PLENARY SESSION AND AWARDS CEREMONY

Special Opening Remarks

Congressman Ron Barber

Arizona's 2nd Congressional District

Keynote Speakers

Rebecca Richards-Kortum

Rice Univ., USA

Point-of-Care Diagnostics for Low-Resource Settings

Jeff Kimble

Caltech, USA

Atom-Light Interactions in Photonic Crystals

Don't miss additional Plenary presentations from distinguished award winners:

- **Paul B. Corkum,** *University of Ottawa and National Research Council, Canada,* **2014 Frederic Ives Medal/Quinn Prize Winner.** This is the highest award given by OSA and recognizes overall distinction in optics.
- **Mordechai Segev,** *Technion - Israel Institute of Technology,* **2014 Arthur L. Schawlow Prize Winner.** This award is recognized by APS for outstanding contributions to basic research which uses lasers to advance the knowledge of the fundamental physical properties of materials and their interaction with light.

TUTORIALS

The FiO/LS meeting features 10 tutorials covering general expertise in a broad range of topic categories. For the full list of tutorials, please visit the website. Below is an abbreviated listing.

- **Plasma Mirrors as Attosecond Light Sources,** Fabien Quéré, *CEA Saclay, France*
- **Intracavity High Harmonic Generation: Frequency Combs From IR to the XUV,** R. Jason Jones, *Univ. of Arizona, USA*
- **Fiber Optic Gyroscopes: Past and Present,** Michel Digonnet, *Stanford Univ., USA*
- **Fiber Optic Sensors for Structural Monitoring,** Eric Udd, *Columbia Gorge Research, USA*
- **Mid-Infrared Fiber Sources: Challenges and Opportunities,** Stuart Jackson, *Univ. of Sydney, Australia*
- **Dealing with Losses in Plasmonics and Metamaterials,** Jacob Khurgin, *Johns Hopkins Univ., USA*

High-Quality Research

Frontiers in Optics/Laser Science 2014 focuses on timely topics in optical science and engineering.

SPECIAL SYMPOSIA

Symposium on the 50th Anniversary of Optical Sciences

Organizer: Tom Koch, *Univ. of Arizona, USA*

The Honorable Jonathan Rothschild

Mayor of the City of Tucson

Special Welcome Remarks

This symposium features a history of Optics Valley, focusing on the Department of Optical Sciences at the Univ. of Arizona and achievements made over the last 50 years.

Symposium on Laser Particle Acceleration and Novel Acceleration Methods

Organizers: Laszlo Veisz, *Max-Planck-Institut fur Quantenoptik, Germany,* and Cameron Geddes, *Lawrence Berkeley National Laboratory, USA*

2014 is the tenth anniversary of the first generation of quasi-monoenergetic electron spectra from laser wakefield acceleration. This achievement has given a significant boost to the development of compact laser plasma acceleration as well as alternative laser-driven acceleration scenarios such as electron acceleration in vacuum by laser or THz fields producing high energies and ultra-short pulses. The rapid evolution of these sources has made them a competing alternative to conventional accelerators by extending their properties and opening up novel application fields from light sources to energy frontier physics.

Symposium on 50 Years of Lasers in Ophthalmology and the New ANSI Safety Standard

Organizer: Brian Vohnsen, *Univ. College Dublin, Ireland*

The first use of a ruby laser to destroy a retinal tumor was realized by Charles J. Campbell in 1961, but the clinical breakthrough on the ophthalmic use of lasers for photocoagulation to prevent retinal detachment was reported by Milton Flocks and Christian Zweng in 1964. In this symposium, historical highlights on the use of lasers in ophthalmology are given alongside state-of-the-art in the current ophthalmic use of lasers and corresponding safety limits.

