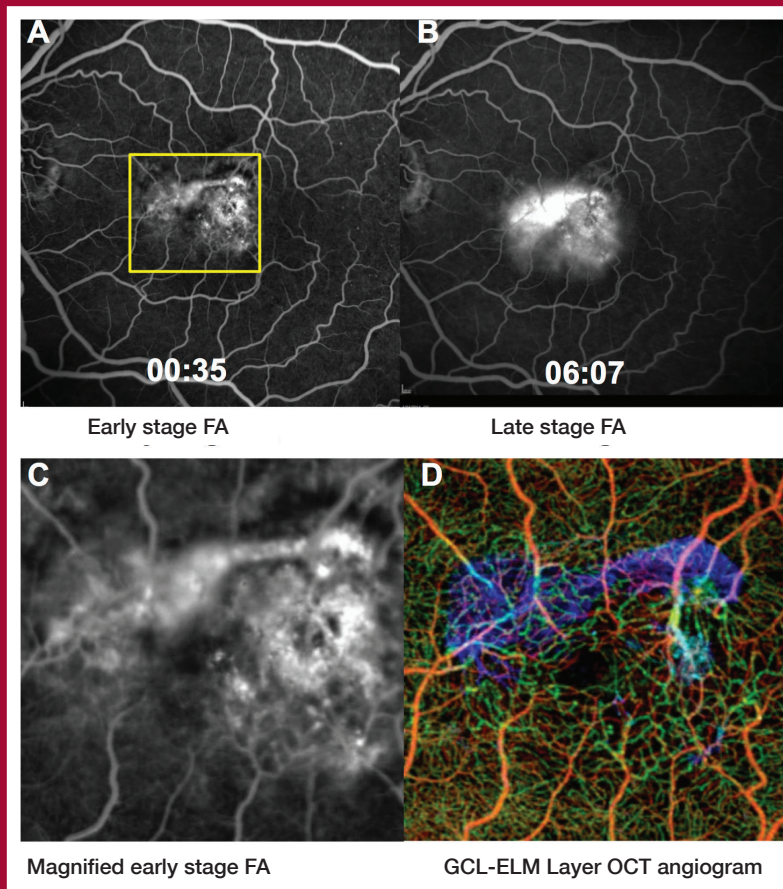


USC Eye Institute

Keck School of Medicine of USC

Present the 2nd Annual

FRONTIERS OF OPTICAL COHERENCE TOMOGRAPHY (OCT) and First International Symposium on OCT Angiography



