International Retinal Research Foundation

2020 Annual Report

The IRRF 2020 Annual Report

Sandra Blackwood, Editor
Photos: Sandra Blackwood
Design: Robert Weathers

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Retinal Research Foundation

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2020 Charles D. Kelman, MD Postdoctoral Scholar

Dr. Swapnil Shinde received his Masters degree in Biotechnology from University of Mumbai, India. He then completed his PhD at the Centre for DNA Fingerprinting and Diagnostics, Hyderabad, India under the supervision of Maddika Subba Reddy, PhD, where his dissertation focused on characterization of the functional role of tumor suppressor phosphatase PTEN (phosphatase and tensin homolog deleted on chromosome 10) in endosomal trafficking pathways. Swapnil is interested in dissecting the molecular players regulating the ciliary ectocytosis.

Currently, Dr. Shinde is a PhD Fellow in The Nachury Lab at University of California San Francisco and is mentored by Maxence Nachury, PhD, Associate Professor in the Department of Ophthalmology. Dr. Nachury says of Dr. Shinde, "Dr. Shinde impressed me as a candidate because of his proven independence and track record of productivity. In 12 years of existence, my lab has hosted postdoctoral fellows who trained in world-class groups. Since Swapnil joined my research group, I have been thoroughly impressed with his resourcefulness, work ethics and insatiable curiosity."

As the IRRF Charles D. Kelman, MD Postdoctoral Scholar, Dr. Shinde will concentrate on Bardet-Biedl syndrome (BBS), an autosomal recessive disorder with cardinal symptoms of retinal degeneration, obesity, renal anomalies and polydactyly that can be caused by mutations in any of 22 different genes. BBS is the second most common syndromic retinal degeneration syndrome behind Usher syndrome, yet the underlying cause of retinal degeneration in BBS patients remains poorly understood. By investigating how the BBSome removes proteins from cilia, Dr. Shinde hopes to gain actionable insights into the pathomechanisms of retinal degeneration of BBS and move therapeutic strategies beyond the current status quo of palliative care.

Prior to being selected as the Kelman Scholar, Dr. Shinde was the second finalist for the 'Inspiring Science Award' in 2019 for his paper, *PTEN Regulates Glucose Transporter Recycling by Impairing SNX27 Retromer Assembly.*

Swapnil Shinde

PROJECT TITLE:

Retinal Imaging with Optical Coherence Tomography in Neonatal Brain Injury to Evaluate and Improve Visual and Neurologic Outcomes.

2020 Alston Callahan, MD Postdoctoral Scholar

Ke (Veronica) Ning, MD
Stanford University
Department of Ophthalmology
Palo Alto, California

Dr. Ning joined Dr. Yang Sun's Lab as a visiting student scholar in the Department of Ophthalmology, Stanford University, where she pursues her research interests, including cilia-mediated signaling in retinal degeneration and other retinal diseases. She has designed and conducted several projects regarding primary cilia signaling pathways in the retina and has discovered novel ciliated cell types in the retina by describing localization and expression of primary cilia on retinal pigment epithelium (RPE) and neurosensory retina in different species. These findings have been presented at international conferences and currently a manuscript is under review. She has also discovered disorganized cilia and abnormal inositol enzyme levels in renal tissue sections of Senior-Loken syndrome patients. During her postdoctoral training, Dr. Ning will continue to build on previous training in primary cilia signaling in eye diseases that will allow her to address additional questions regarding the disease development.

Veronica came from a background in medicine from the Xiamen University and completed her internship in 2017 at Zhongshan Hospital Affiliated to Xiamen University. Her long-term goal is to become a clinician-scientist to develop novel treatments for visual diseases and feels her medical training and research experience have provided an excellent background in multiple biological disciplines including molecular biology, biochemistry, morphogenesis and animal experience.

Ning states there is a critical need to understand the mechanisms underlying RPE repair in response to injury. During her tenure as the IRRF Callahan Scholar, Dr. Ning will concentrate her efforts to the hypothesis that primary cilia are critical for RPE repair and loss of cilia underlying AMD (age-related macular degeneration) pathogenesis. According to Ning, 'If my hypothesis is correct, I would expect to see that the loss of CEP164 (a centrosomal protein, which deleted would fail to assemble primary cilia) will result in a defective response to the NaIO3-injury model. (Dr. Ning's preliminary data using sodium iodate (NaIO3) injection in a pre-clinical model of RPE dystrophy and geographic atrophy, show features of dry AMD.)

While at Stanford, Dr. Ning will be mentored by Dr. Yang Sun, an Associate Professor of Ophthalmology at Stanford University School of Medicine.

PROJECT TITLE:
Cilia regulation of RPE repair in AMD

Ke (Veronica) Ning, MD

2020 Loris and David Rich Postdoctoral Scholar

Mohajeet Balveer Bhuckory, PhD
Stanford University
Hansen Experimental Physics Lab
Stanford, California

Dr. Bhuckory received his BSc with honors in Applied Biomedical Sciences from the Scottish University of Abertay Dundee, UK, after moving from Mauritius. He completed his PhD graduae work in Northern Ireland at Queen's University, Belfast, UK, where he trained in ocular science at the Center for Experimental Medicine. He is currently receiving his postdoctoral training at Stanford University in California, USA, where he joined Daniel Palanker's lab in 2018. His work includes laser therapies, biological and electronic approaches to the restoration of sight. "Being part of the Palanker lab has given me the opportunity to work in one of the most diverse settings. Daily interactions and problem-solving alongside the top experts in physics, applied physics, electrical engineering, material science, medicine and biology has given me the unique ability to bridge the gap between all those disciplines for the betterment of patient visual outcome," says Bhuckory.

Through strong research training programs, he has developed a broad range of expertise in the field of retinal physiology, laser therapies, *in vivo* and *ex vivo* analysis of visual function, and is particularly interested in electronic and biological approaches to restoration of sight after retinal and RPE (retinal pigment epithelium) degeneration. During the past few years, Dr. Bhuckory has developed and improved surgical techniques for subretinal implantation in several animal species and optoelectronic setups for assessment of prosthetic and natural visual functions.

