Saturday
April 30, 2016

TBI Workshop
Vision and traumatic brain injury in veterans and athletes

Education Courses
Separate registration fee required
### Saturday, April 30 – Education courses and TBI workshop (education courses require separate registration)

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ARVO Annual Meeting
- Registration
  - Atrium Lobby
  - 7am – 6pm

ARVO Imaging Conference
- Tahoma (Level 3), TCC
  - 8am – 5:30pm
  - (separate registration required)

ARVO Foundation and Dowling Society Gala Awards
- Ceremony and Dinner
  - Grand Hyatt, Seattle
  - 7 – 9:30pm
  - (tickets required)
TBI Workshop

Room Skagit 4/5, TCC
Saturday, April 30, 2016 10:00 AM-1:00 PM

001 Vision and Traumatic Brain Injury: The Outlook for Therapeutics

Researchers are learning more about the significance of visual function in the evaluation of traumatic brain injury (TBI). During this interactive session, vision scientists and neuropathologists will discuss the impact of systematic, early assessment of the visual system on the potential for therapeutic protection and intervention against TBI. The program provides opportunities for interactions between attendees, panelists and patients.

Moderators: Mary G. Lawrence, Donald A. Gagliano and Tonia S. Rex

— 10:00 Introduction

— 10:05 CTE: A Late Effect of Football and Military Trauma. Ann C. McKee, Director, Neuropathology Core, Boston University, Boston, MA

— 10:30 Traumatic brain injury and visual function. Lee E. Goldstein. Psychiatry, Neurology, Ophthalmology, Pathology & Laboratory Medicine, Boston University School of Medicine, Boston, MA *CR

— 10:55 Do Visual Manifestations of TBI Progress? Randy H. Kardon. Ophthalmology-Neuro-ophthalmology, University of Iowa, Iowa City, IA; Ophthalmology, Iowa City VA Medical Center, Iowa City, IA *CR

— 11:20 Potential therapies based on disturbances in vision. Robert Scott. Medical Director, Moorfields Eye Hospital, Dubai, United Arab Emirates *CR

— 11:45 Blast Concussion and Mild TBI in Veterans: Implications for Vision. Elaine Peskind. Professor, Department of Psychiatry and Behavioral Sciences, University of Washington, Seattle, WA

— 12:10 The link between photophobia and head injury. Andrew T. Hartwick. College of Optometry, Ohio State University, Columbus, OH

*CR Refer to the Program Number in the Commercial Relationships (CR) Index for Disclosures. *CR Refer to the Program Number in the Clinical Trial (CT) Registration Index.
Saturday – Education Courses

Education Courses
Separate Registration Fee Required

Room 6E
Saturday, April 30, 2016 8:30 AM-4:30 PM

002 Diabetic retinopathy: Current concepts and future directions

Diabetes is a global epidemic afflicting approximately 400 million people, and retinopathy is one of its most feared complications, which affects over 90% of patients after 25 years of diabetes. This course will summarize both clinical and basic aspects of diabetic retinopathy, discuss novel molecular mechanisms of its development including epigenetics and endoplasmic stress, and possible biomarkers and latest clinical trials. The course will provide an outstanding platform for the vision community for a balanced discussion of the experimental and clinical aspects of diabetic retinopathy.