Program Director: Carmen A. Puliafito, MD, MBA

SATURDAY, FEBRUARY 14, 2015

Langham Huntington Hotel
PASADENA, CALIFORNIA

OPTICAL COHERENCE TOMOGRAPHY

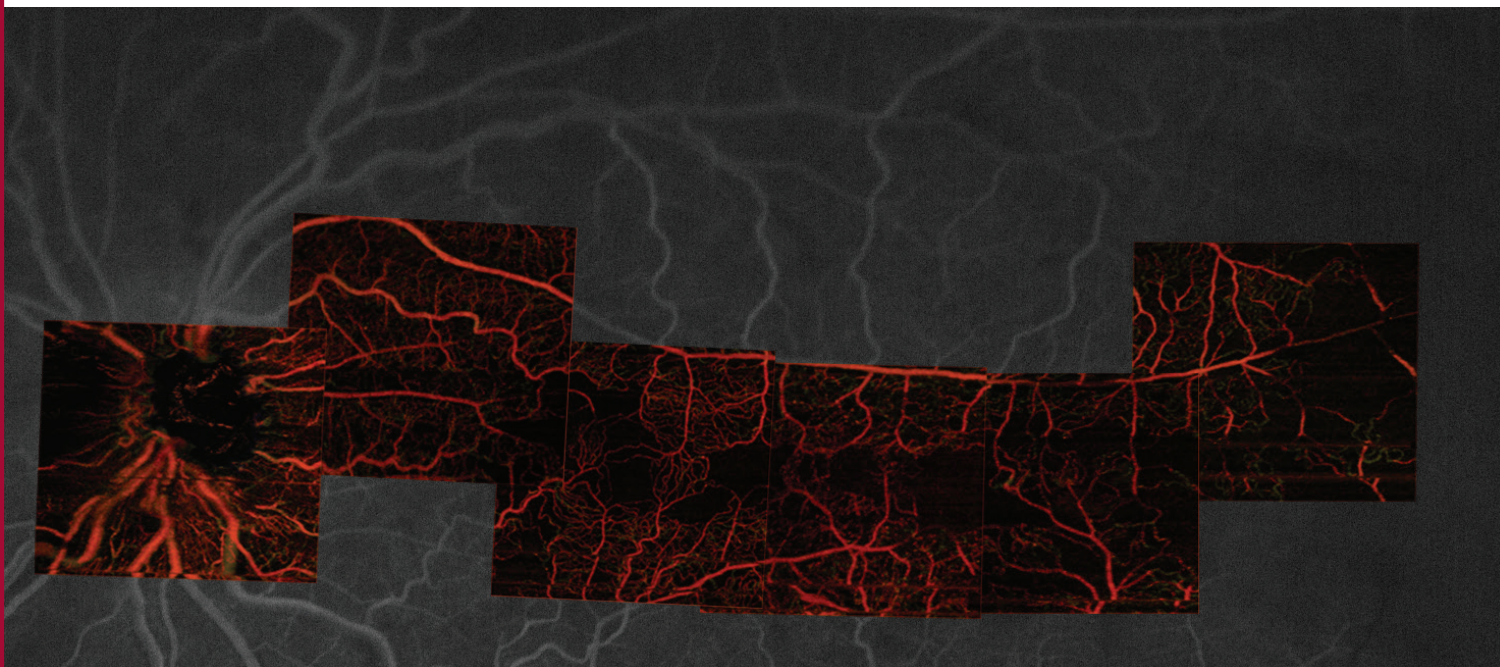
Optical coherence tomography (OCT) is widely recognized as the most powerful ophthalmic imaging technique.

The scientific importance of OCT was recognized by the presentation of the 2012 Champalimaud Vision Award (the so-called Nobel Prize of Vision Research) to the co-inventors of OCT.

Starting with a single “home-built” instrument (from the Massachusetts Institute of Technology and MIT Lincoln Laboratory) studied at the New England Eye Center of the Tufts University School of Medicine in 1994, ophthalmic OCT has grown to more than 20,000 systems in every nation of the world and is used to perform millions of clinical studies each year.

OCT has enabled the successful development of retinal pharmacotherapy for wet macular degeneration and diabetic macular edema, a major victory in the war against global blindness.

OCT systems are likely to evolve along several divergent lines. In one line, OCT systems will become smaller and ubiquitous in every clinical environment and are likely to be frontline eye examination systems. Along another line, advanced OCT systems will provide functional information about the retina, and yield practical innovations such as OCT angiography. OCT is likely to enable completely automated, digital characterization of the human retina, and ultimately the entire clinically relevant anatomy of the eye.



Widefield fluorescein angiogram of an eye with a branch retinal vein occlusion, with superimposed swept source OCT angiograms

Frontiers of Optical Coherence Tomography is a unique scientific meeting that features as its faculty leading clinicians, clinician-scientists, and OCT basic scientists from around the world.

1st INTERNATIONAL SYMPOSIUM ON OCT ANGIOGRAPHY

OCT angiography is a dynamic strategy capable of providing a three dimensional reconstruction of the perfused microvasculature within the retina and choroid. OCT angiography acquires images by detecting motion of scattering particles such as erythrocytes within sequential OCT cross-sectional scans performed repeatedly at the same location of the retina.

This technology is still in its earliest stages of clinical evaluation, but the initial published results are impressive and are likely to improve with improved OCT technology and enhanced analysis algorithms. Head to head comparison with conventional fluorescein angiography is underway.

