

# form & function in ocular disease

NOVEMBER 1-2, 2024

HALIFAX, NOVA SCOTIA, CANADA

**A multi-disciplinary clinical and  
basic science symposium**

## **GUEST FACULTY**

**Kyoko Ohno-Matsui, Tokyo Medical and Dental University**

*Insights into pathologic myopia: Unraveling the enigma of posterior staphyloma*

**Thomas Euler, University of Tübingen**

*What the eye tells the brain: The sequel*

**David Guyton, Johns Hopkins University School of Medicine**

*Crossing of the eyes in the first year of life – why and how*

**Daniel Stamer, Duke University**

*Targeting disease for treatment of ocular hypertension in glaucoma*

**Stephan Ong Tone, Sunnybrook Health Sciences Centre**

*Exploring the regenerative potential of the corneal endothelium in Fuchs endothelial corneal dystrophy*

**Joan Miller, Harvard Medical School**

*Developing treatments for age-related macular degeneration: The road we traveled and the road ahead*

**Sherif El-Defrawy, University of Toronto**

*Privatization and future directions of health care delivery in Canada*



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## 2. Approved CE Credits

### Educationally Approved by Dalhousie University Continuing Professional Development and Medical Education

This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada, and approved by Dalhousie University Continuing Professional Development and Medical Education. You may claim a maximum of **7.0 hours** (credits are automatically calculated). Through an agreement between the Royal College of Physicians and Surgeons of Canada and the American Medical Association, physicians may convert Royal College MOC credits to AMA PRA Category 1 Credits™. Information on the process to convert Royal College MOC credit to AMA credit can be found at:

<https://edhub.ama-assn.org/pages/applications>

In keeping with CMA Guidelines, program content and selection of speakers are the responsibility of the planning committee. Support is directed toward the costs of the course and not to individual speakers through an unrestricted educational grant.



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### Canadian Orthoptic Council (COC)

This program has been granted the following COC CE credits: **1.5 core and 5.1 non-core Credits**



### 3. Welcoming Remarks

Dear Colleagues:

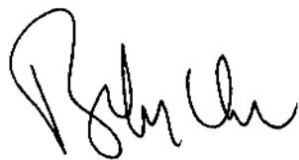


It gives me great pleasure to announce the 10<sup>th</sup> Form and Function in Ocular Disease meeting November 1-2, 2024 at Dalhousie University.

The main objective of this event is to examine and appraise diverse topics in clinical ocular disease and visual neuroscience. To that end, the Research Committee has put together an excellent program with world-renowned experts in exceptionally diverse areas spanning the visual neurosciences, the eye in health and disease, and health care delivery models.

We are grateful to our sponsors, Topcon Healthcare, Heidelberg Engineering, and CenterVue SpA for providing generous unrestricted support for the meeting.

We are excited by the program and hope you find this meeting to be a memorable one. Regards,

A handwritten signature in black ink, appearing to read 'Balwantray C. Chauhan'.

Balwantray C. Chauhan, PhD  
Mathers Professor and Research Director

## 4. Schedule

Friday, November 1, 2024

**Moderators:** Balwantray Chauhan and William Baldrige

Time	Presenter	Presentation Title
1:30 pm	Registration	
2:00 pm	Welcoming Remarks and Housekeeping	
2:05-2:50 pm	Stephan Ong Tone	Exploring the regenerative potential of the corneal endothelium in Fuchs endothelial corneal dystrophy
2:50-3:10 pm	Local Faculty: Melina Agosto	A key role for glycosylation at photoreceptor synapses
3:10-3:30 pm	Break	
3:30-4:15 pm	Thomas Euler	What the eye tells the brain: The sequel
4:15-4:35 pm	Local Faculty: Corey Smith	Clinical epidemiology of rhegmatogenous retinal detachment
4:35-4:55 pm	Trainee Award: Delaney Henderson	Characterizing the effects of experimental glaucoma and age on retinal ganglion cell function
4:55-5:05 pm	General Discussion with Guest Faculty	
5:05 pm	Adjourn	