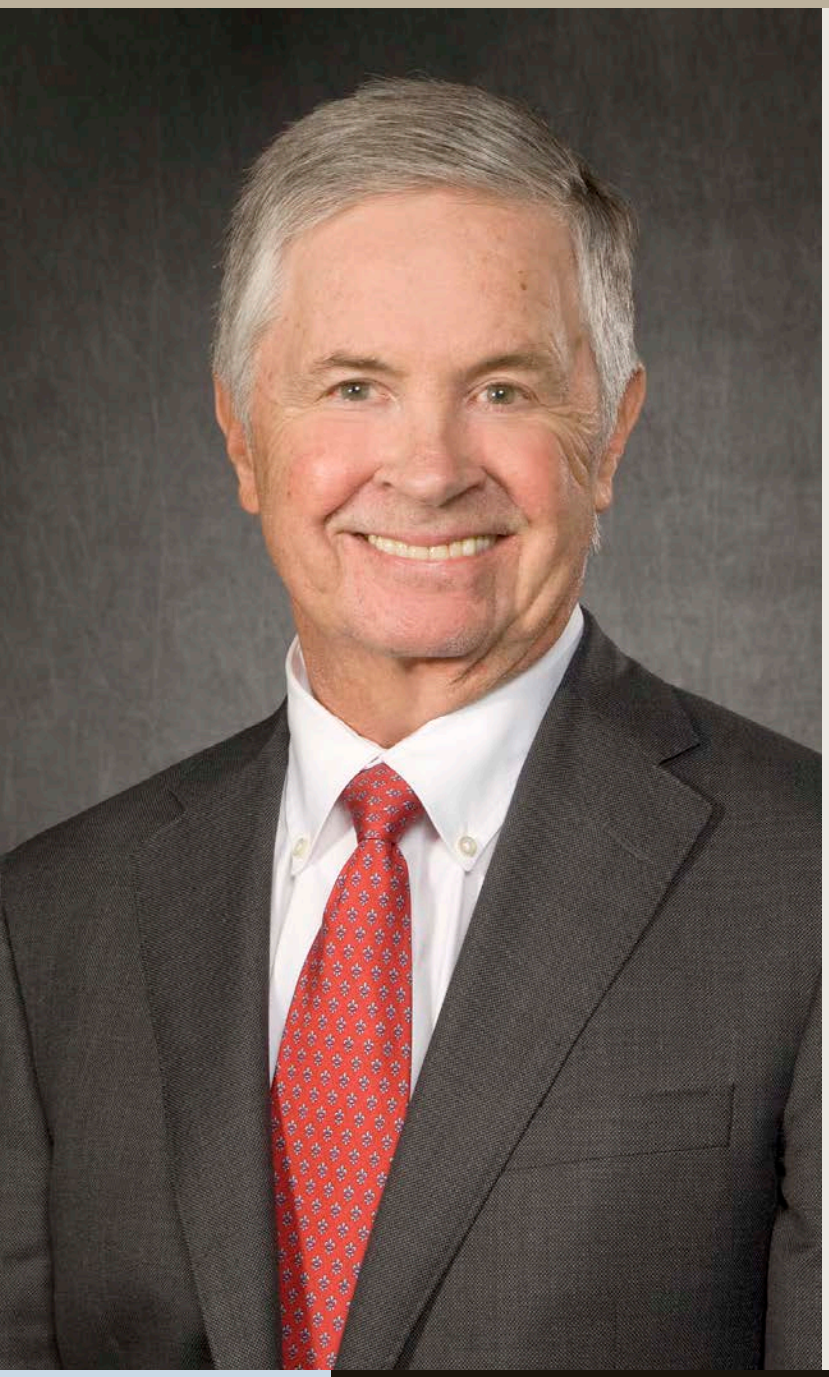
As the International Retinal Research Foundation Rich Scholar, Dr. Bhuckory will work on the restoration of vision using retinal prosthesis. "Our recent clinical trial success has been a critical proof of concept. The IRRF award will allow me to further our research in the next generation of retinal implants to achieve single-cell resolution, and thus closely matching natural vision," added Dr. Bhuckory.

Mohajeet Balveer Bhuckory

PROJECT TITLE:

Electro-neural interface with single-cell resolution for the restoration of sight in Age Related Macular Degeneration

Michael A. Callahan, MD Elected as a Member of the Alabama Healthcare Hall of Fame



IRRF President Michael A. Callahan, MD has been selected as a member of the Alabama Healthcare Hall of Fame, an organization founded in 1997 to recognize those persons, living or deceased, who have made outstanding contributions to, or rendered exemplary service for healthcare in the State of Alabama.

Dr. 'Mike' as he is known to patients and friends, was chosen for this honor because of his commitment to provide the very best care to Alabamians across the state and also for his willingness to donate countless hours of charity service. He serves as director of Oculoplastic Services at the University of Alabama at Birmingham (UAB), teaches intricate surgical procedures of phacoemulsification and intraocular lens insertion, and lectures on ophthalmic plastic surgery.

His desire to provide healthcare where needed has taken him to Nicaragua, along with other volunteers with the FOR Nicaraguan Health, Inc., located in Birmingham, Alabama. There, he worked tirelessly in a one-room clinic outside the hospital in Granada performing about 20 surgeries per day. He has expressed his desire to get people back to a point where they could at least make a living. It is this drive to help others that has set him apart.

To date, the IRRF has granted more than $24 million to support eye scientists around the world. Not only is this due to its exemplary board of directors, but also because Dr. Mike Callahan is at the helm. He has dedicated himself to the betterment of all Alabamians and all mankind, wherever they reside.