Moderators: Renu A. Kowluru and Arup Das

— 8:30 Introduction
— 8:35 Clinical Review of Diabetic Retinopathy. Lee M. Jampol. Ophthalmology, Northwestern University, Chicago, IL
— 9:00 Systemic factors associated with diabetic retinopathy. Robert N. Frank. Wayne State Univ/Kresge Eye Inst, Detroit, MI
— 9:25 Experimental models of diabetic retinopathy. Timothy S. Kern. Case Western Reserve Univ, Cleveland, OH; Stokes VA Hospital, Cleveland, OH
— 9:50 Morning Break
— 10:05 Inflammation and diabetic retinopathy. John S. Penn. Vanderbilt University School of Medicine, Nashville, TN
— 10:30 Targeting the Unfolded Protein Response for New Therapeutic Options in Early Diabetic Retinopathy. Sarah X. Zhang. SUNY University at Buffalo, Buffalo, NY; SUNY Eye Institute, Buffalo, NY
— 10:55 Diabetic retinopathy on an epigenetic platform. Renu A. Kowluru. Kresge Eye/Wayne State Univ, Detroit, MI
— 11:45 Lunch
— 12:45 Phenotypes and Biomarkers of Diabetic Retinopathy. Jose G. Cunha-Vaz. AIBILI, Coimbra, Portugal *CR
— 1:35 MicroRNAs in Diabetic Retinopathy. Maria B. Grant. Ophthalmology, Indiana University, Indianapolis, IN
— 2:00 Human genetic variations, genomic technologies, and the future of diabetic retinopathy research. Anand Swaroop. National Eye Institute, Bethesda, MD
— 2:25 Afternoon Break
— 2:45 Potential for vascular regeneration in diabetic retinopathy. Alan W. Stitt. Queens University Belfast, Belfast, United Kingdom
— 3:35 Therapeutic Targets Beyond VEGF. Arup Das. Univ of New Mexico Sch of Med, Albuquerque, NM
— 4:00 Emerging Therapeutic and Diagnostic Strategies for DR. Ashwath Jayasopal. F. Hoffman-La Roche Ltd, Basel, Switzerland *CR
— 4:25 Conclusion

Room 611-614
Saturday, April 30, 2016 8:30 AM-4:30 PM

003 Applying visual electrophysiology for clinical evaluation and vision research

With the advent of new therapies for blinding diseases, involving the retina and optic nerve, there is an increasing need for functional outcome measurements that can be made in animal models and human clinical trials. The electroretinogram and visual evoked potential are translatable techniques that fit this purpose. The course will discuss the use of the electrophysiological techniques in the understanding of retinal dysfunctions, acquired retinal diseases, glaucoma and optic nerve diseases. It will include discussions about cellular origins, animal models, clinical research applications, and the use of these techniques in clinical diagnosis.

Moderator: Mitchell G. Brigell

— 8:30 Basic principles for recording electrophysiological signals. Mitchell G. Brigell. Aerpio Therapeutics, Belmont, MA
— 9:00 Cellular origins of the electroretinogram. Laura J. Frishman. University of Houston, Houston, TX
— 9:30 Application of the electroretinogram in animal models of retinal degeneration. Neal S. Peacely. Cole Eye Institute, Cleveland Clinic Foundation, Cleveland, OH; Research Service, Cleveland VA Medical Center, Cleveland, OH
— 10:00 Use of the Electroretinogram in Clinical practice. Michael Marmor. Stanford University, Palo Alto, CA; Byers Eye Institute, Palo Alto, CA
— 10:30 Morning Break
— 10:45 Assessing macular function - Electrophysiological techniques. Mineo Kondo. Ophthalmology, Mie University Graduate School of Medicine, Tsu, Japan
— 11:15 Clinical electrophysiology -- pediatrics. Anne B. Fulton. Ophthalmology, Childrens Hospital Boston, Boston, MA
— 11:45 Retinal structure - function relationship. David G. Birch. Retina Foundation of the Southwest, Dallas, TX; Ophthalmology, UT Southwestern Medical School, Dallas, TX
— 12:15 Lunch
— 1:15 Use of the multifocal ERG in acquired retinal disorders. Marcus A. Bearese. University of California, Berkeley, CA
— 1:45 ERG case presentations. Scott E. Brodie. Ophthalmology, Icahn School of Medicine at Mount Sinai, New York, NY
— 1:52 ERG case presentations. Byron L. Lam. Bascom Palmer Eye Institute, University of Miami, Miami, FL
— 1:59 ERG case presentations. Anthony G. Robson. Electrophysiology, Moorfields Eye Hospital, London, United Kingdom; Inst. of Ophthalmology, University College London, London, United Kingdom
— 2:13 Electrophysiology in preclinical models of Glaucoma. Suresh Viswanathan. SUNY College of Optometry, New York, NY
— 2:43 Electrophysiology in glaucomatous optic neuropathy. Michael Bach. University of Freiburg, Freiburg, Germany
— 2:58 Afternoon Break
— 3:58 Case Presentations. Jeffrey G. Odel. Ophthalmology, Columbia University Medical Center, New York City, NY
— 4:05 Case Presentations: Separating the functional diagnosis from the organic. Mary A. Johnson. Ophthalmology & Visual Sciences, University Of Maryland, Baltimore, MD
— 4:12 Case Presentation: Graham E. Holder. Moorfields Eye Hospital, London, United Kingdom; UCL Institute of Ophthalmology, London, United Kingdom
— 4:19 Case Presentation: Daphne McCulloch. Daphne L. McCulloch. School of Optometry and Vision Sciences, University of Waterloo, Waterloo, ON, Canada