Saturday, November 2, 2024

**Moderators:** *morning:* Johane Robitaille and Rishi Gupta *afternoon:* Marcelo Nicolela and Alan Cruess

Time	Presenter	Presentation Title
9:00 am	Welcome and Housekeeping	
9:05-9:25 am	Trainee Award: Khaldon Abbas	Investigating RPE melanin distribution in retinitis pigmentosa utilizing polarization sensitive optical coherence tomography
9:25-10:10 am	Daniel Stamer	Targeting disease for treatment of ocular hypertension in glaucoma
10:10-10:35 am	Break	
10:35-11:20 am	Kyoko Ohno-Matsui	Insights into pathologic myopia: Unraveling the enigma of posterior staphyloma
11:20-12:05 pm	David Guyton	Crossing of the eyes in the first year of life – why and how
12:05-1:05 pm	Lunch	
1:05-1:50 pm	Sherif El-Defrawy	Privatization and future directions of health care delivery in Canada
1:50-2:35 pm	Joan Miller	Developing treatments for age-related macular degeneration: The road we traveled and the road ahead
2:35-2:45 pm	General Discussion with Guest Faculty	
2:45 pm	Closing and Adjourn	

\*\* Please note that 5mins at the end of 20 minute session and 10mins at the end of 45 minute sessions will be used for Q&A

## 5. Speaker Biographies

### Stephan Ong Tone MD, PhD



Clinician-Scientist in Cornea, Cataract and External Eye Disease  
Sunnybrook Health Science Center, Sunnybrook Research Institute

Assistant Professor  
Department of Ophthalmology and Vision Sciences  
Department of Laboratory Medicine and Pathobiology  
University of Toronto

Associate Graduate Appointment  
Department of Laboratory Medicine and Pathobiology  
University of Toronto

Cornea and Cataract Surgeon  
Kensington Eye Institute Toronto, ON

Cornea Fellowship Preceptor  
Department of Ophthalmology and Vision Sciences  
University of Toronto

Stephan Ong Tone is a clinician-scientist at Sunnybrook Research Institute (SRI) and the University of Toronto. He completed his MD-PhD at McGill, residency in Ophthalmology at U of T, and a clinical-research fellowship in Cornea at Mass Eye and Ear, Harvard Medical School. His research potential in the field of Ophthalmology has been recognized through numerous awards and he has been recognized as a clinician-scientist with tremendous potential through the prestigious Claes H. Dohlman MD, PhD, Fellowship Award (2019). To date, he has published 37 peer-reviewed manuscripts, through which he was the first to demonstrate that corneal endothelial cells from Fuchs dystrophy patients display increased cellular migration speeds. In addition to his basic science research on Fuchs dystrophy, he has also implemented a new surgical technique called Descemet's stripping only (DSO), and has collaborated with the Eye Bank of Canada to validate preloaded DMEK tissue, which now enables all Ontario corneal surgeons access to this new device and will improve operating room time utilization province-wide, with the potential to expand Canada-wide. He has demonstrated success in conducting state-of-the-art pre-clinical, translational, and clinical research that is coupled with his specialized clinical and surgical expertise.

Melina Agosto, PhD



Assistant Professor  
Department of Ophthalmology and Visual Sciences, Dalhousie  
University

Dr. Agosto completed undergraduate degrees in Biology and Materials Science & Engineering at the Massachusetts Institute of Technology. She earned a Ph.D. in Microbiology and Molecular Genetics at Harvard University, studying viral capsid proteins, followed by a postdoctoral fellowship at Baylor College of Medicine, where she worked on retinal cell biology and protein biochemistry. She joined Dalhousie University in 2021, with joint appointments in the Departments of Physiology & Biophysics and Ophthalmology & Visual Sciences.

Thomas Euler, PhD



CIN-Professor for Ophthalmic Research, Dr. rer. nat.  
University of Tübingen

Deputy Director of the Institute for Ophthalmic Research  
University of Tübingen

Thomas Euler holds a position as Professor for Ophthalmic Research at the University of Tübingen, Germany, since 2009. He is affiliated with the Centre for Ophthalmology and the Centre for Integrative Neuroscience (CIN). He completed his Diploma in Biology at the Johannes Gutenberg University, Mainz, in 1993 and earned his Doctorate in Biology in 1996, mentored by Prof. Christa Neumeyer (University of Mainz) and Prof. Heinz Wässle (Max-Planck Institute for Brain Research in Frankfurt). His postdoctoral work includes positions at the Harvard Medical School / Mass. General Hospital in Boston, USA, and the Max-Planck Institute for Medical Research in Heidelberg.