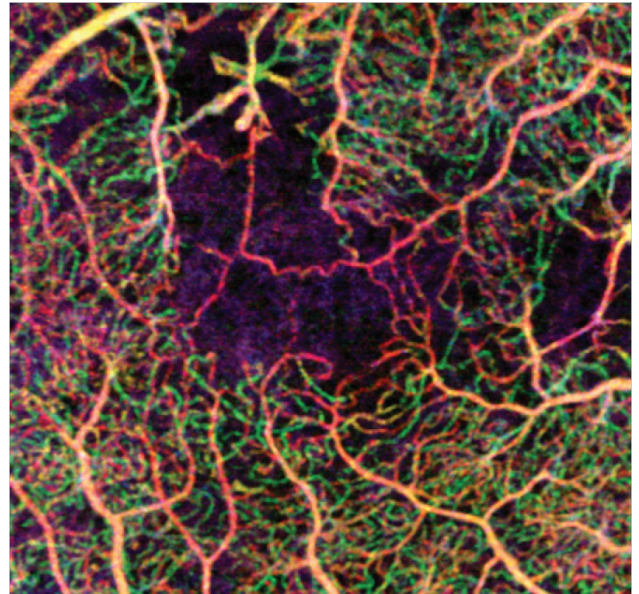
There is no doubt that OCT angiography can detect capillary non-perfusion as good or better than fluorescein angiography. Although OCT angiography cannot detect the same type of leakage seen with fluorescein angiography, it is possible to identify microvascular abnormalities associated with leakage. Studies using OCT angiography to image choroidal and retinal neovascularization are underway. This symposium brings together leading investigators in the field.

THE PROGRAM IS DIRECTED TO:

- 1| Ophthalmologists who wish to obtain a solid foundation in both basic and advanced OCT clinical techniques. The emphasis will be on use of OCT as a practical clinical decision-making tool.
- 2| Vision scientists and engineers who wish to learn about the most important new developments in fundamental OCT research and technology, with an emphasis on OCT angiography.

THE PROGRAM OBJECTIVES ARE:

- 1| Provide a comprehensive review of the development and current status of ophthalmic OCT technology.
- 2| Review the use of OCT in the diagnosis and management of glaucoma.
- 3| Review OCT applications in the management of diabetic retinopathy, macular degeneration, and vitreomacular adhesions.
- 4| Review the use of en-face OCT techniques for studying macular degeneration.
- 5| Review clinical applications of OCT Angiography.



Swept source OCT angiogram of an eye with diabetic retinopathy illustrating capillary non-perfusion

PROGRAM

7:00 Breakfast

SESSION I: CURRENT CLINICAL APPLICATIONS OF OCT

8:20 Welcome

Dean Carmen A. Puliafito, MD, MBA

8:30 OCT in the Diagnosis and Management of Glaucoma

Donald Budenz, MD

8:50 Can OCT Predict Glaucoma Progression?

Joel S. Schuman, MD

9:10 OCT in the Management of Macular Edema (Diabetic Retinopathy and Retinal Venous Occlusion)

Andrew Moshfeghi, MD, MBA

9:30 OCT in the Management of Wet and Dry Macular Degeneration

Philip Rosenfeld, MD, PhD

10:00 OCT in the Assessment and Management of the Vitreoretinal Interface

Dean Carmen A. Puliafito, MD, MBA

10:20 High Resolution OCT in the Diagnosis and Management of Foveal Disorders

Elias Reichel, MD

10:40 Break

11:00 Panel Discussion and Case Presentations:
Management of Glaucoma and Retinal Disorders