Michael A. Callahan, MD

ANNOUNCING:
The scEYEnce Campaign

The International Retinal Research Foundation is one of a coalition (Vision Research Working Group) of 10 leading organizations that have launched a new media campaign to shine a spotlight on the powerful benefits of vision research.

Approximately 12 million adults currently have significant vision loss or difficulty seeing that cannot be corrected by contacts or glasses, including 1 million who are legally blind. Vision disability ranks among the top 10 disabilities among people 18 and older, and one national survey notes that people fear vision loss as much or more than losing hearing, memory, speech or a limb.

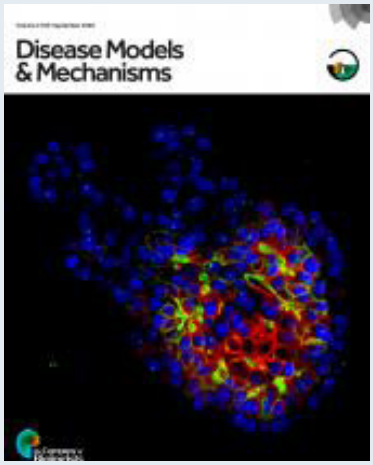
Groundbreaking science has already produced a stem cell-based therapy in clinical testing for age-related macular degeneration, synthetic lenses that improve the sight of people with cataracts, medications that reduce the pressure within the eye to treat glaucoma, and novel therapies on the horizon for relieving dry eye. Eye and vision research also provides valuable insights about our overall health, particularly the brain and its vulnerability to neurodegenerative diseases such as Alzheimer's disease.

Innovations generated by eye and vision science are transforming the sight of millions of Americans and reducing the $170 billion annual impact of major vision problems. "These innovations are allowing millions of blind or visually impaired people to continue to work, contribute to their communities, and live better, fuller lives," said Iris M. Rush, CAE, Executive Director at the Association for Research in Vision and Ophthalmology (ARVO), a scEYEnce coalition member. "Vision research is an investment in a better future for people of all ages."

For more, updated information, go to scEYEnce.org.

The Vision Research Working Group is comprised of 10 organizations dedicated to advancing vision science:

- **Alliance for Eye and Vision Research** emphasizes that National Eye Institute-funded research to save/restore vision has served to reduce healthcare costs, increase productivity, maintain independence, and improve the quality of life for all Americans.
- **American Academy of Ophthalmology** seeks to protect sight and empower lives by serving as an advocate for patients and the public, leading ophthalmic education, and advancing the profession of ophthalmology.
- **American Macular Degeneration Foundation** is a patient-centered foundation that supports potentially game-changing age-related macular degeneration (AMD) research, education and advocacy in order to improve quality of life and treatment outcomes for all those affected by AMD.
- **Association for Research in Vision and Ophthalmology (ARVO)** is the largest eye and vision research organization in the world. Members include nearly 12,000 eye and vision researchers from more than 75 countries. ARVO advances research worldwide into understanding the visual system and preventing, treating and curing its disorders.
- **EyeSight Foundation of Alabama** serves as a catalyst to improve eyesight through education, research, and access to care. Its vision is to make a difference in the eyes of the world.
- **Foundation Fighting Blindness** is the world's leading private funder of retinal disease research. Its mission is to drive the research that will provide preventions, treatments, and cures for people affected by retinitis pigmentosa, age-related macular degeneration, Usher syndrome, and the entire spectrum of retinal degenerative diseases.
- **Glaucoma Research Foundation (GRF)** is a national non-profit organization dedicated to finding a cure for glaucoma. For more than 40 years, GRF has worked to advance sight-saving research and provide essential educational resources for patients.
- **International Retinal Research Foundation** provides financial support for vision research to scientists in every corner of the globe, while focusing on discovery of causes, preventions, and cures of macular degeneration and diabetic retinopathy.
- **National Eye Institute (NEI)**, part of the National Institutes of Health, leads the federal government's research on the visual system and eye diseases. NEI supports basic and clinical science programs to develop sight-saving treatments and address special needs of people with vision loss.
- **Research to Prevent Blindness** is the leading nonprofit organization supporting eye research directed at the prevention, treatment, or eradication of all diseases that damage and destroy sight.



AUTHORS
Gabriel E. Matos-Rodrigues[1], Pedro B. Tan[1], Maurício Rocha-Martins[2], Clara F. Charlier[1], Anielle L. Gomes[1], Felipe Cabral-Miranda[1], Paulius Grigaravicius[3], Thomas G. Hofmann[4], Pierre-Olivier Frappart[4], and Rodrigo A. P. Martins[1]

[1]Institute of Biomedical Sciences, Federal University of Rio de Janeiro, (UFRJ) Brazil. (Contact author for correspondence) rodrigo.martins@icb.ufrj.br

[2]Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany

[3]Deutsches Krebsforschungszentrum, 69120 Heidelberg, Germany.

[4]Institute of Toxicology, University Medical Center of Johannes Gutenberg University Mainz, Mainz, Germany.

Above: IRRF-supported scientist, Rodrigo Martins, PhD

To read this paper in its entirety, please follow this link >

Cell Death & Disease

More from IRRF-supported scientist, Rodrigo A. P. Martins:

ATRIP protects progenitor cells against DNA damage in vivo

Gabriel E. Matos-Redrigues1, Paulius Grigaravicius[2], Bernard S. Lopez, Thomas Hofmann, Pierre-Olivier Frappart, and **Rodrigo A. P. Martins[1]**

ABSTRACT: The maintenance of genomic stability during the cell cycle of progenitor cells is essential for the faithful transmission of genetic information. Mutations in genes that ensure genome stability lead to human development syndromes. Mutations in Ataxia Telangiectasia and Rad3-related (*ATR*) or in ATR-interacting protein (*ATRIP*)lead to Seckel syndrome, which is characterized by developmental malformations and short life expectancy. While the roles of ATR in replicative stress response and chromosomal segregation are well established, it is unknown how ATRIP contributes to maintaining genomic stability in progenitor cells in vivo. Here, we generated the first mouse model to investigate ATRIP function. Conditional inactivation of *Atrip* in progenitor cells of the CNS and eye led to microcephaly, microphthalmia and postnatal lethality. To understand the mechanisms underlying these malformations, we used lens progenitor cells as a model and found that ATRIP loss promotes replicative stress and TP53-dependent cell death. *Trp53* inactivation in *Atrip*-deficient progenitor cells rescued apoptosis, but increased mitotic DNA damage and mitotic defects. Our findings demonstrate an essential role of ATRIP in preventing DNA damage accumulation during unchallenged replication.

