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# CONCEPTS AND BREAKTHROUGHS IN GLAUCOMA

ISER/BRIGHTFOCUS 2022 Glaucoma Symposium

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ATLANTA, GEORGIA, USA  
**MAY 24-27, 2022**

**PROGRAM BOOK**

[www.iser.org](http://www.iser.org)



International Society  
for Eye Research



**BrightFocus®  
Foundation**

Cure in Mind. Cure in Sight.

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# ISER President Letter of Welcome



International Society  
for Eye Research

As President of the International Society for Eye Research (ISER), it is my great pleasure to welcome you to the ISER/BrightFocus 2022 Glaucoma Symposium: Concepts and Breakthroughs in Glaucoma. ISER and the BrightFocus Foundation are co-sponsors of this event. This is the third time that ISER has participated in organizing and sponsoring a topically-focused meeting in the odd-numbered years between our regular Biennial Meetings. This also marks the continuation of a successful partnership with BrightFocus to cooperate in delivering scientific meetings and symposia to advance our understanding and treatment of the devastating disease, glaucoma. We hope this collaboration continues well into the future.

Special thanks are due to the Program Organizing Committee: Drs. Dan Stamer, Rob Nickells, Ross Ethier, Adriana Di Polo, John Morrison, Abe Clark, Paloma Liton, and Rebecca Sappington as well as to Dr. Diane Bovenkamp, Vice President of Scientific Affairs and Dr. Preeti Subramanian, Director of Vision Science Programs at BrightFocus Foundation, all of whom have spent countless hours helping to coordinate and facilitate this meeting. I also would like to thank and acknowledge our corporate sponsors who are essential to keep registration costs reasonable for all, support travel awards and facilitate social activities. (see page 42 for a listing).

The Mission of ISER is to provide a unique international platform for discussion and exchange of ideas on contemporary topics in eye and vision research among its members and the broader eye/vision research community. The current meeting is built on the vibrant success of the first two meetings held on this topic which has enabled the organizers to continue to attract world authorities in glaucoma research and the clinical applications of these findings. We also make a strong effort to attract, support and include young investigators as participants in our programs. The BrightFocus Fast Track workshop which will be held at the beginning of the meeting has proven to be a truly foundational experience, building a more thorough understanding of the mechanistic underpinnings of glaucoma. This further promotes our strategy of providing a solid foundation for our future scientists, clinicians and leaders.

In closing, I look forward to seeing you in Atlanta and hope that you have a very enjoyable and productive meeting. I also hope to see you at the 2023 ISER Biennial Meeting in Gold Coast, Australia. <https://iserbiennialmeeting2023.org/>

Olaf Strauss, PhD  
ISER President



# BrightFocus President and CEO Letter of Welcome

Welcome to the ISER/BrightFocus 2022 Glaucoma Symposium. On behalf of BrightFocus Foundation, thank you for all you do to advance the diagnosis and treatment – and ultimately a cure – for glaucoma.

At BrightFocus our mission is clear: harness the power of science to end the conditions we fear most – loss of sight and loss of mind. Through our work on glaucoma, macular degeneration, and Alzheimer’s, we serve as an umbrella on neurodegenerative disease, uniquely positioned for scientific innovation by sharing discoveries from one disease to inform another.

We have a long track record of supporting breakthrough research. Our grantees often go on to receive funding from other sources that is ten times larger than their original award. Scientists we have supported have won major awards in their fields, including two Nobel Prizes. We also share the latest research findings with millions of families affected by these diseases.

I encourage you to bring your most creative, most innovative ideas to BrightFocus. We now offer a fellowship program to support postdoctoral fellows in glaucoma research. We are an independent organization, free to support investigator-initiated research across borders and across disciplines. The world-class members of our scientific review committees seek out the untried, the unexpected, and the most promising. Since inception we have funded nearly \$275 million in 25 countries.

For more information on our research opportunities please visit <https://science.brightfocus.org/grant-search> or call 1-800-437-2423.

We are excited about our pre-symposium workshop, the **BrightFocus Glaucoma Fast Track**.<sup>SM</sup> It is an immersive environment for emerging researchers to learn from and interact with leaders in this field. The program is open to all, so please take the opportunity to participate. To view recordings of the presentations from the inaugural 2017 BrightFocus Glaucoma Fast Track<sup>SM</sup> and the 2019 workshop that was held in conjunction with the joint ISER/BrightFocus Glaucoma Symposium, visit, <https://science.brightfocus.org/event/glaucoma-fast-track-2022>.

I hope that your time at this symposium is meaningful and rewarding, accelerating your path toward scientific discovery. While diseases such as glaucoma can seem daunting, by investing in bold, innovative research, we can have great hope for the future.

Thank you for joining us this week. I look forward to working with you for years to come.

Stacy Pagos Haller  
President and CEO  
BrightFocus Foundation







# Program Planning Committee Letter of Welcome

Dear Participants,

It is our great pleasure to welcome you to the 2022 glaucoma symposium “Concepts and Breakthroughs in Glaucoma”. As in 2017 and 2019, this meeting is co-sponsored by the International Society for Eye Research and the BrightFocus Foundation and is designed to create a Gordon Conference-style forum for glaucoma researchers. Our goal is to bring together scientists from diverse backgrounds and at different career stages (from students to established thought leaders) working on all aspects of glaucoma research, and to provide a high energy and information-intense environment. This conference marks our third event held at the Emory University Conference Center and the fourth conference organized around the advances in basic and translational science being conducted by the glaucoma research community. The 2017 and 2019 conferences were very successful gatherings of basic scientists, clinician-scientists, and industry-based researchers providing a much-needed platform for our community to discuss advances in science that support the development of new therapeutic and diagnostic avenues for glaucoma. This year’s conference builds on the 2017 and 2019 conferences to provide an even better platform for an enthusiastic exchange of ideas.



We strongly believe that a face-to-face interactive event best maximizes productive scientific exchange. To allow for such a format while ensuring the safety of our participants, we are delighted that we can hold an in-person event in 2022.



Consistent with our strong focus on the safety of all attendees and the staff at the Emory Conference Center, we will be adhering to the most up-to-date COVID-19 guidelines established by the CDC and Emory University. Thus, all attendees, without exception, must show proof of being fully vaccinated and are very strongly encouraged to wear suitable protective masks except while actively presenting, eating or drinking. As we have all learned, the health care challenges posed by COVID-19 are continually changing, and we are grateful to all of you for respecting these measures.



The 2022 conference is focused on cutting edge research in all aspects of glaucoma. Similar to the 2019 symposium, the program features 9 podium sessions (including one new investigator session), poster sessions, and 5 plenary lectures, each given by a world-class scientist in his or her respective field. These plenary lectures cover a wide range of glaucoma topics, from the physiology and pathology of aqueous humor outflow, in vivo imaging technologies, detection of retinal ganglion cell dysfunction, neuroinflammatory processes, and the link between glaucoma and other neurodegenerative diseases.

We have programmed the platform presentations from submitted abstracts, grouping them thematically to complement the topics of the plenary lectures. We extend a special thanks to colleagues from the National Glaucoma Research Scientific Advisory Board of the BrightFocus Foundation who helped review the 182 abstract submissions we received for this meeting. This is an increase of 78 abstract submissions over the 2017 symposium and 11 abstracts over the 2019 meeting. We have once again built into the program an extended poster session to allow participants to interact and

discuss their work. With the continued increase in abstract submissions, we have once again booked an expanded poster session area. Thanks for all of your support to keep this meeting growing and continuing in the future.

This meeting would not have been possible without the generous support from our corporate and institutional sponsors who have collectively donated over \$95,000. These funds have enabled us to offset expenses, subsidizing the meeting registration costs for all participants. We especially extend our appreciation to Dr. Abe Clark, who spearheaded the fundraising campaign.

Again, with the great support of the BrightFocus Foundation, we are pleased to offer a pre-symposium Fast Track course on “all things glaucoma”. The intent is to provide trainees, young investigators and those new to glaucoma with a significant grounding in the complexities of glaucoma, from both clinical and research perspectives immediately prior to the meeting. This will be accomplished by a series of lectures, given by established and respected faculty. We give special thanks to Drs. John Morrison and Abe Clark for their tireless efforts in putting the course together, and to Drs. Paloma Liton and Becky Sappington for leading the review process of the abstracts from students and young investigators who received travel award fellowships. Also, we recognize the generous support of the National Eye Institute for providing an R13 grant that funded the lion’s share of these travel fellowships for a second time; to the BrightFocus Foundation who provided funding for 8 travel fellowships, 7 of which are targeted to members of under-represented groups in glaucoma; and to several of our commercial and institutional sponsors who provided funding specifically to allow us to offer additional fellowships. In total, we were able to provide funding for 60 travel fellowships to attend this innovative and timely Fast Track course plus the general meeting.

Our ultimate goal with this symposium is to provide the community with a forum to hear and learn about new and exciting research in glaucoma, while maintaining an intimate setting that fosters productive discussions, new and renewed acquaintances, and successful collaborations.

Best wishes to all of you and thank you for making this year’s symposium a success.

Your Meeting Co-Organizers,

C. Ross Ethier, Dan Stamer, Rob Nickells, and Adriana Di Polo

# About ISER

The Mission of ISER is to provide a unique international platform for discussion and exchange of ideas on contemporary topics in eye and vision research among its members and the broader eye/vision research community.