Symposium on Radiation Reaction in Ultra-High Intensity Lasers

Organizers: Richard T. Hammond, *US Army Research Office and Univ. of North Carolina Chapel Hill, USA* and Natalia M. Litchinitser, *Univ.at Buffalo, The State Univ. of New York, USA*

By 1905 the problem of radiation reaction in electrodynamics appeared in Abraham's book on the theory of electricity. In 1938 Dirac derived his famous relativistic equation for the equation of motion with radiation reaction, but it gave the infamous unphysical runaway solutions. Landau and Lifshitz used a perturbative form of Dirac's equation that gave sensible results. Since then there have been a number of theories of radiation reaction and the equation of motion, but the physics community has not generally accepted any one approach as correct. Today, with laser intensities already surpassing 10^{22}W cm^{-2} and higher expected in the near future, radiation reaction is a pressing problem. This symposium hopes to bring theoreticians and experimentalists together to find ways to test various theories of radiation reaction.

Symposium on Translational Biophotonics – Focus on Cancer

Organizers: Melissa Skala, *Vanderbilt Univ., USA;* Bernard Choi, *Univ. of California, Irvine, USA* and Nozomi Nishimura, *Cornell Univ., USA*

Optical tools have great potential for innovation in pathology and diagnostics. New imaging modalities, contrast mechanisms and design improvements could enable novel ways of diagnosing, treating and monitoring cancer. Optical technologies are attractive for probing cancer because they provide unique insight into tumor physiology, and are low cost platforms for clinical translation. This symposium showcases promising optical technologies in cancer research and oncology that are at various stages of clinical translation.

Laser Science Symposium on Undergraduate Research

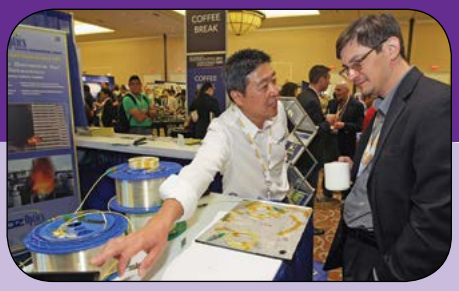
Organizer: Harold Metcalf, *Stony Brook Univ., USA*

This event, established in 2001, provides an opportunity for some of the student members of our community, who are already among the finest young scientists to be found anywhere, to present their work before an audience of their peers as well as the larger optics community. The symposium consists of afternoon poster and oral sessions.

Visit www.frontiersinoptics.org/symposia for the list of invited speakers.

Valuable Connections

A variety of special events provide the perfect platform to connect with members.



NETWORKING EVENTS

This conference provides the perfect forum to exchange ideas and expand your network of colleagues both in academia and industry. Below is an abbreviated list of the numerous events scheduled for networking and exchange:

Welcome Reception – Socialize with colleagues and luminaries at the welcome reception.

FiO Exhibit – Interact with nearly 60 participating companies from around the globe to see the latest products and innovations in optics and laser science.

International Year of Light Info Session – Be a part of the global movement! Attendees are invited to a special information session on the International Year of Light 2015.

Technical Group Meetings – Connect with colleagues and industry leaders.

Minorities and Women in OSA (MWOSA) – Each year OSA features a speaker who discusses current issues and trends in the field. Everyone is welcome to attend.

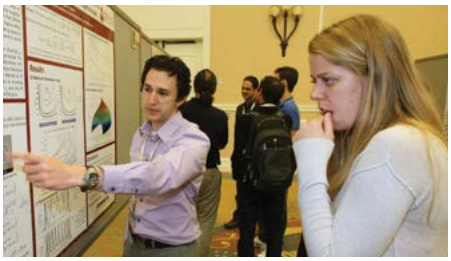
Science Educators' Day (EDAY) – Science Educators' Day (EDAY) presents education sessions hosted by The Optical Society (OSA) for pre-college educators. This program focuses on effective and innovative approaches to science education, with an emphasis on hands-on, interactive classroom activities.

For an updated schedule of events, please visit www.frontiersinoptics.org

Join the Conversation

Get the latest FiO/LS information via Twitter (#FiO14), Facebook, blogs, and more!

