

INTERNATIONAL RETINAL RESEARCH FOUNDATION

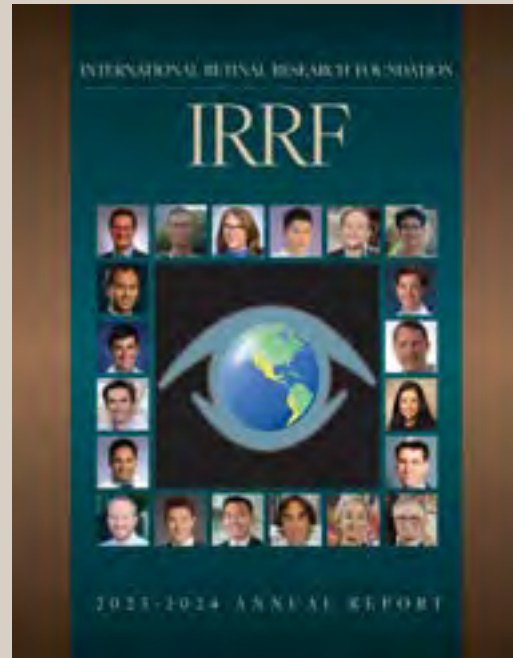
IRRF



2023 - 2024 ANNUAL REPORT

THE IRRF

2023-2024 ANNUAL REPORT



ON THE COVER

The cover of this annual report features a photo collage representing the work of scientists supported by the IRRF over the past two years. Each researcher contributes to key areas of retinal research, including gene therapy, regenerative medicine, retinal imaging, and disease mechanisms.

Together, their efforts reflect the foundation's commitment to advancing scientific discovery and developing innovative treatments for retinal diseases. This collective work drives progress in diagnostics, therapeutic approaches, and the preservation and restoration of vision.

Sandra Blackwood, Editor
(Unless otherwise noted) Photos: Sandra Blackwood
Design: Robert Weathers

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International Retinal Research Foundation

CONTENTS



3 | THE CALLAHAN ENDOWED CHAIR

The IRRF pledged \$1.5 million to establish an endowed chair at UAB honoring Dr. Michael A. Callahan. This prestigious gift will support ophthalmology research, global collaboration, and innovation in vision science.

4 | THE 2023 KELMAN SCHOLAR

Dr. Marco Bassetto and a UCI research team identified CRALBP's crucial role in retinal pigment epithelium (RPE) cells in supporting photoreceptor function. Their findings clarify therapeutic targets for CRALBP gene therapies in retinal disease treatment.

6 | THE 2023 RICH SCHOLAR

Dr. Joel Jovanovic was named the 2023 Loris and David Rich Postdoctoral Scholar for his research on Müller glia's regenerative potential in retinal degeneration. His work explores how gene inactivation influences retinal repair, advancing potential treatments for vision loss.

7 | THE 2023 CALLAHAN SCHOLAR

Dr. Zhiquan Liu is developing a CRISPR-based gene therapy for PDE6A-related retinitis pigmentosa. His research at Stanford focuses on refining base-editing techniques to correct genetic mutations, aiming for targeted treatment of this degenerative eye disease.

8 | THE 2024 KELMAN SCHOLAR

Dr. Kevin Zhang is investigating new pathways in age-related macular degeneration using high-sensitivity proteomics. As the inaugural iPOWER resident at Penn, his work bridges research and clinical training to advance retinal disease understanding.



9 | THE 2024 RICH SCHOLAR

Dr. Deng, working at Stanford, is investigating glia-vasculature interactions in retinal diseases. His research aims to uncover molecular mechanisms that could lead to new insights into vascular-related eye disorders.

10 | THE 2024 CALLAHAN SCHOLAR

Dr. Kaplan is studying how human RPE cells can be reprogrammed into neurons for retinal regeneration. His research explores a potential path to restore vision by activating regenerative mechanisms in the human eye.

11 | THE 2023 - 2024 RETINA SOCIETY/IRRF AWARDEES

The IRRF continues its three-year partnership with The Retina Society to fund innovative retinal research. Together, they support multiple \$50,000 grants annually, leveraging matching funds to expand impact and advance knowledge in the field.



14 | THE MACHEMER FELLOWSHIP

The IRRF has committed to annually funding the Robert Machemer, MD/IRRF Fellowship, supporting vitreoretinal surgery fellows in advancing research on retinal diseases and treatments.



15 | THE 2023 MACHEMER FELLOWSHIP AWARDEE

Dr. Charles DeBoer of Stanford was awarded the 2023 Robert Machemer/IRRF Fellowship. A vitreoretinal surgeon and researcher, he focuses on implantable devices and surgical tools, combining engineering and medicine to advance retinal care.

16 | THE IRRF/MACULA SOCIETY AWARDEES

The IRRF partnered with The Macula Society to fund four annual awards of \$35,000 each for three years. Supporting cutting-edge research in retinal vascular and macular diseases, this initiative aligns with the Society's mission to advance and share leading scientific discoveries.

19 | EXPANDING VISION ASSISTANCE

The IRRF is partnering with Sight Savers America to provide high-tech vision assistive devices to low-vision and blind adults in Alabama. This initiative enhances independence and quality of life, with IRRF committing \$10,000 annually.

20 | THE IRRF BOARD OF DIRECTORS

The IRRF Board of Directors—six dedicated leaders guiding the foundation's mission to advance retinal research and innovation.

THE TERESA AND MICHAEL A. CALLAHAN, MD ENDOWED CHAIR IN THE DEPARTMENT OF OPHTHALMOLOGY AND VISUAL SCIENCES

Photo portrait of Teresa and Michael Callahan by Nik Layman PhotoVideo

In 2024, the International Retinal Research Foundation (IRRF) pledged \$1.5 million, taking the first step in establishing an endowed Chair in Ophthalmology and Visual Sciences at the University of Alabama at Birmingham (UAB), honoring Michael A. Callahan, MD. This type of endowment is among the most prestigious and meaningful gifts that can be made to or accepted by an academic institution. An endowed chair recognizes a senior-level faculty member's continued contributions and provides funds to push the frontiers of scholarship. The funds will be used to propel research, in addition to creating opportunities for scholars to collaborate across the world.

