivo* Imaging (SCI 3) and co-director of the Molecular Imaging Program at Stanford (MIPS). Dr. Contag received his B.S. from the University of Minnesota, St. Paul in 1982; and earned his Ph.D. in Microbiology from the University of Minnesota, Minneapolis in 1988. He was a postdoctoral fellow at Stanford University from 1990-1994, and joined the faculty in Pediatrics at Stanford in 1995. He also has courtesy appointments in the Departments of Microbiology & Immunology and Radiology at Stanford. Dr. Contag pioneered the use of biological indicators for *in vivo* bioluminescence imaging (BLI), has developed novel bioluminescent reporters, and has been involved in the optimization of the hardware and software of the detection systems for *in vivo* monitoring of bioluminescent reporters. His

laboratory works on whole animal imaging studies of immune cell migration and experimental therapies that seek to combine approaches and optimize the bodies own defenses against biological insults. His interests are in complex biological process and the means of understanding networks of regulatory pathways that control these process, his laboratory seeks to understand signals and cell sensing mechanisms that drive stem cell differentiation and migration within the body. Dr. Contag is a pioneer in the emerging field of *in vivo* cellular and molecular imaging and is developing novel imaging strategies aimed at revealing the molecular basis of disease and identifying targets for novel therapeutic approaches. He is a founding member of the Society for Molecular Imaging and currently the recent past president of this society.

Fermionic Condensates, *Deborah Jin, Univ. of Colorado, USA*
By tuning interparticle interactions, we create condensates in an ultracold Fermi gas of atoms. These fermionic condensates involve correlated pairs of atoms, which are related to Cooper pairs of electrons in superconductors.

Debobah Jin graduated from Princeton University in 1990. In 1995 she received a Ph. D. from the University of Chicago, where she worked on experimental studies of exotic low temperature superconductors. From 1995 to 1997 she was a National Research Council research associate with NIST, working at JILA in Boulder, Colorado. At JILA Deborah worked with Dr. Eric Cornell and Prof. Carl Wieman on some of the first studies of dilute gas Bose-Einstein condensates. In 1997 she accepted a permanent position with NIST and began work on creating and exploring a dilute Fermi gas of atoms. Her group at NIST created the first quantum degenerate Fermi gas in 1999 and reported the first observation of fermionic condensate in 2004. Deborah is also currently a JILA Fellow and an Associate Professor Adjoint at the University of Colorado. Her awards include a Presidential Early Career Award for Scientists and Engineers 2000, NIST's Samuel W. Stratton Award 2001, the Maria-Goeppert Mayer Award 2002, the National Academy of Sciences Award for Initiatives in Research 2002, a MacArthur fellowship 2003, the Arthur S. Flemming Award (Scientific Category) 2003**,** the Service to America Medal: Science and Environment 2004, and the I.I. Rabi Prize 2005.

Short Course Schedule by Time

Sunday, May 22, 2005, 9:00 a.m.– 5:30 p.m.
SC136 Understanding Lasers and Critical Optical Components, *Shaoul Ezekiel, MIT, USA*
SC200 Laser Remote Sensing, *Timothy Carrig, Phillip Gatt, Coherent Technologies, Inc., USA*

Sunday, May 22, 2005, 1:00 p.m.– 5:00 p.m.
SC149 Foundations of Nonlinear Optics, *Robert Fisher, R. A. Fisher Associates, USA*
SC157 Laser Beam Analysis, Propagation and Shaping Techniques, *James R. Leger, Univ. of Minnesota, USA*

SC160 Microwave Photonics, *Keith Williams, NRL, USA*
SC192 Fiber Optic Sensors: Principles and Applications, *Michel Digonnet, Stanford Univ., USA*
SC194 Photonic Crystal Fibers and Devices, *Benjamin Eggleton, Univ. of Sydney, Australia*

Monday, May 23, 2005, 9:00 a.m.– 5:30 p.m.
SC219 Understanding Laser-Based Sensors, *Shaoul Ezekiel, MIT, USA*

Monday, May 23, 2005, 8:30 a.m.– 11:30 a.m.
SC133 Reliability Methodologies for Fiber Optic Components, *David Maack, JDS Uniphase, USA*
SC164 THz Technology, *Xi-Cheng Zhang, Rensselaer Polytechnic Institute, USA*
SC165 Laser Diode-Pumped Solid-State Lasers, *Larry Marshall, Lightbit, USA*
SC197 Fiber Wireless Communications, *Dalma Novak, Pharad, USA*
SC199 Cancelled Micro- and Nano-Machined Optics, *Ernst-Bernhard Kley, Friedrich-Schiller Univ. Jena, Germany*
SC246 NEW! An Introduction to Precision Optical Frequency Metrology, *Scott A. Diddams, Chris Oates, NIST, USA*

Monday, May 23, 2005, 1:00 p.m.– 5:00 p.m.
SC123 Optical Amplifiers in Optical Networks, *John Zyskind, Optovia Inc., USA*
SC147 Optical Fiber Communication Systems, *Alan Willner, Univ. of Southern California, USA*
SC163 Practical OPOs, *Malcolm Dunn, Univ. of St. Andrews, UK; Majid Ebrahim-Zadeh, Inst. de Ciencies Fotoniques, Spain*
SC182 Biomedical Optical Diagnostics and Sensing, *Thomas Huser, Lawrence Livermore Natl. Lab., USA*
SC198 Packaging of Optoelectronic Components, *Andreas Rose, Chromera Corp., USA*
SC220 Diffractive Optics, Design, Analysis and Applications, *James R. Leger, Univ. of Minnesota, USA*
SC247 NEW! Tabletop EUV Sources for Nanoscale Microscopy and Metrology, *Margaret Murnane, JILA, USA; Jorge Rocca, Colorado State Univ., USA; David Attwood, Univ. of California at Berkeley, USA*

Tuesday, May 24, 2005, 8:30 a.m.– 11:30 a.m.
SC189 Quantum Technologies, *Ian Walmsley, Oxford Univ., UK*
SC193 Optical Coherence Tomography, *Joseph Izatt, Duke Univ., USA*
SC195 Tunable Lasers, *Jens Buus, Gayton Photonics Ltd., UK*
SC196 Solid-State Lighting, *Ghassan Jabbour, Arizona State Univ., USA; E. Fred Schubert, Rensselaer Polytechnic Inst., USA*
SC221 Nano-Photonics: Physics and Techniques, *Axel Scherer, Caltech, USA*
SC245 NEW! New Directions in Nanoscale Lithography and Pattern Transfer, *Steven R. Brueck, Univ. of New Mexico, USA*

Tuesday, May 24, 2005, 1:00 p.m.– 5:00 p.m.
SC143 Introductory and Intermediate Topics in Polarized Light, *Robert Fisher, R. A. Fisher*

Associates, USA
SC154 NEW! Quantum Well Devices for Optics and Optoelectronics, *David A. B. Miller, Stanford Univ., USA*
SC155 Ultrashort Laser Pulse Measurement, *Rick Trebino, Georgia Tech, USA*
SC166 Photonic Crystal Devices and Integrated Circuits, *Dennis W. Prather, Univ. of Delaware, USA*
SC167 Advances in VCSELs and Microcavity Lasers, *Kent D. Choquette, Univ. of Illinois, USA; Weng Chow, Sandia National Laboratories, USA*
SC191 Tissue Optics and Spectroscopy, *Valery V. Tuchin, Saratov State Univ., Russian Federation*