Corey Smith, PhD



Assistant Professor  
Department of Ophthalmology and Visual Sciences  
Dalhousie University

Dr. Corey Smith is an Assistant Professor at Dalhousie University, Affiliate Scientist at Nova Scotia Health, and the QEII Foundation Scholar in Retina Research. He earned a Master of Engineering Science (MEng) in Biomedical Engineering from The University of Western Ontario and a PhD in Physiology and Biophysics from Dalhousie University. His research interests span both discovery science and clinical research with an emphasis on medical imaging and image analysis. His current research program focuses on investigating retinal conditions and diseases.

Delaney Henderson, PhD



Dr. R. Evatt and Rita Mathers Postdoctoral Fellow in Ophthalmology and Visual Sciences  
Department of Ophthalmology and Visual Sciences  
Dalhousie University

Delaney Henderson is a Post Doctoral Research Fellow in the Department of Ophthalmology and Visual Sciences at Dalhousie University. She earned a Master of Science in Anatomy and Neurobiology, and a PhD in Medical Neuroscience at Dalhousie University under the supervision of Dr. Balwantray Chauhan. Her graduate work focused on adeno-associated viral delivery of functional fluorescent calcium indicators to investigate changes in inner retinal cell function with age, and in models of experimental glaucoma. Her post-doctoral research extends this work to investigate longitudinal changes in retinal ganglion cells with *in vivo* functional imaging.

## Khaldon Abbas, MD

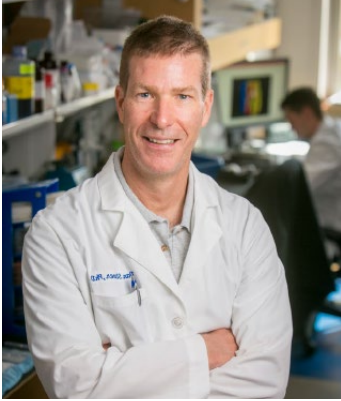


Research Fellow in Retinal Diseases & Epidemiology  
St. Joseph's Ivey Eye Institute

Masters Student  
Equity and Sustainability  
Western University

Khaldon Abbas is currently pursuing a Research Fellowship in Retinal Diseases & Epidemiology at St. Joseph's Ivey Eye Institute and is also pursuing a Master's degree in Equity and Sustainability at Western University. He earned his MD from the University of British Columbia in 2024 and a BSc in Biomedical Sciences from York University in 2017. With a strong foundation in clinical research, Khaldon worked for three years as a Clinical Research Coordinator in Toronto, gaining valuable expertise before starting his medical studies. He has presented his research at numerous national and international conferences. Khaldon is passionate about ophthalmology and is committed to enhancing the quality of life for patients with visual impairments.

## Daniel Stamer, PhD



Professor of Ophthalmology and Biomedical Engineering  
Duke University

Distinguished Professor  
Joseph A.C. Wadsworth Professor of Ophthalmology,  
Duke University