## Information

Requests for information about membership, journal subscriptions and biennial meetings should be directed to:

### ISER Secretariat

655 Beach Street  
San Francisco, CA 94109  
USA

Phone: + 1-415-561-8569  
Fax: + 1-415-561-8531  
E-mail: [mail@iser.org](mailto:mail@iser.org)  
Website: [www.iser.org](http://www.iser.org)

Requests for information about any other matters related to the affairs of the Society should be directed to:

### Office of the President

**Olaf Strauss, PhD**  
NCSU Experimentelle  
Ophthalmologie  
Charite University Medicine  
Augustenburger Platz 1  
13353 Berlin

E-mail:  
[olaf.strauss@charite.edu](mailto:olaf.strauss@charite.edu)

### Office of the Secretary

**Frank J. Lovicu, PhD**  
University of Sydney  
F13 Anatomy and Histology  
Sydney, NSW 2006  
Australia

E-mail:  
[frank.lovicu@sydney.edu.au](mailto:frank.lovicu@sydney.edu.au)

ISER supports this mission by holding scientific meetings at venues throughout the world, through its journal, *Experimental Eye Research*, and by focusing resources on the development and support of young investigators.

## ISER MEMBERSHIP INFORMATION

In August 2019, the Society had over 350 members from approximately 20 countries. The Bylaws of the Society (Article II, Section I) stipulate the following requirements for membership:

Full Members shall be investigators who are actively engaged in eye or vision research or other fields related to eye or visual system tissues and are 7 years or more past their terminal degree.

Young Investigators shall be predoctoral or postdoctoral (PhD/MD/OD/DVM/DO) equivalent students, clinical residents, or clinical fellows engaged in vision/eye research for no longer than 7 years since their terminal degree.

Emeritus Members shall be Full Members who have 10 years cumulative ISER membership, who have reached the age of 65, whose academic appointment is no more than 50%, and who have requested a change to Emeritus Membership in writing.

Honorary Members shall be persons who have made exceptional scientific contributions to eye or vision research or other fields related to eye or visual system tissues. The Membership Committee will solicit nominations one year prior to the ISER meeting. The Committee will review the nominations and submit recommendations to the Council for action.

## ISER XXV BIENNIAL MEETING

ISER's XXV Biennial Meeting in Gold Coast, Australia will be held February 19 – 23, 2023.

## OFFICIAL JOURNAL

*Experimental Eye Research* (EER), published by Elsevier Ltd., (3251 Riverport Lane, St. Louis, Missouri, 63043) is the official Journal of the Society. A reduced subscription rate for the journal in print or electronic format is an optional membership benefit for all members.

# About BrightFocus



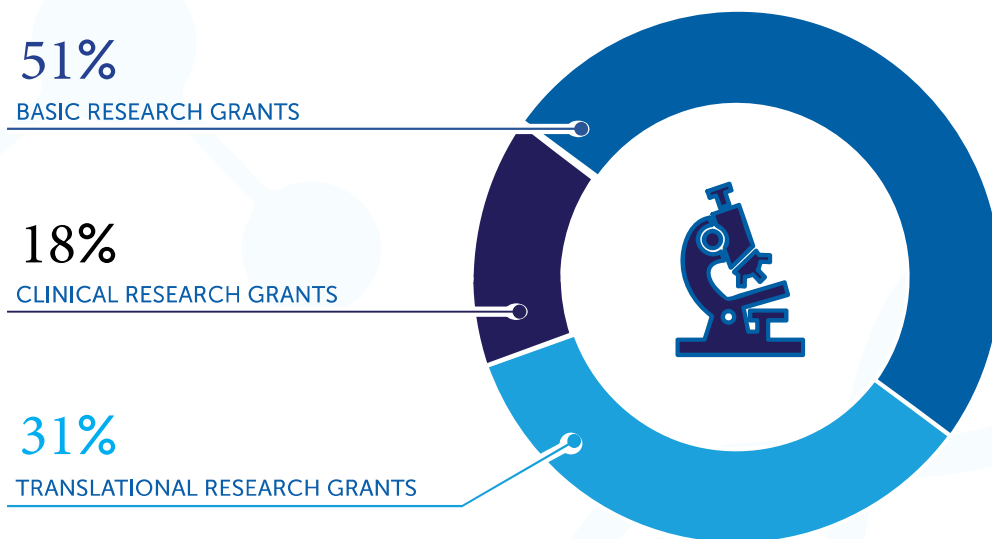
**BrightFocus®  
Foundation**

Cure in Mind. Cure in Sight.

**National Glaucoma Research  
Macular Degeneration Research  
Alzheimer's Disease Research**

BrightFocus is the world's premier source of funding and support for research into glaucoma, macular degeneration, and Alzheimer's. We seek to find the cures for the devastating conditions we all fear most: loss of sight and loss of mind.

We fund cutting-edge ideas from scientists all over the world who are dedicated to making groundbreaking discoveries. Since our beginning, we have invested more than \$250 million in bold, innovative scientific research.



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International Grants Available. Apply today:  
[www.brightfocus.org](http://www.brightfocus.org) • 1-800-437-2423



# Symposium Planning Committee

## ISER/BRIGHTFOCUS 2022 GLAUCOMA SYMPOSIUM CO-CHAIRS

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**W. Daniel Stamer, PhD**  
Duke University Medical Center  
Durham, NC

W. Daniel Stamer, PhD currently serves as the Joseph A.C. Wadsworth Professor of Ophthalmology and Professor of Biomedical Engineering at Duke University. Professor Stamer was educated at the University of Arizona, earning his bachelor of science in Molecular and Cellular Biology in 1990 and doctorate in Pharmacology and Toxicology in 1996. He completed two research fellowships: the first with Dr. Andrea Yool in electrophysiology and the second with Dr. David Epstein in glaucoma/cell biology. 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 then recruited to the Duke Eye Center in 2011, where he remains today. Notable recent accomplishments include the Rudin Prize for Glaucoma in 2012, the RPB Senior Scientific Investigator Award in 2013 and ARVO president in 2019/2020. He currently serves on the editorial boards for *the Journal of Ocular Pharmacology and Therapeutics*, *Investigative Ophthalmology and Visual Science* and *Experimental Eye Research* and scientific advisory boards for the BrightFocus Foundation, the Glaucoma Foundation and the Glaucoma Research Foundation. The primary research focus of the Stamer laboratory is to understand the molecular and cellular mechanisms that regulate conventional outflow resistance, and thus intraocular pressure.



**C. Ross Ethier, PhD**  
Georgia Institute of Technology,  
Emory University School of Medicine  
Atlanta, GA

Professor Ethier holds the Lawrence L. Gellerstedt, Jr. Chair in Bioengineering and is a Georgia Research Alliance Eminent Scholar in the Wallace H. Coulter Department of Biomedical Engineering at Georgia Institute of Technology & Emory University School of Medicine. He received his PhD from MIT in 1986, his S.M. from MIT in 1983, his M. Math from Waterloo in 1982 and his BSc from Queen's in 1980. His research is in the biomechanics of cells and whole organs, with specific emphasis on ocular biomechanics. His lab seeks to understand the pathogenesis of, and develop treatments for, glaucoma, working in both the anterior and posterior segments. This has included characterizing the role of the sclera in optic nerve head biomechanics; mechanotransduction in the trabecular meshwork; and technology for stem cell delivery to the trabecular meshwork. The Ethier lab also conducts research on the biomechanics of myopia. He serves on multiple editorial and advisory boards, including being Editor-in-Chief of the *ASME Journal of Biomechanical Engineering*.

**Robert W. Nickells, PhD**

University of Wisconsin-Madison  
Madison, WI

Dr. Nickells received his PhD in developmental biology at the University of Calgary and began studying the pathophysiology of glaucoma as a research fellow at the Wilmer Eye Institute at Johns Hopkins. He is currently Professor and Frederick A. Davis Research Chair in the Department of Ophthalmology and Visual Science at the University of Wisconsin-Madison, where he runs an active research program centered on the molecular pathways activated in retinal ganglion cells after optic nerve damage. A major focus is on the interactions of the pro-apoptotic and anti-apoptotic members of the Bcl2 gene family. Major branches of this research include investigating the role of BAX in the process of mitochondrial dynamics, how modulating BAX alters the activation program, and how this will affect ganglion cells in therapies that target BAX function.



**Adriana Di Polo, PhD**

University of Montreal, CRCHUM  
Montreal, QC

Dr. Di Polo is Full Professor in the Departments of Neuroscience and Ophthalmology at the University of Montreal and holds a Tier 1 Canada Research Chair in glaucoma and age-related neurodegeneration. She received her PhD from the University of California, Los Angeles followed by postdoctoral training at the Centre for Research in Neuroscience at McGill University. Her research program focuses on understanding mechanisms of neuronal, glial, and vascular deficits in glaucoma. The ultimate goal of the Di Polo laboratory is to develop regenerative therapies to restore retinal ganglion cell function and, ultimately, vision in patients affected by glaucoma. She is the current Director of the Retinal and Posterior Segment Group of the Quebec Vision Health Research Network, was recently elected Vice-President of the Canadian Association for Neuroscience (CAN), and will serve as CAN President in 2023. Dr. Di Polo is an ARVO Gold Fellow and recent accomplishments include the 2019 Shaffer Prize from the Glaucoma Research Foundation and the Lewis Rudin Glaucoma Research Prize awarded in 2020.