Moderators: *Drs. Puliafito and Budenz*

Panelists: *Drs. Moshfeghi, Rosenfeld, Puliafito, Reichel, and Duker*

11:20 Advanced Vitreous Imaging

Jay S. Duker, MD

11:40 En Face OCT: Clinical Applications

Bruno Lumbroso, MD

12:00-1:00 Luncheon and Keynote: Second Annual Michelson Lecture

James G. Fujimoto, PhD

New Developments from the Cutting Edge of Ophthalmic OCT Research

SESSION II: FIRST INTERNATIONAL SYMPOSIUM ON OCT ANGIOGRAPHY

1:00	The Physics of OCT Angiography <i>Scott Fraser, PhD</i>
1:20	Retinal Functional Imaging <i>Shuliang Jiao, PhD</i>
1:40	OCT Angiography of Glaucoma <i>David Huang, MD, PhD</i>
2:00	Retinal Vascular Imaging Using SD OCT with Eye Tracking <i>Maciej Wojtkowski, PhD</i>
2:20	OCT Based Microangiography: The University of Washington Experience <i>Riukang “Ricky” Wang, PhD</i>
2:40	OCT Angiography of Diabetic Retinopathy <i>Amir Kashani, MD, PhD</i>
3:00	Break
3:20	OCT Angiography of Choroidal Neovascularization <i>Nadia Waheed, MD</i>
3:40	Pigment Epithelial Detachment with Type 1 Versus Type 3 Neovascularization: An SD OCT and OCTA Analysis <i>David Sarraf, MD</i>
4:00	Advanced Retinal OCT Applications <i>SriniVas Sadda, MD</i>
4:20	OCT of Retinal Pigment Epithelial Cell Transplantation <i>Mark Humayun, MD, PhD</i>
4:40	OCT Angiography- New Opportunities in Quantitative Vascular Imaging <i>Richard Rosen, MD</i>
5:00	Adjourn

FACULTY



Carmen A. Puliafito, MD, MBA, is Dean of the Keck School of Medicine of USC and Professor of Ophthalmology and Health Management. He shared the Rank Prize in Opto-electronics and the 2012 Champalimaud Vision Award for his role in the invention of OCT.



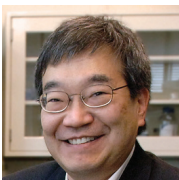
Donald Budenz, MD, is Professor and Chair of the Department of Ophthalmology at the University of North Carolina School of Medicine and Director of the Kittner Eye Institute.



Jay Duker, MD, is Professor and Chairman of the New England Eye Center at Tufts University School of Medicine.



Scott Fraser, PhD, is Provost Professor of Biological Sciences and Biomedical Engineering and the Director of Science Initiatives at the University of Southern California. He was previously Anna L. Rosen Professor of Biology and founder of the Biological Imaging Center at the Beckman Institute of the California Institute of Technology.



James G. Fujimoto, PhD, is Elihu Thomson Professor of Electrical Engineering at the Massachusetts Institute of Technology and Adjunct Professor of Ophthalmology at the Tufts University School of Medicine. He shared the Rank Prize in Opto-Electronics and 2012 Champalimaud Vision Award for his role in the invention of OCT.



David Huang, MD, PhD, is Weeks Professor of Ophthalmic Research at the Casey Eye Institute and Professor of Ophthalmology and Biomedical Engineering at the Oregon Health Sciences University. He shared the 2012 Champalimaud Vision Award for his work on the invention of OCT.



Mark Humayun, MD, PhD, holds the Cornelius Pings Chair of Biomedical Science and is Professor of Ophthalmology, Biomedical Engineering, and Cell and Neurobiology at the Keck School of Medicine of USC and USC Viterbi School of Engineering.



Shuliang Jiao, PhD, is Professor of Biomedical Engineering at the Herbert Wertheim College of Medicine of Florida International University.



Amir Kashani, MD, PhD, is Assistant Professor of Ophthalmology at the Keck School of Medicine and USC Eye Institute.



Bruno Lumbroso, MD, is Professor of Ophthalmology, Ophthalmic Hospital of Rome.



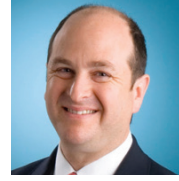
Andrew Moshfeghi, MD, MBA, is Associate Professor of Clinical Ophthalmology, at the Keck School of Medicine, USC Eye Institute.



David Sarraf, MD, is Clinical Professor of Ophthalmology at the Jules Stein Eye Institute of the David Geffen School of Medicine.



Elias Reichel, MD, is Vice Chair and Professor of Ophthalmology at the Tufts University School of Medicine and Director of the Retina Service at the New England Eye Center.



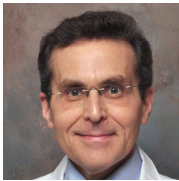
Joel S. Schuman, MD, is Eye and Ear Foundation Professor and Chairman, Department of Ophthalmology, Director of the UPMC Eye Center, Director of the Louis J. Fox Center for Vision Restoration, and Professor of Bioengineering at the University of Pittsburgh School of Medicine. He shared the 2012 Champalimaud Vision Award for his work on the invention of OCT.



Richard Rosen, MD, is a Professor and Vice Chairman of the Department of Ophthalmology at the New York Eye and Ear Infirmary.