Co-Vice Chair for Basic Science Research  
Duke Eye Center

W. Daniel Stamer, Ph.D. was educated at the University of Arizona, earning a bachelor's of science in Molecular and Cellular Biology in 1990 and then a doctorate in Pharmacology and Toxicology in 1996. After completing two research fellowships, Professor Stamer started his research program in 1998 at the University of Arizona, where he remained for 13 years; rising through the ranks to full Professor and Director of Ophthalmic Research. He was subsequently recruited to Duke University in 2011, where he currently serves as the Joseph A.C. Wadsworth Distinguished Professor of Ophthalmology, Professor of Biomedical Engineering and Co-Vice Chair of Basic Science Research. The primary research focus of the Stamer laboratory is to understand the molecular and cellular mechanisms that regulate aqueous humor outflow such that novel targets can be identified and exploited therapeutically to lower intraocular pressure in people with glaucoma. Over the past 30+ years, Professor Stamer has pioneered the development of cellular, tissue, organ culture and murine model systems for use by his laboratory and others to study conventional outflow physiology and pharmacology. His laboratory has worked closely with industry, assisting 60+ biotechnology companies in the development/pre-clinical testing of new classes of glaucoma drugs that target the diseased conventional outflow pathway responsible for ocular hypertension. Research progress is documented in over 190 peer-reviewed primary contributions to the literature and 50+ reviews/book chapters/editorials, having over 12,000 citations. His work was recognized by the Rudin Prize for Glaucoma in 2012 and the Research to Prevent Blindness Foundation in 2013. In 2015, Professor Stamer was elected as ARVO trustee and in 2020 elected as ARVO president. Most recently, in 2022 he was elected into the Glaucoma Research Society, restricted to the top 100 glaucoma scientists worldwide. Professor Stamer currently holds prominent editorial positions with the *Journal of Ocular Pharmacology and Therapeutics* and *Investigative Ophthalmology and Visual Science*. Moreover, Professor Stamer currently serves on the scientific advisory boards for four companies developing glaucoma therapeutics, three foundations that support glaucoma research and chair of the scientific advisory board of the Crandall Center for Glaucoma Innovation.

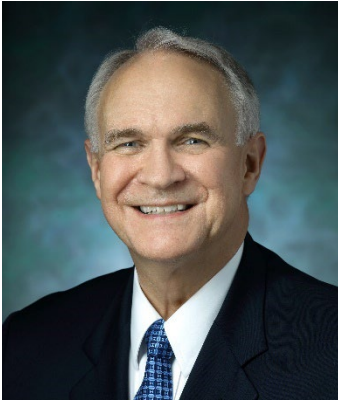
Kyoko Ohno-Matsui, MD



Professor and Chairperson, Ophthalmology and Visual Science,  
Tokyo Medical and Dental University

Kyoko Ohno-Matsui is Professor and Chairperson of the Department of Ophthalmology at Tokyo Medical and Dental University (TMDU). She is also the Chief of the Advanced Clinical Center for Myopia. Her research focuses on myopia, especially pathologic myopia. She established an international photographic classification of myopic maculopathy. As a method to visualize the shape of the entire globe in high myopes, she established a new technique '3D MRI of the eye' and proposed a novel classification of staphyloma. She has authored or co-authored 377 manuscripts published in peer-reviewed journals. She has been awarded The J. Donald Gass Medal at the Macula Society in 2022 and The Jose Rizal Medal at Asia-Pacific Academy of Ophthalmology in 2023.

## David Guyton, MD



Zanvyl Krieger Professor of Ophthalmology  
The Johns Hopkins University School of Medicine

David Guyton is a problem solver, a clinical innovator, an inventor, a teacher, and a communicator. He followed his grandfather, father, and uncle into medicine, becoming the first of a record ten siblings *all* physicians. Following a physics degree from the University in Mississippi in 1965, he obtained his MD degree from Harvard Medical School in 1969.

After his residency in ophthalmology at Johns Hopkins' Wilmer Eye Institute and a Fellowship in Strabismus with Gunter von Noorden, he returned in 1977 to Johns Hopkins as the Director of Strabismus and Pediatric Ophthalmology, until 2011, where he continues to serve as the Zanvyl Krieger Professor of Ophthalmology.

Dr. Guyton's contributions to clinical optics and strabismus have achieved international recognition. In clinical optics he gave us one of the first automated refractors; the proper techniques for prescribing cylinders, measuring strabismus with prisms, and centering corneal surgical procedures; and the Potential Acuity Meter for assessing the potential visual acuity in cataract patients. In strabismus he has given us the exaggerated traction test for assessing oblique muscle tightness, an explanation of oblique muscle overaction and A and V patterns in patients with strabismus, an explanation of the mechanism of dissociated vertical deviation, advanced adjustable suture techniques for strabismus surgery in both adults and children, and theories of how and why strabismus changes over time.

For more than 40 years Dr. Guyton has been the foremost teacher of ophthalmic optics and clinical refraction in the United States. He is a Fellow of the Optical Society of America and has served on the Board of Directors, and as President, of both AAPOS and ARVO.