**EXHIBITS/SPONSORSHIP COMMITTEE CHAIR**

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**Abbot F. Clark, PhD**

North Texas Eye Research Institute,  
University of North Texas Health Science Center  
Fort Worth, TX

Abbot (Abe) Clark, PhD, FARVO is Regents Professor and Executive Director of the North Texas Eye Research Institute at the University of North Texas Health Science Center in Ft. Worth, Texas, USA. The major focus of his research has been on the discovery of molecular pathogenic pathways for glaucoma and the development of novel disease modifying therapies. He has extensive expertise and experience in molecular biology, cell biology, ex vivo models (perfusion cultured anterior segments), and rodent models. His lab identified a number of glaucomatous pathogenic pathways in the TM, the retina, and the optic nerve



head. They culture ocular cells including TM, optic nerve head, and retinal ganglion cells from human donor eyes, bovine eyes, and/or mouse eyes. They also have extensive experience with mouse models of glaucoma and acute retinal injury. His laboratory has recently discovered both small molecular and gene therapies that prevent glaucoma-like damage to the TM, RGCs, the optic nerve, and visual centers of the brain. Abe is on the editorial boards of 4 ophthalmic and molecular neuroscience journals and serves on NEI and BFF study sections.

## **BRIGHTFOCUS GLAUCOMA FAST TRACK WORKSHOP COMMITTEE CHAIRS**

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### **John C. Morrison, MD**

Casey Eye Institute,  
Oregon Health & Science University  
Portland, OR

Dr. Morrison received his MD from the Oregon Health and Science University (OHSU) in 1977 and completed his Ophthalmology residency in 1985 from the same institution. This was followed by glaucoma fellowships, first at Oregon and then the Johns Hopkins Wilmer Eye Institute. He joined the faculty of the Casey Eye Institute (OHSU) in 1988, where he is now the Fred P. and Joan Thompson Family Professor of Ophthalmology. His lab studies the cellular events of glaucomatous optic nerve damage by modeling elevated intraocular pressure (IOP), the best-known and only modifiable risk factor for glaucoma. This has included experimentally increasing aqueous humor outflow resistance and developing optimal methods for monitoring IOP and assessing optic nerve damage. New approaches for precisely controlling elevation of IOP (CEI) in anesthetized, and more recently awake animals have been developed to allow study of IOP-induced gene expression and protein responses within the optic nerve head (ONH) and retina. Understanding early ONH responses will lead to new approaches for protecting the optic nerve in patients with severe glaucoma. These experiences have also led to determining how IOP affects retina and ONH blood flow using Optical Coherence Tomography Angiography.



### **Abbot F. Clark, PhD**

North Texas Eye Research Institute,  
University of North Texas Health Science Center  
Fort Worth, TX

## TRAVEL GRANT REVIEW COMMITTEE CO-CHAIRS

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### **Paloma Liton, PhD**

Duke University  
Durham, NC

Dr. Liton is an Associate Professor at Duke University. She received her PhD in Molecular Biology at the Universidad de Madrid (Spain) and joined the laboratory of the late Dr. David Epstein, MD as a Postdoctoral Fellow, where she was trained in outflow pathway biology and physiology. After her postdoctoral fellowship, Dr. Liton joined the Departments of Ophthalmology & Pathology at Duke University. She has pioneered the study of autophagy in the outflow pathway physiology and pathophysiology and extended her studies to the role of autophagy in neurodegeneration in glaucoma. Dr. Liton is an active member of the community. She is on the Editorial board of four journals and serves on NEI, BFF and Fight for Sight study sections. Dr. Liton has been the recipient of several awards, including the prestigious Alcon Research Institute Young Investigator Award, and the Thomas R. Lee Glaucoma Research Award.



### **Rebecca Sappington, PhD**

Wake Forest School of Medicine  
Winston-Salem, NC

Dr. Sappington is an Associate Professor in the Departments of Neurobiology and Anatomy and Ophthalmology at Wake Forest School of Medicine. In the Department of Ophthalmology, she also serves as the Vice Chair for Research. Dr. Sappington's research program focuses on neuroinflammation in health and disease of the visual system, particularly glaucoma. Her work currently emphasizes neuroinflammatory pathways that serve as trophic factors but are transformed by disease-related stressors into pathological mediators. Dr. Sappington's laboratory utilizes a variety of animal models, including rodents, swine, and non-human primates. She has a passion for technical innovation in both basic science and translational platforms. At Wake Forest, she is a member of the Faculty Representative Council and the Faculty Development Committee. Extramurally, she serves on 3 editorial boards and several advisory boards, including BrightFocus Foundation and SAJE Pharma, LLC. She is currently a member of the Annual Meeting Planning and Publications committees for ARVO and the Membership Committee for ISER.





# Travel Award Grants

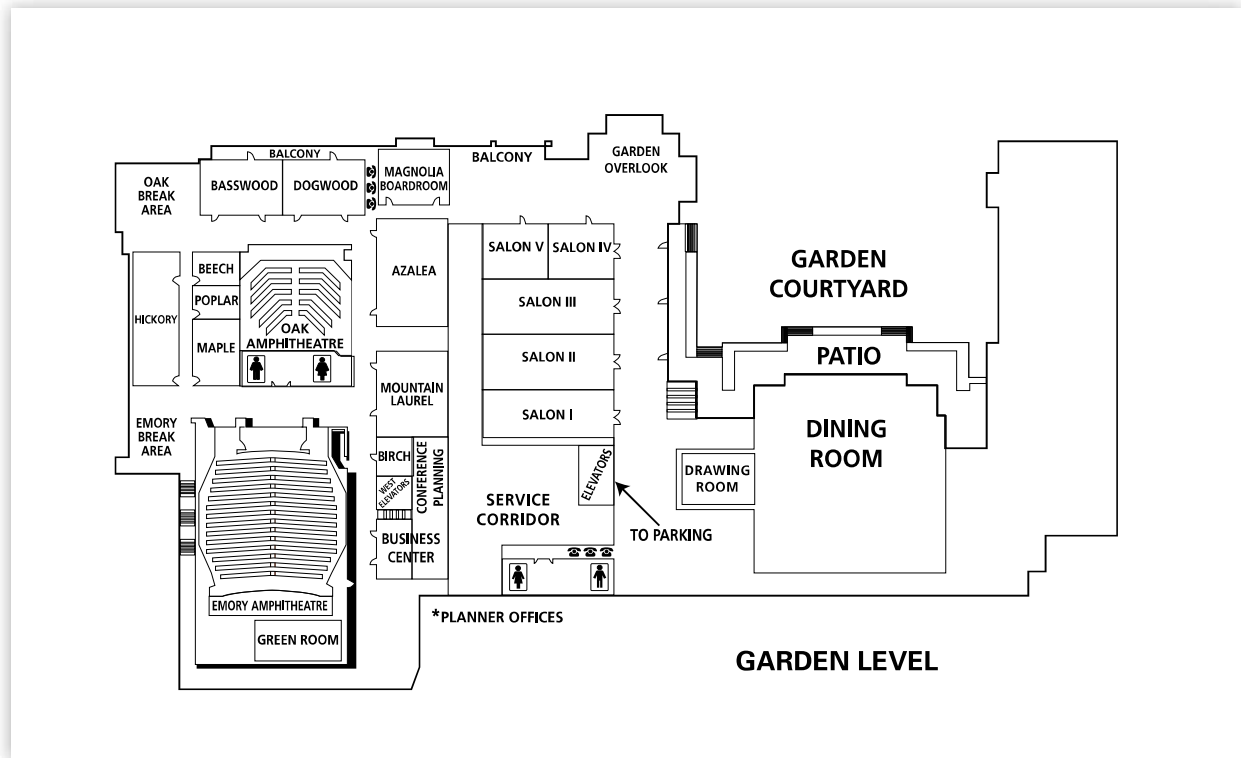
As part of its commitment to ensuring that young investigators from around the world have the opportunity to participate in scientific meetings and present their research, ISER and BrightFocus established the Travel Award Grant Program for the 2022 Glaucoma Symposium. Based upon established criteria, the Travel Grant Review Committee, carefully reviewed and selected 60 travel award grants from among many deserving applications. This program was made possible in part by a R13 grant from the National Institutes of Health, and generous sponsorship from Allergan, Clearside Biomedical, University of Wisconsin – Department of Ophthalmology and Visual Sciences, OHSU – Casey Eye Institute, Duke University, and BrightFocus Foundation.

Congratulations to all those that received a travel award grant to attend the ISER/BrightFocus 2022 Glaucoma Symposium and BrightFocus Glaucoma Fast Track.