Correspondence: Pierre-Olivier Frappart (pfrappar@uni-mainz.de) or **Rodrigo A. P. Martins** (Rodrigo-martins@icb.ufrj.br)

[1]Programa de Biologia Celular e do Desenvolvimento, Instituto de Clências Biomédicas, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil, [2]Clinical Cooperation Unit Neuropathology, German Cancer Research Center.

To read this paper in its entirety, please follow this link >

Disease Models & Mechanisms (2020)

Progenitor death drives retinal dysplasia and neuronal degeneration in a mouse model of ATRIP-Seckel syndrome

(27 August 2020)

ABSTRACT:

Seckel syndrome is a type of microcephalic primordial dwarfism (MPD) that is characterized by growth retardation and neurodevelopmental defects, including reports of retinopathy. Mutations in key mediators of the replication stress response, the mutually dependent partners ATR and ATRIP, are among the known causes of Seckel syndrome. However, it remains unclear how their deficiency disrupts the development and function of the central nervous system (CNS). Here, the team investigated the cellular and molecular consequences of ATRIP deficiency in different cell populations of the developing murine neural retina. It was discovered that conditional inactivation of Atrip in photoreceptor neurons did not affect their survival or function. In contrast, Atrip deficiency in retinal progenitor cells (RPCs) led to severe lamination defects followed by secondary photoreceptor degeneration and loss of vision. Furthermore, it was shown that RPCs lacking functional ATRIP exhibited higher levels of replicative stress and accumulated endogenous DNA damage that was accompanied by stabilization of TRP53. Notably, inactivation of Trp53 prevented apoptosis of Atrip-deficient progenitor cells and was sufficient to rescue retinal dysplasia, neurodegeneration and loss of vision. Together, these results reveal an essential role of ATRIP-mediated replication stress response in CNS development and suggest that the TRP53-mediated apoptosis of progenitor cells might contribute to retinal malformations in Seckel syndrome and other MPD disorders.

KEY WORDS:

APOPTOSIS: The death of cells that occurs as a normal and controlled part of an organism's growth or development. (Wikipedia)

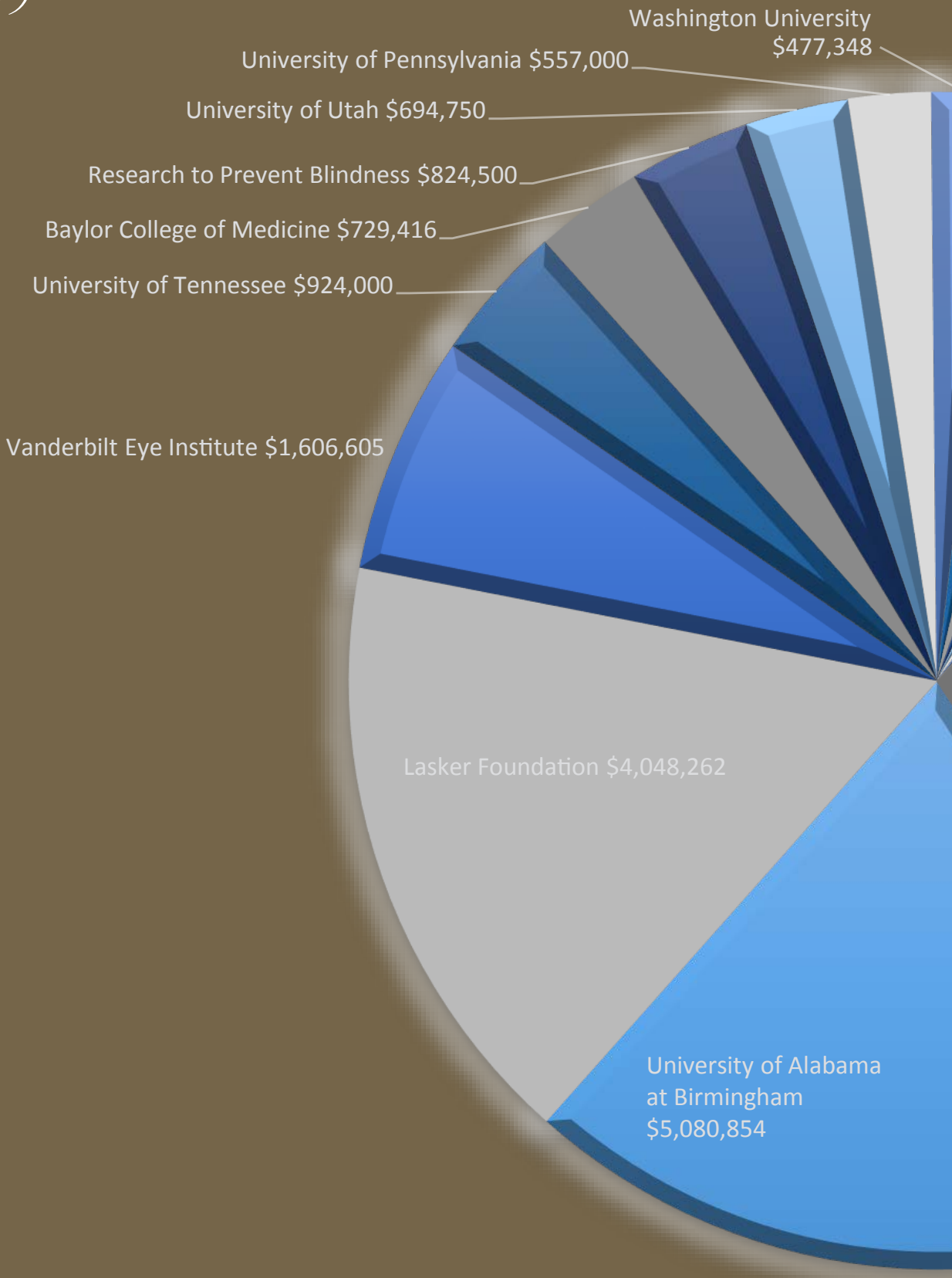
ATRIP (ATR INTERACTING PROTEIN): A gene that encodes an essential component of the DNA damage checkpoint. (GeneCards; The Human Gene Database. Genecards.org)