Dr. Callahan is an experienced ocular and oculoplastic surgeon and has held a faculty position as professor of Ophthalmology in the UAB Department of Ophthalmology and Visual Sciences since 1998. Dr. Callahan also serves as director of Oculoplastic Services at UAB Callahan Eye Hospital & Clinics, where he teaches intricate surgical procedures of phacoemulsification and intraocular lens insertion and lectures on ophthalmic plastic surgery. He has served as a leader in healthcare and is widely regarded as a pioneer in ocular and oculoplastic surgery. In recognition of the impact on the education of a

generation of ophthalmologists, the careers of pioneering researchers, and the sight of countless patients, Dr. Callahan was inducted into the Alabama Healthcare Hall of Fame in 2022, recognizing his contributions.

Dr. Callahan is a member of the American Society of Ophthalmic Plastic & Reconstructive Surgery, the American Academy of Ophthalmology, the Medical Association of Alabama, the Jefferson County Medical Society, and the American Board of Ophthalmology.

“Not only has Dr. Mike Callahan served the UAB Department of Ophthalmology and the State of Alabama, he has led the International Retinal Research Foundation as President for over two decades. It is most appropriate to honor him and his wife, Teresa, in this way. All of us at the IRRF feel confident this gift will propel the continued success of the University of Alabama at Birmingham's Department of Ophthalmology and Visual Sciences,” said Sandy Blackwood, Executive Director of IRRF. This endowment will bolster the UAB Department of Ophthalmology's reputation as a leader in ophthalmology and visual sciences while furthering the mission of the IRRF to fund cutting-edge research that will benefit countless individuals, not only nationally but internationally as well.



MARCO BASSETTO, PhD 2023 IRRF CHARLES D. KELMAN, MD POSTDOCTORAL SCHOLAR

UC IRVINE STUDY RESOLVES THE FUNCTION OF A KEY VISION-SUPPORTING PROTEIN IN CELLULAR-LEVEL DETAIL.

Source: University of California Irvine School of Medicine
(Reprinted from UCI News Release, April 26, 2024)

Marco Bassetto, PhD, 2023 IRRF Charles D. Kelman, MD Postdoctoral Scholar, worked with other UCI team members to discover a pivotal role for cellular retinaldehyde protein (CRALBP) in the retinal pigmented epithelium (RPE) in supporting the physiology of the light-sensing cells in the eye, known as photoreceptors. The finding clarifies and highlights the importance of RPE cell targeting for CRALBP gene therapies.

“This study resolves a key question regarding the relative importance of the two cellular pools of CRALBP – one in the RPE and one in Müller cells – in supporting the function of the light-sensitive cells of the retina,” said the corresponding author, Philip Kiser, PharmD, PhD, UCI associate professor of physiology and biophysics and ophthalmology. “Our data will assist in decision-making related to which retinal cells should be prioritized for receipt of gene replacement or genome-editing treatment for CRALBP-associated retinal diseases.”

In the retina, CRALBP is found in two distinct cell types that occupy different regions: the RPE and the Müller glia. The relative physiological contribution of these two CRALBP pools in supporting photoreceptors physiology has been debated due to inconsistent data from studies in different animal models.

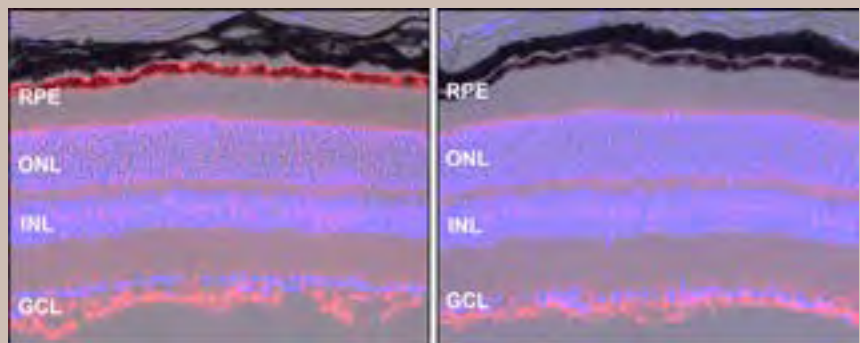
The study was recently published online in *CELL REPORTS*, and found that removing CRALBP from the RPE produced a set of eye phenotypes closely matching those of mice with CRALBP deleted in all cells of the body.

“We found that loss of CRALBP in the RPE significantly reduces the rate at which the photoreceptors can operate,” said lead author **Marco Bassetto, PhD**, a postdoctoral researcher in Dr. Kiser’s laboratory at the UCE Center for Translational Vision Research. “Besides characterizing the retinal physiology of CRALBP, our work also suggests

new therapeutic opportunities in the treatment and prevention of retinal damage induced by light.”

This work was accomplished in close collaboration with Alexander Kolesnikov, PhD, from the laboratory of Vladimir Kefalov, PhD, as well as Krzysztof Palczewski, PhD.

Combined funding included the U.S. Department of Veterans Affairs, Research to Prevent Blindness, the National Institutes of Health, the Knights Templar Eye Foundation, and **The International Retinal Research Foundation**.



Above: Fluorescence microscopy of mouse retinal cryosections showing CRALBP immunostaining (red fluorescence) in control (left) and RPE-CRALBP KO (right) mice. Cellular nuclei within the neural retina are marked by the blue fluorescence signal (DAPI).