**Vishnu Adi, DO, MPH** NYU Langone  
**Katherine M. Andersh, MS** University of Rochester  
**Jacques A. Bertrand, MRes** Imperial College London  
**Andrew M. Boal, BA** Vanderbilt University  
**James D. Cole, BS** University of Virginia  
**Sophie Coyle, BSc** Northern Ireland Centre for Stratified Medicine, Ulster University  
**Devon Crouch** University of Liverpool  
**Cameron A. Czerpak** Johns Hopkins University  
**Michael L. De Ieso, PhD** Duke University  
**Cory Diemler** Jackson Laboratory  
**Ryan J. Donahue, PhD** Boston Children’s Hospital  
**Chelsey Doyle, BSc** Ulster University  
**Sana El Hajji** University of Montreal (CRCHUM)  
**Emma K. Geiduschek, BS** University of Wisconsin – Madison  
**Vidisha Goyal** Georgia Institute of Technology  
**Yinjie Guo, MD** Schepens Eye Research Institute, Massachusetts Eye and Ear Infirmary  
**Johanna Heimbucher, MSc** University of Regensburg  
**Cindy Hoppe, MSc** Schepens Eye Research Institute, Massachusetts Eye and Ear Infirmary  
**Kang-Chieh Huang** Indiana University Purdue University Indianapolis  
**Thomas V. Johnson, MD, PhD** Johns Hopkins University  
**Margarete Karg, PhD** Schepens Eye Research Institute of Mass Eye and Ear  
**Alireza Karimi, PhD** University of Alabama at Birmingham  
**Chenna Kesavulu Sugali, PhD** Indiana University School of Medicine, IUPUI  
**Bindu Kodati, PhD** University of North Texas Health Science Center  
**Arina Korneva, PhD** Johns Hopkins University School of Medicine  
**Emine Kubra Bilir, PhD** University of Liverpool  
**Ajay Kumar, PhD** University of Pittsburgh  
**Kazuhiro Kurokawa** Indiana University/ Legacy Health  
**Haiyan Li** SUNY Upstate Medical University  
**Katy C. Liu, MD, PhD** Duke University  
**Diana C. Lozano, PhD** Oregon Health and Science University  
**Margaret Maes, PhD** Institute of Science and Technology Austria  
**Olivia J. Marola, MS** University of Rochester  
**Nolan R. McGrady, PhD** Vanderbilt University Medical Center  
**Philip Mzyk, PhD** University of Wisconsin – Madison  
**Sarah Naguib, BA** Vanderbilt University

**Christina Nicou** University of South Florida  
**Kazuya Oikawa, BVSc, PhD** University of Wisconsin – Madison  
**Ramona Pawlak, MSc** University of Regensburg  
**Monichan H. Phay, PhD** Schepens Eye Research Institute, Massachusetts Eye and Ear Infirmary  
**Heberto Quintero, PhD** University of Montreal Hospital Research Center (CRCHUM)  
**Ester Reina-Torres, PhD** Imperial College London  
**Luis Sanchez, BS** University of California Los Angeles  
**Gabriela Sanchez Rodriguez** Universidad Carlos III de Madrid & Georgia Institute of Technology  
**Sailee Sham Lavekar, MS** Indiana University Purdue University Indianapolis  
**Heather Schmitt, PhD** Duke University  
**Magdalena Schneider, PhD** University of Regensburg  
**Yukihiro Shiga, MD, PhD** Montreal University Hospital Research Centre (CRCHUM)  
**Myoungsup Sim, PhD** Duke Eye Center, Duke University  
**Ayushi Singh, MS** SUNY Upstate Medical University  
**Jonathan Soucy, PhD** Schepens Eye Research Institute of Mass. Eye & Ear, Harvard Medical School  
**Avinash Soundararajan, PhD** Indiana University Purdue University Indianapolis  
**Markus Spurlok, BS** University of Miami Miller School of Medicine  
**Minh Thu Ma** Georgia Institute of Technology  
**Odalys Torne, DVM** University of Wisconsin-Madison  
**Arunkumar Venkatesan** SUNY Upstate Medical University  
**Deborah Villafranca Baughman, MSc** University of Montreal Hospital Research Center (CRCHUM)  
**Cydney A. Wong, BS** Georgia Institute of Technology  
**Hongli Yang** Legacy Health Research  
**Hannah Youngblood, BS** Augusta University

# Hotel Map and Schedule at a Glance



TUESDAY, MAY 24	WEDNESDAY, MAY 25	THURSDAY, MAY 26	FRIDAY, MAY 27
Registration	Registration	Registration	Registration
6:30 AM			
6:45 AM			
7:00 AM			
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9:00 PM			

■ FAST TRACK (add'l fee)

■ BREAKS/MEALS

■ SCIENTIFIC PROGRAM



# Fast Track Agenda

Tuesday, May 24

7:45 AM – 5:00 PM

- 7:45 AM**     **INTRODUCTION OF BRIGHTFOCUS GLAUCOMA FAST TRACK**  
Preeti Subramanian, PhD, BrightFocus Foundation
- INTRODUCTION OF FAST TRACK SPEAKERS**  
John Morrison, MD, Oregon Health and Science University
- 8:00 AM**     **CLINICAL GLAUCOMA**  
Leon Herndon, MD, Duke University
- 8:25 AM**     **EPIDEMIOLOGY AND PUBLIC HEALTH IMPACT OF GLAUCOMA**  
Anne Coleman, MD, PhD, University of California, Los Angeles
- 8:50 AM**     **Q AND A**
- 9:00 AM**     **HUMAN GLAUCOMA GENETICS**  
Michael Hauser, PhD, Duke University
- 9:25 AM**     **GLAUCOMA THERAPEUTICS IN THE PIPELINE AND THE FUTURE**  
Kate Bollinger, MD, Medical College of Georgia
- 9:50 AM**     **Q AND A**
- 10:00 AM**     **BREAK**
- 10:30 AM**     **OCT IN THE DIAGNOSIS AND MANAGEMENT OF GLAUCOMA**  
Joel Schuman, MD, New York University
- 10:55 AM**     **NEW OCT DEVELOPMENTS AND APPLICATION TO EXPERIMENTAL GLAUCOMA**  
Yali Jia, PhD, Oregon Health and Science University
- 11:20 AM**     **Q AND A**
- 11:30 AM**     **LUNCH**

- 12:30 PM**     **BIOMECHANICS OF ONH INJURY IN GLAUCOMA**  
Vicky Nguyen, PhD, Johns Hopkins University
- 12:55 PM**     **BIOMECHANICS OF OUTFLOW DYSFUNCTION IN GLAUCOMA**  
Mark Johnson, PhD, Northwestern University
- 1:20 PM**     **Q AND A**
- 1:30 PM**     **INDUCIBLE RODENT MODELS OF GLAUCOMATOUS OPTIC NERVE DAMAGE**  
Colleen McDowell, PhD, University of Wisconsin
- 1:55 PM**     **NON-RODENT MODELS OF GLAUCOMATOUS OPTIC NERVE DAMAGE**  
Gillian McLellan, PhD, University of Wisconsin
- 2:20 PM**     **Q AND A**
- 2:30 PM**     **BREAK**
- 3:00 PM**     **MECHANISMS OF AXONAL INJURY IN EXPERIMENTAL GLAUCOMA**  
Denise Inman, PhD, University of North Texas
- 3:25 PM**     **RGC INJURY IN GLAUCOMA**  
Richard Libby, PhD, University of Rochester
- 3:50 PM**     **Q AND A**
- 4:00 PM**     **EXPERIMENTAL MODELS TO STUDY TM PATHOLOGY**  
Abe Clark, PhD, University of North Texas
- 4:25 PM**     **CROSS-TALK BETWEEN GLAUCOMA PATHOGENIC SIGNALING PATHWAYS IN THE TM**  
Weiming Mao, PhD, Indiana University
- 4:50 PM**     **Q AND A**
- 5:00 PM**     **ADJOURN**
- 5:45 PM**     **KICKOFF RECEPTION**

# Detailed Program Schedule

WEDNESDAY, MAY 25

TIME	TITLE/EVENT	LOCATION
6:30 AM - 4:30 PM	Registration	Salon I-V Hallway
6:30 AM - 8:00 AM	Poster Setup	Lullwater Ballroom
7:00 AM - 8:00 AM	Breakfast	Dining Room
8:00 AM - 8:45 AM	<b>Keynote Lecture I</b> <b>Francesca Cordeiro, MD, PhD: "DARC as a Biomarker of Disease"</b> Moderator: Anne Coleman, MD, PhD	Emory Amphitheatre
8:45 AM - 10:05 AM	<b>Platform Session I</b> <b>Stress Management</b> Moderators: Ian Sigal, PhD and Vicky Nguyen, PhD	Emory Amphitheatre
8:45 AM - 9:01 AM	Rachel W. Kuchtey, MD, PhD: "Elastic Fiber Defects in Glaucoma Pathogenesis"	
9:01 AM - 9:17 AM	Terete Borrás, PhD, FARVO: "Matrix GLA (MGP) Ablation Increases Stiffness in the Trabecular Meshwork and Disrupts the Retinal Vasculature in Living Mice"	
9:17 AM - 9:33 AM	J. Crawford Downs, PhD, FARVO: "Simulating the Biomechanics of the Lamina Cribrosa Microstructure and Associated Neural Tissues"	
9:33 AM - 9:49 AM	Thao (Vicky) Nguyen, PhD: "OCT Measurement of In Vivo Deformation and Strain in the Human Lamina Cribrosa after Laser Suturelysis"	
9:49 AM - 10:05 AM	Ian A. Sigal, PhD: "The Strain that Broke the Axon's Back; Towards Axon-Centric Optic Nerve Head Biomechanics"	
10:05 AM - 10:30 AM	Break and Poster Viewing	Lullwater Ballroom
10:30 AM - 12:20 PM	<b>Platform Session II</b> <b>Translational Advances</b> Moderator: Kimberly Gokoffski, MD, PhD and Katy Liu, MD, PhD	Emory Amphitheatre
10:30 AM - 10:35 AM	Paul Kaufman, MD: "Special Tribute to Dr. Laszlo Z. Bito"	
10:35 AM - 10:52 AM	C. Ross Ethier, PhD: "Sustained IOP Lowering by a Novel Non-Surgical, Non-Pharmacologic Mechanism"	
10:52 AM - 11:09 AM	Gaurang C. Patel, PhD: "RNAi Based Approach for MYOC-Associated Glaucoma"	
11:09 AM - 11:26 AM	Tonia S. Rex, PhD: "Sustained Release Of EPO-R76E Protects Against Glaucoma by Activating Nrf2 Via the MAPK Pathway"	
11:26 AM - 11:43 AM	Cynthia L. Steel, MBA, PhD: "Preclinical Efficacy and Safety Profile of QLS-101, A Novel ATP-Sensitive Potassium Channel Opener for the Reduction of IOP"	
11:43 AM - 12:00 PM	Ariana M. Levin, MD: "The Bigger Picture: Use of Daily Round-the-Clock Intraocular Pressure Measurements for Understanding Glaucoma Progression"	
12:00 PM - 12:17 PM	Brad Fortune, OD, PhD: "Pharmacodynamic response of optic nerve head (ONH) tissue vasculature and blood flow after administration of PER-001, an endothelin receptor antagonist"	
12:20 PM - 1:45 PM	Lunch	Dining Room

