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# RETINA

RESEARCH  
FOUNDATION

2010 annual report



*Emmett Humble and Jacquelyn Royce*



*Cecil Rix, PhD*



*Alice McPherson, MD, and Shara Fryer*



*James Key, MD, and Arthur Willis, MD*



*Cecil Rix, PhD, Bernard Hicks, MD, and Ben Orman, MD*

# Retina Research Foundation Annual Report 2010

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*Retina Research Foundation Board of Directors*



*Dede Weil, Bettie Lee and Nancy Japhet*



*John Dawson, Jr., and John Cater*



*L. Henry Gissel, Jr.*



*Bruce Mack and Richard Walton*

## Chairman Emeritus Message



In introducing past Annual Reports, Dr. McPherson and others have emphasized the importance of our loyal friends and the importance of their support in achieving the many advances made by the Foundation, and properly so. But this is only part of the story, and it is the financial and business management of the Foundation that I would like to comment on for this Annual Report. The Foundation has taken exceptional care of your donations over the years and is happy to report that your trust has been well placed.

Those early days of RRF were truly a hand-to-mouth existence. Through careful budgeting and research project selection, we were able to start research projects locally and then gradually expand them beyond Houston, Texas, and even the U.S. Our investments consisted only of three month CDs laddered to mature at intervals to pay bills as they came due. As funds grew the Board decided to establish an endowment and structured it so that only the interest and dividend income from its investment could be spent. The core funds could not be spent but continued to grow. It was called the Permanent Endowment Fund. Professional management was selected to manage these funds, and the PEF market value has now grown in value to over double the amount of the original contributions. This increase in value has been achieved while your continuing donations have made possible generous funding for research projects sponsored by the Foundation - \$24 million spent to date. We also take pride in our ability to keep administrative and overhead expenses low, averaging only about 15 percent of budget expenditures.

While our research support started locally, it has steadily expanded to national and international coverage. As Dr. McPherson has reported, RRF now supports research in 11 institutions in Texas, 42 in the United States, and 45 internationally.

All affairs of the RRF are directed by a Board of Managing Directors, which is composed of a group of very capable and dedicated community leaders with career experiences in business, law, medicine, basic sciences, etc. None is affiliated with any research institution, and no member of the Foundation receives compensation from RRF for their services.

So, in conclusion I would like to express all of our appreciation to those Board members and officers who serve so diligently and so well in stewarding the confidence and trust put in them. You, our supportive community of donors, also help our programs grow and thrive. We continue to meet the highest standards of research thanks to a winning team of leaders, donors, and scientists. 2010 was a year of outstanding research, and RRF is fortunate to have the leadership in place which makes the science possible and gives hope to so many.

Sincerely,

A handwritten signature in cursive script that reads "Emmett A. Humble".

Emmett A. Humble  
Chairman Emeritus

## Overview of Research - 2010

Retina Research Foundation supports an exemplary variety of programs in retina research around the world. Past and present RRF research sites now total 53 national and 45 international. The following is a brief recap of sites for RRF research funds in 2010, which illustrates the wide reach of RRF activities.

### RRF Pilot Study Grants - Investigation of New Research Topics

Baylor College of Medicine, Houston, TX

Samuel Wu, PhD - Gueymard Research Project

Ramon Font, MD - Kayser Research Project

Milan Jamrich, PhD - Lawrence Research Project

Rui Chen, PhD - Manning Research Project

Graeme Mardon, PhD - Miller Research Project

Richard Hurwitz, MD - Wilson Research Project

Texas A&M Health Science Center, Temple, TX

Lih Kuo, PhD - Basic Research Grant

University of Wisconsin, Madison, WI

Curtis Brandt, PhD - Murfee Macular  
Degeneration Project

Barbara Klein, MD, MPH - Basic Research Grant

Leonard Levin, MD, PhD - Basic Research Grant

UT MD Anderson Cancer Center, Houston, TX

Louise Strong, MD - Humble Research Project

### RRF Macula Research Grant - Pilot Study Award

RRF Cox Research Project - administered by The Macula Society

Rajendra Apte, MD, PhD - Washington University School of Medicine, St. Louis, MO

### Established Awards - Awards Recognizing Lifetime Achievement

RRF Award of Merit - presented by The Retina Society - San Francisco, CA - Sept. 25

Eliot Berson, MD - Harvard Medical School, Massachusetts Eye and Ear Infirmary, Boston, MA

RRF Kayser International Award - presented by International Society for Eye Research (ISER) - Montreal, Canada - July 18-23

Frank Werblin, PhD, University of California, Berkeley, CA

RRF Pyron Award - presented by American Society of Retina Specialists (ASRS) - Vancouver, Canada - Aug. 29

Julia Haller, MD - Wills Eye Institute, Thomas Jefferson University, Philadelphia, PA

CL Schepens MD/AAO Award - Co-Sponsored by RRF and Schepens International Society (SIS) - Chicago, IL - Oct. 15

William Tasman, MD - Wills Eye Institute, Thomas Jefferson University, Philadelphia, PA