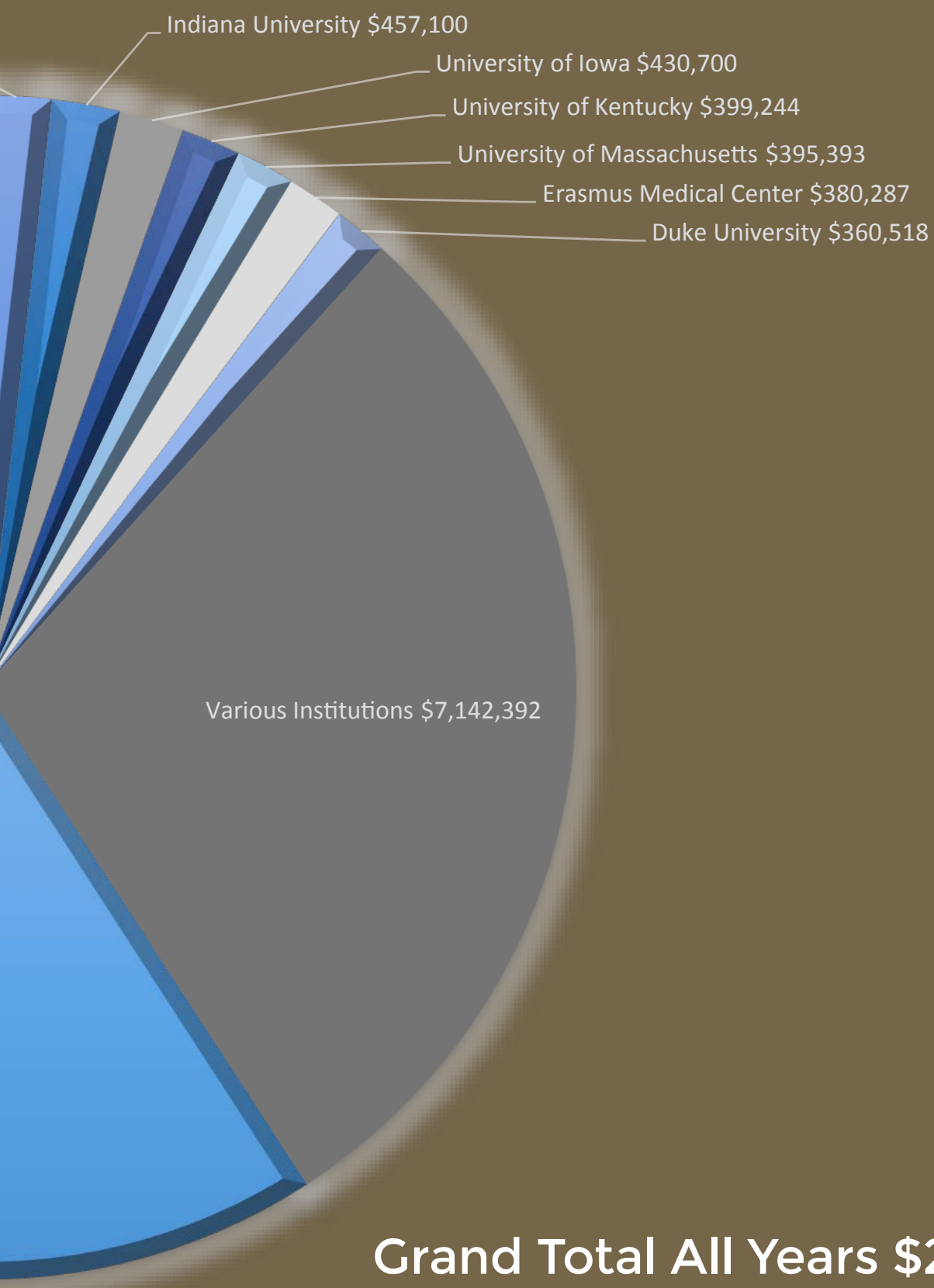
TRP53: A gene that encodes tumor protein p53, that in response to diverse cellular stresses to regulate target genes that inducing cell cycle arrest, apoptosis, senescence, DNA repair as well as other alterations in cell metabolism. (National Center for Biotechnology Information (NCBI), U.S. National Library of Medicine, 8600 Rockville Pike, Bethesda, Maryland 20894)

SECKEL SYNDROME: An extremely rare inherited disorder characterized by growth delays prior to birth (intrauterine growth retardation) resulting in low birth weight. Growth delays continue after birth (postnatal), resulting in short stature (dwarfism). (National Organization for Rare Disorders (NORD), 55 Kenosia Avenue, Danbury, Connecticut 06810.

This study was conducted with IRRF Funds: Rodrigo A.P. Martins, PhD.