1:45 PM - 3:30 PM	<b>Platform Session III</b> <b>Molecular Mechanisms</b> Moderators: Denise Inman, PhD and Pete Williams, PhD	Emory Amphitheatre
1:45 PM - 2:02 PM	Raquel L. Lieberman, PhD: "Benign or Pathogenic? Perplexing Variants of the Glaucoma-Associated Myocilin Olfactomedin Domain"	
2:02 PM - 2:19 PM	Pete Williams, PhD: "Targeting NMNAT2 for Neuroprotection in Glaucoma"	
2:19 PM - 2:36 PM	Yutao Liu, MD, PhD: "The Role of miR-182 in Conventional Outflow Pathway"	
2:36 PM - 2:53 PM	Colin E. Willoughby, MD, FRCOphth: "A Comparative Genome-wide Transcriptome Analysis of Glucocorticoid Responder and Non-responder Primary Human Trabecular Meshwork Cells"	
2:53 PM - 3:10 PM	Stanislav Tomarev, PhD: "miRNA Changes in Retinal Ganglion Cells After Optic Nerve Crush and Glaucomatous Damage"	
3:10 PM - 3:27 PM	Dorota Skowronska-Krawczyk, PhD: "Age-Related Response to Ocular Hypertension"	
3:30 PM - 4:00 PM	Break and Poster Viewing	Lullwater Ballroom
4:00 PM - 4:45 PM	<b>Keynote Lecture II</b> <b>Hao Zhang, PhD: "Multiscale Imaging for Glaucoma Research, from Single Molecules to Humans"</b> Moderator: Joel Schuman, MD, FACS	Emory Amphitheatre
4:45 PM - 5:30 PM	Break and Posting Viewing	Garden Overlook
5:30 PM - 7:00 PM	Dinner	Dining Room
7:00 PM - 9:00 PM	Reception and Poster Session 7:00 PM - 8:00 PM Even numbered posters 8:00 PM - 9:00 PM Odd numbered posters	Lullwater Ballroom



## THURSDAY, MAY 26

TIME	TITLE/EVENT	LOCATION
7:00 AM - 6:20 PM	Registration	Salon I-V Hallway
7:00 AM - 8:00 AM	Breakfast	Dining Room
8:00 AM - 8:45 AM	<b>Keynote Lecture III</b> <b>Malú Gámez Tansey, PhD: "Neuroinflammation in Neurodegenerative Disease: Nexus of Glaucoma, Parkinson's disease, and Alzheimer's and Related Dementias"</b> Moderator: Diane Bovenkamp, PhD	Emory Amphitheatre
8:45 AM - 10:05 AM	<b>Platform Session IV</b> <b>NextGen Glaucoma</b> Moderators: Yiqin Du, MD, PhD and Xiaorong Liu, PhD	Emory Amphitheatre
8:45 AM - 8:58 AM	Ester Reina-Torres, PhD: "Nitric Oxide Mediates Rapid IOP-Dependent Homeostatic Regulation of Aqueous Humour Outflow in Mice"	
8:58 AM - 9:11 AM	Ajay Kumar, PhD: "Stem Cell Secretome as a Potential Treatment for Steroid-Induced and Primary Open-Angle Glaucoma Models"	
9:11 AM - 9:24 AM	Olivia J. Marola, MS: "MKK4 and MKK7 Control Retinal Ganglion Cell Soma Loss, Axonal Degeneration, and Dendritic Remodeling after Glaucoma-Relevant Injury"	
9:24 AM - 9:37 AM	Yukihiro Shiga, MD, PhD: "Live Two-Photon Calcium Imaging in Retinal Ganglion Cells: Characterization of Early Changes in a Mouse Glaucoma Model"	
9:37 AM - 9:50 AM	Margarete Karg, PhD: "Sustained Reversal of Glaucoma-Induced Vision Loss by in Vivo Epigenetic Reprogramming"	
9:50 AM - 10:03 AM	Kazuhiro Kurokawa: "Measuring Cumulative Loss of Ganglion Cell Layer Somas in Normal and Glaucomatous Subjects"	
10:05 AM - 10:30 AM	Break and Poster Viewing	Lullwater Ballroom
10:30 AM - 12:30 PM	<b>Platform Session V</b> <b>Inflammation and Glial Activation</b> Moderators: Harry Quigley, MD and Milica Margeta, MD, PhD	Emory Amphitheatre
10:30 AM - 10:47 AM	Milica A. Margeta, MD, PhD: "APOE4 Ameliorates Microglial Cytotoxicity and Neurodegeneration in Glaucoma"	
10:47 AM - 11:04 AM	Kin-Sang Cho, PhD: "Novel Function of Insulin Like Growth Factor Binding Protein-Like 1 (IGFBPL1) Against Microglia Activation and Protects Glaucomatous Degeneration"	
11:04 AM - 11:21 AM	Markus Kuehn, PhD: "Passive Transfer of Mononuclear Cells from POAG Donors Confers Retinal Ganglion Cell Loss in Recipient Mice"	
11:21 AM - 11:38 AM	Rudolf Fuchshofer, PhD: "Decorin - An Antagonist of TGF-B in Astrocytes of the Optic Nerve"	
11:38 AM - 11:55 AM	Qi N. Cui, MD, PhD: "The GLP-1 Receptor Agonist NLY01 Reduces Neuroinflammation and Protects Against Neuron Loss in Ocular Hypertension"	
11:55 AM - 12:12 PM	Valery Shestopalov: "Inflammasome Facilitates Ganglion Cell Dysfunction and Loss in Ocular Hypertension Glaucoma"	
12:12 PM - 12:29 PM	Claire Mitchell, PhD: "Signaling Pathways that Link IOP Elevation with Retinal Microglial Activation and IL-1 $\beta$ Release"	
12:30 PM - 1:45 PM	Lunch	Dining Room

1:45 PM - 3:45 PM	<b>Platform Session VI</b> <b>Insights From Novel Models and Approaches</b> Moderators: J. Crawford Downs, PhD, FARVO and Claire Mitchell, PhD	Emory Amphitheatre
1:45 PM - 2:02 PM	TJ Hollingsworth, BS, PhD: "Mining the BXD Family of Mice to Model the Natural Progression of Glaucoma"	
2:02 PM - 2:19 PM	Sabrina Reinehr, Dr. rer. nat.: "Enhanced Optic Nerve and Retinal Ganglion Cell Degeneration in a new Multifactorial Glaucoma Animal Model"	
2:19 PM - 2:36 PM	Matthew B. Veldman, PhD: "SREBF2 is Necessary for Efficient Optic Nerve Regeneration in Zebrafish"	
2:36 PM - 2:53 PM	Carl Romano, PhD: "ANGPTL7 Gene Silencing and Knockdown lowers IOP"	
2:53 PM - 3:10 PM	Francisco M. Nadal-Nicolas, PhD: "Establishing the Ground Squirrel as a Model for Exploring Optic Neuropathologies, Neurodegeneration and Neuroprotection"	
3:10 PM - 3:27 PM	John Kuchtey, PhD: "Mice Carrying an A387T Variant of ADAMTS10 Recapitulate Phenotypes of Weill-Marchesani Syndrome"	
3:27 PM - 3:44 PM	Jason S. Meyer, PhD: "Human Stem Cell-Derived Retinal Ganglion Cells Carrying a Glaucoma-Causing Mutation Exhibit Neurodegenerative Phenotypes and are Sensitive to the Effects of Diseased Astrocytes"	
3:45 PM - 4:15 PM	Break and Poster Viewing	Lullwater Ballroom
4:15 PM - 5:35 PM	<b>Platform Session VII</b> <b>Structural and Functional Neuroenhancement</b> Moderators: Luca Della Santina, PharmD, PhD and Judith West-Mays, PhD	Emory Amphitheatre
4:15 PM - 4:31 PM	Paloma B. Liton, PhD: "Autophagy Deficiency Protects Against IOP Elevation and Offers Neuroprotection in Experimental and Chronic Glaucoma Mouse Models"	
4:31 PM - 4:47 PM	Luca Della Santina, PhD: "Rod Pathway Asymmetries Following to Transient Intraocular Pressure Elevation"	
4:47 PM - 5:03 PM	Simon Kaja, PhD: "Functional Effects of Optic Nerve Head Astrocyte-derived Extracellular Vesicles"	
5:03 PM - 5:19 PM	Jiaxing Wang, MD, PhD: "Robust Optic Nerve Regeneration in a Mouse Mutant"	
5:19 PM - 5:35 PM	Matthew J. Van Hook, PhD: "Loss of RGC Synaptic Outputs to the Visual Thalamus in a Mouse Model of Glaucoma"	
5:35 PM - 6:20 PM	<b>Keynote Lecture IV</b> <b>Gareth Howell, PhD: "The Benefits of Studying Eyes and Brains to Uncover Common Mechanisms of Neurodegenerative Diseases"</b> Moderator: Rick Libby, PhD	Emory Amphitheatre
6:30 PM - 9:00 PM	Awards Reception and Dinner	Lullwater Ballroom