The Commercial Relationships (CR) Index for Disclosures and the Clinical Trial (CT) Registration Index are at arvo.org/amindices.
Saturday, April 30, 2016 8:30 AM-4:30 PM

**004 Genome engineering with CRISPR and more: From discovery to therapy**

In the current era of personalized medicine, we have identified a large number of genetic variants in patients with various diseases using next generation sequencing. Recent advances in genetic engineering, genotyping, high-resolution imaging and biomarker testing have made it easier to deliver the right treatments to the right patients at the right time. This course presents an overview of CRISPR technology from the leading experts who have pioneered it in other disciplines, followed by examples in eye and vision science and practical applications. A two-hour interactive workshop concludes the day, wherein participants will respond to problem-based questions via an Internet search on their own computers or tablets, in order to learn how to design gRNA and conduct off-targeting analysis.

**Moderators:** Stephen H. Tsang, Alexander Bassuk, Vinit B. Mahajan and Scott Smemo

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**8:30**  **Genome Engineering in patient specific stem cells.** Bruce R. Conklin. Gladstone Institutes, San Francisco, CA; UCSF, San Francisco, CA

**9:00**  **Engineering Universal Donor Stem Cells.** David Russell. Dept. of Medicine, University of Washington, Seattle, WA *CR

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**9:30**  **CRISPR-Cas9-mediated animal model generation with high efficiency and throughput.** Haoyi Wang. Institute of Zoology, Chinese Academy of Sciences, Beijing, China; Research, The Jackson Laboratory, Bar Harbor, ME

**10:00**  **CRISPR-Cas9-mediated gene Activation and Suppression.** Haoyi Wang. Institute of Zoology, Chinese Academy of Sciences, Beijing, China; The Jackson Laboratory, Bar Harbor, ME

**10:30**  **Morning Break**

**10:45**  **The Use of CRISPR-Cas9 to treat Corneal Disease.** Tara C. Moore. School of Biomedical Sciences, Ulster University, Coleraine, United Kingdom

**11:00**  **The Use of CRISPR-Cas9 to treat Corneal Disease.** M. Andrew Nesbit. School of Biomedical Sciences, Ulster University, Coleraine, United Kingdom

**11:15**  **Using piggyBack transposon and CRISPR to dissect genetic associations of AMD.** Scott Smemo. Ophthalmology, Columbia University, New York, NY

**11:45**  **Use of CRISPR/Cas9 for disease modeling and drug screening applications.** Donald J. Zack. Wilmer Eye Inst, Johns Hopkins Univ, Baltimore, MD *CR

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**12:15**  **Lunch**

**1:15**  **Practical Applications: Mouse**

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**1:30**  **Practical applications: Stem cell engineering.** Bruce R. Conklin. Gladstone Institutes, San Francisco, CA; Medicine, UCSF, San Francisco, CA

**1:35**  **Practical applications: Stem cell engineering.** Scott Smemo. Ophthalmology, Columbia University, New York, NY

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**8:30**  **Welcome and Introduction**

**8:45**  **Types of intellectual property.** Michael B. Stewart. Fishman Stewart PLLC, Bloomfield Hills, MI

**9:15**  **Why IP is important (and what will it accomplish for you).** Mark Paulson. Partner, Jones Day, Washington, DC

**9:45**  **Panel Q&A**

**10:00**  **Break**

**10:20**  **Working with a tech transfer office (the technology licensing director’s perspective).** Fiona Wills. University of Washington, Seat, WA

**10:40**  **Establishing IP in an academic setting (the entrepreneurial faculty perspective).** Glenn Prestwich. Medicinal Chemistry, University of Utah, Salt Lake City, UT *CR