To join the conversation, visit www.frontiersinoptics.org



STUDENT ACTIVITIES

There are many programs and special events for students attending Frontiers in Optics. This year's activities include:

Student Member Reception

The student member reception is free of charge and open to all OSA Student Members. Attendees enjoy refreshments and get to know colleagues from around the world during this fun social event.

Student Chapter Competition

The Student Chapter Competition showcases the youth education outreach activities of Chapters and Student Members. Contestants exhibit innovative lessons and demonstrations, and compete for a special recognition and cash prize. To learn more and to enter the contests, contact chaptersandsections@osa.org.

Social Activities

Students are encouraged to join the Frontiers in Optics online discussion forum and to receive updates on their smartphone or iPad. To join the discussion, visit #FiO14.

Annual OSA Student Chapter Leadership Meeting

A representative from each student chapter receives a travel grant to attend the Annual Student Chapter Leadership Conference held during Frontiers in Optics. Conference activities include technical and professional development sessions and many opportunities for networking. The 2014 program features keynote speakers, career development and student chapter activity/management sessions, updates on the International OSA Network of Students, the presentations of "Excellence Awards" and much more.

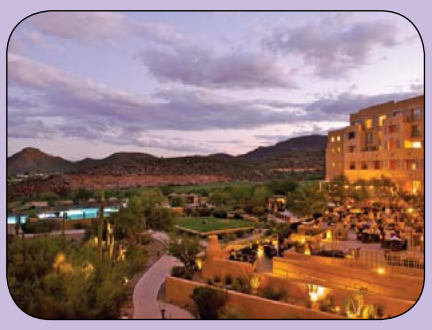
For an updated list of Student Activities, visit www.frontiersinoptics.org

IMPORTANT DEADLINES

Advance Registration Deadline:
22 September 2014

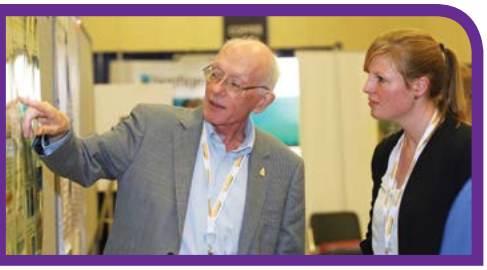
Advance Housing Deadline:
19 September 2014

Postdeadline Papers Deadline:
6 October 2014
12:00 EDT (16:00 GMT)



Frontiers in Optics/Laser Science 2014 offers a dynamic technical program covering a broad range of topics in optical science and engineering.

Please visit www.frontiersinoptics.org for speakers and titles.



Frontiers in Optics 2014

TOPICS AND CHAIRS

FiO 1: Optical Design and Instrumentation
Ronguang Liang, *Univ. of Arizona, USA*

1.1 General Optical Design, Fabrication, Testing, and Instrumentation
1.2 Coherence, Interference, and Polarization
1.3 Three-Dimensional Optical Structure Design, Fabrication and Nanopatterning
1.4 Wavefront Sensing and Adaptive Optics
1.5 Freeform Optics
3.2 Microscopy and OCT (Joint with FIO 3)
8.4 Low-cost ophthalmic instrumentation and imaging (Joint with FiO 8)

FiO 2: Optical Sciences
Laszlo Veisz, *Max Planck Inst. for Quantum Optics*

2.1 Novel Intense Attosecond Sources *(Joint with LS)*
2.2 Coherent Combination of Laser Beams
2.3 Frequency Combs in Novel Spectral Ranges
2.4 Relativistic Light Sources
2.5 General Optical Sciences

FiO 3: Optics in Biology and Medicine
Nozomi Nishimura, *Cornell Univ., USA*

3.1 Fibers for Biomedical Applications *(Joint with FiO 5)*
3.2 Microscopy and OCT *(Joint with FIO 1)*
3.3 Optical Trapping and Manipulation
3.4 Lab-on-a-chip and Optofluidics
3.5 Novel Methods for Tissue Imaging and Therapy
3.6 General Optics in Biology and Medicine