The most recent of his 330+ publications and 19 U.S. Patents deal with remote optical systems and automated screening devices for detection of strabismus and amblyopia in infants and children.

Joan Miller, MD



Chief Ophthalmology  
Massachusetts Eye and Ear

Chief Ophthalmology  
Massachusetts General Hospital

Chief Ophthalmologist  
Brigham and Women's Hospital

Chair Ophthalmology  
Harvard Medical School

Joan W. Miller, MD, is the David Glendenning Cogan Professor of Ophthalmology and Chair of the Department of Ophthalmology at Harvard Medical School (HMS), as well as Chair of Ophthalmology at both Massachusetts Eye and Ear and Massachusetts General Hospital and Ophthalmologist-in-Chief at Brigham and Women's Hospital. A graduate of Massachusetts Institute of Technology, Dr. Miller earned her MD from HMS and completed her ophthalmology residency and vitreoretinal fellowship at Mass Eye and Ear.

An internationally recognized expert on retinal disorders, Dr. Miller and her colleagues at Mass Eye and Ear/HMS pioneered the development of verteporfin photodynamic therapy (Visudyne®), the first pharmacologic therapy for age-related macular degeneration (AMD). The group also identified the key role of vascular endothelial growth factor (VEGF) in ocular neovascularization, leading to the development of anti-VEGF therapies now administered to millions of people with sight-threatening retinal diseases annually around the world. Dr. Miller's current research investigations focus on the pathogenesis of AMD, including genomics, metabolomics, imaging, and functional measures; strategies for early intervention in AMD; and neuroprotective therapies for retinal disease.

Her scholarly contributions include more than 400 original research investigations, reviews, book chapters, and editorials. Dr. Miller serves on the editorial board for the journals *Ophthalmology* and *Ophthalmology Retina*, and has served as an editor for several textbooks, including the recently published 4<sup>th</sup> edition (Springer) of Albert and Jakobiec's *Principles and Practices of Ophthalmology*. Dr. Miller is a member of the National Academy of Medicine, the Academia Ophthalmologica Internationalis, the American Ophthalmological Society, and the Dowling Society, as well as a Gold Fellow of the Association for Research in Vision and Ophthalmology (ARVO). Among her numerous honors, Dr. Miller was a co-recipient of the 2014 António Champalimaud Vision Award, the highest distinction in ophthalmology and visual science. In 2015, Dr. Miller became the first woman to receive the Mildred Weisenfeld Award for Excellence in Ophthalmology from ARVO; in 2018, she became the first woman awarded the Charles L. Schepens Award from American Academy of Ophthalmology (AAO). Additionally, Dr. Miller was awarded the 2018 Lucien Howe Medal from the American Ophthalmological Society and the 2018 Gertrude D. Pyron Award from the American Society of Retinal Specialists.

Sherif El-Defrawy MD, PhD



Professor  
Department of Ophthalmology and Vision Sciences,  
University of Toronto  
Kensington Eye Institute University Health Network

Dr. El-Defrawy was the Nanji Family Chair in Ophthalmology and Vision Sciences, Professor and Chair of the Department of Ophthalmology and Vision Sciences at the University of Toronto and the Ophthalmologist-in-Chief at Kensington Eye Institute from 2012-2023. He is a Past President of the Canadian Ophthalmological Society and the Association of Canadian University Professors of Ophthalmology as well as co-Chair of the Eye Health Council of Ontario. He was the Chair of the Department of Ophthalmology at Queen's University, and Ophthalmologist-in-Chief at the University Hospitals in Kingston, Ontario from 2004 to 2012.



## 6. Learning Objectives

Stephan Ong Tone, MD, PhD

*Exploring the regenerative potential of the corneal endothelium in Fuchs endothelial corneal dystrophy*

### Objectives

1. Review the regenerative properties of the human corneal endothelium.
2. Review Fuchs endothelial corneal dystrophy (FECD) pathogenesis and how this leads to altered corneal endothelial cell migration.
3. Discuss current and future therapeutic interventions for FECD.