Nadia Waheed, MD, is Assistant Professor of Ophthalmology at the New England Eye Center at Tufts University School of Medicine.



Philip J. Rosenfeld, MD, PhD, is Professor of Ophthalmology at the Bascom Palmer Eye Institute and the University of Miami Miller School of Medicine. He is a world leader in developing innovative treatment for age-related macular degeneration and the development of advanced OCT analytic techniques.



Ruikang "Ricky" Wang, PhD, is Professor of Biomedical Engineering and Ophthalmology at the University of Washington.



Srinivas Sadda, MD, is Professor of Ophthalmology at the Doheny Eye Institute.



Maciej Wojtkowski, PhD, is Associate Professor and Group Leader of the Biomedical Optical Engineering Group at Nicolaus Copernicus University, Torun, Poland.

THE ALBERT A. MICHELSON LECTURE ON RESEARCH IN OPTICAL COHERENCE TOMOGRAPHY

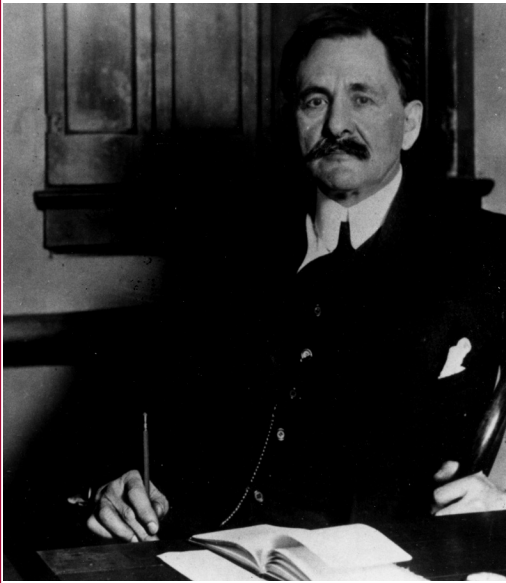
“NEW DEVELOPMENTS FROM THE CUTTING EDGE OF OPHTHALMIC OCT RESEARCH”

James G. Fujimoto, PhD

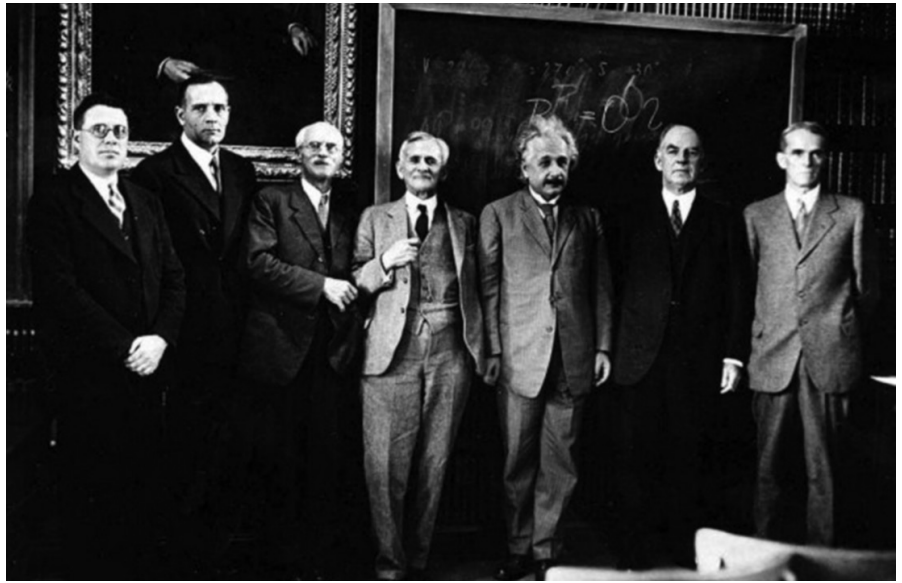
Massachusetts Institute of Technology

Albert A. Michelson (1852-1931) was the first American scientist to be awarded a Nobel Prize (Physics, 1907) for “his optical precision instru-

making . . . are Benjamin Franklin, Josiah Willard Gibbs, and Albert A. Michelson . . . Michelson, pure experimentalist, designer of instruments, refiner of



Albert A. Michelson



In 1931, Edwin Hubble (second from the left), Michelson (fourth from the left), and Albert Einstein met in the library of the Pasadena headquarters of the Mt. Wilson Observatory.

ments and the spectroscopic and metrological investigations carried out with their aid.” The Michelson interferometer, one of the innovations that he developed in his life-long quest to measure the speed of light experimentally, was a key element of the time domain optical coherence tomography (OCT) first described in 1991. OCT represents a significant step in using quantitative, physical science techniques to describe the human eye in health and disease.