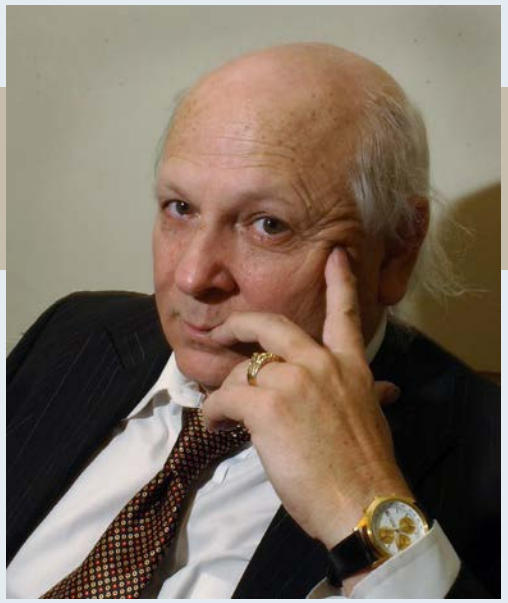
The International Retinal Research Foundation Grants 1998 – Present





Grand Total All Years $24,508,369

Various Institutions Include all grants less than $75,000



Larry A. Donoso, MD Award in Retinal Research

In July 2000, when the International Retinal Research Foundation moved into a small office located at the Callahan Eye Hospital, it was still a very young entity. It was supervised by an extremely dynamic and motivated board of directors that consisted of businessmen and physicians - Michael A. Callahan, MD, a well-known cataract and ophthalmic plastic surgeon; Charles D. Kelman, MD, inventor extraordinaire who had revolutionized cataract surgery with the development of the phacoemulsification method of cataract extraction; Daniel H. Markstein, III, a highly successful Birmingham lawyer; John S. Parker, MD, cornea surgeon and Director of the UAB Cornea Service; and founder Alston Callahan, MD, who had pioneered ophthalmic plastic surgery in the aftermath of World War II. Dr. Callahan began looking to expand the knowledge of the current board with an individual who had research experience in the area of retina.

On a recommendation from Charles Kelman, he was introduced to Larry A. Donoso, MD, PhD, the then Director of Research at Wills Eye Hospital in Philadelphia and later the Director of the Henry and Corinne Bower Laboratory for Macular Degeneration. Not only was Dr. Donoso an extremely capable administrator, he was a retinal specialist, a researcher and author of numerous scientific publications. Dr. Donoso was asked to review grant applications for the IRRF, which he did for the next few years.

In 2001, L.D. (as he preferred to be called) was asked to join the IRRF board of directors as the Scientific Director, with the duties of determining those applications to be reviewed by the acting Grants Officer and to arrange for outside reviewers. He carried out this responsibility until he became Emeritus in 2019.

Dr. Donoso was tireless in his efforts for the IRRF, dedicating countless hours to facilitate a ten-year collaboration with the Albert and Mary Lasker Foundation and helped establish the Lasker/IRRF Initiative for Innovation in Vision Science. With the long-term goal of identifying the knowledge gaps in vision research and developing innovative strategies to advance retinal research toward discovering sight-saving treatments and prevention of retinal diseases, the Initiative brought together outstanding scientists from a wide spectrum of specialties and provided a forum for new investigations of potential breakthroughs.

Among his many other accomplishments, Dr. Donoso is a member of the Royal College of Ophthalmologists in London, and has been honored by Queens Medical Center at the University of Nottingham with the establishment of the Larry A. Donoso Eye Research Laboratory, the first American to be so honored.

In 2019, after nearly two decades of innovative and substantial contributions to the International Retinal Research Foundation, Dr. Donoso announced that although he had decided to shift his focus to other areas, he would continue helping the Foundation as an Emeritus Member of the IRRF board.

On March 13, 2020, the IRRF Board of Directors recognized the dedication and service of Dr. Donoso with the creation of the Larry A. Donoso, MD, PhD Award in Retinal Research. This Award will be given to the highest ranking applicant during each regularly scheduled funding cycle, who will thereafter be formally recognized as the Donoso Awardee.

Nashville, Tennessee

Dolly Ann Padovani-Claudio, MD, PhD Receives First Donoso Award

Dolly Ann Padovani-Claudio, MD, PhD Vanderbilt University, PhD was selected to receive the first Larry A. Donoso, MD Award in Retinal Research, an award created to honor IRRF Director, Larry A. Donoso, MD, PhD. Dr. Padovani-Claudio received the highest ranking score in the 2019 grant review process, a criterion for the Award.

While determining the criteria for the Award, it became evident that it be given to an outstanding and high-ranking IRRF-funded applicant. In 2019, that scientist was Dolly Ann Padovani-Claudio, MD, PhD, who became the inaugural recipient of the Donoso Award for her project, **Investigating VEGF:VEGFR2 and CXCL8/ Interleukin-8:CXCR1/2 Interactions in Diabetic Retinopathy.** Dr. Padovani-Claudio's laboratory focuses on finding new treatments for diabetic retinopathy, a leading cause of vision loss and blindness. Her IRRF-supported grant will involve investigating the CXCL8/Interleukin 98 pathway in animal models and also in human patients as an effective potential therapy for patients. She postulates that targeting this chemokine signaling may help patients who fail anti-VEGF therapy.

Paul Sternberg, Jr., MD, IRRF Director of Research Funding and Dolly Ann Padovani-Claudio, MD, PhD

Frans Vinberg, PhD

To read this paper in its entirety, please follow this link >

Neuronal plasticity of the inner retina has been observed in response to photoreceptor degeneration. Typically, this phenomenon has been considered maladaptive and may preclude vision restoration in the blind. However, several recent studies utilizing triggered photoreceptor ablation have shown adaptive responses in bipolar cells expected to support normal vision. Whether such homeostatic plasticity occurs during progressive photoreceptor degenerative disease to help maintain normal visual behavior is unknown. We addressed this issue in an established mouse model of Retinitis Pigmentosa caused by the P23H mutation in rhodopsin. We show robust modulation of the retinal transcriptomic network, reminiscent of the neurodevelopmental state, and potentiation of rod – rod bipolar cell signaling following rod photoreceptor degeneration. Additionally, we found highly sensitive night vision in P23H mice even when more than half of the rod photoreceptors were lost. These results suggest retinal adaptation leading to persistent visual function during photoreceptor degenerative disease.