RRF Gonin Lecturer - presented by Club Jules Gonin - Kyoto, Japan - Nov. 5

Napoleone Ferrara, MD, and Anthony Adamis, MD - Genentech, San Francisco, CA

RRF Gonin Medalist - presented by ICO with Club Jules Gonin - Berlin, Germany - June 5-9

Alan Bird, MD - Moorfields Eye Hospital, London, England

## **Research Chairs –O ngoing Proven Research Projects**

University of Wisconsin, Madison, WI

Curtis Brandt, PhD - Helmerich Chair

Nansi Colley, PhD - Helmerich Chair

Nader Sheibani, PhD - RRF Chair

Daniel Albert, MD, MS - Humble Distinguished Directorship

David Gamm, MD, PhD - Murfee Chair

Baylor College of Medicine, Houston, TX

RRF Chair - Yet to be named

## **Research Professorships –O ngoing Proven Research Projects**

University of Wisconsin, Madison, WI

Arnold E. Ruoho, PhD - Gamewell Professor

Arthur S. Polans, PhD - Matthews Professor

Bikash Pattnaik, PhD - Brown Professor

## **International Fellowships – Advanced Subspecialty Training**

ICO/Helmerich International Fellowships - administered by International Council of Ophthalmology Foundation (ICOF)

Lala Ceklic, MD, PhD - from Sarajevo to Bern University Hospital, Switzerland

Afsun Sahin, MD - from Turkey to Schepens Eye Research Inst., Harvard Univ., Boston, MA

Gillingham Fellowships - administered by Pan-American Association of Ophthalmology (PAAO)

Sandra Montezuma, MD - from Colombia to Massachusetts Eye and Ear Infirmary, Boston, MA

Alfredo Castillejos, MD - from Mexico to New York Eye and Ear Infirmary, New York, NY

## **Research Initiatives –E ducational and Travel Scholarships**

AAO Educational Trust Fund - administered by The Foundation of the American Academy of Ophthalmology (FAAO)

Retina-related educational research programs for clinical and basic science

RRF Lawrence Travel Scholarships – administered by The Association for Research in Vision and Ophthalmology (ARVO)

Twenty-three vitreoretinal scientists representing schools in fifteen states traveled to the ARVO Annual Meeting to present their scientific research

Pan-American Research Initiatives - administered by Pan-American Association of Ophthalmology (PAAO)

Kayser Travel Scholarships

Eight ophthalmologists from California, Massachusetts, Florida, New York, and Oregon traveled to Brazil, Venezuela, Dominican Republic, Mexico, Chile, Argentina, and Colombia

Tyson Research Initiatives

Eight ophthalmologists from Mexico, Argentina, and Colombia traveled to the ARVO Annual Meeting