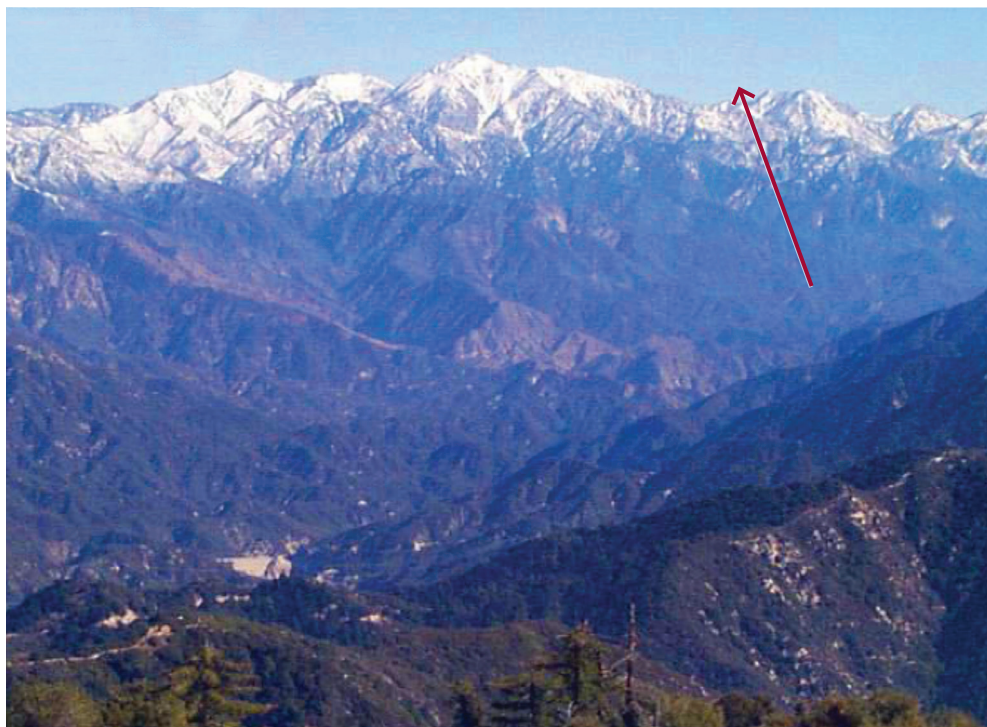
Robert Millikan, first president of the California Institute of Technology and one of Michelson’s students and colleagues wrote of him: “. . . *The three American physicists whose work has been most epoch-*

techniques, lives because in the field of optics he drove the refinement of measurement to its limits and by so doing showed the skeptical world what far-reaching consequences can follow from that sort of process, and what new vistas of knowledge can be opened by it.”

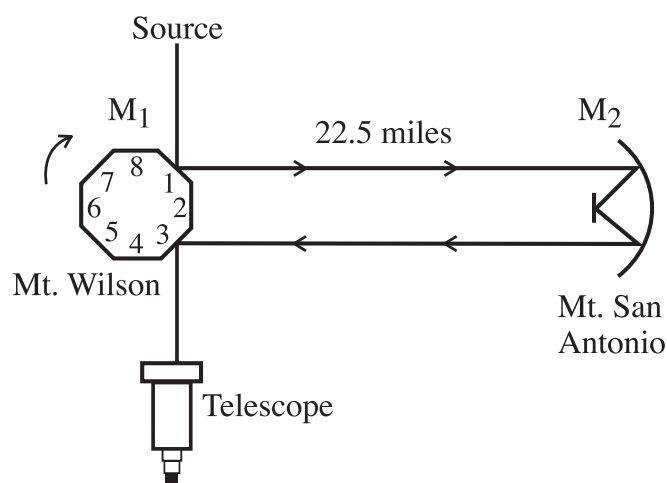
It is most appropriate that one of our keynote presentations be presented in honor of Professor Michelson. Michelson’s quest to measure the speed of light took him to Pasadena and the San Gabriel Valley many times. In 1926, he used a time-of-flight technique between Mt. Wilson and Mt. San Antonio (separated by 22 miles) to achieve an extraordinarily accurate measurement of the velocity of light (before lasers and modern electronics!).