Dr. Vinberg is an IRRF-Funded scientist at the University of Utah, John A. Moran Eye Center. His funded project, *Homeostatic Mechanisms Promoting Retinal Output and Vision During Photoreceptor Degenerative Disease*, has produced a publication entitled, ***Homeostatic plasticity in the retina is associated with maintenance of night vision during retinal degenerative disease***, which appears in ELife Science Magazine. Authors: Henri Leinonen, Nguyen C. Pham, Taylor Boyd, Johanes Santoso, Krzysztof Palczewski, **Frans Vinberg**.

The FFS/International Retinal Research Foundation Grant-in-Aid Award, offered and administered by FFS, is a collaboration between the two Foundations to ensure continued funding for young scientists who are developing their independent research projects.

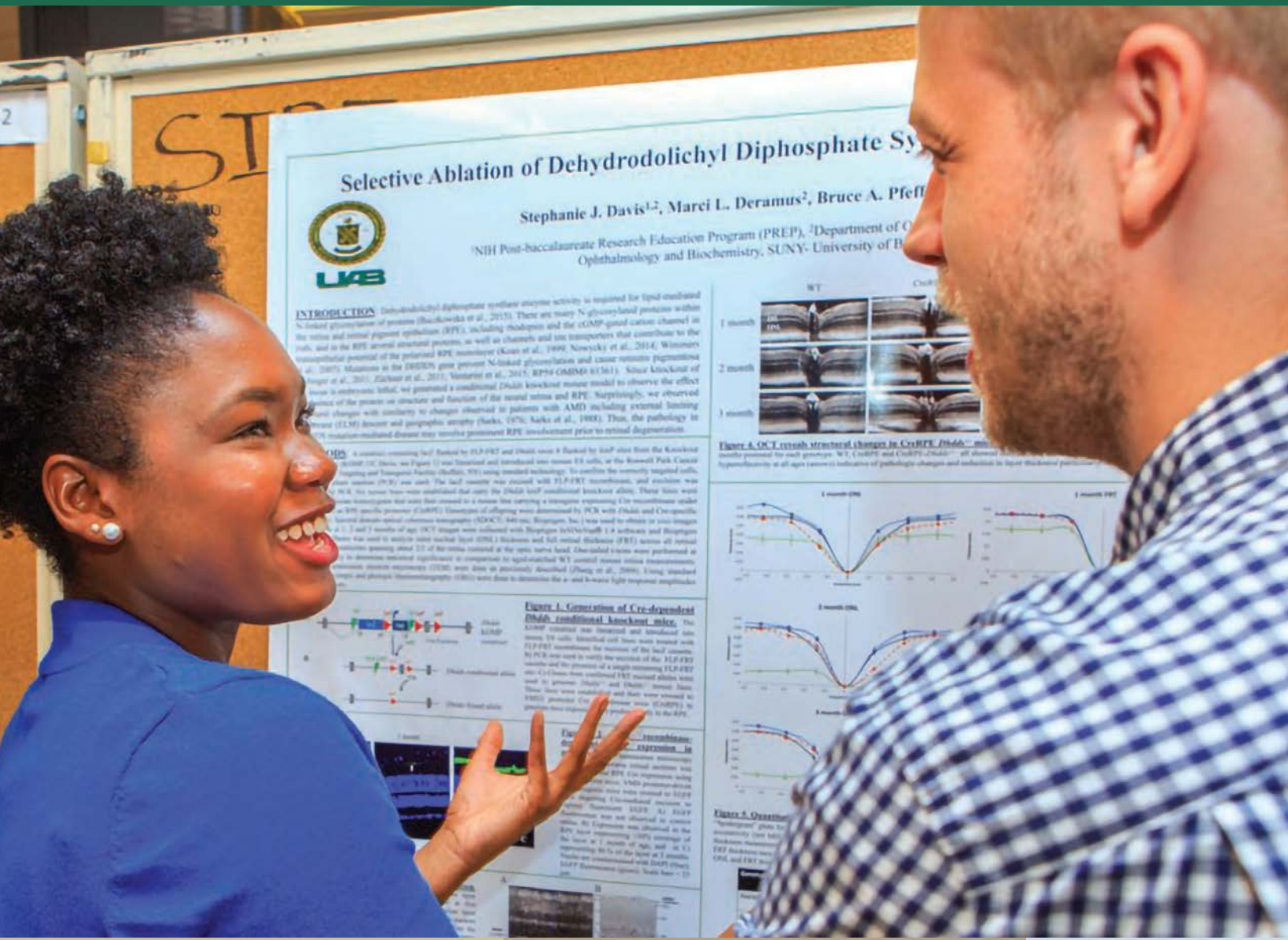
University of California, Santa Barbara – Carolina Arias, PhD, is the recipient of the 2020 FFS/IRRF Grant-in-Aid Award for her project, *Establishing Retinal Organoids as Models for the Study of Herpetic Retinopathies.*

ABSTRACT: Herpesvirus infections can establish vision-threatening retinal disease. The lack of physiologically accurate model systems to study these infections has rendered our current knowledge on the mechanisms driving ocular herpesvirus pathogenesis limited. Using mature retinal organoids (ROs day 180-200 post differentiation) as a physiological model of this tissue, it has been determined that the kinetics of HSV1 infection in retinal cells. Virus production begins at 8 hours and increases rapidly, reaching a maximum at 24 hours, post-infection. The morphology of the ROs changes dramatically at 48h post-infection, when the loss of tissue integrity is visible. These experiments indicate that HSV1 infection progresses rapidly and leads to retinal cell death. We are currently evaluating the activation of specific cell death pathways during HSV1 infection. To determine the identity of the retinal cells infected by HSV1 in the ROs, we have done single-cell RNA sequencing (scRNAseq) in a time course of infection. Using this method, we can differentiate multiple cell types present in the RO, including amacrine cells, photoreceptors (rods and cones), retinal ganglion cells, Müller glia cells, and bipolar cells. We can also detect specific viral gene expression programs in individual cells, suggesting that cells at different infection stages are being captured. Currently, Dr. Arias is analyzing the data to identify cell types infected by HSV1. It is anticipated that the studies will generate new knowledge on the pathophysiology of HSV1 infections in the retina.

