This Is Why.
Over 322 Million Impacted.

Which is why we’ll never quit.

In 2020, an estimated 322 million people worldwide are currently living with Alzheimer’s, macular degeneration and/or glaucoma. Our three scientific research programs are Alzheimer's Disease Research, Macular Degeneration Research, and National Glaucoma Research.
Our Mission

BrightFocus funds exceptional scientific research worldwide to defeat Alzheimer’s disease, macular degeneration, and glaucoma, and provides expert information on these heartbreaking diseases.
DEAR FRIENDS,

2020 has been a year of great adversity and uncertainty, and also a sharp reminder of how precious life is and how much we value both those we love and the experiences we treasure.

Our annual report is titled This is Why, because this year powerfully reaffirms why, at BrightFocus, we relentlessly pursue a mission of innovative science to save mind and sight, to better the quality of life for our children, grandchildren, and generations to come.

On the following pages, you will meet several of the many hundreds of researchers we have funded around the world. You will discover their “why” – what fuels their lifelong pursuit of the bold “what-if’s” of scientific discovery.

You will meet several of the many thousands of donors across the country who each year support BrightFocus and its three scientific programs: Alzheimer’s Disease Research, Macular Degeneration Research, and National Glaucoma Research. Their generosity and loyalty inspire us daily, a shared belief that research equals hope.

More than ever, the need for innovative science is abundantly clear. This is why in 2020 we awarded $17.8 million for 93 new grants, a single-year record level of support, with 70 percent going toward testing the bold ideas of early-career researchers.

We hope This is Why gives you a glimpse into the creativity and brilliance of the scientists we partner with, and the selfless, unyielding commitment of our donors, staff, and Board. No matter how great the challenges may seem, we fully believe there will be a day when these diseases become a thing of the past.

Stacy Pagos Haller
President and CEO

Patricia McGlothlin Stewart, CFP
Chair, Board of Directors

10,000 AMERICANS TURN 65 EVERY DAY

NEARLY $50M IN RESEARCH IN LAST THREE YEARS ALONE

Left: Alzheimer’s Fast Track workshop session.

Right: Retinal ganglion cells (green) differentiated from human pluripotent stem cells. (Courtesy of Meyer Lab, Indiana University)
FUNDING RESEARCH IN 25 COUNTRIES

70% OF NEW GRANTS WILL TEST THE BOLD IDEAS OF EARLY-CAREER RESEARCHERS

OVER 220 RESEARCH PROJECTS

93 NEW RESEARCH GRANTS

Left: Colleen McDowell, PhD, University of Wisconsin-Madison at Glaucoma Fast Track.

Below: Neurons and astrocytes. (Courtesy of Dominik Paquet, PhD, Ludwig Maximilian University of Munich, Germany)

Right: A cross section of central retinal-pigmented epithelium region with atrophy, as seen by the loss of green color (between two arrows), marking retinal-pigmented epithelium cells. The optic nerve head (ONH) at the top indicates that the section is in the center. (Courtesy of Claudio Punzo, PhD, University of Massachusetts Medical School)

Left: Marilyn Nadolny, one of our Donor Spotlights. (featured on page 30)
Every day more than 1,300 Americans develop Alzheimer’s disease.

In 2020, BrightFocus awarded more than $11 million in funding for 53 new Alzheimer’s research grants.
5.8 million people live with Alzheimer’s in the United States today and by 2050 there will be close to 15 million.

Incubator for Promising Researchers

Nearly 90 scientists from across the globe attended the latest BrightFocus Alzheimer’s Fast Track® workshop in October 2019. Bringing together preeminent Alzheimer’s disease experts with graduate students, postdoctoral fellows or other early career scientists, they reviewed the latest discoveries and research directions and fostered new collaborations to accelerate progress toward treatments and cures.

"Alzheimer’s Fast Track is an immersive learning opportunity specifically created for scientists who are starting or contemplating a career in Alzheimer’s research," said Diane Bovenkamp, PhD, BrightFocus Vice President, Scientific Affairs.

Groundbreaking Insights Into Alzheimer’s and Hypertension

Patrick Kehoe, PhD, Gestetner Professor of Translational Dementia Research at the University of Bristol, UK, a current Alzheimer’s Disease Research grantee, is exploring molecular links between hypertension and Alzheimer’s, and whether some existing drugs could be repurposed as Alzheimer’s treatments.

His findings, published in early 2020, were viewed in an even broader light than might have been imagined because of their potential relevance to the COVID-19 disease process and treatments being developed.
Marking World Alzheimer’s Day

Appearing on an MSNBC program, University of California, San Francisco researcher and former Alzheimer’s Disease Research grantee, Kristine Yaffe, MD, joined MSNBC anchor Richard Lui on a segment to mark World Alzheimer’s Day. She shared key scientific findings of the increased dementia risk for military veterans who sustained traumatic brain injury.

Dr. Yaffe sees patients and conducts research through her roles as a UCSF professor and chief of Geriatric Psychiatry and director of the Memory Evaluation Clinic at the San Francisco Veterans Affairs Medical Center.

Renowned Alzheimer’s Researcher Wins “The Oscars of Science”

University of Pennsylvania professor Virginia M.Y. Lee, PhD, who helped develop and guide BrightFocus Foundation’s Alzheimer’s Disease Research program, won a 2020 Breakthrough Prize in Life Sciences. The prize, known as the “The Oscars of Science,” recognizes her research leading to new avenues for potential drug discovery and development.
Guided by his Grandmother’s Experience

Makoto Ishii, MD, PhD, of Weill Cornell Medicine, is shedding new light on why Alzheimer’s can lead to weight loss, particularly early in the course of the disease.

Ishii is running a clinical trial analyzing blood and spinal fluid samples from cognitively healthy volunteers who have the earliest pathological signs of Alzheimer’s and comparing those samples to healthy individuals who lack Alzheimer’s pathology. Through his research, Ishii hopes to explore new avenues for developing better diagnosis and treatment of the disease.