## FRIDAY, MAY 27

TIME	TITLE/EVENT	LOCATION
7:00 AM - 12:30 PM	Registration	Salon I-V Hallway
7:00 AM - 8:00 AM	Breakfast	Dining Room
8:00 AM - 8:45 AM	<b>Keynote Lecture V</b> <b>Mark Johnson, PhD: "The Role of the Inner Wall of Schlemm's Canal in Ocular Hypertension"</b> Moderator: Thom Freddo, OD, PhD	Emory Amphitheatre
8:45 AM - 10:05 AM	<b>Platform Session VIII</b> <b>Modulation and Enhancement of Outflow Function</b> Moderators: John Danias, MD, PhD and Samuel Herberg, PhD	Emory Amphitheatre
	8:45 AM - 9:01 AM Michael P. Fautsch, PhD: "Effect of ATP-Sensitive Potassium (KATP) Channel Openers on Intraocular Pressure (IOP) and Aqueous Humor Dynamics in Preclinical Ocular Hypertensive Models"	
	9:01 AM - 9:17 AM Haiyan Gong, MD, PhD: "Schlemm's Canal Endothelium Cellular Connectivity in Giant Vacuole and Pore Formation in Different Flow Regions: A 3D Electron Microscopy Study"	
	9:17 AM - 9:33 AM Yiqin Du, MD, PhD: "Stem Cell Effects on Myocilin Mutant TM Cells and on a Mouse Model with Myocilin Mutation"	
	9:33 AM - 9:49 AM Samuel Herberg, PhD: "TGFβ2 Modulates YAP/TAZ Activity in Human Trabecular Meshwork Cells Through ERK and ROCK Signaling Pathways"	
	9:49 AM - 10:05 AM Vasantha Rao Ponugoti, PhD: "Glypican-4 Activated Wnt5 PCP Pathway-Induced Actin Cytoskeletal Reorganization is a Predominant Response in Trabecular Meshwork Cells Treated with Dexamethasone"	
10:05 AM - 10:30 AM	Break and Poster Viewing	Lullwater Ballroom
10:30 AM - 12:30 PM	<b>Platform Session IX</b> <b>The Last Word in Glaucoma</b> Moderators: Janey Wiggs, MD and Brad Fortune, OD, PhD	Emory Amphitheatre
	10:30 AM - 10:47 AM Michael G. Anderson, PhD: "Mechanism of APBB2 Contributions to Glaucoma"	
	10:47 AM - 11:04 AM Cindy Hoppe, MSc: "Inhibiting the Alternative Complement Pathway is Neuroprotective in a Microbead-Induced Mouse Model of Glaucoma"	
	11:04 AM - 11:21 AM Ryan J. Donahue, PhD: "Bax Activation in Damaged Retinal Ganglion Cells in Vivo Occurs in Two Distinct and Delayed Stages"	
	11:21 AM - 11:38 AM Christina Nicou: "IOP Variability in Conscious Rats"	
	11:38 AM - 11:55 AM Wennan Lu, PhD: "Morphologic Changes to Microglial Cells Accompany Stimulation of the P2X7 Receptor in the Retina"	
	11:55 AM - 12:12 PM Michael Risner, PhD: "Axon Development in Human Derived Retinal Ganglion Cells"	
	12:12 PM - 12:29 PM Harry Quigley, MD: "Aquaporins Absent and Specialized Junctional Complexes: Unique Astrocyte Phenotype in Nerve Head Across Species Shows Lack of Glymphatic Pathway"	
12:30 PM - 1:45 PM	Lunch	Dining Room
12:30 PM - 1:45 PM	Poster Tear Down	Lullwater Ballroom

# KEYNOTE SPEAKERS



## **Francesca Cordeiro, MD, PhD**

**University College London and Imperial College  
London, United Kingdom**

Francesca Cordeiro is Chair and Professor of Ophthalmology at Imperial College London, Honorary Consultant Ophthalmologist and Research Lead at the Western Eye Hospital, Imperial College Healthcare NHS Trust and Director of the Imperial College Ophthalmology Research Group (ICORG) Clinical Trials Research Unit (CTU). She is also Professor of Glaucoma and Retinal Neurodegeneration, at the Institute of Ophthalmology, University College London (UCL).

She qualified in medicine from St Bartholomew's Hospital University of London and completed training in general and surgical ophthalmology at Moorfield's Eye & St Thomas' Hospitals in London in 2003, following her PhD at UCL in 1998.

Her research is translational - applying molecular and biological approaches to the treatment or pathogenesis of retinal neurodegenerative diseases, including glaucoma, Alzheimer's, Parkinson's, optic neuritis and diabetes. Early clinical trials stemming from basic science research are performed in the Imperial College Ophthalmology Research Group (ICORG) Clinical Trials Unit, and the aims of this work are to establish new methods of diagnosis of early disease to avoid disability, identify early markers of cell processes in neurodegenerative disease and investigate therapeutic approaches including novel modes of drug delivery and improved treatment strategies.

Title: **DARC as a Biomarker of Disease**



## **Gareth Howell, PhD**

**Department of Ophthalmology, The Jackson Laboratory, Maine**

Gareth Howell is an Associate Professor, Diana Davis Spencer Foundation Chair for Glaucoma Research at the Jackson Laboratory. He received his PhD in Comparative Genome Mapping at The Sanger Institute in Hinxton, United Kingdom.

For almost fifteen years Dr. Howell's research has aimed to understand the contributions of neuroinflammation – particularly innate immune responses – to neurodegenerative diseases. Due to his training at The Wellcome Trust Sanger Institute and The Jackson Laboratory (JAX), he initially used genetic and genomic approaches to show neuroinflammation and vascular changes were early components of glaucoma. He performed this work as a Research Scientist in the lab of Howard Hughes Investigator Dr. Simon John. When he established his own lab at JAX in 2012, he expanded his interests and applied similar approaches to identify mechanisms involved in neuroinflammation and cerebrovascular health in the aging brain and in mouse models of Alzheimer's disease.

It became clear that existing models of particularly Alzheimer's disease and related dementias were limited and findings in mice had failed to translate to successes in clinical trials. Therefore, the major aim of his lab has become to work collaboratively to develop models of dementia that more faithfully recapitulate human forms of dementia. This led to the establishment in 2016 of the NIA-funded MODEL-AD (Model Organisms Development and Evaluation for Late-Onset Alzheimer's Disease). This collaboration between JAX, Indiana University, Sage Bionetworks, University of Pittsburg and University California Irvine aims to create more than 50 new models relevant to Late-Onset Alzheimer's Disease.

Dr. Howell's lab is also pioneering the use of genetically distinct mouse strains (such as wild-derived strains CAST/EiJ, WSB/EiJ and PWK/PhJ) as more conducive genetic backgrounds for studying neurodegenerative diseases including glaucoma and dementias.

**Title: The Benefits of Studying Eyes and Brains to Uncover Common Mechanisms of Neurodegenerative Diseases**





## **Mark Johnson, PhD**

**Department of Biomedical Engineering, Northwestern University  
Chicago, Illinois**

Mark Johnson is a Professor of Biomedical Engineering, Mechanical Engineering, and Ophthalmology at the Northwestern University McCormick School of Engineering. He received his PhD in Mechanical Engineering from the Massachusetts Institute of Technology (MIT).

Dr. Johnson's research interests have been focused on ocular biomechanics, particular with regards to the pathogenesis of glaucoma and age-related macular degeneration. Studies in his group involve a bioengineering approach that utilize perfusion studies, atomic force microscopy and theoretical analysis in combination with use of high-resolution morphometry and finite element modeling. More generally, his work has been involved in the study of a variety of physiological transport and mechanics problems including flow through the aqueous humor outflow pathways as relates to glaucoma, transport and mechanics of the arterial wall, transport through the cornea, transport through macromolecular gels such as hyaluronic acid and Matrigel, and transport through Bruch's membrane. Recently, his group has been studying cell mechanics, particularly the role of the cortex, and novel mechanism of targeted drug delivery for treating glaucoma.