FiO 4: Optics in Information Processing
Michael Gehm, *Univ. of Arizona, USA*

4.1 Optical System Design for Information
4.2 Coherence and Polarization Imaging
4.3 Image and Information Processing in Bio-optics
4.4 Information Capacity of the Photon
4.5 Analysis Techniques, Signal Recovery, and Synthesis
4.6 General Information Optics

FiO 5: Fiber Optics and Optical Communications
John Marciante, *Univ. of Rochester, USA*

5.1 Enabling Technologies for High Speed Optical Communications
5.2 Optical Fiber Sensors
5.3 Long Wavelength (Mid-IR to THz) Fiber Devices
5.4 Frequency Comb Generation in Optical Fibers and Their Applications
5.5 Optical Interconnections for Data Centers
5.6 Enabling Technologies for Astrophotonics *(Joint with FiO 6)*
5.7 General Fiber Optics and Optical Communications
3.1 Fibers for Biomedical Applications (Joint with FiO 3)

FiO 6: Integrated Photonics
Ronald Reano, *Ohio State Univ., USA*

6.1 Silicon Photonics
6.2 Hybrid Integrated Photonics
6.3 Waveguide Integrated Optics
6.4 Photonic Crystals
6.5 Plasmonics and Nanophotonics
6.6 General Integrated Photonics
5.6 Enabling Technologies for Astrophotonics (Joint with FiO 5)

FiO 7: Quantum Electronics
Alexander V. Sergienko, *Boston Univ., USA*

7.1 Integrated Quantum Optics
7.2 Quantum Communications
7.3 Quantum Optical Measurement and Quantum Technologies
7.4 Nonlinear Optics in Micro/Nano-Optical Structures
7.5 Optics and Photonics of Disordered Systems
7.6 General Quantum Electronics

FiO 8: Vision and Color
Brian Vohnsen, *Univ. College Dublin, Ireland*

8.1 Wavefront Sensing and Adaptive Optics for the Eye
8.2 Analysis of the Eye from the Retina to the Visual Cortex
8.3 Applications of Visual Science and Physiological Optics
8.4 Low-cost Ophthalmic Instrumentation and Imaging *(Joint with FiO 1)*

Laser Science 2014

TOPICS AND ORGANIZERS

1. Photonic Crystals: Fundamentals and Applications
Julian Sweet, *Wyle Laboratories, USA*

2. Optical and Laser-Based Approaches in Chemical and Biological Sensing
King-Chuen Lin, *National Taiwan Univ., Taiwan*

3. Filamentation of Ultrashort Intense Laser Pulses
Jerry Moloney, *Univ. of Arizona, USA*

4. Cold Atoms and Molecules - Exploring New Physics with Quantum Degenerate Gases
Brian Anderson, *Univ. of Arizona, College of Optical Sciences, USA*

5. Attosecond EUV and X-ray Light Sources and Their Applications
Andy Kung, *Institute of Atomic and Molecular Sciences, Taiwan*

6. Innovative Resonator-Emitter Coupled Systems
Joshua Hendrickson, *AFRL (Wright-Patterson), USA*

7. Quantum Information with Photons
Elohim Chavez, *Univ. of New Mexico, USA*

8. Semiconductor Nano-optics
Stephan Koch, *Phillips-Universität Marburg, Germany*

9. General Laser Science

Frontiers in Optics General Chairs
Alfred U'Ren, *Instituto de Ciencias Nucleares, Mexico*
Adam Wax, *Duke Univ., USA*

Frontiers in Optics Program Chairs
P. Scott Carney, *Univ. of Illinois at Urbana-Champaign, USA*
Urs Utzinger, *Univ. of Arizona, USA*

Laser Science General Chair
Galina Khitrova, *Univ. of Arizona, USA*

Laser Science Program Chair
Cheuk-Yiu Ng, *Univ. of California Davis, USA*

Register today at **www.frontiersinoptics.org**

Advance Registration Savings up to $120 USD.
Deadline is 22 September 2014.