**11:00**  **The lifecycle and impact of IP changes over time.** Ryo Kubota. Ophthalmology, Acucela Inc, Seattle, WA

**11:20**  **Panel Q&A**

**11:40**  **Lunch**

**12:30**  **How, when and where to apply for a patent.** Mark Paulson. Partner, Jones Day, Washington, DC

**12:50**  **How to conduct a thorough IP Due Diligence - what is prior art.** Padmaja Sankaridurg. Brien Holden Vision Institute, Sydney, NSW, Australia; School of Optometry and Vision Science, University of New South Wales, Sydney, NSW, Australia

**1:10**  **Academic considerations - balancing the needs of the scientist entrepreneur in the US.** Stephen McLeod. Ophthalmology, UCSF, San Francisco, CA; Francis I. Proctor Foundation, San Francisco, CA

**1:30**  **Global opportunities - protecting, enforcing and negotiating Intellectual Property rights internationally.** Michael B. Stewart. Fishman Stewart PLLC, Bloomfield Hills, MI

**1:50**  **Panel Q&A**

**2:20**  **Break**

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Saturday – Education Courses

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Room 618/620

Saturday, April 30, 2016 8:30 AM-4:30 PM

**005 Intellectual property and patenting in vision and ophthalmic research**

The basics of intellectual property is not a traditional part of research training or medical curricula, yet is of growing importance to scientists in the competitive environment for funding and emphasis on translation of research. This course provides an overview of intellectual property, with a focus on patenting researchers’ intellectual property.

**Moderators:** Barbara M. Wirostko and Eugene De Juan

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Saturday – Education Courses

— 2:35 Establishing a company: Role of IP. 
  Eugene De Juan. Ophthalmology, ForSight Labs, LLC, Menlo Park, CA *CR

— 2:55 Financing your idea. Emmett T. Cunningham. Clarus Ventures LLC, South San Francisco, CA *CR

— 3:15 Licensing intellectual property - taking your IP to a strategic partner, what needs to be in place and what needs to be conveyed? Laurent Attias. Alcon, Inc., Fort Worth, TX *CR

— 3:35 Non-profit assessment of IP - moving the needle for orphan and unmet rare diseases. 
  Stephen M. Rose. Science, Foundation Fighting Blindness, Columbia, MD

— 3:55 Panel Q&A

— 4:20 Closing remarks
Room 615-617
Saturday, April 30, 2016 1:00 PM-4:30 PM
006 Epigenetic and miRNA regulation in normal and diseased retina

This course will discuss the outcome of multiple mechanisms merging to influence gene expression in development and disease. The course will cover interactions via environment - epigenetics - miRNA on gene expression in neural stem cells, developing and mature retina, and human disease.

Moderator: Neena B. Haider

— 1:00 Opening remarks
— 1:10 Epigenetic regulation of retinal cell fate determination and homeostasis. Dong F. Chen. Ophthalmology, Schepens Eye Research Institute/Massachusetts Eye and Ear, Harvard Medical School, Boston, MA; VA Boston Healthcare System, Harvard Medical School, Boston, MA *CR
— 1:30 Histone Modifications in Retinal Development and Disease. Shiming Chen. Washington University School of Medicine, St Louis, MO
— 1:50 Regulation of DNA methylation and miRNA expression during Muller glia reprogramming and retina regeneration in zebrafish. Daniel Goldman. University of Michigan, Ann Arbor, MI
— 2:10 miRNA and Retinal Neurogenesis. Thomas A. Reh. Bioloogical Structure, University of Washington, Seattle, WA
— 2:30 Break
— 2:50 Epigenetics and Metabolism. Paul N. Baird. Centre for Eye Research Australia, University of Melbourne, Melbourne, VIC, Australia
— 3:10 Epigenetics and Human Disease. Margaret M. DeAngelis. University of Utah, Salt Lake City, UT *CR
— 3:30 Dynamic changes in the epigenome during retinal development. Michael A. Dyer. Department of Developmental Neurobiology, HHMI/St. Jude Children’s Research Hospital, Memphis, TN
— 3:50 miRNA-Epigenetics in Retina Development and Disease. Neena B. Haider. Schepens Eye Research Inst/MEEI, Boston, MA
— 4:10 Questions & answers
— 4:25 Closing Remarks

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