**Title: The Role of the Inner Wall of Schlemm's Canal in Ocular Hypertension**



### **Malú Gámez Tansey, PhD**

**Center for Translational Research in Neurodegenerative Disease, University of Florida  
Gainesville, Florida**

Malú Gámez Tansey obtained her BS/MS in biological sciences from Stanford University and her PhD in physiology from The University of Texas Southwestern Medical Center in Dallas, Texas. Dr. Tansey spent two years in the biotech sector in Los Angeles after post-doctoral training at Washington University in St. Louis before returning to academia as an assistant professor of physiology at UT Southwestern. She became a tenured associate professor of physiology in 2008 at UTSW and moved to Emory University in Atlanta in 2009 where she became professor of physiology and director of the Center for Neurodysfunction and Inflammation.

She is now a professor of neuroscience and director of the Center for Translational Research in Neurodegenerative Disease and the first endowed chair of the Fixel Institute for Neurological Diseases at the University of Florida in Gainesville. The general research interests of Dr. Tansey's laboratory include investigating mechanisms underlying the role of immune and inflammatory responses in health and disease, in particular the role and regulation of central and peripheral inflammatory and immune system responses in modulating the gene-environment and gut-brain axis interactions that determine risk for development and progression of neurodegenerative diseases like Parkinson's disease, Alzheimer's and related dementias, and neuropsychiatric diseases like depression.

**Title: Neuroinflammation in Neurodegenerative Disease: Nexus of Glaucoma, Parkinson's disease, and Alzheimer's and Related Dementias**



## **Hao Zhang, PhD**

**Department of Biomedical Engineering, Northwestern University  
Chicago, Illinois**

Hao F. Zhang is a Professor of Biomedical Engineering and Ophthalmology (by courtesy) at Northwestern University. He received his Bachelor's and Master's degrees from Shanghai Jiao Tong University (Shanghai, China) in 1997 and 2000, respectively, and his Ph.D. degree from Texas A&M University (College Station, Texas) in 2006. From 2006 to 2007, he was a post-doctoral fellow at Washington University in St. Louis. He and colleagues reported the first demonstration of photoacoustic microscopy (Nature Biotechnology 2006, Nature Protocols 2007, PNAS 2010, Nature Communications 2019), spectroscopic super-resolution imaging (Nature Communications 2016, Optica 2019, Light: Science and Applications 2020), visible-light optical coherence tomography (Light: Science and Applications 2016), and the first observation of intrinsic stochastic fluorescence emission from DNA (PNAS 2016). He received the NSF CAREER award and NIH Director's Challenge Award in 2010, the NIH IMPACT award in 2015, the SPIE Translational Research Award in 2016, and the US National Academy of Sciences Cozzarelli Prize in 2017. His research interests include optical coherence tomography, super-resolution imaging, ophthalmology and vision science, and genomics. In 2015, he co-founded Opticent Health to commercialize visible-light optical coherence tomography.

**Title: Multiscale Imaging for Glaucoma Research, from Single Molecules to Humans**

# Platform Session Moderators

## **Diane Bovenkamp, PhD**

**[dbovenkamp@brightfocus.org](mailto:dbovenkamp@brightfocus.org)**

Diane Bovenkamp, PhD, Vice President of Scientific Affairs, oversees the global scientific operations for BrightFocus and serves as the scientific liaison for the organization in local, national, and international forums. Dr. Bovenkamp obtained her PhD in Biochemistry from Queen's University in Kingston, Ontario, Canada, discovering and studying Eph receptors in angiogenesis and neural development in zebrafish and mice. She completed a Postdoctoral Fellowship in the Vascular Biology Program at Boston Children's Hospital/Harvard Medical School, isolating and characterizing zebrafish neuropilins. Dr. Bovenkamp conducted further research at the Johns Hopkins University Bayview Proteomics Center in the Division of Cardiology at Johns Hopkins School of Medicine in Baltimore, Maryland, using proteomic techniques for biomarker detection in human serum. Prior to assuming her current position, Dr. Bovenkamp served as the Scientific Program Officer and Science Communications Specialist at BrightFocus, and as Director of Science Information and Programs at Foundation Fighting Blindness.

## **Anne L. Coleman, MD, PhD**

**[coleman@isei.ucla.edu](mailto:coleman@isei.ucla.edu)**

Dr. Coleman is the Fran and Ray Stark Professor of Ophthalmology at the Jules Stein Institute, David Geffen School of Medicine, UCLA, and Professor of Epidemiology at the UCLA Fielding School of Public Health. She is the Director for the UCLA Center for Eye Epidemiology, the Mobile Eye Clinic, and the Center for Community Ophthalmologists and Vision Health. She is a member of the U.S. Food and Drug Administration Ophthalmic Devices Panel, the U.S. Cochrane Collaboration Eyes and Vision Steering Group, the Board of Trustees of Helen Keller International and the ARVO Awards Committee. She is the Chair of the NEI's National Eye Health Education Program Planning Committee, Director of the H. Dunbar Hoskins, Jr. M.D. Center for Quality Eye Care, executive editor of glaucoma for the American Journal of Ophthalmology, as well as the Secretary of Quality of Care for the American Academy of Ophthalmology.

## **John Danias, MD, PhD**

**[John.Danias@downstate.edu](mailto:John.Danias@downstate.edu)**

Dr. John Danias is a tenured Professor of Ophthalmology and Cell Biology and the Chair of Ophthalmology at SUNY – Downstate HSU, in New York. He is practicing clinical ophthalmology while at the same time engaging in research on glaucomatous neurodegeneration and steroid-induced glaucoma.

A devoted clinician-scientist, he has a busy medical and surgical glaucoma practice. He is credited with developing innovative methods for accurately quantifying retinal ganglion cell loss and measuring the intraocular pressure non-invasively in animal glaucoma models. His work on complement in glaucoma has received the prestigious Lewis Rudin Award from the NY Academy of Medicine.

Dr Danias is the principal investigator on an NIH sponsored grant and is involved in a number of other ongoing research projects. Ultimately, he hopes to transfer knowledge gained from basic research into clinical practice and contribute to the advancement of academic ophthalmology.

**Luca Della Santina, PharmD, PhD**  
**Luca.DellaSantina@ucsf.edu**

Dr. Santina is an assistant professor at UCSF and at University of Houston. His research on animal models of glaucoma focuses on retinal connectivity, type-specific ganglion cell function and synaptic plasticity following to intraocular pressure elevation. His laboratory also develops novel computer vision approaches based on deep learning for clinical image analysis and early detection of ocular diseases.

**J. Crawford Downs, PhD, FARVO**  
**cdowns@uab.edu**

J. Crawford Downs received his PhD in biomedical engineering from Tulane University and is now Professor of Ophthalmology and Visual Sciences at the University of Alabama at Birmingham. He studies the biomechanics and mechanobiology of the optic nerve head (ONH), sclera, and lamina cribrosa to better understand the pathophysiology of glaucoma. Dr. Downs uses the unilateral, inducible model of glaucoma in nonhuman primates, instrumented with radio-telemetry that records continuous intraocular, arterial, and intracranial pressures. He uses these data, along with 3D reconstructions of ONH geometry, as inputs to numerical simulations of ONH biomechanics in nonhuman primate and human donor eyes.

**Yiqin Du, MD, PhD**  
**duy@upmc.edu**

Dr. Du is an associate professor in the Departments of Ophthalmology and Developmental Biology at University of Pittsburgh. Her research focuses on stem cell biology as well as regeneration and reconstruction of the trabecular meshwork for glaucoma and of the corneal stroma for corneal disease using stem cells and stem cell-derived extracellular vesicles/secretome. She employs in vitro, ex vivo, and in vivo models to explore the effects and mechanisms of different types of stem cells and their trophic factors and to investigate new therapies for glaucoma and corneal disease.

**Brad Fortune, OD, PhD**  
**BFortune@deverseye.org**

Dr. Fortune began working in vision research over 30 years ago as an undergraduate research assistant in Barbara Finlay's lab at Cornell, followed by clinical training in optometry at SUNY, residency at the SFVAMC, graduate program in vision sciences graduate at UC-Berkeley and post-doctoral fellowship at Devers Eye Institute, where he remains primarily active in glaucoma research, translational and clinical:

- Measurement of vision function in human glaucoma and experimental models of glaucoma
- Electrophysiological assessment of vision function in human and experimental retinal disease models
- Imaging retinal nerve fiber layer and optic nerve head structure, correlations with vision function
- Glaucoma pathogenesis, axonal transport, neurovascular coupling, ocular blood flow



**Thomas F. Freddo OD, PhD, FAAO**  
**tffreddo@gmail.com**

Dr. Freddo is an experienced Clinician/Scientist educator, author and researcher, semi-retired from working in the hospital & academic health care industry. Skilled in Clinical and Basic Research, Ophthalmology /optometry, Medicine/Pathology, and successful NIH AND SBIR grant writing. Service on several Foundation and educational boards as well as consulting and grant writing for medical device and ophthalmic pharma companies, and academic consulting as Fulbright Senior specialist. Experience on NIH committees, including SBIR review and in elected office as President of the International Society for Eye Research. Most recently, service on World Health Organization committee related to eyecare delivery.

**Kimberly Gokoffski, MD, PhD**  
**kimberly.gokoffski@med.usc.edu**

Dr. Gokoffski is an Assistant Professor in the Department of Ophthalmology at the University of Southern California Roski Eye Institute. She practices as a Neuro-Ophthalmologist, treating patients with optic nerve disease and strabismus. She is supported by a K08 award from the NEI and a foundation grant from the Brightfocus Foundation. She directs a multi-disciplinary research group whose aim is to develop electric field application into a technology that will help regenerate the optic nerve. Specifically, her team is using electric fields to promote retinal ganglion cell survival and direct axon regeneration to appropriate targets in the brain.