MARCO BASSETTO, PhD

University of California Irvine, USA

To access this article from *Cell Reports*:

'Dominant role for pigment epithelial CRALBP in supplying visual chromophore to photoreceptors'

Volume 43, Issue 5, May 28, 2024

DOI:



2023 CHARLES D. KELMAN, MD, POSTDOCTORAL SCHOLAR

PROJECT TITLE: *Pharmacological Treatment for Maculopathies Based on Oral Administration of New Visual Cycle Modulator*

Dr. Bassetto developed his PhD in the field of ocular drug delivery. His early research aimed at establishing methods to enhance permeation of therapeutics within the eye after non-invasive, topical application. Most drugs are incompatible with the treatment of ocular diseases because they display unfavorable pharmacokinetic and/or pharmacodynamic profile.

Philip Kiser, Associate Professor, Departments of Physiology & Biophysics, Ophthalmology and Clinical Pharmacy Practice at UCI will supervise and participate in the day-to-day development of Dr. Bassetto as a scientist, providing him with professional development and networking opportunities, and thereby ensuring that his scientific training is rigorous and thorough.

Dr. Kiser remarked "Marco has made outstanding progress in the development of a new small molecule for the treatment of maculopathies that exerts its effects through therapeutic inhibition of the visual cycle. Specifically, Dr. Bassetto has (1) successfully screened a library of 15 new derivatives of emixustat for inhibition of RPE65 *in vitro*, (2) demonstrated that the best hit, compound 16e, is characterized by resistance to VAP-1 oxidative deamination and faster hepatic metabolized compared to emixustat, (3) demonstrated the ability of 16e to inhibit RPE65 *in vivo*, (4) determined the pharmacokinetic of 16e after intraperitoneal injection. This is, by any measure, outstanding progress towards establishment of a new pharmacological treatment for maculopathies based on oral administration of inhibitors of the visual cycle."

2023 LORIS AND DAVID RICH POSTDOCTORAL SCHOLAR

PROJECT TITLE: *The Role of Microglia-Mediated Inflammation on the Cell Fate of Proliferating Müller Glia Following p27Kip1 Inactivation and Outer Retina Degeneration in Aged Mice*

Joel Jovanovic, PhD has been selected as the 2023 Loris and David Rich Postdoctoral Scholar for his project, *The role of microglia-mediated inflammation on the cell fate of proliferating Müller glia following p27Kip1 inactivation and outer retina degeneration in aged mice.*

Dr. Jovanovic received a Master of Sciences in Biomedical Sciences from the University of Bern, Switzerland, and went on to earn a PhD in Biomedical Sciences from the University of Bern, Switzerland. Before becoming a Research Fellow at Vanderbilt University Medical Center, USA, he was a Research Assistant at Bern University Hospital, Switzerland.

Dr. Jovanovic's current research is focused on how the Müller glia respond to disruptions in the interactions between the retinal pigment epithelium (RPE) and photoreceptors with a focus on pushing the Müller glia into a regenerative program. For the project proposed, he will perform experiments to assess how Müller glia-specific inactivation of the cyclin-dependent kinase inhibitor gene p27Kip1 alters the gene expression profiles of these cells after laser-driven RPE injury combined with outer retina (photoreceptors) degeneration.

Dr. Jovanovic's mentor, Dr. Edward Levine, states that "having worked with Dr. Jovanovic for over two years, he has demonstrated the intellect, drive, and competency to succeed with excellence in this ambitious research project and training plan. I have no doubt he will make a successful transition from postdoctoral fellow to principal investigator while making important discoveries in the fields of retinal degeneration and regeneration."



JOEL JOVANOVIC, PhD

Vanderbilt University Medical Center,
Department of Ophthalmology &
Visual Sciences
Nashville, Tennessee

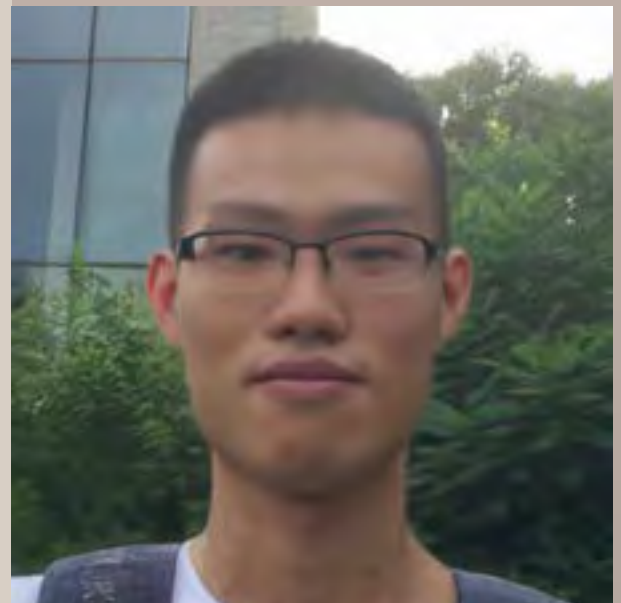
2023 ALSTON CALLAHAN, MD, POSTDOCTORAL SCHOLAR

PROJECT TITLE: *Gene Therapy for PDE6A Deficient Retinitis Pigmentosa Via CRISPR Base Editing*

Dr. Zhiquan Liu earned his undergraduate and graduate training in biology at Jilin University in China, was in the top 1% of students and published many high impact papers. He went on to earn his PhD degree in biochemistry and molecular biology in 2022 at Jilin. He is interested in the modification and application of CRISPR genome editing technologies for therapeutic research in eye diseases. He will be mentored by Yang Sun, MD, PhD, Professor and Vice Chair, Academic Affairs and Director, Stanford SOAR Program, Ophthalmology Department at Stanford University and will train in her laboratory. Dr. Sun says of Dr. Liu, “He is brilliant and incredibly creative, productive and hardworking and has a passion for research.”