Melina Agosto, PhD

*A key role for glycosylation at photoreceptor synapses*

### Objectives:

1. Analyze the role of mGluR6 in neurotransmitter detection at photoreceptor synapses
2. Examine assays for isolating plasma membrane proteins and detecting glycosylation
3. Appraise the potential affects of glycosylation on protein-protein interactions

Thomas Euler

*What the eye tells the brain: The sequel*

### Objectives:

1. Illustrate that the mammalian retina extracts several dozens of behaviorally relevant visual feature representations and relays these to the brain
2. Review the regional, natural scene-dependent adaptations in neural processing in the retina
3. Demonstrate that mice do not have "poor" vision; their visual system is well-adapted to the tasks they need to perform to survive.

Corey Smith, PhD

*Clinical epidemiology of rhegmatogenous retinal detachment*

### Objectives:

1. Summarize what is currently known about rhegmatogenous retinal detachments.
2. Describe the epidemiology of rhegmatogenous retinal detachments in the Maritime provinces.
3. Consider future directions for studying and managing patients at risk or with retinal detachments.

Delaney Henderson, PhD

*Characterizing the effects of experimental glaucoma and age on retinal cell function*

**Objectives:**

1. Discuss methods for labelling retinal ganglion cells (RGCs).
2. Explore changes in RGC structure and function in adult mice with experimental glaucoma induced using a cross-linking hydrogel polymer.
3. Assess the impact of age and experimental glaucoma on RGC degeneration and discuss the importance of using aged animal models to study age-related disease.

Khaldon Abbas, MD

*Investigating RPE melanin distribution in retinitis pigmentosa utilizing polarization sensitive optical coherence tomography*

**Objectives:**

1. Discuss the application of PS-OCT in studying melanin distribution in retinitis pigmentosa (RP).
2. Identify key differences in melanin distribution between RP patients and controls using PS-OCT imaging.
3. Analyze the clinical relevance of PS-OCT findings in monitoring and diagnosing retinal changes in RP.

Daniel Stamer, PhD

*Targeting disease for treatment of ocular hypertension in glaucoma*

**Objectives:**

1. Illustrate the unique anatomy and physiology of the conventional outflow pathway and its role in intraocular pressure regulation.
2. Discuss the pathological processes that occur in the conventional outflow pathway that result in ocular hypertension.
3. Highlight key pathways to target therapeutically for the treatment of ocular hypertension.

Kyoko Ohno-Matsui, MD

*Insights into pathologic myopia: Unraveling the enigma of posterior staphyloma*

**Objectives:**

1. Describe pathologic myopia and how pathologic myopia is different from physiologic myopia.
2. Identify how and at what age posterior staphyloma develops and progresses over time.
3. Identify possible treatments to prevent or treat staphylomas before vision-threatening complications occur.

David Guyton, MD

*Crossing of the eyes in the first year of life – why and how*

**Objectives:**

1. Demonstrate that the damping of latent nystagmus is the key to understanding infantile esotropia.
2. Describe how the infant learns to improve vision by damping the cyclovertical and horizontal components of latent nystagmus, by vertical vergence and convergence respectively, leading to the dissociated deviations of DVD and DHD
3. Discuss how the chronic convergence of DHD robustly shortens the MR muscles and thereby results in acquired, large-angle, infantile ET
4. Describe how the eventual prevention of latent nystagmus, if possible, may actually eliminate the entire problem of infantile esotropia in the first place

Joan Miller, MD

*Developing treatments for age-related macular degeneration: The road we traveled and the road ahead*

**Objectives**

1. Describe the path of development for both Photodynamic Therapy and anti-VEGF treatment for AMD.
2. Summarize the pathophysiology of AMD based on molecular biology and genomics.
3. Identify the strategies needed to advance our understanding of the pathophysiology of AMD, and ultimately to develop new treatments for early and intermediate AMD.

Sherif El-Defrawy, MD, PhD

*Privatization and future directions of health care delivery in Canada*

**Objectives:**

1. Discuss universal health care in Canada and its biggest issues
2. Identify the current difficulties in access to elective surgery and the risks and benefits of private for-profit surgical centers
3. Examine possible solutions moving forward

## 7. Sponsors

This program has received an educational grant or in-kind support from:

