Across the Research Spectrum

Expanding our Innovative 360° Approach

Alzheimer’s Disease Research
Macular Degeneration Research
National Glaucoma Research

2022 ANNUAL REPORT
In 2022, BrightFocus funded

Nearly $25 Million in Research Grants to Save Mind and Sight

25%
International Grants

95
New Research Grants

80%
Early Stage Research

Over 287
Ongoing Science Projects

Cover images, left to right:

1. A cross-section of the choriocapillaris, or “bed” of blood vessels that feeds the retinal area and can be disrupted in diseases like AMD. (Courtesy of Benjamin Thomson, PhD, Northwestern University)

2. Lymph nodes and surrounding vessels provide the brain nutrients and may play a role in Alzheimer’s disease. (Courtesy of Sandro DaMesquita, PhD, Mayo Clinic, Jacksonville)

3. The flow of blood and oxygen delivery is being studied in glaucoma. This model shows oxygen levels surrounding the optic nerve. (Courtesy of Yi Hua, PhD, University of Pittsburgh)

4. Human microglia were derived from adult cells to study their role in immune regulation in Alzheimer’s disease. (Courtesy of Renzo Mancuso, PhD, Vlaams Instituut voor Biotechnologie, Belgium)

5. In a mouse brain, eye pressure is being studied for its role in disrupting cellular communication. (Courtesy of Prabhavathi Maddineni, PhD, University of North Texas Health Science Center)

6. Photoreceptors are studied in a CRISPR-modified frog model where they are damaged in ways similar to AMD. (Courtesy of Brittany Carr, PhD, University of British Columbia, Canada)
Funding New Frontiers in Neurodegenerative Research

Alzheimer’s Disease Research
- Biomarkers
- Cells & Circuits
- Fats & Proteins
- Genomics
- Inflammation
- Metabolism
- Other Proteins
- Resilience
- Sex-Based
- Sleep
- Tau
- Translational
- Vascular
- Waste Clearance

Macular Degeneration Research
- Cell Metabolism
- Diet
- Drusen Formation
- Genes
- Geographic Atrophy
- Innovative Approaches
- Cell Regeneration
- Early-Stage AMD

National Glaucoma Research
- Eye Pressure
- Glaucoma Causes
- Eye-Brain Connection
- Predicting Outcomes
- Nerve Regeneration

Images on left:
ADR Research Art: The brain’s resident immune cells, microglia, are involved in Alzheimer’s and neurodegeneration. Microglia (black) surround an amyloid-beta plaque (red). (Courtesy of Jonas Neher, PhD, German Center for Neurodegenerative Diseases, Germany)

MDR Research Art: An image of patient-derived induced pluripotent stem cells, differentiated to RPE cells. (Courtesy of Daniel Hass, PhD, University of Washington)

NGR Research Art: Overlay of retinal ganglion cell images obtained using two different non-invasive imaging instruments. (Courtesy of Robert Zawadzki, PhD, University of California, Davis)
With Gratitude.

It has been an incredible year of advancement for BrightFocus. From driving bold scientific collaborations across the globe to expanding our robust research portfolio and building upon new discoveries to defeat Alzheimer’s, macular degeneration, and glaucoma, our commitment to curing diseases of mind and sight is unwavering.

BrightFocus awarded nearly $25 million in grants this year, a fivefold increase in annual funding from a decade ago. The awards were given to launch 95 new scientific projects that support BrightFocus’ 360-degree approach to research and seek to foster a better understanding of the root causes of disease onset, improve early disease detection and diagnosis, and develop effective new drugs and treatments.

One game-changing example, rooted in key, early research funding from BrightFocus, is the newly FDA-approved anti-VEGF medicine which significantly improves patient care by reducing the frequency of injections for patients with age-related macular degeneration.

We continue to broaden the field of research and are proud that this year, 44 percent of our awarded scientists are women; nearly 25 percent are to leading institutions outside the U.S.; and 80 percent of the new awards will support promising, early-stage researchers whose new ideas may lead to breakthroughs.

This diversity of perspectives gives way to bold ideas and promising novel science, like an in-depth, international research collaboration to study the link between Down syndrome and Alzheimer’s. As many as 80 percent of this population have Alzheimer’s pathology by the time they reach middle-age.

Because of you—our generous and growing community of donors, scientists, and friends—we can continue to fuel the drive and brilliance of our researchers working around the world to save mind and sight.

We are deeply grateful to partner with you in our quest toward a cure. Together, we make a difference.

Stacy Pagos Haller
President and CEO

Patricia McGlothlin Stewart, CFP
Chair, Board of Directors
Science that Makes a Difference

The impact factor of Molecular Neurodegeneration, the official BrightFocus scientific journal, has risen to **18.9** a 33% increase from 2020, making it the top-ranked open-access publication in its field.

A scientific journal’s impact factor is derived from how often its articles are cited in scientific literature which reflects the journal’s influence in shaping scientific progress.

“Molecular Neurodegeneration’s impact factor is a tribute to the scientific discoveries and collaborations that BrightFocus is fostering to cure diseases of mind and sight,” said Diane Bovenkamp, PhD, BrightFocus vice president, scientific affairs.
There are over 55 million people worldwide living with Alzheimer’s and other dementias.

In 2022, BrightFocus awarded nearly $14 million in funding for 55 new Alzheimer’s research grants.
Our Alzheimer’s researchers are tackling the disease from all angles—investigating how multiple complex systems like cardiovascular, endocrine, and immune, interact to influence the disease in order to develop earlier detection strategies and novel new treatments.

6.5 million now
8.5 million by 2030
Nearly 13 million by 2050

Page 6, left: Organoids, or 3D tissue cultures derived from stem cells, can replicate organs with disease. A cerebral organoid with frontotemporal dementia expresses pathological tau (red). (Courtesy of Hongjun Fu, PhD, The Ohio State University)

Page 6, middle: Human neurons with a mutation for frontotemporal dementia (red) express pathological tau (green). (Courtesy of Kathryn Bowles, PhD, Icahn School of Medicine at Mount Sinai)

Page 6, right: The vasculature, or layers of blood vessels in a mouse retina, is being used to study interactions between the brain and blood in Alzheimer’s disease. (Courtesy of Melanie Samuel, PhD, Baylor School of Medicine)
Health Equity Through Better Alzheimer’s Data

A new report co-authored by Diane Bovenkamp, PhD, vice president, scientific affairs; Constantine G. Lyketsos, MD, former ADR grantee, Johns Hopkins University; and others calls for the development and adoption of a Standard Health Record for Dementia (SHRD, pronounced “shared”) to advance health equity by collecting and sharing real-world data about Alzheimer’s and related dementias in diverse population groups.

“Standardizing electronic records will help achieve equity by improving the accuracy, speed, and diversity of patient recruitment for Alzheimer’s clinical trials.”

Diane Bovenkamp, PhD

CareCon: A Partnership on Alzheimer’s Awareness

Nancy Lynn, BrightFocus vice president, strategic partnerships, shared the latest Alzheimer’s research updates during the second annual Hilarity for Charity CareCon, a free, virtual event, designed to educate, inspire, and empower Alzheimer’s and dementia family caregivers with support, knowledge, and community.

Investing in Women’s Alzheimer’s Research

Women’s Health Access Matters (WHAM) recently announced Sharyn Rossi, PhD, BrightFocus director of scientific programs, neuroscience, to its collaborative that is working to increase funding for women-focused Alzheimer’s research—an unmet need.
Changes in Driving Behavior Can Predict Alzheimer’s

Ganesh Babulal, PhD, a BrightFocus Alzheimer’s Disease Research grantee, is at the forefront of bold science to more accurately predict and pinpoint the start of Alzheimer’s disease (AD). Dr. Babulal, originally from Guyana, has developed a highly integrated program to evaluate driving behaviors in older adults that may signal functional cognitive changes that can serve as biomarkers of AD. This research combines Babulal’s interests in driving, geriatrics, health disparities, and AD.

His lab at Washington University in St. Louis uses his new technology, Driving Real-World In-Vehicle Evaluation System (DRIVES), to collect data on driving including distances, acceleration, braking, and speeding to detect subtle preclinical cognitive changes that might be missed by traditional cognitive testing.

Eventually he hopes to take DRIVES into the clinic for real-world use.

In addition, Dr. Babulal hopes to use this technology to develop and validate effective strategies to improve older people’s driving and other functional skills so they can maintain their independence and age in place longer. “I am incredibly grateful and humbled to BrightFocus donors,” Babulal said. “The funding I received will allow us to collect data that will support larger grants and collaboration across different disciplines, thus embracing the team science ideals to solve this very complex problem.”

“I believe science is not immutable, but a tool that we adjust and change to help find better treatments, interventions, and cures,” he added. “This is no more evident than in the field of aging and dementia.”

“The funding I received will allow us to support larger grants and collaboration across different disciplines—to solve this very complex problem.”

Ganesh Babulal, PhD
Age-related macular degeneration (AMD) is the leading cause of blindness in people over age 50 worldwide, and is expected to affect 288 million by 2040.

In 2022, BrightFocus awarded nearly $7 million in funding for 21 new macular degeneration research grants.
Macular Degeneration Research

TODAY

11 million in U.S.

BY 2050

The incidence of macular degeneration is expected to double by 2050.

We are funding studies looking at the influence of early life events on AMD.

From a disease-in-a-dish approach to screening for FDA-approved drugs, we have invested in several promising avenues of research that cover a broad array of innovative scientific approaches.

Page 10, left: A cross-section of the choriocapillaris, or “bed” of blood vessels that feeds the retinal area. ( Courtesy of Benjamin Thomson, PhD, Northwestern University)

Page 10, middle: Microscopic image of the retinal pigmented epithelium, a layer of cells supporting the retina, reveals a characteristic “honeycomb” pattern. ( Courtesy of Antonio Escudero Paniagua, PhD, University of California, Los Angeles)

Page 10, right: Phagosomes—a part of the retinal “housekeeping” team—are being studied for their role in macular degeneration. ( Courtesy of Antonio Escudero Paniagua, PhD, University of California, Los Angeles)
Creating a Virtual AMD Community

Designed as a community forum for those living with macular degeneration, the AMD Community Circle provides the opportunity for participants to share tips and ask questions in a private, virtual platform.

Increasing Awareness of Geographic Atrophy

A new BrightFocus resource about geographic atrophy (GA), an advanced and severe form of age-related macular degeneration (AMD) was recently featured in the National Eye Institute’s Eye Health Connection newsletter. The GA fact sheet covers symptoms, diagnoses, and tips for patients and families living with the disease.

The Impact of Diet on Vision Loss

BrightFocus Chats, our monthly in-depth conversation series, features the latest news and advice from expert scientists, clinicians and low vision specialists for those living with vision loss.

Former BrightFocus Macular Degeneration Research grantee Sheldon Rowan, MD, an assistant ophthalmology professor at Tufts University School of Medicine and scientist at the Jean Mayer USDA Human Nutrition Research Center on Aging, recently joined a Chat to discuss the best foods to eat for long-term eye health. He shared with listeners the importance of a low-glycemic diet that, along with other healthy lifestyle choices, can serve as an essential tool to stave off AMD. “There’s never an inevitability of macular degeneration—you can always do something,” said Rowan.

Past chats are archived and accessible on the BrightFocus website.

“A low-glycemic diet, along with other healthy lifestyle choices, can serve as an essential tool to stave off AMD.”

Sheldon Rowan, PhD

Participants during a recent AMD Community Circle.
On A Journey to Restore Vision Loss from AMD

As a young biology student in Argentina, Maria Valeria Canto-Soler dreamt of studying elephants and other wildlife in Africa. Instead, “I’m in a dark room sitting in front of a microscope,” she joked. Yet she’s now on an adventure to restore lost sight.

In 2016, Dr. Canto-Soler received the Helen Juanita Reed Award from the BrightFocus Macular Degeneration Research program to build the first retina-in-a-dish model to study age-related macular degeneration (AMD). It was created by sampling stem cells from adult tissue—typically skin or blood—then coaxing them to multiply and differentiate into retinal tissue. She knew it was important to recreate both photoreceptors—the nerve cells that receive and process light—and the surrounding tissue that nourishes and maintains them. The ultimate goal is to transplant parts of the retinal machinery that are no longer functioning.

Now at the University of Colorado School of Medicine and its Gates Institute for Regenerative Medicine, she and her colleagues used the model to show that retinal tissue, when stressed, releases nanosized cell particles associated with drusen formation. Their discovery could lead to earlier diagnosis and new therapies.

Canto-Soler’s Human 3D Retina Modeling Lab is using the retinal organoid she developed to advance innovative stem cell-based technologies to prevent and cure AMD.

“I have become quite an optimist,” Dr. Canto-Soler said last year. “I really didn’t think you could regenerate retinal layers and photoreceptors that respond to light, but things you never thought were possible may actually happen!”

Things you never thought were possible may actually happen!

Maria Valeria Canto-Soler, PhD
Glaucoma is the most common cause of irreversible blindness worldwide.

In 2022, BrightFocus awarded nearly $4 million in funding for 19 new glaucoma research grants.
Today, more than 3 million Americans have glaucoma. By 2050, it is estimated that the number will double to 6 million people.

Our glaucoma researchers are advancing newer imaging techniques for early detection, exploring moderate-intensity exercise to slow vision loss, and finding new ways to control eye pressure—taking a 360-degree approach to ending this disease.
Nearly 100 current and former National Glaucoma Research and Macular Degeneration Research grantees shared their research results at this year’s meeting of the Association for Research in Vision and Ophthalmology (ARVO), the largest conference for vision research in the world. Washington University in St. Louis professors, Michael Kass, PhD and Mae Gordon, PhD, were presented with the 2022 Helen Keller Prize for Vision Research by BrightFocus, in partnership with the Helen Keller Foundation for Research and Education, for their landmark work that led to a significant understanding of the natural progression and effective treatment of glaucoma, which drove improvements in public health for vision disease. BrightFocus was also honored to pay tribute to Johns Hopkins University’s Sheila West, PhD, PharmD, the 2020 Keller Laureate, for her seminal work to curb blindness in developing nations.

Top-ranking grant proposals from the BrightFocus class of 2022 vision grantees, as determined by our scientific review committees of leading advisors in the field, were recognized at a networking breakfast event.

Above: Helen Keller Prize for Vision Research awardees top to bottom: Sheila West, PhD, Johns Hopkins University (2020 awardee); Michael Kass, MD and Mae Gordon, PhD, Washington University in St. Louis (2022 awardees).

To right: Congratulations to BrightFocus Foundation’s 2022 named vision award recipients. From left: Diane Bovenkamp, PhD; Lev Prasov, MD, PhD; Thomas V. Johnson III, MD, PhD; Preeti Subramanian, PhD; Ella Berry, PhD, receiving the award on behalf of Emmanuelle Souzeau, PhD; Stacy Pagos Haller, and Lucia Celkova, PhD. Missing is Leah VandenBosch, PhD who could not attend the awards ceremony in person.
Glaucoma damages axons, the long tails of neurons called retinal ganglion cells (RGCs). Axons are threaded like cables through an opening between the eye and brain, forming the optic nerve. The outermost layers—supplying peripheral vision—are the first to go. Damaged RGCs do not regenerate; the hope is to someday grow them in the lab and transplant them into the eye—a chief goal of National Eye Institute (NEI) Audacious Goal Initiative. Last year, seeking ways to improve the long-term survival and integration of transplanted RGCs, NEI awarded $6.7 million to a team of experts at different research institutions. NEI’s entire “dream team” is composed of current or former National Glaucoma Research grantees, who developed their expertise in part thanks to BrightFocus funding.

They include Jason Meyer, PhD (Indiana University School of Medicine), a leader in stem cell techniques to create RGCs from adult tissue samples; Brad Fortune, OD, PhD (Legacy Research Institute), whose glaucoma model will be used; Ben Sivyer, PhD (Oregon Health and Science University), and Yvonne Ou, MD (University of California, San Francisco), who together with Dr. Sivyer will assess the functional and anatomical integration of donor ganglion cells; and Gareth Howell, PhD (Jackson Laboratories), who will monitor immune-like responses.

“There’s such a strong importance placed on collaborative science,” said Dr. Meyer. “We all have our own distinct set of expertise and skills, and when we have that combined, we create a powerful team.”

Jason Meyer, PhD

“We all have our own distinct set of expertise and skills, and when we have that combined, we create a powerful team.”

The team is made up of five current and former BrightFocus National Glaucoma Research grantees: from left, Jason Meyer, PhD; Brad Fortune, PhD; Ben Sivyer, PhD; Yvonne Ou, MD; and Gareth Howell, PhD.
BrightFocus Research Awards

that were offered total nearly $25 million in 2022.

Our 287 active projects are in:

- 17 countries
- 33 U.S. states
- 112 cities worldwide
- 154 global institutions

2022 (and prior years)
BrightFocus grants by country

Prior year(s)
BrightFocus grants by country
2022 BrightFocus Grants at a Glance
As of July 15, 2022

**54%**
Basic Research Grants

**13%**
Clinical Research Grants

**33%**
Translational Research Grants

**BASIC**
Research that aims to better understand how a disease happens, and to obtain new ideas of how to stop the disease.

**CLINICAL**
Research involving volunteer participants to test the safety and effectiveness of drugs, devices, or other treatment candidates.

**TRANSLATIONAL**
Research to move findings from the lab bench to the “bedside” by testing potential treatments.
Alzheimer’s Disease Research

Influence of Testosterone on Dementia in Male Mice
Charly Abi Ghanem, PhD
ALBANY MEDICAL COLLEGE
Fellowship Mentor: Kristen Zuloaga, PhD
Fellowship Mentor: Sally Temple, PhD
NEURAL STEM CELL INSTITUTE

Revealing Early Biomarkers in Alzheimer’s Disease
Uri Ashery, PhD
TEL AVIV UNIVERSITY (ISRAEL)
Co-PI: Shahar Alon, PhD
BAR-ILAN UNIVERSITY (ISRAEL)

Identifying Women-Specific and Men-Specific Risk Factors for Alzheimer’s Disease
Gael Chetelat, PhD
UNIVERSITY OF CAEN NORMANDIE (FRANCE)
In partnership with the Fondation Vaincre Alzheimer

Studying Lysosomal Vulnerability in Aging and Alzheimer’s Disease
Ching-Chieh Chou, PhD
STANFORD UNIVERSITY Fellowship Mentor: Judith Frydman, PhD

Mapping Brain Connectivity Changes in Alzheimer’s Disease
Kevin Beier, PhD
UNIVERSITY OF CALIFORNIA, IRVINE
Co-PI: Johanna Jackson, PhD

Understanding Women-Specific and Men-Specific Risk Factors for Alzheimer’s Disease
Karen Williams, PhD
UNIVERSITY OF CALIFORNIA, BERKELEY Fellowship Mentor: Paul Chang, PhD

Advanced Imaging of the Spatial Organization of Brain Cells in Alzheimer’s Disease
Limor Cohen, PhD
HARVARD UNIVERSITY Fellowship Mentor: Xiaowei Zhuang, PhD

Impact of Midlife Subclinical Cardiovascular Disease on Alzheimer’s Disease
Marta Cortes-Canteli, PhD
SPANISH NATIONAL CENTRE FOR CARDIOVASCULAR RESEARCH (SPAIN)
Co-PI: Valentin Fuster, PhD Co-PI: Juan Domingo Gispert, PhD

Neurovascular Changes During Midlife Hypertension and Alzheimer’s Disease
Christian Crouzet, PhD
UNIVERSITY OF CALIFORNIA, IRVINE Fellowship Mentor: David Cribs, PhD Fellowship Mentor: Bernard Choi, PhD

Liquid Biopsy for Detection of Cell Death in Alzheimer’s Disease
Based on cfDNA Methylation Patterns
Yuval Dor, PhD
HEBREW UNIVERSITY OF JERUSALEM (ISRAEL)
This award is made possible in part by the support from The Sephardic Foundation on Aging

Mapping the Crosslink of Senescence and Inflammation in Neurodegeneration
Violeta Duran Laforet, PhD
UNIVERSITY OF COLORADO, BOULDER Fellowship Mentor: Rudolph E. Tanzi, PhD

Exploring Microglial Activation in Normal Physiology and Disease
Gabriela Farias Quipildor, PhD
ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI Fellowship Mentor: Stephen Salton, MD, PhD

Using cfDNA Methylation Patterns to Study Brain Activity in Alzheimer’s Disease
Sally Temple, PhD
UNIVERSITY OF MICHIGAN Fellowship Mentor: John H. Morris, Jr, MD

Understanding the Role of TREM2 T96K in Alzheimer’s Disease Pathogenesis
Hoang Le, PhD
UNIVERSITY OF CALIFORNIA, SJC Fellowship Mentor: Ana Griciuc, PhD Fellowship Mentor: Rudolph E. Tanzi, PhD

Effective Measures Towards the Early Detection of Alzheimer’s Disease
Stephanie Leal, PhD
RICE UNIVERSITY Fellowship Mentor: Martin Kampmann, PhD

Microbiome and Alzheimer’s Disease
Uri Ashery, PhD
TEL AVIV UNIVERSITY (ISRAEL)
Co-PI: Shahar Alon, PhD
BAR-ILAN UNIVERSITY (ISRAEL)

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Stephanie Leal, PhD
RICE UNIVERSITY Fellowship Mentor: Martin Kampmann, PhD
Drivers of Vulnerability to Alzheimer’s Disease Neuropathological Changes
Nicole Liachko, PhD
SEATTLE INSTITUTE FOR BIOMEDICAL AND CLINICAL RESEARCH

Abca1 Regulates Lipid Metabolism and Tau Pathology in the P301S/ApoE4 Mice
Alexandra Litvinchuk, PhD
WASHINGTON UNIVERSITY IN ST. LOUIS
Fellowship Mentor: David Holtzman, MD

Home-Based Noninvasive Brain Stimulation for Mild Alzheimer’s Disease
Brad Manor, PhD
HEBREW REHABILITATION CENTER
Co-PI: Alvaro Pascual-Leone, MD, PhD

Identifying a Disease-Modifying Treatment for Alzheimer’s
Courtney Marshall, PhD
UNIVERSITY OF PENNSYLVANIA
Fellowship Mentor: Virginia Lee, PhD

Assessment of Tandem Repeat Variation in Alzheimer’s Disease
Alejandro Martin Trujillo, PhD
ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI

Do Protein Levels and Brain Structure Impact Cognition in Alzheimer Disease
Nicole McKay, PhD
WASHINGTON UNIVERSITY SCHOOL OF MEDICINE
Fellowship Mentor: Tammie Benzinger, MD, PhD

Modeling MRI Brain Aging in Autosomal Dominant Alzheimer’s Disease
Peter Millar, PhD
WASHINGTON UNIVERSITY SCHOOL OF MEDICINE
Fellowship Mentor: Eric McDade, DO

Do Post-Translational Modifications Cause Tau to Shapeshift?
Sue-Ann Mok, PhD
UNIVERSITY OF ALBERTA (CANADA)
Co-PI: Carlo Condello, PhD
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

Tau Variants in Blood to Diagnose and Stage Alzheimer’s Disease
Laia Montoliu-Gaya, PhD
UNIVERSITY OF GOTHENBURG (SWEDEN)
Fellowship Mentor: Kaj Blennow, MD, PhD

Relationship Between Sleep Loss and Protein Buildup in Alzheimer’s Disease
Christopher Morrone, PhD
CENTRE FOR ADDICTION AND MENTAL HEALTH (CANADA)
Fellowship Mentor: Wai Haung (Ho) Yu, PhD

Is the Niacin Receptor HCAR2 Protective in Alzheimer’s Disease?
Miguel Moutinho, PharmD, PhD
INDIANA UNIVERSITY
Fellowship Mentor: Gary Landreth, PhD

Understanding Brain Networks Causing Associative Memory Impairments in AD
Tatsuki Nakagawa, PhD
UNIVERSITY OF CALIFORNIA, IRVINE
Fellowship Mentor: Kei Igarashi, PhD

Investigating TDP-43 Biology in Alzheimer’s Disease and LATE: Impact on the Clinical Diagnosis
Sandra O. Tomé, PhD
CATHOLIC UNIVERSITY OF LEUVEN (BELGIUM)
Fellowship Mentor: Gabriela Chiosis, PhD

A Human Brain-in-a-Dish Model to Investigate Disease Mechanisms of FTD
Dominik Paquet, PhD
HOSPITAL OF THE LUDWIG MAXIMILIAN UNIVERSTÄT MÜNCHEN (GERMANY)

What is the Best Way to Give tDCS to People with Alzheimer’s Disease?
Carlos Roncero, PhD
BAYCREST CENTRE FOR GERIATRIC CARE (CANADA)

Targeting Memory Circuits as a Therapeutic Strategy in Alzheimer’s Disease
Kristie Stefanoska, PhD
FLINDERS UNIVERSITY (AUSTRALIA)
Fellowship Mentor: Arne Ittner, PhD

Identification of Protein Biomarkers for Aging and Alzheimer’s Disease
Xiaojing Sui, PhD
NORTHWESTERN UNIVERSITY
Fellowship Mentor: Richard Morimoto, PhD

Metabolism Driving Cell Death and Inflammation in Alzheimer’s Disease
Larissa Traxler, PhD
UNIVERSITÄT INNSBRUCK
Fellowship Mentor: Jerome Mertens, PhD

APOE Immunotherapy as a Potential Treatment for Cerebral Amyloid Angiopathy
Susanne van Veluw, PhD
MASSACHUSETTS GENERAL HOSPITAL
Curbing Inflammation at Brain’s Barrier in Alzheimer’s Disease
Huixin Xu, PhD
BOSTON CHILDREN’S HOSPITAL
Fellowship Mentor: Maria Lehtinen, PhD
Fellowship Mentor: Mark Andermann, PhD
BETH ISRAEL DEACONESS MEDICAL CENTER

Understanding How Human Blood-Brain Barrier Cells Drive Alzheimer’s Disease
Andrew Yang, PhD
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
Fellowship Mentor: Saul Villeda, PhD

Sleep Restoration, Microglia and Alzheimer’s Disease
Qiuchen Zhao, MD, PhD
MASSACHUSETTS GENERAL HOSPITAL
Fellowship Mentor: Stephen Gomperts, MD, PhD

Macular Degeneration Research

Innovative Award
Mouse Models for Subretinal Fibrosis
Patsy M. Nishina, PhD
THE JACKSON LABORATORY
Co-PI: Juergen K. Naggert, PhD

New Investigator Award
Regenerative Response in Spiny Mice
Manas R. Biswal, PhD
UNIVERSITY OF SOUTH FLORIDA
This award is made possible with support of the Free Family Foundation

Regulation of Capillary Blood Flow in the Choroid Vasculature
Albert Gonzales, PhD
UNIVERSITY OF NEVADA

Discovering an Invisible Layer in Retina and its Ties to AMD
Yifan Jian, PhD
OREGON HEALTH & SCIENCE UNIVERSITY

To Identify New Factors That Play a Role In Early Onset Drusen Maculopathy
Yara TE Lechanteur, MD, PhD
RADBODU UNIVERSITY NIJMEGEN MEDICAL CENTRE (THE NETHERLANDS)
Mentor: Frans Cremers, PhD

Gene Regulation of RPE Maintenance
Lev Prasov, MD, PhD
UNIVERSITY OF MICHIGAN
The Dr. Joe G. Hollyfield Award

Stem Cell-Based Approaches to Identify New Drugs for Treating Dry AMD
Srinivasa Rao Sripathi, PhD
RETINA FOUNDATION OF THE SOUTHWEST

Macular Degeneration, Metabolism, and a Novel Mitigation Strategy
Thomas Wubben, MD, PhD
UNIVERSITY OF MICHIGAN

Can Fatty Acid Oxidation Influence Drusen Levels in the Eye?
Daniel Hass, PhD
UNIVERSITY OF WASHINGTON
Fellowship Mentor: James Hurley, PhD

Dark Matter: Developing a Nanoantioxidant-Based Therapeutic System for AMD
Yongsu Kwon, MD, PhD
UNIVERSITY OF NORTH CAROLINA
Fellowship Mentor: Han Zongchao, MD, PhD

Killifish: A Novel Model of Age-Related Macular Degeneration
Nicole C. L. Noel, PhD
UNIVERSITY COLLEGE LONDON (UK)
Fellowship Mentor: Ryan MacDonald, PhD

Machine Learning to Predict AMD-Associated Genetic Variant Impact
Leah VandenBosch, PhD
SEATTLE CHILDREN’S HOSPITAL
Fellowship Mentor: Stephen Burns, PhD

The Role of Reactive Astrocytes in Glaucumatos Axonal Degeneration
Catia Gomes, PhD
INDIANA UNIVERSITY SCHOOL OF MEDICINE
Fellowship Mentor: Jason Meyer, PhD

Post-Doctoral Fellowship Award
Cellular Scale Characterization of the RPE-Photoreceptor Complex in a Model for Geographic Atrophy Progression
Kristen Bowles Johnson, PhD, OD
INDIANA UNIVERSITY Fellowship Co-Mentors: Donald T. Miller, PhD & Jennifer J. Hunter, PhD
UNIVERSITY OF ROCHESTER

Investigating Multiarmed Cell Death (PANoptosis) in Dry AMD Progression
Lucia Celkova, PhD
TRINITY COLLEGE DUBLIN, (IRELAND)
Fellowship Mentor: Matthew Campbell, PhD
The Elizabeth Anderson Award

Identifying FDA Approved Drugs to Reverse Dry AMD
Steffi Daniel, PhD
THE UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL CENTER
Fellowship Mentor: John Hulleman, PhD
This grant is made possible by the support from The Ivan Bowen Family Foundation

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Machine Learning to Predict AMD-Associated Genetic Variant Impact
Leah VandenBosch, PhD
SEATTLE CHILDREN’S HOSPITAL
Fellowship Mentor: Stephen Burns, PhD

The Role of Reactive Astrocytes in Glaucumatos Axonal Degeneration
Catia Gomes, PhD
INDIANA UNIVERSITY SCHOOL OF MEDICINE
Fellowship Mentor: Jason Meyer, PhD

Bold Ideas Initiatives
A Novel High-Dose Statin for Treatment of Intermediate AMD
John Edwards
DRUSOLV THERAPEUTICS, INC.

Charity-Led Big Data Resource for Discovery of Novel Biomarkers for Multiple Conditions Using Eye Scans
Wen Hwa Lee, PhD
ACTION AGAINST AMD (UK)

National Glaucoma Research

Post-Doctoral Fellowship Award
Improved Imaging of the Outflow Pathway in the Living Human Eye
Alessandra Carmichael-Martins, PhD
INDIANA UNIVERSITY Fellowship Mentor: Stephen Burns, PhD
Increased Pressure in Eye Affects the Neuronal Communications in the Brain
Prabhavathi Maddineni, PhD
UNIVERSITY OF NORTH TEXAS HEALTH SCIENCE CENTER
Fellowship Mentor: Gulab Zode, PhD

Developing Communication Strategies for Genetic Risk Testing in Glaucoma
Emmanuelle Souzeau, PhD
FLINDERS UNIVERSITY (AUSTRALIA)
Fellowship Mentor: Jamie E Craig, MBBS, PhD
The Thomas R. Lee Award

Standard Award
The Role of Podosomes in Regulating IOP
Michael G. Anderson, PhD
THE UNIVERSITY OF IOWA

Preserving Eye’s Vision by Neuroprotecting Retinal Cells
Marco Feligioni, PhD
FONDAZIONE EBRI “RITA LEVI-MONTALCINI” (ITALY)

Study of Segmental Aqueous Outflow in Uveal Drainage Pathway
Haiyan Gong, MD, PhD
BOSTON UNIVERSITY
Co-PI: Carol Toris, PhD
UNIVERSITY OF NEBRASKA MEDICAL CENTER

New Tools for Leveraging Regenerative Medicine to Restore Sight in Glaucoma
Thomas V. Johnson III, MD, PhD
WILMER EYE INSTITUTE, JOHN'S HOPKINS SCHOOL OF MEDICINE
The Douglas H. Johnson Award

Can Progression of Glaucoma be Slowed by Regular Exercise?
Andras Komaromy, DVM, PhD
MICHIGAN STATE UNIVERSITY

Cellular-Scale Imaging in the Living Eye to Study Glaucoma Pathophysiology
Kazuhiro Kurokawa, PhD
GOOD SAMARITAN FOUNDATION, LEGACY HEALTH SYSTYEM

Investigating Autophagy in Nitric Oxide Production to Control Eye Pressure
Myoungsup Sim, PhD
DUKE UNIVERSITY SCHOOL OF MEDICINE

Combined Stem Cell and Trophic Factor Therapy for Glaucoma
Shaomei Wang, MD, PhD
CEDARS-SINAI MEDICAL CENTER

A Possible Link between Glaucoma and Alzheimer’s Disease
Nick Marsh-Armstrong, PhD
UNIVERSITY OF CALIFORNIA, DAVIS

Human Stem Cell Modeling of the APBB2 Risk Variant for Glaucoma
Jason Meyer, PhD
INDIANA UNIVERSITY SCHOOL OF MEDICINE

Cell-To-Cell Communication in Health and Disease
Michael Risner, PhD
VANDERBILT UNIVERSITY MEDICAL CENTER
Co-PI: David Calkins, PhD

Investigating Neuronal Changes in Optic Nerve Regeneration
Jiaxing Wang, PhD
EMORY UNIVERSITY

Understanding Alterations in an Early Experimental Glaucoma Model
Hongli Yang, PhD
GOOD SAMARITAN FOUNDATION, LEGACY HEALTH SYSTYEM
Co-PI: Priya Chaudhary, PhD

Bold Ideas Initiatives
Neuroprotection and Neuroenhancement in Glaucoma: A Clinical Trial for CNTF
Jeffrey Goldberg, MD, PhD
STANFORD UNIVERSITY

Hunting for Genes Controlling Optic Nerve Regeneration
Jiaxing Wang, PhD
EMORY UNIVERSITY

Does Aberrant Mechanotransduction Trigger RPE Atrophy in AMD?
Aparna Lakkaraju, PhD
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
The Lorraine Maresca Award

Validation of Novel OCT-Based Imaging Tools for Noninvasive Monitoring
Robert Zawadski, PhD
UNIVERSITY OF CALIFORNIA, DAVIS
Co-Principal Investigator: Pengfei Zhang, PhD
Dr. Douglas H. Johnson Award

National Glaucoma Research
Deciphering the Local Effect of Glaucoma Risk Factors on Axonal Mitochondria
Romain Cartoni, PhD
DUKE UNIVERSITY MEDICAL CENTER
The Thomas R. Lee Award

Addressing the Link Between Impairment in Phagosome Degradation and AMD
Antonio Escudero Paniagua, PhD
UNIVERSITY OF CALIFORNIA, LOS ANGELES
Fellowship Mentor: David Williams, PhD
The Elizabeth Anderson Award

Does Aberrant Mechanotransduction Trigger RPE Atrophy in AMD?
Aparna Lakkaraju, PhD
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
The Lorraine Maresca Award

Note: All grants will be awarded pending conclusion of contract negotiations.
Our World-Class Scientific Review Committees

Composed of renowned leaders in their fields, our Scientific Review Committees recommend new research opportunities for BrightFocus to advance its goal of defeating Alzheimer’s, macular degeneration, and glaucoma.
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National Glaucoma Research

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RESEARCH IN EYE DEVELOPMENT

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Our Valued Partners

BrightFocus works closely with nonprofit and corporate partners on issues of common concern.
Global Network for Alzheimer’s

BrightFocus has worked with partners worldwide to advance research and provide public awareness of Alzheimer’s disease including:

**Belgium**  
Stichting Alzheimer Onderzoek

**France**  
Fondation Vancre Alzheimer

**Germany**  
Alzheimer Forschung Initiative e.V.

**The Netherlands**  
Alzheimer Nederland
Jumpstarting the Next Generation

The BrightFocus signature Fast Track series of scientific conferences provides a unique, immersive learning experience for new researchers that accelerates their knowledge, expertise, and visibility in the fields of Alzheimer’s, macular degeneration, and glaucoma.

The inaugural Alzheimer’s Fast Track meeting was developed in close coordination with Harry Steinbusch, PhD, Maastricht University, The Netherlands.

BrightFocus has expanded this successful “boot camp” model to glaucoma and macular degeneration, preparing some of the brightest young investigators for research careers aimed at prevention, treatment, and cures for these diseases of mind and sight.

Clockwise from top left: Malu Tansey, PhD, University of Florida; Harry Steinbusch, PhD, Maastricht University (The Netherlands); Toinét Cronjé, PhD, University of Copenhagen (Denmark); Patrick Kehoe, PhD, University of Bristol (UK).

Alzheimer’s Fast Track

In 2021, BrightFocus held its first virtual Fast Track conference. Alzheimer’s Fast Track convened 165 researchers from 23 countries—a record number of participants. Featured speakers addressed topics ranging from the neurological impact of COVID-19 to racial and sex-based disparities in research.
Expanding Diversity in Science
BrightFocus is committed to providing opportunities for scientists from diverse backgrounds to attend key research meetings and network with experts in their field. We are proud to have sponsored these diversity fellows for recent vision Fast Track meetings:

Glaucoma Fast Track

Left to right: Cindy Hoppe, MSc, Schepens Eye Research Institute of Mass Eye and Ear, Harvard Medical School; Margarete Karg, PhD, Schepens Eye Research Institute of Mass Eye and Ear; Ajay Kumar, PhD, University of Pittsburgh; Sailee Sham Lavekar, MS, Indiana University School of Medicine; Kazuya Oikawa, PhD, University of Wisconsin-Madison; Monichan H. Phay, PhD, Schepens Eye Research Institute of Mass Eye and Ear, Harvard Medical School; Ester Reina-Torres, PhD, Imperial College London, UK.

Macular Fast Track

Left to right: Bruna Costa, graduate student, Columbia University; Miguel Flores-Bellver, instructor, University of Colorado; Yeboah Gyening, graduate student, University of Oklahoma Health Science Center; Ezequiel Salido, research assistant professor, West Virginia University; Kendra Wilcots, graduate student, Lerner Research Institute; Felix Yemanyi, postdoctoral fellow, Boston Children’s Hospital, Harvard Medical School.

BrightFocus continues to lead the field in nurturing macular degeneration research and talent.
The Fast Track format is invaluable for those starting in the field to better understand the latest findings about this complex disease.”

Shyamanga Borooah, MBBS, PhD
Shiley Eye Institute, University of California, San Diego, a BrightFocus travel awardee and Macular Fast Track attendee.
Celebrating the Impact of Science

BrightFocus hosted its seventh annual gala at the National Portrait Gallery to spotlight exemplary scientists working with the foundation and showcased some of the world’s most exciting research around the globe to end diseases of mind and sight.

“Now more than ever we understand the power of bold, innovative research to change lives,” said BrightFocus President and CEO Stacy Pagos Haller. “We are seeing progress to defeat these devastating diseases, and are so proud to recognize some of these outstanding scientists.”

Pictured: David M. Holtzman, MD, received the BrightFocus Scientific Impact Award; Sheila West, PhD, was awarded the Helen Keller Prize for Vision Research; and Ilyas Washington, PhD, received the BrightFocus Bench-to-Bedside Award.
Top left: Actor/singer Eric McCormack performs “Pure Imagination” in tribute to the legendary Gene Wilder.

Above left: National Glaucoma Research grantee Jason Meyer, PhD, has been a leader in genetically reprogramming adult cells to recreate and study cells affected by glaucoma; currently he’s creating a “retina-in-a-dish” glaucoma model.

Above middle: Macular Degeneration Research grantee Joelle Hallak, PhD, is developing a statistical model that integrates imaging, genetic and clinical data to predict AMD progression to optimize and personalize each individual patient’s treatment.

Above right: Alzheimer’s Disease Research grantee Ksenia Kastanenka, PhD, is investigating whether non-neuronal cells contribute to Alzheimer’s progression using state-of-the-art methodology, possibly leading to the development of novel therapeutics.

Above: BrightFocus grantees shared their latest research findings. From left: Alireza Faridar, MD (Houston Methodist Hospital); Kimberly Gokoffski, MD, PhD (University of Southern California Roski Eye Institute); Diane Bovenkamp, PhD; Stacy Pagos Haller; Sharyn Rossi, PhD (BrightFocus); Joelle Hallak, PhD (University of Illinois College of Medicine); Ksenia Kastanenka, PhD (Massachusetts General Hospital, Harvard Medical School); Ye Sun, MD, PhD (Harvard Medical School and Boston Children’s Hospital); and Jason Meyer, PhD (Indiana University School of Medicine).
Brain Info Live

Brain Info Live® is a free informative video series about brain health, Alzheimer’s disease, and related dementias geared toward communities that are underrepresented in clinical trials and research studies. Since its launch in August 2021, it has expanded to include Brain Info Live En Español. Over 40 episodes have streamed to date on subjects ranging from the differences between Alzheimer’s and dementia to prevention and financial and life management tips.

Images from Brain Info Live, including:

Top image to right, musician Ashley Campbell, daughter of the late Glen Campbell, legendary singer and musician who passed away from Alzheimer’s. Second image from top, John Lewis, founder of Energy Fitness.

Page 33, top row left to right, a guest expert on Alzheimer’s, Goldie Smith Byrd, PhD, Wake Forest School of Medicine; Lucina Rodriguez, Los Cenzonties Cultural Arts Academy.
Sharing Personal Caregiving Tips

Richard Lui, MSNBC news anchor, author, and filmmaker joined BrightFocus for a special session of Brain Info Live to discuss his experience caring for his father with Alzheimer’s and glaucoma, with Maddy Dychtwald, Age Wave co-founder and BrightFocus board member. Lui also shared personal caregiving tips and answered audience questions.
Our Donors

BrightFocus thanks our donors for their generosity toward our three scientific and public awareness programs: Alzheimer’s Disease Research, Macular Degeneration Research, and National Glaucoma Research. The support of individual donors, family foundations, and corporate partners makes our work possible. A wide range of contribution opportunities is available to accommodate resources and charitable goals. Each gift is important and needed to help us find a cure.

BrightFocus donors often have special connections to the scientific research programs they support. We are honored to share stories of three donors with you.

Donor Spotlight
Supporting Research to Save Sight

Lyn O’Niel of Boulder Creek, California, is longtime member of the Santa Cruz community where she raised her two children. She worked for 35 years at the Santa Cruz County Public School system, serving to coordinate an occupational program.

A volunteer and former president of the Santa Cruz Archeological Society, she often used her vacation days to help at dig sites for prehistoric artifacts. Lyn also volunteered for the Santa Cruz County Sheriff’s Office and helped with the Valley Churches United effort following the San Lorenzo River flooding crisis in 1982.

She knows the devastating impact of vision disease, as her grandmother suffered from both glaucoma and macular degeneration. In honor of her grandmother, Lyn has supported National Glaucoma Research (NGR), a BrightFocus program, since 1997.

“I have learned so much about vision research from BrightFocus and realize that they are getting closer and closer to figuring out what to do at the beginning of the disease to fix it.”

Lyn was diagnosed with pre-glaucoma decades ago, has had surgery for a detached retina and is currently undergoing treatment. “To lose your eyesight is a terrible thing. It is just debilitating—there are too many beautiful things that you will never get to see if you don’t take care of your eyes,” she continued. “Don’t ever give up. You will get through it and people are working to change the way the disease progresses.”

Thanks to donors like Lyn, NGR continues to advance groundbreaking research to diagnose and treat glaucoma.
Committed to a Cure for Macular Degeneration

Betty Van Norman of New Orleans, Louisiana, met her late husband Gene when they worked together at Chevron. Gene, a petroleum engineer and Betty, an independent consulting geologist, traveled the world together after retirement, experiencing new places and enjoying art.

Age-related macular degeneration (AMD) runs on both sides of Betty’s family. Both her parents had AMD, and all her siblings have been diagnosed with it.

Betty was first diagnosed with AMD in her 30s, but it wasn’t until five years ago that the disease began to progress much more quickly, impacting her ability to read. She has since moved into a retirement community where she has started an AMD support group that meets monthly.

Betty also enjoys listening to advice and updates on the monthly BrightFocus Macular Degeneration Chats.

At 93, Betty feels that it is very important to support AMD research, especially for dry AMD, the form of the disease she has.

“When my vision started getting progressively worse, I wanted to find an organization that was funding research and trying to find a cure for this devastating disease.”

“I hope my estate gift to Macular Degeneration Research will be able to help the next generation. Supporting research is so important. This disease has been so devastating and sad.”
High school sweethearts Janet and Phil Spanninger of Akron, Ohio, have been married for 59 years. They raised three children and have four grandchildren. Phil’s career as a chemist for Goodyear and later working in international business afforded them the opportunity to live around the world, including Germany, Hong Kong, and the United Kingdom. They loved participating in sports, with skiing among their favorites.

After Janet’s Alzheimer’s diagnosis in 2012, they moved to Montana, where they continued to enjoy an active lifestyle of skiing and hiking with a dedicated group of supportive friends for several years. After Janet’s condition progressed, they moved back to Ohio where she is now living in a retirement community.

The Spanningers’ commitment to supporting Alzheimer’s Disease Research (ADR), a program of BrightFocus Foundation, goes back a decade. Phil had explored different options to help support Alzheimer’s research before selecting ADR. He appreciates the scientific updates and news on the latest research in the field.

“Research is very, very important,” said Phil.

“Without research, we will never find the cure. Whatever anyone can give to support research, I would highly recommend they do it.”
Financial Highlights

BrightFocus is a nonprofit organization designated under Section 501(c)(3) of the Internal Revenue Code. All contributions to BrightFocus and its programs are tax-deductible to the extent allowed by law. The Foundation is supported entirely by voluntary private contributions.

BrightFocus received in-kind donations to expand public health information outreach and these are included in Program Services expenses. This allowed the organization to reach millions of people with information about risk factors, treatments and caregiving.

A complete copy of financial statements audited by Marcum, LLP is available upon request from BrightFocus Foundation, 22512 Gateway Center Drive, Clarksburg, MD 20871 or on our website at brightfocus.org.
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