In his project, Dr. Liu will use CRISPR base-editing for gene therapy to treat a specific form of retinitis pigmentosa (RP). After in vitro screening to optimize the base editing, he will attempt to correct the PDE6A mutation in a mouse model via subretinal injections using AAV delivered vector.

DEFINITION: CRISPR – Clustered Regularly Interspaced Short Palindromic Repeats. A technology used to selectively modify the DNA of living organisms.



ZHIQUAN LIU, PhD

Department of Ophthalmology
Stanford University

2024 CHARLES D. KELMAN, MD, POSTDOCTORAL SCHOLAR

**PROJECT TITLE: Aqueous Humor
Proteomics in Age-Related Macular
Degeneration**

Dr. Zhang completed his PhD in the Dunaief Lab in the Department of Ophthalmology at the University of Pennsylvania, and now dives deeper into retinal lipid metabolism as a postdoc and medical resident. In addition to his scientific pursuits, he is the lab's resident carnivorous plant expert, often seen sharing specimens from his greenhouse.

Having matched in 2024 for ophthalmology residency at Scheie Eye Institute, University of Pennsylvania, Dr. Zhang became the inaugural iPOWER resident. In this program, he has engaged in full-time research as a postdoctoral fellow for a year starting June 1, 2024. Following this, a technician continued his project throughout his ophthalmology residency. This has allowed him to stay engaged and productive in his research, which has been his main focus after clinical training.

Josh Dunaief, MD, PhD, an earlier recipient of the IRRF Aston Callahan, MD Scholar Award, and in whose Lab Dr. Zhang has trained says of him, "Kevin is always enthusiastic about teaching less experienced students, as exemplified when he mentored an under-represented minority college student through the American Physician Scientists Association (APSA), meeting with her once a week to discuss papers, and enabling her to prepare an impressive written research proposal and poster." During his project during his postdoc year, Dr. Zhang used proteomics to discover new pathways involved in AMD pathogenesis. This approach, which leverages new, high sensitivity techniques, has been remarkably successful when applied to several other ocular diseases.

Further, Dr. Dunaief says of Dr. Zhang, "Kevin's kindness, scientific curiosity, intellect, drive, collaborative personality and leadership skills will propel him to success in his future career as a vision scientist-clinician."



KEVIN ZHANG, PhD

Department of Ophthalmology
University of Pennsylvania

2024 LORIS RICH POSTDOCTORAL SCHOLAR

PROJECT TITLE: Dissect the glia-
vasculature interactions in retinal diseases

Dr. Deng completed his PhD degrees in Ophthalmology at Sun-Yat-sen University, which is ranked as a top ophthalmology PhD program in China. During his graduate career, he focused on endothelial cell differentiation and angiogenesis in ocular disease, and published basic science papers in prestigious journals, demonstrating the ability to develop testable hypotheses and efficiently bring projects to completion. Dr. Sui Wang, PhD, Assistant Professor, Department of Ophthalmology at Stanford University School of Medicine, Byers Eye Institute at Stanford, in whose lab Dr. Deng now works, feels the strong foundation of scientific training has prepared him well for a career as an independent scientist.

“He has shown an aptitude for research, a willingness to teach and mentor young students in the lab, and shows a strong desire to tackle difficult questions in ophthalmology.”

Dr Wang and Dr. Deng are working to determine the molecular mechanisms underlying glia-vasculature interactions in retinal diseases. It is hoped that the results gained from this study will not only advance our fundamental understanding of tissue-tissue interaction, but also could lead to new insights into a range of eye disorders and vascular defects.



BOXIONG DENG, PhD

Department of Ophthalmology
Stanford University

2024 ALSTON CALLAHAN, MD, POSTDOCTORAL SCHOLAR

PROJECT TITLE: Derivation of cultured RPE from human fetal tissue, 3D organoids, and directed differentiation for the purpose of RPE to photoreceptor reprogramming

Dr. Kaplan trained in Germany, at the Ludwig Maximilian University of Munich, where he received his PhD degree. His prior training in glial cell biology, and particularly in Müller glial cells, in the lab of Professor Antje Grosche, provided a strong basis for the work he has proposed. In his thesis research, published in the journal *GLIA*, he compared proteomic data from Müller glia of human and mouse to determine the proteins that differ between cone-rich and rod-rich retinas. He found that the protein epiplakin was an important factor in maintaining the macular architecture via its expression in Müller glia. This was the first demonstration of a macular-specific Müller glial protein that is important in the unique architecture of this important retinal region.

Dr. Thomas Reh, Dr. Kaplan's sponsor for the Award, says of him, "As for his potential as a scientist, Dr. Kaplan shows great promise. In addition to his outstanding technical skillset, he is extremely motivated to succeed. The project that Dr. Kaplan has proposed is based on work from lower vertebrates that shows the potential of RPE cells to serve as a source of neural retina regeneration. Dr. Kaplan's proposal outlines a series of studies to explore this possibility in human RPE cells. His initial results show for the first time that human RPE can be reprogrammed by transcription factors to regenerate new neurons, and in the next years he will determine what types of neurons can be generated by these cells."



LEW KAPLAN, PhD

Department of Biological Structure
University of Washington



IRRF CONTINUES A PARTNERSHIP INITIATIVE PROVIDING SUSTAINED RESEARCH FUNDING:

The International Retinal Research Foundation is continuing a partnership with The Retina Society that has provided research funding for two consecutive years, and will continue for one additional year. This partnership presents opportunities that leverage the power of matching grants from more than one source.

The main mission of the Retina Society is to advance knowledge and education in the field of retina. Consistent with that mission, the Retina Society established a research and education grant program, with the objective of funding several annual research grants

to support innovative research by Retina Society members. In their inaugural year, two grants of \$25,000 each were funded. In 2022, The Retina Society and the IRRF partnered to fund three grants of \$50,000 each per year for three years.

Eligibility: Only active and associate members of The Retina Society may apply for grants. For further information and funding guidelines, go to www.retinasociety.org.



THE 2023 RETINA SOCIETY/IRRF AWARDEES:



GLENN YIU, MD, PhD

**Director, Tele-Ophthalmology
Professor, Department of Ophthalmology
University of California Davis**

Project Title: *Photoreceptor Reprogramming in an Optogenetic Model of Geographic Atrophy*

Chronic oxidative retinal pigment epithelium (RPE) damage in age-related macular degeneration (AMD) leads to damage to rod photoreceptors and scotopic function loss in early disease, and later involve cones in more advanced stages like geographic atrophy (GA). This study will investigate photoreceptor structure and function in a novel optically-induced mouse model of GA, and then assess the effectiveness of reprogramming rods to cone-like cells using CRISPER-mediated gene ablation of the Nr1 transcription factor as a neuroprotective strategy to prevent photoreceptor damage in GA.

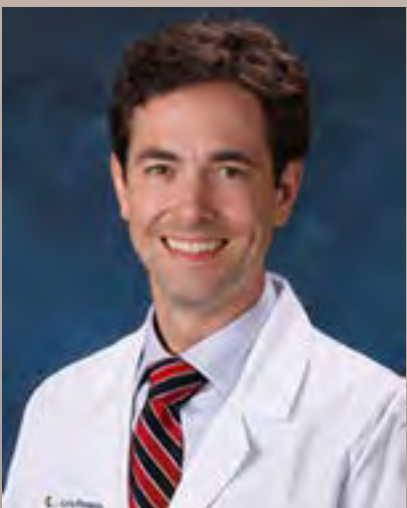


THOMAS WUBBEN, MD, PhD

**Assistant Professor, Ophthalmology & Visual Science
University of Michigan**

Project Title: *Photoreceptor Protection Via Metabolic Targeting of the Integrated Stress Response*

Understanding the metabolic underpinnings that orchestrate stress pathway activation in photoreceptors is critical to creating innovative, therapeutic strategies for retinal degenerative diseases. This proposal will identify the link between metabolic dysregulation and stress pathway activation to potentially provide novel, gene-agnostic, photoreceptor neuroprotective strategies with immediately translatable applications.



ANDREW BROWNE, MD, PhD

**Assistant Professor, Ophthalmology
Gavin Herbert Eye Institute
University of California Irvine**

Project Title: *An Imaging Assay to Objectively Quantify Dark Adaptometry With a Gradient Photobleach Recovery Assay*

Rod-mediated dark adaptometry is the most reliable subjective assay of visual function that can distinguish normal aging from early and intermediate macular degeneration. This study seeks to develop an objective imaging assay to quantify rod-mediated dark adaptation.

THE 2024 RETINA SOCIETY/IRRF AWARDEES:



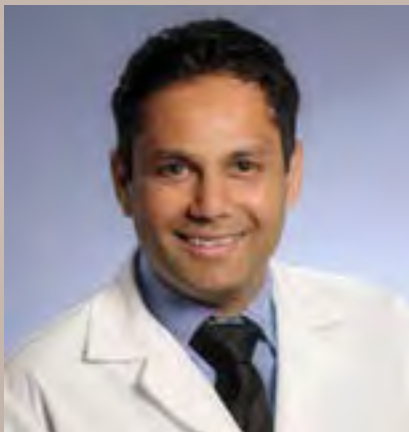
STEVEN YEH, MD, PhD

**Director, of Retina and Uveitis
Truhlsen Eye Institute
University of Nebraska Medical Center**

Project Title: *Molecular and Immunologic Mechanisms of HIV-and Non-HIV-Related CMV Retinitis: A Global Approach to Disease Understanding*

Dr. Yeh has focused his expertise to provide care and investigate the spectrum of eye disease in Ebola survivors in the U.S. and West Africa. He and his team have also studied the ophthalmic consequences of COVID-19 and the local mucosal molecular and immunologic responses.

Dr. Yeh has published more than 180 scientific articles on infectious diseases of the eye, immunotherapy for noninfectious uveitis, drug delivery, advances in diagnostic imaging and pathogenesis of ocular inflammation. He is a member of the American Uveitis Society Executive Committee, American Society of Retina Specialists, Retina Society and Macula Society, and has served as a consultant to the World Health Organization (WHO) Global Outbreak Alert and Response Network with prior outbreak response work in Liberia, Sierra Leone and the Democratic Republic of the Congo.



KANISHKA THIRAN JAYASUNDERA, MD

Project Title: *Development of a Patient-Reported Outcomes Measure for Diabetic Retinal Diseases*

Dr. Jayasundera is an ophthalmologist in Ann Arbor, Michigan and is affiliated with multiple hospitals in the area, including University of Michigan Health-Ann Arbor and Veterans Affairs Ann Arbor Healthcare System. He received his medical degree from University of Auckland Faculty of Medicine and Health Sciences and has been in practice for more than 20 years. Dr. Jayasundera has expertise in treating cataract, retinal detachment, glaucoma, among other conditions.

During his K23 grant, Dr. Jayasundera developed inherited retinal diseases (IRD)-specific and psychometrically validated patient reported outcome measures.



AARON NAGIEL, MD, PhD

**Assistant Professor of Ophthalmology
Keck School of Medicine
University of Southern California – Los Angeles**

Project Title: *Hippo Pathway Inhibition for RPE Regeneration*

Dr. Nagiel earned his bachelor's degree from Harvard University summa cum laude, and then underwent combined MD and PhD training at Cornell University and The Rockefeller University in New York City. His PhD work was supported by an NIH fellowship and contributed to the understanding of how synapses form in the developing brain. After an internship at memorial Sloan-Kettering Cancer Center, Dr. Nagiel completed both ophthalmology residency and vitreoretinal fellowship at the renowned Stein Eye Institute at UCLA.