Emory Eye Center Hosted Fourth Annual

SOUTHEASTERN

VISION RESEARCH CONFERENCE



Southeastern Vision Research Conference

Emory Eye Center hosted the fourth annual Southeastern Vision Research Conference (SEVRC) on December 7-8, 2020. The event was held in collaboration with two other vision research groups from Vanderbilt University Medical Center and the University of Alabama at Birmingham. The virtual, two-day seminar was a way for research scientists to celebrate an exchange of excellence in vision research and science.

"We highlighted topics that were ready for further investigation among new collaborators," says John M. Nickerson, PhD, professor of ophthalmology and director of research at Emory Eye Center. "Each institution has world leaders in various phases of vision sciences and ophthalmology. We learned greatly from these world experts."

Keynote speakers Jay Neitz, PhD, professor of ophthalmology and adjunct professor of Biological Structure at the University of Washington, and Maureen Neitz, PhD, Ray H. Hill Endowed Chair in Ophthalmology and professor in the department of ophthalmology at the University of Washington, delivered the keynote lecture entitled, "A solution to the world-wide myopia epidemic."

Dr. Jay Neitz holds a doctorate in biopsychology from the University of California, Santa Barbara. His graduate work was conducted in the laboratory of Gerald Jacobs, PhD, with a focus on understanding how the human visual system works using color vision as a model.

Dr. Maureen Neitz, a graduate of the University of California, Santa Barbara, directs a research laboratory investigating the genetic basis of normal vision and vision disorders.

Both of their specialty interests focus on understanding how the human visual system operates by studying the entire process of seeing from genes to behavior. They have discovered how genetic mutations influence the most common vision problems that affect modern humans, including myopia and colorblindness.

SEVRC attendees learned from various speakers, presentations, and posters while collaborating with vision research scholars on all aspects of vision science—molecular, disease, cognitive, imaging, and more. Junior faculty, predoctoral and postdoctoral researchers also had an opportunity to present their case abstracts, collaborate and share their ideas.

Members of the program committee included Nickerson and Michael Iuvone, PhD, professor and vice director of research, Emory Eye Center; Christine Curcio, PhD, professor and director of AMD Histopathology Lab and Tim Kraft, PhD, professor and interim associate dean for research, University of Alabama Birmingham; Tonia Rex, PhD, professor and associate director for research and David Calkins, PhD, professor and vice chair and director of research, Vanderbilt Eye Institute.

Emory Eye Center researcher Jeffrey Boatright, PhD, and Machelle Pardue, PhD, professor of biomedical engineering at Georgia Tech and research career scientist at the Atlanta VAMC, also moderated the sessions.

This conference was conducted with the support of the Internation Retinal Research Foundation.

This article contributed by Emory Eye Center.

THE IRRF BOARD OF DIRECTORS

MICHAEL A. CALLAHAN, MD,
has served as President since 2004 and gives generously of his time. Since 1998, Dr. Callahan has held a faculty position as Professor of Ophthalmology in the Department of Ophthalmology at the University of Alabama at Birmingham (UAB), and teaches the intricate surgical procedures of phacoemulsification and intraocular lens insertion. In addition, Dr. Callahan lectures on ophthalmic plastic surgery. Dr. Callahan is also very involved in providing ophthalmic care in the U.S. and countries worldwide, where medical care is not readily available.

JOHN S. PARKER, MD,
serves as Vice President while devoting himself to private ophthalmology practice and teaching responsibilities in the UAB Department of Ophthalmology where he trains ophthalmology residents and donates time and expertise caring for indigent patients. Dr. Parker has served as Director of the Corneal Service and as Director of the Residency Training Program in the UAB Department of Ophthalmology.

V. HUGO MARX, III,
serves as Treasurer and has been a member of the IRRF Board since 2004. Mr. Marx operates several corporations, which represent various industries, including health care, investment banking and venture capital. Through his numerous businesses, Mr. Marx has provided charitable donations as medical supplies, food and support items used in multiple, extreme emergency situations in and outside the U.S.

PAUL S. STERNBERG, JR., MD,
serves as Director of Research Funding for the Foundation in addition to his many other responsibilities at Vanderbilt University in Nashville, Tennessee, where he is Associate Dean for Clinical Affairs and Assistant Vice Chancellor for Adult Health Affairs at the Vanderbilt School of Medicine. He also serves as professor and chairman of the Department of Ophthalmology and the Vanderbilt Eye Institute. With a special interest in age-related macular degeneration, Dr. Sternberg oversees a cell biology and biochemistry laboratory that carries out studies into the causes of the disease.

CYNTHIA A. TOTH, MD
was invited to join the IRRF Board of Directors in 2019 and assists in grant-funding determinations. Dr. Toth is a professor of ophthalmology at Duke Eye Center in Durham, North Carolina. She is the Joseph A.C. Wadsworth Distinguished Professor of Ophthalmology, Vice Chair of Clinical Research and is a professor of biomedical engineering. Dr. Toth specializes in the evaluation and surgical treatment of vitreoretinal disease in infants, children and adults, and in novel research resulting in the clinical application of optical coherence tomography (OCT) imaging in surgery and at the bedside. Her clinical interests and skills include the surgical treatment of macular diseases (as macular hole, epiretinal membrane and vitreomacular traction), retinal detachment, proliferative diabetic retinopathy, proliferative vitreoretinopathy (PVR), and retinopathy of prematurity (ROP).

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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 2020, the IRRF had granted more than $24 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