Michelson's biography is quint-essentially American: He was a high-achieving immigrant. Born in Prussia, as a small child he came to California, where his parents sold supplies to gold miners in the town of Murphy's Camp. Appointed to the United States Naval Academy (Annapolis) by President Ulysses S. Grant, he performed his initial light experiments as a young naval officer. He studied with Helmholtz (one of the inventors of the ophthalmoscope) in Berlin. Moving back to the U.S., he taught and researched at the Case School of Applied Science in Cleveland, where in collaboration with Professor Edward Morley he demonstrated experimentally that the "luminiferous ether" did not exist. After a brief stint at Clark University, he moved on to the University of Chicago its first Head of the Department of Physics, where he trained the first generation of America's great physicists (for instance, Robert Millikan, winner of the 1923 Nobel Prize). In 1930, after retiring from the University of Chicago, he returned to Pasadena and Southern California where he continued his speed of light experiments. He died in Pasadena in 1931.

We celebrate the unique role that the scientists and terrain of the San Gabriel Valley have played in the great achievements of modern physical sciences.



View from Mt. Wilson to Mt. San Antonio (also referred to as Mt. Baldy or Lookout Mountain), which are 22 miles apart. The arrow marks the location where Michelson placed the return mirrors for his famous velocity-of-light experiments during the years 1923-1926.



Michelson's rotating mirror method

COURSE REGISTRATION

- TUITION** \$150 for Health Care Professionals or Researchers, *if registered and paid by noon PDT on 2/11/15*. Additional \$25 for onsite registration. Fellows, residents, MD's in 1st three years of practice, USC affiliates are complimentary. **Tuition is non-refundable, unless program is cancelled by USC.**
- LOCATION** Langham Huntington Hotel, 1401 S. Oak Knoll Avenue, Pasadena, CA 91106.
- LODGING** Room Rate \$199 per night, single or double, plus taxes and fees — book early as space is limited 626.568.3900 (Group Reservations) mention Keck School of Medicine OCT Conference
- CANCELLATION** Courses are subject to cancellation. **USC will not refund travel costs for cancelled courses.**
- REGISTER** **Online:** oct.usc.edu
Phone: 1-800-USC-1119 or **Fax:** 1-888-665-8650
Mail: Office of CME | 1540 Alcazar Street, CHP 223 | LA 90033
Onsite: Langham Huntington, Viennese Ballroom Foyer
Registration confirmation and event reminder will be emailed.
- SPECIAL NEEDS** Advance notice of any special physical or dietary needs by February 1, 2015 will help us serve you better.

APPLICATION FOR FRONTIERS OF OPTICAL COHERENCE TOMOGRAPHY

SATURDAY, FEBRUARY 14, 2015

TUITION \$150 for Health Care Professionals or Researchers *if registered and paid by noon PDT on 2/11/15*. \$25 surcharge for onsite registration.

NAME _____
LAST FIRST

DEGREE _____

TELEPHONE _____ FAX _____

EMAIL ADDRESS _____

ADDRESS _____
STREET

CITY _____ STATE _____ ZIP _____

SPECIALTY _____

METHOD OF PAYMENT: ☐ CHECK (Payable to USC) ☐ Credit Card (Visa or Mastercard)