He has seen the awful impact of Alzheimer’s up close. When watching the progression of his grandmother’s disease, he not only noticed her loss of identity and independence, but also that she shed a significant amount of weight despite eating what appeared to be her normal amount of food.

“As a grandson, I feel at times helpless as my grandmother’s dementia continues to worsen,” said Ishii. “As a clinician-scientist, I see the potential advances we can make by exploring clinical observations that can help solve the complexities of Alzheimer’s disease.”

Ishii began his connection to BrightFocus by attending Alzheimer’s Fast Track, its signature program to identify and train the most promising early-career scientists in the field.

Grateful for a grant from the foundation’s Alzheimer’s Disease Research program, he aims to make, “a broader contribution to the large community of clinicians, research scientists, tireless family caregivers, and most importantly to the patients like his grandmother, who are all battling this devastating disease.”
Age-related Macular Degeneration is a leading cause of irreversible vision loss in the United States, and for Caucasians over age 40, it is the leading cause of blindness.

In 2020, BrightFocus awarded $3.5 million in funding for 22 new macular degeneration research grants.
The incidence of macular degeneration is expected to double by 2050.

### Sharing Guidance with Families

Our free, monthly telephone call-in series, BrightFocus Chats, features the latest news and advice for those living with vision loss. Researchers, clinicians, and low vision specialists share their tips and answer questions from participants via phone or online. The Chats are archived at BrightFocus.org.

A recent telephone discussion featured Michael B. Gorin, MD, PhD, an ophthalmologist from UCLA devoted to research and clinical care of hereditary retinal disorders, especially age-related macular degeneration, retinal dystrophies and other medical retinal conditions.

Noting both patients’ questions and concerns, as well as changes in vision care during the pandemic, Dr. Gorin cautioned, “It is very important that we do not lose ground in maintaining your sight going forward.”

**Page 10 top:** Shown in red is a cone photoreceptor on an array of other cone terminals, responsible for high-definition central vision, the kind lost in macular degeneration. (Courtesy of Mrinalini Hoon, PhD and Raunak Sinha, PhD, University of Wisconsin) **Page 10 bottom:** Inflammation is a major player in AMD, where fragile, leaky blood vessels damage retinal cells. Here, immune cells (green) interact with blood vessels (red) in an animal retina. (Courtesy of David Alvarez, PhD Harvard Medical School, and Ye Sun, MD, PhD)
BrightFocus Takes Leadership Role at Geroscience Summit

Diane Bovenkamp, PhD, BrightFocus Vice President, Scientific Affairs, addressed the third NIH Geroscience Summit on how the field of geroscience (the relationship between aging and most age-related diseases) intersects with the mission of improving health and well-being in later years, and advancing cures for diseases of aging, specifically of mind and sight.

“What’s really relevant for today’s geroscience summit is that age is the number one risk factor for Alzheimer’s, macular degeneration, and glaucoma,” said Bovenkamp. “Time lost is vision lost and cognition lost.”

An action plan for moving forward on personalized medicine, preventive medicine and disease-based research will be published in the future.

“Take 5” is a new feature on our website that reveals the personal side of our grantees and expert contributors.
“I WOULD LIKE TO SAY A MASSIVE THANK YOU FOR GIVING ME THE OPPORTUNITY TO DO THE RESEARCH THAT I LOVE DOING.”

Working Toward a New Treatment for AMD

A professor at the Institute of Neurosciences at Trinity College Dublin, Sarah Doyle, PhD, focuses her research on investigating the role of inflammation in advanced forms of age-related macular degeneration (AMD), a leading cause of blindness.

According to Doyle, “The more we understand about the disease processes underlying AMD, the better we’ll be to contribute to new treatments. Our work on a therapeutic for wet AMD continues, and we are hopeful that our research can lead to a new way for treating this condition.”

Doyle serves as one of the world’s experts in AMD as a reviewer on the BrightFocus Macular Degeneration Research Scientific Review Committee. She has served as an investigator and co-investigator on past-BrightFocus projects.

The support of Macular Degeneration Research, a BrightFocus program, has been key to her research. “I would like to say a massive thank you for giving me the opportunity to do the research that I love doing,” said Doyle. “I can’t imagine what it would be like to lose my sight… to be able to help people keep their sight would be amazing.”
Glaucoma is the second leading cause of irreversible blindness worldwide, and shows increased risk for Hispanics and African Americans according to the World Health Organization.

In 2020, BrightFocus awarded more than $3 million in funding for 18 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**.

**Forum for Rising Researchers**

BrightFocus held its second Glaucoma Fast Track™ to accelerate the fight for a cure by investing in promising young scientists in the field of vision research. The Glaucoma Fast Track featured world-renowned glaucoma experts who are known for their research and/or clinical expertise, as well as their mentoring skills. Together, they reviewed the latest discoveries and research directions, and inspired new thinking and interdisciplinary approaches in the search for cures.

*Page 14 top:* Gene therapy is being explored as a way to rebalance immune factors in the eye that could protect against glaucoma. In this animal model showing neurons (white), microglia (green), and varied gene expression (multicolored), it’s shown some success. (Courtesy of Alejandra Bosco, PhD, University of Utah).

*Page 14 bottom:* A BrightFocus-funded team was first to unveil the 3D structure of myocilin, a protein linked to inherited forms of glaucoma, to shed light on how it becomes misshapen through genetic miscoding. (Courtesy of Raquel Lieberman, PhD, Georgia Institute of Technology)

*Above left and center:* Glaucoma Fast Track™ attendees at the Emory Conference Center.

*Above right:* Jessica Cooke Bailey, PhD, Case Western Reserve University School of Medicine is interviewed by Richard Lui, MSNBC.
Resources for Families

Resources for families to better understand, manage and engage with loved ones who are impacted by diseases of mind and sight, are available free for download at BrightFocus.org or upon request by email to info@brightfocus.org.

BrightFocus also has a trial finder tool on our website, powered by Antidote, to identify local clinical trials.

BrightFocus Town Hall on Challenges of COVID-19 and Older Adults

BrightFocus held a virtual town hall on COVID-19 and Older Adults to address topics like long-distance caregiving, tele-health, social isolation and anxiety disproportionately affecting aging adults. The program featured guests Scott Kaiser, MD, a noted geriatrician and Chief Innovative Officer with the Motion Picture & Television Fund, and Art Taylor, CEO of the Better Business Bureau’s Wise Giving Alliance, and moderator Cecilia Arradaza, a leading health and science communicator and Executive Director, Strategy, Wondros.
Unlocking the Genetics of Glaucoma in Africa

Working to save sight, National Glaucoma Research is supporting Kathryn Burdon, PhD, of Australia’s University of Tasmania and Girum Gessesse, MD, of Ethiopia’s St. Paul’s Hospital Millennium Medical College to expand our scientific understanding of glaucoma in Africa.

The majority of glaucoma research has studied white populations in Europe and in the United States. Now, with this upcoming study, scientists will examine the genetic variants of African populations in hopes of better meeting the needs of those at a higher risk of vision loss, while also reducing the medication burden for those at lower risk. Their work will begin by focusing on patients in Ethiopia, and then broaden by comparing their research findings with other studies of African populations.

“Although Sub-Saharan Africa is with the highest prevalence of glaucoma with particularly worse outcome, research undertakings on the disease are very limited in the region. We need to do much more,” said Gessesse. “Research on glaucoma is very important for better understanding of the clinical, epidemiological and genetic nature of the disease, for evidence-based decision-making in our clinic work, and also for planning and policy making by the government.”

Burdon credits her grandfather for her inspiration. “He was an ophthalmologist who provided eye treatment to Aboriginal Australians to ensure they got the care they needed. When the opportunity came up to do a PhD in the genetics of eye disease, it seemed like the perfect way to combine my interests and honor the earlier work of my grandfather preventing blindness. I still strive towards this goal every day.”
These new research awards that were offered total more than $17.8 million in 2020, part of our ongoing scientific portfolio of over 220 projects, nearly $50 million investment in research worldwide in the past three years alone.
### 2020 BrightFocus Grants at a Glance

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

**TRANSLATIONAL** — Research to move findings from the lab bench to the “bedside” by testing potential treatments.

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASIC RESEARCH GRANTS</td>
<td>51%</td>
</tr>
<tr>
<td>TRANSLATIONAL RESEARCH GRANTS</td>
<td>31%</td>
</tr>
<tr>
<td>CLINICAL RESEARCH GRANTS</td>
<td>18%</td>
</tr>
</tbody>
</table>

---

| **Alzheimer’s Disease Research** | | | | |
| --- | --- | --- | --- |
| Studying the Role of a Novel Innate Immunity Pathway in Inducing Brain Inflammation and Damage in Alzheimer’s Disease | Sadaf Amin, PhD | WEILL CORNELL MEDICINE | Fellowship Mentor: Li Gan, PhD |
| Understanding the Beneficial Role of Sleep in Cognitive Deficits | Christelle Anaclet, PhD | UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL | Co-Principal Investigator: Heinrigh Gompf, PhD |
| Washing Alzheimer’s Disease Off the Brain | Michele Cavallari, MD, PhD | HARVARD MEDICAL SCHOOL & BRIGHAM AND WOMEN’S HOSPITAL | |
| Nanobodies Stabilizing Fragile Molecular Machines to Lower the Production of Toxic Amyloid-Beta in Alzheimer’s Disease | Lucia Chávez-Gutiérrez, PhD | VLAAMS INSTITUUT VOOR BIOTECHNOLOGIE (VIB), (BELGIUM) | |
| Examining How the TREM2 R47H Mutation Affects Microglial Lipid Content and the Interactions Between Human Microglia and Alzheimer’s Disease Pathology Within the Brain | Christel Claes, PhD | UNIVERSITY OF CALIFORNIA, IRVINE | Fellowship Mentor: Mathew Blurton-Jones, PhD |
| Gene Correction as a Therapy for Frontotemporal Dementia (FTD) and Amyotrophic Lateral Sclerosis (ALS) Caused by the C9orf72 Mutation | Claire Clelland, MD, PhD | UNIVERSITY OF CALIFORNIA, SAN FRANCISCO | Fellowship Primary Mentor: Bruce Conklin, MD \nUNIVERSITY OF CALIFORNIA, SAN FRANCISCO/GLADSTONE INSTITUTES | Fellowship Co-Mentor: Li Gan, PhD \nWEILL CORNELL MEDICINE |
| The Role of Chemical Messenger Signaling in Removing Alzheimer’s Pathology From the Brain | Scott Counts, MD | MICHIGAN STATE UNIVERSITY | Co-Principal Investigator: Roxana Carare, MD, PhD \nUNIVERSITY OF SOUTHAMPTON (ENGLAND) |
| Protecting Brain Cells from Death using Lipid Metabolic Drugs as a New Treatment for Alzheimer’s Disease | Simone Crivelli, PhD | UNIVERSITY OF KENTUCKY | Fellowship Mentor: Erhard Bieberich, PhD \nUNIVERSITY OF KENTUCKY | Fellowship Co-Mentor: Pilar Martinez-Martinez, PhD \nMAASTRICHT UNIVERSITY, (THE NETHERLANDS) |
| Is Hexokinase 2 a Molecular Link Between TREM2 Signaling and Microglial Activity in Alzheimer Disease? | Juan Codocedo, PhD | INDIANA UNIVERSITY | Fellowship Mentor: Gary Landreth, PhD |

**Note:** All grants will be awarded pending conclusion of contract negotiations.

---
Improving Cognitive Function in Alzheimer’s Disease Therapy Using a Combinatorial Approach of Reducing Disease Progression and Increasing Memory
Brati Das, PhD
UNIVERSITY OF CONNECTICUT HEALTH CENTER Fellowship Mentor: Riqiang Yan, PhD

Mitochondrial Calcium Deregulation and Memory Loss in Alzheimer’s Disease
Heng Du, MD, PhD
THE UNIVERSITY OF TEXAS AT DALLAS

Identifying Therapeutic Targets and Biomarkers to Facilitate a Meaningful Therapy and a Pre-Symptomatic Alzheimer’s Diagnostic
Mark Ebbert, PhD
MAYO CLINIC, JACKSONVILLE

Testing New Markers of Brain Function that May be Sensitive to Early Signs of Alzheimer’s Disease in Older Adults Who Still Have Normal Cognition
Peter Fried, PhD
BETH ISRAEL DEACONESS MEDICAL CENTER & HARVARD MEDICAL SCHOOL

Understanding ApoE
Carl Frieden, PhD
WASHINGTON UNIVERSITY IN ST. LOUIS

Evaluating the Role of Immune Cells in the Brain and a Related Protein, TREM2, on Alzheimer’s Disease Pathology
Maud Gratuze, PhD
WASHINGTON UNIVERSITY IN ST. LOUIS Fellowship Mentor: David M. Holtzman, MD

Identifying Aging and Alzheimer’s Disease-Related Protein Changes in Skin Cells, Blood and Spinal Fluid That Can be Used as Markers of Disease or Therapeutic Targets
Chadwick Hales, MD, PhD
EMORY UNIVERSITY

Unraveling the Biological Overlap of Alzheimer’s Disease and Dementia with Lewy Bodies
Lenora Higginbotham, MD
EMORY UNIVERSITY Fellowship Co-Mentor: Allan Levey, MD, PhD Fellowship Co-Mentor: Nicholas Seyfried, PhD

Investigating Coordinated Removal of Old and Synthesis of New Materials in Neurons and How These Processes are Disrupted in FTD
Sarah Hill, PhD
NATIONAL INSTITUTES OF HEALTH/NINDS Fellowship Co-Mentor: Michael Ward, MD, PhD Fellowship Co-Mentor: Jennifer Lippincott-Swartz, PhD JANELIA RESEARCH CAMPUS, HHMI

The Role of Signaling Factors That Modulate Immune and Metabolic Function in Alzheimer’s Disease
Makoto Ishii, MD, PhD
WEILL CORNELL MEDICINE

A Simple Blood Test to Identify Individuals at Risk of Developing Alzheimer’s Disease
Thomas Karikari, PhD
UNIVERSITY OF GOTHENBURG, (SWEDEN) Fellowship Mentor: Kaj Blennow, MD, PhD Fellowship Co-Mentor: Henrik Zetterberg, MD, PhD

Using OCTA Eye Imaging of Retinal Blood Vessels As Biomarker of Vascular Cognitive Impairment and Dementia
Amir Kashani, MD, PhD
UNIVERSITY OF SOUTHERN CALIFORNIA, ROSKI EYE INSTITUTE

Non-Neuronal Contribution to Alzheimer’s Disease
Ksenia Kastanenka, PhD
MASSACHUSETTS GENERAL HOSPITAL & HARVARD MEDICAL SCHOOL

The Impact of the Exercise Hormone Irisin on Astrocytes in Alzheimer’s Disease
Eunhee Kim, PhD
MASSACHUSETTS GENERAL HOSPITAL & HARVARD MEDICAL SCHOOL Fellowship Mentor: Rudolph E. Tanzi, PhD

Twisting Away Toxic Proteins in Alzheimer’s Disease
John Koren, PhD
UNIVERSITY OF FLORIDA, GAINESVILLE

A New Way to Measure How the Brain Uses Ketones as Fuel in Alzheimer’s Disease
Lydia Le Page, DPhil, MChem
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO Fellowship Co-Mentor: Myriam Chaumeil, PhD Fellowship Co-Mentor: Ken Nakamura, MD, PhD

Circadian Regulation, Autonomic Function, and Alzheimer’s Disease
Peng Li, PhD
BRIGHAM AND WOMEN’S HOSPITAL & HARVARD MEDICAL SCHOOL

Explore the Impacts of APOE Genotype Switching From apoE4 to apoE2 in the Periphery (Liver and Bloodstream) for Alzheimer’s Disease Therapy
Chia-Chen Liu, PhD
MAYO CLINIC, JACKSONVILLE

A New Method to Determine Alzheimer’s and Parkinson’s Toxins in the Lipid-Enriched Environment
Jinghui Luo, PhD
PAUL SCHERRER INSTITUTE (PSI), (SWITZERLAND)

Targeting Blood Vessel Excitability to Reduce Tau Pathology in Alzheimer’s Disease
Shannon Macauley-Rambach, PhD
WAKE FOREST UNIVERSITY

Finding Aberrant Glial and Neuronal Dysfunctions that Promote Neurodegeneration in Alzheimer’s Disease and Related Dementia
Elise Marsan, PhD
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO Fellowship Mentor: Eric L. Huang, MD, PhD Fellowship Co-Mentor: Arnold Kriegstein, MD, PhD

Co-principal investigator and fellowship mentor institutions are listed if different than the PI.
Identifying Groups of Alzheimer’s Disease Patients with Slower Disease Progression

Justin Miller, PhD
BRIGHAM YOUNG UNIVERSITY
Fellowship Mentor: John S. K. Kauwe, PhD

Gene Changes in Individual Cells Assessed Across the Progression of Alzheimer’s Disease

Michael Miller, MD, PhD
BRIGHAM AND WOMEN’S HOSPITAL & HARVARD MEDICAL SCHOOL
Fellowship Mentor: Christopher Walsh, MD, PhD

Validation of a Biomarker That Could Identify a Subset of Frontotemporal Dementia and Alzheimer’s Disease Patients

Sarah Pickles, PhD
MAYO CLINIC, JACKSONVILLE
Fellowship Mentor: Leonard Petrucelli, PhD

A New Method That Uses the 3D Structure of the Human Genome to Identify the Genetic Basis of Alzheimer’s Disease

Ivana Quiroga, PhD
UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Fellowship Mentor: Douglas Phanstiel, PhD

Investigating How Genetic Risk Contributes to Cerebrovascular Damage in Alzheimer’s and Dementia

Alaina Reagan, PhD
THE JACKSON LABORATORY
Fellowship Mentor: John K. Kauwe, PhD

Using Astrocyte Factors to Prevent Synaptic Alterations in Alzheimer’s Disease

Isabel Salas, PhD
THE SALK INSTITUTE FOR BIOLOGICAL STUDIES
Fellowship Mentor: Nicola Allen, PhD

Deciphering the Alzheimer’s Disease Glyco-Code

Manveen Sethi, PhD
BOSTON UNIVERSITY
Fellowship Mentor: Joseph Zaia, PhD

Role of Platelet-Derived Factors in Ameliorating Alzheimer’s Disease Pathology

Saul Villeda, PhD
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

Understanding the Role of Lysosome in Brain Function and Alzheimer’s Disease

Shuo Wang, PhD
BAYLOR COLLEGE OF MEDICINE
Fellowship Mentor: Hui Zheng, PhD

Development of Synthetic Gene Feedback Circuits to Prevent Tau Aggregation

Benjamin Wolozin, MD, PhD
BOSTON UNIVERSITY
Co-Principal Investigator: Ahmad Khalil, PhD

A Novel Way to Expand Human-Derived Pathogenic Tau Seeds in a Cell Free System

Hong Xu, PhD
UNIVERSITY OF PENNSYLVANIA
Fellowship Mentor: Virginia M.Y. Lee, PhD

Study Vascular Dysfunction of Cerebral Perforating Arteries in the Pathogenesis of VCID/AD

Lirong Yan, PhD
This grant is made possible in part by support from Alzheimer’s Los Angeles
UNIVERSITY OF SOUTHERN CALIFORNIA

Fingerprinting In Vivo and In Vitro Prion Strains

Hyunjung Yang, PhD
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
Fellowship Mentor: William DeGrado, PhD
Fellowship Co-Mentor: Carlo Condello, PhD

Macular Degeneration Research

Engineered Eye Tissue Models to Analyze Mechanisms of Age-related Vision Loss

Kapil Bharti, PhD
NATIONAL INSTITUTES OF HEALTH/NEI
Co-Principal Investigator: Eric Nguyen, PhD

A New Therapeutic Strategy to Treat AMD

Sabrina Carrella, PhD
FONDAZIONE TELETHON, ROMA, (ITALY)
Co-Principal Investigator: Alessia Indrieri, PhD
UNIVERSITY OF NAPLES FEDERICO II, (ITALY)

A Novel Method for Modeling AMD in a Dish

Jennifer Chao, MD, PhD
UNIVERSITY OF WASHINGTON

Discovery of New Methods to Regenerate Cone Photoreceptors

Mark Emerson, PhD
THE CITY COLLEGE OF NEW YORK, CITY UNIVERSITY OF NEW YORK

Understanding the Role of Support Cells, known as Glia in Geographic Atrophy

Malia Edwards, PhD
WILMER EYE INSTITUTE, JOHNS HOPKINS MEDICINE

Examining the Role of Choroidal Blood Flow in AMD

Bradley Gelfand, PhD
UNIVERSITY OF VIRGINIA

Targeting Proline Metabolism in AMD

Jianhai Du, PhD
WEST VIRGINIA UNIVERSITY RESEARCH CORPORATION
Co-Principal Investigator: Deborah Ferrington, PhD
UNIVERSITY OF MINNESOTA

Immune Cell Specific DNA Modifications and Gene Expression in AMD

Willard Freeman, PhD
OKLAHOMA MEDICAL RESEARCH FOUNDATION
Co-Principal Investigator: Ana J Chucair-Elliott, PhD

Exploring the Role of Gut Bacteria in Early AMD

Christopher Hammond, MD, MRCP, FRCoPhth
KING’S COLLEGE LONDON (UNITED KINGDOM)
The Gut Bacteria and AMD in Aging Women
Amy Millen, PhD
UNIVERSITY OF NEW YORK AT BUFFALO

Generating Precision Model for AMD Research
Jurgen Naggert, PhD
THE JACKSON LABORATORY

Elucidating How Smoking Causes Advanced AMD
Claudio Punzo, PhD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL

Profling of Immune Cell Subtypes in AMD Patients and Controls
Philip Ruzycki, PhD
This award is made possible by support from The Ivan Bowen Family Foundation.
WASHINGTON UNIVERSITY IN SAINT LOUIS
Co-Principal Investigator: Rajendra Apte, MD, PhD

Role of Lipids (Deposits) in Causing Dry AMD
Dorota Skowronska-Krawczyk, PhD
The Elizabeth Anderson Award
UNIVERSITY OF CALIFORNIA, IRVINE
Co-Principal Investigator: Daniel Chao, MD, PhD
UNIVERSITY OF CALIFORNIA, SAN DIEGO

A Novel Method for Treating Wet AMD Reversibly with Single Intraocular Injection
Shushen Wang, PhD
TULANE UNIVERSITY
Co-Principal Investigator: Bo Yu, PhD

Development of Gene Editing as a Permanent Cure for Wet AMD
Glenn Yiu, MD, PhD
UNIVERSITY OF CALIFORNIA, DAVIS

Genetics of Glaucoma in Africa
Kathryn Burdon, PhD
UNIVERSITY OF TASMANIA, (AUSTRALIA)
Co-Principal Investigator: Girum Gessesse, MD
ST. PAUL’S HOSPITAL MILLENNIUM MEDICAL COLLEGE, (ETHIOPIA)

A Novel Use of Specialized Pro-resolving Mediators to Treat Glaucoma
Kin-Sang Cho, PhD
SCHEPENS EYE RESEARCH INSTITUTE, MASSACHUSETTS EYE AND EAR AND HARVARD MEDICAL SCHOOL,
Preventing Vision Loss by Helping Doctors Predict and Treat Exfoliation Syndrome in Patients
Karen Curtin, PhD
UNIVERSITY OF UTAH
Co-Principal Investigator: Barbara M. Wirostko, MD

Defining the Importance of Extrinsic Signalling in Glaucoma Neurodegeneration
Richard Libby, PhD
Thomas R. Lee Award
UNIVERSITY OF ROCHESTER MEDICAL CENTER

Direct Observation and Manipulation of Energy Regulation in Retinal Neurons During Glaucoma
Philip Williams, PhD
WASHINGTON UNIVERSITY IN ST. LOUIS

Using Electric Fields to Regenerate the Optic Nerve
Kimberly Gokoffski, MD, PhD
Dr. Douglas H. Johnson Award
UNIVERSITY OF SOUTHERN CALIFORNIA EYE INSTITUTE

A Novel Tool for Seeing Neuron Cells in the Eyes of Glaucoma Patients
Yali Jia, PhD
OREGON HEALTH AND SCIENCE UNIVERSITY
Co-Principal Investigator: Shaohua Pi, PhD

Identifying Which Retinal Ganglion Cell Types Die Earlier in Glaucoma
Siamak Yousefi, PhD
UNIVERSITY OF TENNESSEE

A Novel Method for Treating Wet AMD Reversibly with Single Intraocular Injection

Cell Replacement in Glaucoma: Making Mature Retinal Ganglion Cells
Petr Baranov, MD, PhD
SCHEPENS EYE RESEARCH INSTITUTE, MASSACHUSETTS EYE AND EAR AND HARVARD MEDICAL SCHOOL,
Regulation of APBB2 Gene Expression and How it Influences Risk for Glaucoma
John Fingert, MD, PhD
UNIVERSITY OF IOWA
Using Electric Fields to Regenerate the Optic Nerve
Kimberly Gokoffski, MD, PhD
Dr. Douglas H. Johnson Award
UNIVERSITY OF SOUTHERN CALIFORNIA EYE INSTITUTE

Identifying Factors that Protect Ganglion Cells from Death after Optic Nerve Injury
Jeffrey Gross, PhD
UNIVERSITY OF PITTSBURGH
Determine the Genetic Element on Human Chromosome 9 that Increases Risk for Glaucoma
Gareth Howell, PhD
THE JACKSON LABORATORY

A Novel Tool for Seeing Neuron Cells in the Eyes of Glaucoma Models
Yali Jia, PhD
OREGON HEALTH AND SCIENCE UNIVERSITY
Co-Principal Investigator: Shaohua Pi, PhD

Insights into Genetic Risk Factors and Biological Consequences in a Naturally Occurring Glaucoma Model
Amanda Melin, PhD
UNIVERSITY OF CALGARY (CANADA)
Co-Principal Investigator: James Higham, PhD
NEW YORK UNIVERSITY

Genetics of Glaucoma in Africa
Kathryn Burdon, PhD
UNIVERSITY OF TASMANIA, (AUSTRALIA)
Co-Principal Investigator: Girum Gessesse, MD
ST. PAUL’S HOSPITAL MILLENNIUM MEDICAL COLLEGE, (ETHIOPIA)

A Novel Use of Specialized Pro-resolving Mediators to Treat Glaucoma
Kin-Sang Cho, PhD
SCHEPENS EYE RESEARCH INSTITUTE, MASSACHUSETTS EYE AND EAR AND HARVARD MEDICAL SCHOOL,
Preventing Vision Loss by Helping Doctors Predict and Treat Exfoliation Syndrome in Patients
Karen Curtin, PhD
UNIVERSITY OF UTAH
Co-Principal Investigator: Barbara M. Wirostko, MD

Defining the Importance of Extrinsic Signalling in Glaucoma Neurodegeneration
Richard Libby, PhD
Thomas R. Lee Award
UNIVERSITY OF ROCHESTER MEDICAL CENTER

Direct Observation and Manipulation of Energy Regulation in Retinal Neurons During Glaucoma
Philip Williams, PhD
WASHINGTON UNIVERSITY IN ST. LOUIS

Identifying Which Retinal Ganglion Cell Types Die Earlier in Glaucoma
Siamak Yousefi, PhD
UNIVERSITY OF TENNESSEE

Co-principal investigator and fellowship mentor institutions are listed if different than the PI.
BrightFocus scientists shared research highlights at special movie screening

During a virtual BrightFocus at-home movie night, Dr. Amir Kashani, University of Southern California, Roski Eye Institute discussed his innovative new research to develop retinal scans to identify early signs of vascular contributions to cognitive dementia, one of the leading causes of memory loss.

Dr. Yvonne Ou of the University of California, San Francisco explained the importance of glaucoma research in helping save sight for millions around the world.
Our world class scientific review committees

comprised of renowned leaders in their fields, recommend new research opportunities for BrightFocus to advance our goal of defeating Alzheimer’s, macular degeneration, and glaucoma.

The following experts have served on each committee within the preceding five years:

**Alzheimer’s Disease Research**

**COMMITTEE MEMBERS:**
- Beau Ances, MD, PhD
  - UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
- Carlos Cruchaga, PhD
  - UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
- Philip De Jager, MD, PhD
  - COLUMBIA UNIVERSITY
- Steven Estus, PhD
  - UNIVERSITY OF KENTUCKY
- Matthew Frosch, MD, PhD
  - MASSACHUSETTS GENERAL HOSPITAL

**CO-CHAIRS:**
- David M. Holtzman, MD
  - WASHINGTON UNIVERSITY SCHOOL OF MEDICINE IN ST. LOUIS
- Hui Zheng, PhD
  - BAYLOR COLLEGE OF MEDICINE
- Carlos Cruchaga, PhD
  - UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
- M. Flint Beal, MD
  - THE NEW YORK HOSPITAL-CORNELL MEDICAL CENTER
- David R. Borchelt, PhD
  - UNIVERSITY OF FLORIDA
- Guojun Bu, PhD
  - MAYO CLINIC, JACKSONVILLE
- George Carlson, PhD
  - UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
- Charles G. Glabe, PhD
  - UNIVERSITY OF CALIFORNIA, IRVINE
- Alison M. Goate, D.Phil
  - COLUMBIA UNIVERSITY
- Todd E. Golde, MD, PhD
  - UNIVERSITY OF FLORIDA, GAINESVILLE
- John Hardy, PhD, FMedSci, FRS
  - UNIVERSITY COLLEGE LONDON (UK)
- Julie Harris, PhD
  - ALLEN INSTITUTE FOR BRAIN SCIENCE
- Joanna Jankowsky, PhD
  - BAYLOR COLLEGE OF MEDICINE
- Edward Koo, MD
  - UNIVERSITY OF CALIFORNIA, SAN DIEGO

- Guojun Bu, PhD
  - MAYO CLINIC, JACKSONVILLE
- Todd E. Golde, MD, PhD
  - UNIVERSITY OF FLORIDA, GAINESVILLE
- John Hardy, PhD, FMedSci, FRS
  - UNIVERSITY COLLEGE LONDON (UK)
- Julie Harris, PhD
  - ALLEN INSTITUTE FOR BRAIN SCIENCE
- Joanna Jankowsky, PhD
  - BAYLOR COLLEGE OF MEDICINE
- Edward Koo, MD
  - UNIVERSITY OF CALIFORNIA, SAN DIEGO

BrightFocus grantees have received numerous prestigious awards over the years.
BrightFocus works closely with nonprofit and corporate partners on issues of common concern.

As a respected member of broad coalitions, we communicate with key policymakers and elected officials on the importance of research funding and caregiving support.
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
Investing in a Cure

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.

Sowing the Seeds of Scientific Progress

BrightFocus-funded researchers often go on to receive awards TEN TIMES GREATER from NIH and other sources, a 1,000% return on our early investment.
BrightFocus provided a free special screening of the award-winning documentary, *Linda Ronstadt: The Sound of My Voice*. The movie follows the life and career of one of the world’s best-selling artists as she embraced genres spanning rock, country, operetta and Latin, and paved the way to become an iconic female pioneer in the male-dominated music world. Ronstadt was forced to retire early due to a neurodegenerative disease.

Prior to the movie, four BrightFocus-funded scientists shared highlights from their ongoing research and progress toward ending diseases of mind and sight.

Stacy Pagos Haller, BrightFocus President and CEO, and James Keach, filmmaker, PCH Films, share a message on the importance of the research for the cure of diseases of mind and sight.
A Commitment to Help Future Generations

For Marilyn Nadolny of The Villages, Florida, Alzheimer’s is personal. Her husband Ed, of nearly 60 years, suffered from the disease for 14 years.

Marilyn supports Alzheimer’s Disease Research, a program of BrightFocus Foundation to help make the difference for other families. “Research is so important to find some way to eliminate and slow down Alzheimer’s disease,” said Marilyn Nadolny. “It is so just devastating to families.”

Ed was a repair specialist who could fix anything. His career spanned decades – working at top technology companies like Smith Corona and Sun International before joining the Broward County School Board.

Marilyn, Ed and their family enjoyed the outdoors and were longtime campers. “Our plans to travel across the country got wiped out, and we had to sell our motorhome,” Marilyn said. “Later on, Ed, who was no longer driving, went missing for two days.”
He headed south until he couldn’t drive any further— he had reached Key West! It was truly a miracle that he was able to return home safely as the police were in the driveway with me discussing next steps in their statewide search.”

The Nadolny family now spans four generations with Marilyn, two children, five grandchildren and one great grandchild. “I just hope that the research can find a cure, so the disease won’t have the same impact on my children or my grandchildren,” Marilyn added.
BrightFocus is proud to serve as presentation partner for *Turning Point*, a documentary that captures the drama and personal dedication of researchers who are pursuing drug breakthroughs to make Alzheimer’s a distant memory. Directed and produced by award-winning filmmaker James Keach, the film has been screened over 130 times worldwide since its festival premiere in 2018.

*Turning Point* was recently released on VOD (video on demand) platforms and is now available to watch at home. For more information, visit brightfocus.org.

BrightFocus also works on the RACERS initiative, in partnership with Gates Ventures, the National Institute on Aging, and the Health Resources and Services Administration, to help health care providers learn about early detection and diagnosis of cognitive impairment/Alzheimer’s/related dementias. The film has been screened for medical associations and schools of health professionals nationwide.

Above left: Stacy Pagos Haller, President and CEO, BrightFocus, joins C. Marie Taylor, President & CEO, Leadership Montgomery, at a Turning Point screening in Silver Spring, MD. **Above right:** James Keach, filmmaker, speaks following a Turning Point screening at the HudsonAlpha Institute in Huntsville, AL.
TURNING POINT
THE QUEST FOR A CURE

PCH FILMS in association with BRIGHTFOCUS FOUNDATION presents
a JAMES KEACH Film “TURNING POINT”
Edited by ELISA BONORA PARKER LARAMIE Original Score by ADAM PETERS
Cinematography by ALEX EKINE JAI Coad Supervising Producers NICOLAS HIPPILEY-COXE KAYLA THORNTON
Executive Producers MICHELE FARINOLA NANCY LYNN
Produced and Directed by JAMES KEACH

www.turningpointmovie.com

From the award-winning director of Glen Campbell...I’ll Be Me
A film by James Keach

Alzheimer’s clinical trial participant Pasquale Rocchio.
(Photo courtesy of PCH Films)

Noted scientist Neil deGrasse Tyson.
(Photo courtesy of PCH Films)
The Importance of Knowledge in Saving Sight

Sally Straus of Union, New Jersey, was an office manager for a major perfume company in New York City before retiring to focus fulltime on volunteerism in her hometown. Her motto is “If it happens in Union, I am either in it, on it or know about it.”