**Samuel Herberg, PhD**  
**HerbergS@upstate.edu**

Dr. Samuel Herberg is an Assistant Professor in the Department of Ophthalmology and Visual Sciences at SUNY Upstate Medical University. His research is centered around understanding cellular and biomechanical aspects of outflow tissue dysfunction in primary open-angle glaucoma. Dr. Herberg's interdisciplinary training in cell biology, bioengineering, and regenerative medicine informs the innovative use of ECM biopolymer hydrogels to model the cellular, molecular, and biomechanical properties of the native outflow tissues. He uses these engineered 3D tissue replicas to interrogate the involvement of mechanoregulatory pathways and epigenetic modifications in progressive tissue dysfunction in glaucoma.

**Denise Inman, PhD**  
**Denise.Inman@unthsc.edu**

Dr. Inman is an Associate Professor at the University of North Texas Health Science Center. Her laboratory investigates the mechanisms of glaucoma, with an emphasis on how neurons and glial cells interact during the process of neurodegeneration. Her research has implicated metabolism in the pathogenesis of glaucoma, finding that transfer of energy substrate is compromised and mitochondria are dysfunctional prior to axon loss. Restoration of metabolic transporters can protect retinal ganglion cells from degeneration and sustain mitochondria function. These observations offer new targets for therapeutic development.

**Richard T. Libby, PhD**

**Richard\_Libby@URMC.Rochester.edu**

Dr. Libby did his doctoral work on the role of extracellular matrix in retinal development in Dr. William Brunken's laboratory (Boston College). After completion of his doctorate, he studied Usher Syndrome as a postdoctoral fellow in Dr. Karen Steel's Hereditary Deafness Group at the Medical Research Council's Institute for Hearing Research (Nottingham England). He continued his postdoctoral training in Dr. Simon John's laboratory (The Jackson Laboratory) where he began to study glaucomatous neurodegeneration. After he left Dr. John's laboratory, he started his own laboratory at the University of Rochester Medical Center focused on identifying the cell death pathways controlling retinal ganglion cell death in glaucoma. Currently, Dr. Libby is a Professor of Ophthalmology and Biomedical Genetics and Senior Associate Dean for Graduate Education and Postdoctoral Affairs at the University of Rochester Medical Center.

**Katy Liu, MD, PhD**

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Dr. Liu received her BS from Princeton University and MD/PhD from the University of North Carolina Chapel Hill. She completed her ophthalmology residency and fellowship at Duke University and joined the faculty as Medical Instructor in 2020. Her research interests include roles of the immune system in the outflow tract of the eye, intraocular pressure regulation, and glaucoma, with a special clinical interest in treating patients with uveitic glaucoma.

**Xiaorong Liu, PhD**

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Dr. Liu is an Associate Professor in the Departments of Biology and Psychology at the University of Virginia. Her research focuses on studying visual system degeneration in mouse models of experimental glaucoma. Specifically, she is interested in characterizing early signs of retinal ganglion cell (RGC) degeneration for better diagnosis of the disease. In collaboration with Dr. Hao Zhang at Northwestern University, her lab is developing an innovative imaging modality, the visible light-OCT fibergram (vis-OCTF), for quantification and tracking of changes in RGC axon bundles in vivo. She is also interested in studying neuroprotective signals for vision preservation with disease progression.

**Milica Margeta, MD, PhD**

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Dr. Margeta is an Assistant Professor of Ophthalmology at the Harvard Medical School and a full-time faculty member of the Massachusetts Eye and Ear Glaucoma Service. She is an NIH-funded clinician scientist whose primary research interest is in the role of neuroinflammation and microglia in the pathogenesis of glaucoma, with the ultimate goal of developing novel neuroprotective treatments for this blinding disease.

**Claire Mitchell, PhD**  
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Dr. Mitchell's research links mechanical strain with ion channel activation and inflammatory responses, integrating reactions in retinal ganglion cells, optic nerve head astrocytes and microglia. Her work demonstrates that acute and chronic elevations in IOP lead to mechanosensitive release of ATP through pannexin hemichannels, with subsequent stimulation of P2X7 receptors and activation of the NLRP3 inflammasome. Her investigations into the impact of lysosomal compromise on inflammatory signaling has particular relevance for microglial cells in aging neurodegenerations like glaucoma. Dr. Mitchell is currently a Vice President for ISER representing the Americas.

**Vicky Nguyen, PhD**  
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Dr. Nguyen received her BS from MIT in 1998, and MS and PhD from Stanford in 2004, all in mechanical engineering. She joined Johns Hopkins University in 2007 and is currently Professor and The Marlin U. Zimmerman Faculty Scholar in Mechanical Engineering, with secondary appointments in Materials Science and Ophthalmology. Dr. Nguyen's research encompasses growth and remodeling of collagenous tissues and ocular biomechanics. Dr. Nguyen's research in ocular biomechanics is focused on modeling and characterization of the structure and mechanical behavior of the sclera and optic nerve head. Her work has been supported by NIH/NEI, NSF, the BrightFocus Foundation, and the DoD Vision Research Program.

**Harry Quigley, MD**  
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Dr. Quigley, the A. Edward Maumenee Professor of Ophthalmology at Wilmer, Johns Hopkins, has been CEO of ARVO and Editor-in-chief of IOVS. His 440 publications are the most cited in the ophthalmic literature: h-index=131, 82,000 citations. He received the Friedenwald, Joanne Angle and Epstein Mentoring Awards by ARVO, Doyne Medal and multiple awards from RPB, Alcon, and the Lewis Rudin Prize. He is a Life Achievement Honor Awardee of AAO, having given 47 named lectures, including the AAO Jackson Lecture. He has trained 70 glaucoma clinician--scientists who lead glaucoma centers worldwide. His research improved diagnosis of glaucoma, was first to report on success with laser iridotomy and his trabeculectomy suturing technique was widely adopted. He pioneered studies of glaucoma epidemiology, conceptualized the roles for iris and choroid in angle closure, performed the first neuroprotection gene therapy, and initiated scleral neuroprotection research and developed glaucoma models in monkeys, rats and mice.

**Joel Schuman, MD, FACS**  
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Dr. Schuman is Director of the NYU Langone Eye Center, Professor and Chairman of Ophthalmology and Professor of Neuroscience and Physiology at NYU Langone Health, NYU School of Medicine, and Professor of Biomedical Engineering at NYU Tandon School of Engineering. Dr. Schuman and his colleagues were first to identify a molecular marker for human glaucoma, published in Nature Medicine in 2001. Continuously funded by the National Eye Institute as a principal investigator since 1995, he is an inventor of optical coherence tomography (OCT), used world-wide for ocular diagnostics. Dr. Schuman has published more than 400 peer-reviewed scientific journal articles.

**Ian Sigal, PhD**

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Dr. Sigal is Associate Professor of Ophthalmology and Bioengineering at the University of Pittsburgh. He received a BSc in Physics from UNAM in México City (1999), a MASc in Aerospace Engineering from the University of Toronto, Canada (2001), and a PhD in Mechanical Engineering also from the University of Toronto, Canada (2006). Dr. Sigal has dedicated his scientific career to the study of biomechanics-related diseases of the eye, and to glaucoma in particular. Current projects include the development of novel techniques to visualize and characterize connective tissue architecture and biomechanics, and the study of in-vivo effects of intraocular and intracranial pressures on the eye.

**Judith West-Mays, PhD**

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Dr. West-Mays is a Professor in the Department of Pathology and Molecular Medicine, and Associate Member in Biomedical Engineering, Faculty of Engineering at McMaster University, Canada. She is also the Assistant Dean of the Medical Sciences Graduate Program, the largest graduate program at McMaster. Her research expertise is in molecular biology and genetics of vision and she has held multiple grants from the NIH and CIHR for investigating genes and molecular mechanisms involved in eye development and ocular disease, with emphasis on genes causing cataracts and glaucoma.

**Janey Wiggs, MD, PhD**

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Dr. Wiggs is the Paul Austin Chandler Professor of Ophthalmology at Harvard Medical School, Vice Chair for Ophthalmology Clinical Research, and Associate Director of the Ocular Genomics Institute. She received her PhD in biochemistry from the University of California at Berkeley, her MD from Harvard, and ophthalmology residency and glaucoma fellowship at Mass. Eye and Ear. Dr. Wiggs' research program is focused on the discovery and characterization of genetic factors that contribute to glaucoma. She currently serves on a number of editorial and scientific advisory boards, and is an elected member of the National Academy of Medicine

**Pete Williams, PhD**

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Dr. Williams received his BSc. (Hons) in Biomedical Sciences - Neuroscience and PhD in Visual Neuroscience and Molecular Biology from Cardiff University, U.K., before a postdoctoral fellowship with HHMI Prof. Simon John at The Jackson Laboratory, ME, U.S.A. Since 2018 he has been an Assistant Professor in Medical Sciences and a Research Group Leader at Karolinska Institutet and St. Erik Eye Hospital, Stockholm, Sweden. The overarching theme of his research program is to explore how bioenergetic insufficiency drives neurodegeneration and to identify novel neuroprotective therapies based on these data.

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# CONCEPTS AND BREAKTHROUGHS IN GLAUCOMA

ISER/BRIGHTFOCUS 2022 Glaucoma Symposium

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