CARD# _____ EXPIRATION DATE _____

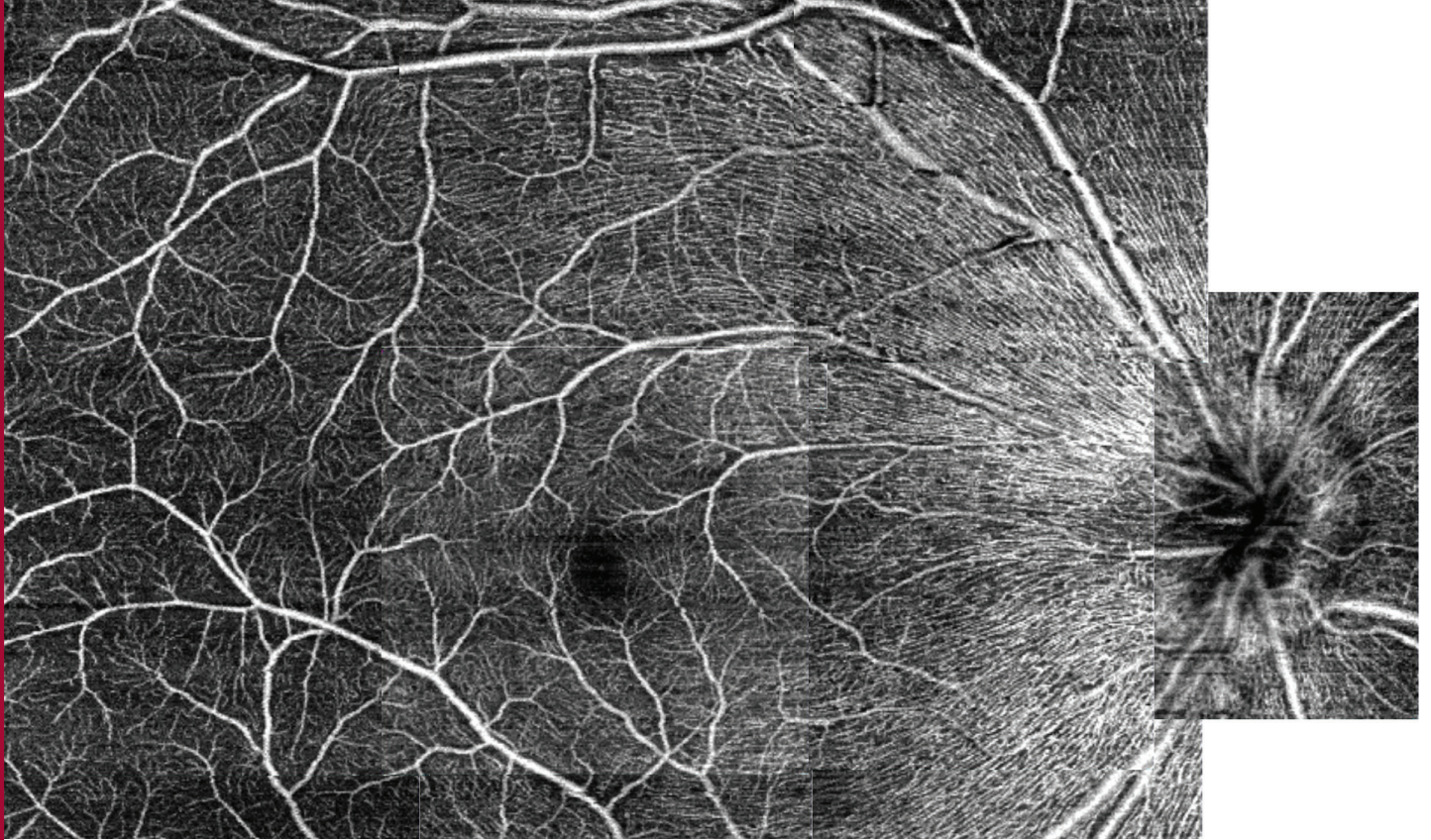
AUTHORIZED SIGNER _____ 3 OR 4 DIGIT CODE _____

AMOUNT\$ _____

Courses are subject to cancellation. USC will not refund travel costs for cancelled courses.

ACCREDITATION STATEMENT: The Keck School of Medicine of USC is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

CREDIT DESIGNATION: The Keck School of Medicine of USC designates this live activity for a maximum of 7.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity



Spectral domain OCT angiogram of a normal human eye



OFFICE OF CONTINUING MEDICAL EDUCATION

Keck School of Medicine
University of Southern California
Health Sciences Campus
1540 Alcazar Street, CHP 223
Los Angeles, California 90033
323-442-2555
<http://keck.usc.edu/cme>

Non-Profit
U.S. Postage
PAID
University of
Southern California