Dr. Nagiel specializes in the medical and surgical management of retinal diseases, including retinopathy of prematurity, retinal detachment, ocular trauma, familial exudative vitreoretinopathy, Coats disease, Norrie disease, X-linked retinoschisis, retinitis pigmentosa, Leber congenital amaurosis and Stickler syndrome. He leads a state-of-the art program specializing in the diagnosis and treatment of genetic eye disease, including gene therapy surgery.

The Robert Machemer Foundation



THE ROBERT MACHEMER, MD/ IRRF FELLOWSHIP

In 2022, the not-for-profit Robert Machemer Foundation and the International Retinal Research Foundation (IRRF) partnered to create the Robert Machemer, MD/IRRF Fellowship. At the time of the collaboration, the IRRF agreed to provide \$100,000 to The Robert Machemer, MD Foundation to co-fund this Fellowship. The overall goal was to support the transition of a vitreoretinal surgical Fellow to pursue independent research to improve knowledge of the causes and treatment of vitreoretinal diseases.

At the end of the two-year commitment, the IRRF Board of Directors took the action of continuing this as an annual IRRF Award. The Robert Machemer Foundation Board has separately

approved handoff of the Fellowship from the not-for-profit to the International Retinal Research Foundation.

Dr. Machemer is considered one of the pioneers of retinal surgery and it deemed appropriate that the IRRF honor him in this way. The Award will be available for an individual upon completion of their vitreoretinal training to support research in that field. The individual will be chosen by the IRRF Director and Co-Director of Research Funding to be approved by the full Board of the IRRF.

To learn more about this Award, follow the below link to The Robert Machemer Foundation: www.machemerfoundation.com.

THE ROBERT MACHEMER FOUNDATION ROBERT MACHEMER FELLOWSHIP 2023



CHARLES DEBOER, MD, PhD

Clinical Instructor,
Ophthalmology

The members of the Board of The Robert Machemer Foundation have awarded the 2023 Robert Machemer MD and International Retinal Research Foundation Fellowship to The Stanford Health Care Byers Eye Institute, Stanford University, Stanford, California, USA, to Charles DeBoer, MD, PhD. Dr. DeBoer is a board-certified, fellowship-trained vitreoretinal surgeon, who specializes in retinal and macular diseases, treating a range of conditions such as retinal tears, diabetic retinopathy, retinal vein occlusions, macular pucker, macular hole, macular degeneration, retinal detachment, and other complex retinal conditions. Dr. DeBoer incorporates state-of-the-art treatments in personalized, comprehensive care plans for each of his patients. He is dedicated to training future vitreoretinal surgeons and passionate about helping

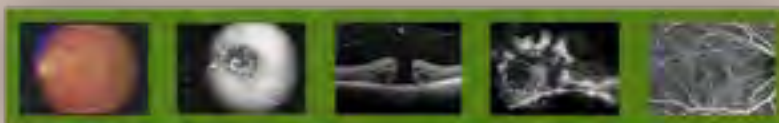
patients through both direct care and research.

Dr. DeBoer's scientific background in micro- and nanofabrication, mechanical and electrical engineering, and medicine drives his research interests in implantable devices and surgical instruments. While completing his PhD, Dr. DeBoer co-invented a biomimetic accommodating intraocular lens (IOL) that treats both cataracts and presbyopia. Dr. DeBoer's scientific background in physics, micro- and nanofabrication, mechanical and electrical engineering and medicine drives his research interests in implantable devices and surgical instruments. Dr. Cynthia Toth, Chairman of the Board of The Robert Machemer Foundation said of Dr. DeBoer, "He is amazingly well-prepared in understanding micro-electronical mechanical drug delivery."



The Macula Society

Established in 1977



THE MACULA SOCIETY/ INTERNATIONAL RETINAL RESEARCH FOUNDATION AWARD:

The International Retinal Research Foundation (IRRF) partnered with The Macula Society to form The Macula Society/IRRF Award.

The Macula Society/IRRF Award will be in accordance with the Macula Society's purpose of providing a forum for the presentation and dissemination of the most current and most advanced scientific information and research in retinal vascular and macular diseases. This partnership will provide funds for a total of four Awards per year at \$35,000 each for three years.

Membership to The Macula Society is by application, with acceptance criteria including extensive contribution to retinal literature. The Macula Society recognizes outstanding achievement by its members and others through awards and lectures, and holds an annual meeting open to members, their guests, co-authors and supporting company representatives.

2023 MACULA SOCIETY / IRRF AWARDEES:



THOMAS WUBBEN, MD, PhD

University of Michigan, Medical School, Kellogg Eye Center

Project Title: *Elucidating the Role of Glutamine Catabolism in Cone Photoreceptor Metabolic Homeostasis and Survival*

Dr. Wubben's research focuses on the intersection of retinal metabolism and vitreoretinal disease. Understanding the metabolic pathways that support retinal cell function and survival and how these pathways are rewired in certain disease states is expected to provide a framework for developing novel therapeutic paradigms to prevent vision loss in those afflicted with retinal disease. Thomas Wubben, MD, PhD, graduated from the University of Illinois Urbana-Champaign and then obtained his MD and PhD from the University of Illinois at Chicago. He completed his ophthalmology residency at the Kellogg Eye Center at the University of Michigan and is currently a vitreoretinal surgical fellow at the Kellogg Eye Center at the University of Michigan.