Diagnosed with wet macular degeneration in 2015, Straus has been undergoing treatment by Dr. Vinod Voleti of NJ Retina, including eye injections and taking supplements that have stabilized the progression of the disease. Her advice for those diagnosed with vision loss is, “Be prepared. Be your own advocate. Have a positive attitude and discover what resources are available, such as the BrightFocus Chats.”

A supporter of Macular Degeneration Research, a program of BrightFocus Foundation, she is an active and loyal participant in the organization’s monthly telephone discussions, which feature leading experts answering questions and providing helpful advice for living with vision loss. “I continue to be very impressed by the BrightFocus Chats. They are very informative and a wonderful resource. I am getting excellent care from my retina specialist, but the Chats help with my comfort level.”

Straus continues her community service for the Union Public Library Board of Trustees, Union Historical Society, local Veterans alliance, and Knights of Columbus among others. In 2014, she was honored by the Union Senior Center as its inaugural Senior Citizen of the Year.
Defeating Alzheimer’s— It Takes a Team

Honoring his grandfather who had passed away from Alzheimer’s, Lafayette College basketball player Cal Reichwein dedicated a game to supporting scientific research through BrightFocus Foundation’s Alzheimer’s Disease Research program. Not only did Lafayette win their game 82-70, but he raised $4,681 for research donated by the Lafayette community.
Moved to Action: Glaucoma’s Impact on a Family

Judy and Wayne Yendall of Buffalo have long known the impact of glaucoma. The disease runs in Judy’s family, affecting her grandmother, great-aunt, father and sisters. She was tested at early age and has managed her glaucoma for decades with laser surgery and eye drops.

After their son Rick was diagnosed with pigmentary glaucoma, Wayne was also tested and diagnosed with the same rare form of the disease.

Rick was a championship swimmer at Grove City College in Pennsylvania when severe eye pain took him from the school infirmary to hospitals in Pittsburgh and Boston for surgery and treatment. His disease was managed, allowing him a long career as a plastics engineer. Eventually, however, his vision declined to a point where he could no longer read the blueprints at his job. Rick, now blind, uses a special computer to stay in touch with others and is grateful for the support of his family.

Wayne has been fortunate to be able to manage his sight with eye drops, and has had both laser and cataract surgery under the care of a glaucoma specialist. He encourages others to “get your eyes checked and stay on top of your eyesight.”

Judy and Wayne recently celebrated their 60th anniversary and are hopeful that scientific progress will help reverse Rick’s blindness. They have been inspired by a new National Glaucoma Research project, Using Electric Fields to Regenerate the Optic Nerve, as a possible cure to reverse the damage.

“We are very interested in the research,” said Judy. “We donate what we can on limited budget, and what we can give, we give gladly.”
Carol Maude Pearl, lived in Odessa, Delaware for 35 years, was active in community and church activities, and was known as “our queen” and a “hostess with the mostess” by all who knew her. She opened her home each year for the Christmas in Odessa House Tour, sponsored by the Odessa Women’s Club. Carol loved to dance, and her smile would light up any room.

She and David, her husband of 54 years, first met at a faculty party and both taught school for decades. In retirement, they travelled the world. The Pearl clan now includes four children, eight grandchildren and four great grandchildren.

Carol first experienced mild signs of dementia in 2012, and the disease progressed slowly at first. David became aware of Alzheimer’s Disease Research (ADR), a BrightFocus program, when he attended a local session on dementia. The speaker discussed research for treatments and a cure, and that is when he began supporting the ADR program.

“I am so happy that Alzheimer’s research is going on, and that there are little green shoots of progress,” said David. “My hope is that with enough resources, eventually scientists will be able to come up with prevention for this horrible disease.”

For David, supporting research was, “the only answer so the next family would not have to suffer like we did.”

Carol passed away in July 2019. Her family held a celebration of her life, and David and their children light candles in her memory. David is arranging a tree memorial for Carol at BrightFocus.

“MY HOPE IS THAT WITH ENOUGH RESOURCES, EVENTUALLY SCIENTISTS WILL BE ABLE TO COME UP WITH PREVENTION FOR THIS HORRIBLE DISEASE.”
Investing in hope

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 the BrightFocus Foundation, 22512 Gateway Center Drive, Clarksburg, MD 20871 or on our website at www.brightfocus.org.
Board & Leadership

Our board of directors

Chair
Patricia McGlothlin Stewart, CFP
J.P. Morgan & Co., Inc., retired

Vice Chair
Cecilia Arradaza
C.A. Collaborative

Treasurer
Ethan Treese
Nuix

Secretary
Maddy Dychtwald
Age Wave

Emeritus directors
Michael H. Barnett, Esq
Grace Frisone
June Kinoshita
Judith F. Lee
Henry J. Pownall, PhD
Nicholas W. Raymond

Our senior management team
President & CEO
Stacy Pagos Haller

Vice President, Scientific Affairs
Diane Bovenkamp, PhD

Vice President, Public Affairs
Michael Buckley

Senior Vice President, Development
R. Brian Elderton

Senior Vice President, Strategic Partnerships
Nancy Lynn

Vice President, Finance and Administration
David F. Marks, CPA, CMA