2023 MACULA SOCIETY / IRRF AWARDEES (cont.):



LUIS ARIAS, MD

Head, Retina Department of Ophthalmology, Bellvitge University Hospital, Barcelona, Spain

Project Title: *Application of New Molecular Technologies in the Genetic diagnosis of hereditary Retinal Dystrophies*

After a Fellowship at Bascom Palmer Eye Institute in Miami, Dr. Arias returned to the University of Barcelona, where he is now Associate Professor of Ophthalmology. His work focuses on AMD, pathologic myopia, diabetic retinopathy, retinal vein occlusion, macular surgery, and retinal detachment. He has published in journals such as *Ophthalmology*, *Retina*, and *The British Journal of Ophthalmology*, and contributed chapters to books on maculopathies. Recently, he edited a retina handbook and an update on anti-VEGF therapy. Dr. Arias has led clinical trials on photodynamic therapy and antiangiogenic drugs, and serves on the editorial board of *Archivos de la Sociedad Española de Oftalmología* and the board of SERV.



DANIEL TING, MBBS (HONS), M MED (OPHTH), FAMS, PhD (UWA)

Project Title: *A Multi-Model Explainable Artificial Intelligence System Using Weekly Supervised Deep Learning Techniques to Detect and Prognosticate Center-Involving Diabetic Macular Edema Requiring Treatment via a Web-3 Based Digital Platform*

Dr. Daniel Ting is Associate Professor of Ophthalmology at Duke-NUS Medical School in Singapore. Named SingHealth Residency Valedictorian in 2016, he began his vitreo-retinal fellowship at the Singapore National Eye Center. In 2017, he was selected as a US-ASEAN Fulbright Scholar, studying AI, big data, and telemedicine at Johns Hopkins. In collaboration with top global eye centers, he and his team developed a deep learning AI system to detect referable diabetic retinopathy, glaucoma suspect, and age-related macular degeneration – paving the way for smarter, earlier detection of major eye diseases.

His research interests include artificial intelligence, surgical innovation, health and medical technologies, retina diseases such as diabetic retinopathy, age-related macular degeneration, and retinal vein occlusion, retinal and choroidal imaging, and clinical trials.



MATTHEW SIMUNOVIC, MD

Save Sight Institute, University of Sydney, Australia

Project Title: *Collagen Biogluce for Retinal Detachment Repair*

Matthew Simunovic is Professor Ophthalmology & Visual Science at the Save Sight Institute where he leads the Retinal Disease and Rescue Group. Additionally, he is a senior consultant ophthalmic surgeon at Sydney Eye Hospital and The Sydney Children's Hospitals Network, Australia, where he sub-specializes in surgery and diseases of the retina. Professor Simunovic's research interests include emerging treatments for retinal diseases, experimental vitreoretinal surgery and visual psychophysics. He was the first Australian ophthalmologist to be awarded a Career Development Award from the Foundation Fighting Blindness, USA. Dr. Simunovic's clinical practice focuses on vitreoretinal surgery (including small gauge vitrectomy, scleral buckling and macular surgery), medical retinal disorders and complex cataract surgery in which vitreoretinal intervention may be required (including sutured and non-sutured scleral fixation techniques for intraocular lenses).

2024 MACULA SOCIETY/IRRF AWARDEES:



ANDREAS POLLREISZ, MD

Project Title: *High-resolution Imaging of Microglia in Diabetic Retinopathy Visualized by Adaptive-Optics (OCT)*

Dr. Andreas Pollreis is a specialist in ophthalmology with a focus on retinal diseases at the Department of Ophthalmology at the Medical University of Vienna (MUV). His clinical interest is in diabetic retinopathy, age-related macular degeneration and vitreoretinal surgery. His research interest lies in retinal imaging with a focus on different optical coherence tomography systems, including OCT-Angiography and adaptive optics assisted instruments.

Dr. Pollreis leads the Retina Advanced Imaging Study Group at the Medical University of Vienna and serves as principal investigator in multicenter clinical trials



KANISHKA THIRAN JAYASUNDERA, MD

Project Title: *Functional Vision Limitations and Distress Quantification in Diabetic Retinal Diseases*

Dr. Jayasundera is an ophthalmology in Ann Arbor, Michigan and is affiliated with multiple hospitals in the area, including University of Michigan Health-Ann Arbor and Veterans Affairs Ann Arbor Healthcare System. He received his medical degree from University of Auckland Faculty of Medicine and Health Sciences and has been in practice for more than 20 years. Dr. Jayasundera has expertise in treating cataract, retinal detachment, glaucoma, among other conditions.

During his K23 grant, Dr. Jayasundera developed inherited retinal diseases (IRD)-specific and psychometrically validated patient reported outcome measures. During the use of stem cells for retinal regeneration. She also has interest in using the latest retinal imaging tools to improve the understanding of retinal disorders.



AVNI FINN, MD, MBA

Project Title: *Developing a Deep Learning Model for the Automated Analysis of Macular Holes*

Dr. Finn was born in London and moved to the United States at a young age and grew up in Claremont, California. She earned her BA in Human Biology from Stanford University, where she graduated Phi Beta Kappa. Dr. Finn pursued her medical degree at the Dartmouth School of Medicine in Hanover, New Hampshire followed by an ophthalmology residency at the Massachusetts Eye and Ear Infirmary at Harvard Medical School.

After Harvard Medical School, Dr. Finn performed a fellowship in medical and surgical diseases of the retina and vitreous at Duke University in Durham, North Carolina. During her fellowship, she received the Ronald G. Michels Fellowship Foundation Award, given to select outstanding fellows in vitreoretinal surgery.

Dr. Finn is an active member of the American Academy of Ophthalmology and the American Society of Retina Specialists.



JOSHUA DUNAIEF, MD, PhD

Project Title: *Nutritional Intervention for AMD Amelioration: A Prospective Trial Feasibility Study*

During his undergraduate career at Harvard University, Dr. Dunaief's Lowell House pre-medical advisor was Dnaiel Albert who had discovered the retinoblastoma gene with Ten Dryja and Robert Weinberg. After leaving Harvard, Dr. Dunaief began his medical education at Columbia University in the Medical Scientist Training Program. As a graduate student in the lab of Dr. Stephen Goff, he continued to work on retinoblastoma. His graduate career culminated in a first-author publication in the publication Cell, which has since been cited hundreds of times. During his graduate work Dr. Dunaief received the "Most Outstanding PhD Award."

Dr. Dunaief completed his residency at Johns Hopkins Wilmer Eye Institute, after which he continued his study of retinoblastoma. In his final year of residency, Dr. Dunaief received a K08 grant, funded by the National Eye Institute, and joined the faculty of the Scheie Eye Institute at the University of Pennsylvania.

Dr. Dunaief has spent the last 20 plus years at University of Pennsylvania and has mentored more than 70 undergraduate, graduate, medical and postdoctoral students.



PROGRAM DESCRIPTION

Sight Savers America's approach for addressing low vision needs is two-fold; to provide state-of-the-art high-tech vision aids and an in-depth case management process to serve the unique vision needs of each person referred to the Low Vision and Blindness Program.

Every person referred to the program is assigned a personal SSA Case Specialist who manages his or her vision needs from start to finish and will provide each referred person with a customized vision rehabilitation plan, including equipment recommendations. Through this program, all services are provided AT NO COST to qualifying individuals, through support from community partners as IRRF.

SSA is the only organization in the United States that proactively places high-tech vision aids, such as the Onyx Video Magnifier (VM), into the homes of severely vision impaired children on a large scale – all at no cost to qualifying families. VMs are more expensive than the average family can afford and are not covered by medical insurance.

In 2024, the International Retinal Research Foundation (IRRF) approved a commitment to partner with Sight Savers America (SSA), along with other organizations and funders, to provide life-changing high-tech vision assistive devices to adult Alabamians living with low vision (permanently impaired vision that cannot be corrected with medication, glasses, contacts or surgery) or blindness (no vision or vision so poor that reading and other daily activities are performed primarily non-visually). The goal of this type support is to assist these individuals in maintaining

their safety, independence, dignity and quality of life. SSA has been providing high-tech vision aids to children with low vision in Alabama since 1999. In the case of older adults, this assistance will promote the ability to successfully age-in-place. This is targeted funding to serve adults who have both a medical and financial need for high-tech vision assistive equipment.

IRRF will commit \$10,000 annually, with the possibility of additional funds when made available.



DAWN K. DECARLO, PhD
CHIEF EXECUTIVE OFFICER

337 BUSINESS CIRCLE
PELHAM, ALABAMA 35124
877-942-2627, EXT. 209

THE IRRF BOARD OF DIRECTORS



MICHAEL A. CALLAHAN, MD, has served as IRRF President since 2004, dedicating his time to advancing vision research. A Professor of Ophthalmology at UAB since 1998, he specializes in phacoemulsification, intraocular lens insertion, and ophthalmic plastic surgery. In addition to teaching, he lectures globally and is deeply involved in providing ophthalmic care in underserved areas worldwide. Dr. Callahan's leadership and commitment continue to drive the IRRF's mission forward.



JOHN S. PARKER, MD, serves as IRRF Vice President while maintaining a private ophthalmology practice and training residents at UAB's Department of Ophthalmology. Dedicated to education and patient care, he has served as Director of the Corneal Service and Residency Training Program. Dr. Parker also donates his time and expertise to caring for indigent patients, reflecting his deep commitment to both medical education and community service.



V. HUGO MARX, III, has served as IRRF Treasurer and Board Member since 2004. A business leader across healthcare, investment banking, and venture capital, he operates multiple corporations. Through his enterprises, Mr. Marx has provided charitable aid, including medical supplies and essential resources, in emergency situations both in the U.S. and abroad. His leadership and philanthropy play a vital role in supporting IRRF's mission and global impact.



PAUL S. STERNBERG, JR., MD, serves as IRRF Director of Research Funding while holding multiple leadership roles at Vanderbilt University. He is Associate Dean for Clinical Affairs, Assistant Vice Chancellor for Adult Health Affairs, and Chair of the Department of Ophthalmology at the Vanderbilt Eye Institute. With a focus on age-related macular degeneration, he leads a cell biology and biochemistry lab investigating its causes. His expertise and research contributions drive advancements in vision science.



CYNTHIA A. TOTH, MD joined the IRRF Board in 2019 and assists with grant funding decisions. A professor at Duke Eye Center, she holds the Joseph A.C. Wadsworth Distinguished Professorship and serves as Vice Chair of Clinical Research. Dr. Toth specializes in vitreoretinal surgery for infants, children, and adults and has pioneered clinical applications of OCT imaging. Her expertise spans macular disease, retinal detachment, diabetic retinopathy, and retinopathy of prematurity, advancing both research and surgical innovation.



KOULA CALLAHAN, joined the IRRF Board in December 2023, bringing expertise in leadership, cross-functional collaboration, and brand storytelling. The daughter of Michael A. Callahan, MD, and granddaughter of IRRF founder Alston Callahan, MD, she has a deep-rooted connection to the foundation's mission. With experience in scientific research at UAB alongside Cynthia Owsley, PhD, Ms. Callahan understands the critical role of research funding in advancing vision science and innovation.



1720 University Boulevard
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HOW YOU CAN HELP...

Today's scientists play a crucial role in the universal struggle against debilitating eye diseases, but financial funding is needed to facilitate and sustain their efforts. As of year-end 2022, the IRRF had granted more than \$34 million in support of scientific investigations targeting all structures of the human eye, with emphasis on finding the causes, prevention and cure of degenerative diseases. If you would like to help with this challenge, please send your tax deductible contribution to:

The International Retinal Research Foundation, Inc.
Attn.: Sandra Blackwood, MPA, Executive Director
1720 University Boulevard
Birmingham, AL 35233 www.irrf.org