## **Special Recognition Awards –O utstanding Grantees**

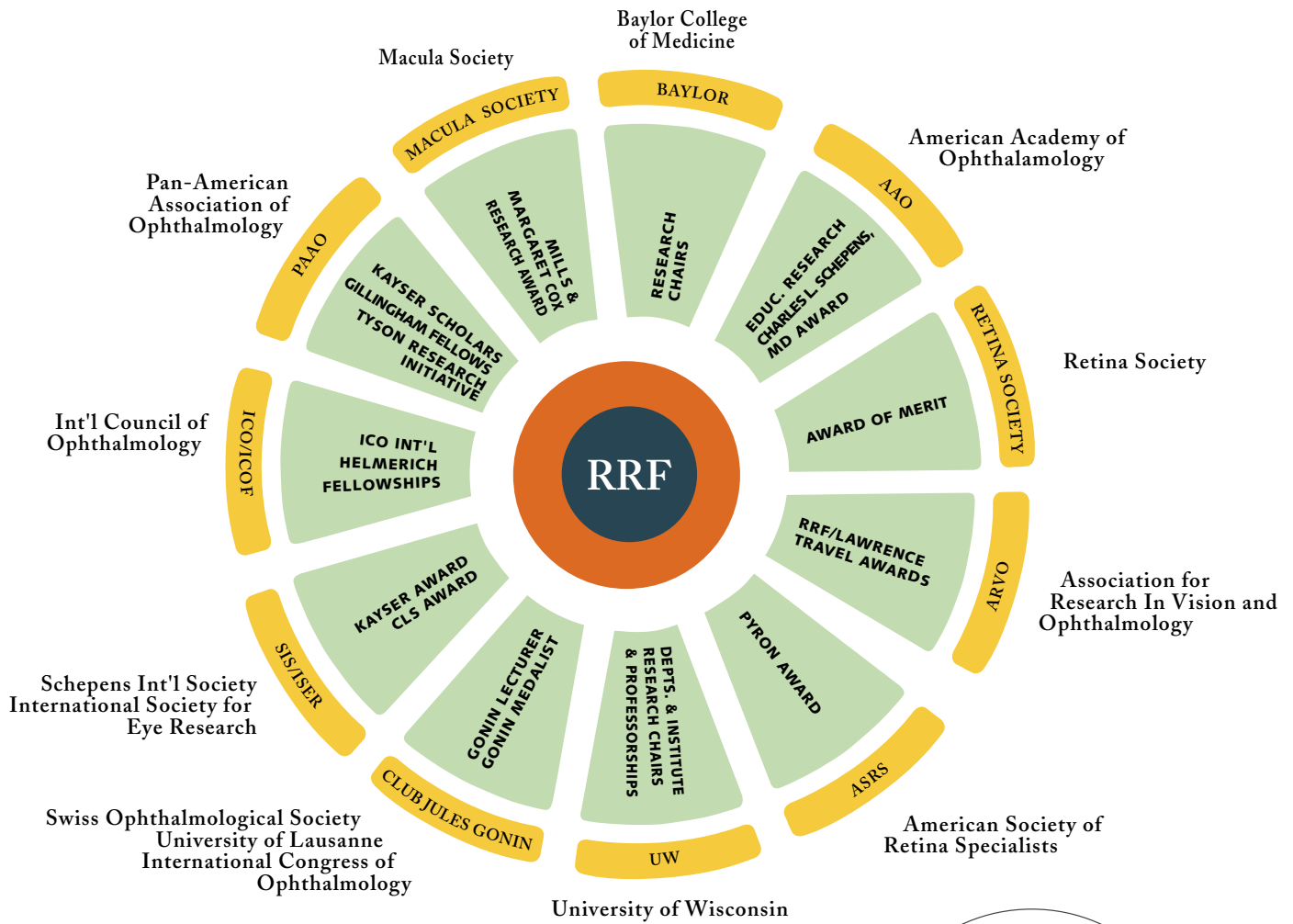
Baylor College of Medicine, Houston, TX

Ramon Font, MD - Brochstein Award

Richard Hurwitz, MD - Barr Award



# COLLABORATING ORGANIZATIONS





# RETINA RESEARCH SITES

## PAST AND PRESENT

### TEXAS : 11

Baylor College of Medicine  
Center for Technology  
Houston Advanced Research Center  
M.D. Anderson Hospital  
Southwest Research Institute  
Texas A & M Health Science Center  
Texas Children's Hospital  
The Methodist Hospital  
University of Houston  
University of Texas at Galveston  
University of Texas at Houston

### NATIONAL : 42

Bascom Palmer Eye Institute	Miami, FL	Schepens Eye Research Institute	Boston, MA
California Institute of Technology	Pasadena, CA	Sheie Eye Institute	Philadelphia, PA
Casey Eye Institute	Portland, OR	St. Joseph's Hospital	Baltimore, MD
Cleveland Eye Clinic/Foundation	Cleveland, OH	Stanford University Medical School	Palo Alto, CA
Columbia University	New York, NY	Tulane University Medical School	New Orleans, LA
Cornell University Medical College	Ithaca, NY	Thomas Jefferson University	Philadelphia, PA
Duke University Medical School	Durham, NC	University of California	Berkeley, CA
Emory University Eye Center	Atlanta, GA	University of California	Los Angeles, CA
Eye Research Institute	Boston, MA	University of California	San Francisco, CA
Eye Tech Pharmaceuticals	Worcester, MA	University of Florida	Gainesville, FL
GreaterBaltimore Medical Center	Baltimore, MD	University of Kansas Medical College	Kansas City, KS
Harvard Medical School	Boston, MA	University of Miami Medical School	Miami, FL
Johns Hopkins University Medical School	Baltimore, MD	University of Nebraska HSC	Omaha, NE
Joslin Diabetes Center	Baltimore, MD	University of Pennsylvania	Pittsburg, PA
Kresge Eye Institute	Detroit, MI	University of Southern California	Los Angeles, CA
Massachusetts Eye & Ear Infirmary	Boston, MA	University of Washington	Seattle, WA
Massachusetts Institute of Technology	Boston, MA	University of Wisconsin Medical School	Madison, WI
Medical University of South Carolina	Charleston, SC	Washington University	St. Louis, MO
National Eye Institute	Bethesda, MD	Wills Eye Hospital	Philadelphia, PA
Northwestern University	Evanston, IL	Wilmer Eye Institute	Baltimore, MD
Rockefeller University	New York, NY	William Beaumont Hospital	Royal Oaks, MI

### INTERNATIONAL : 21

Asahikawa Medical College	Asahikawa, Japan
Foundation of Argentina	Buenos Aires, Argentina
Hospital Ophthalmique	Lausanne, Switzerland
Keio University	Tokyo, Japan
Lariboisiere Hospital	Paris, France
Lidcombe Hospital	Sydney, Australia
McGill University	Montreal, Québec, Canada
Montreal General Hospital	Montreal, Québec, Canada
Moorfields Eye Hospital	London, England
Osaka Medical School	Osaka, Japan
Royal College of Ophthalmologists	Edinburgh, Scotland
University of Cambridge	Cambridge, England
University of Iceland	Reykjavik, Iceland
University of Osaka	Osaka, Japan
University of Oxford	Oxford, England
University of Paris	Paris, France
University of Erlangen-Nürnberg	Erlangen, Germany
University of Leipzig	Leipzig, Germany
University of Regensburg	Regensburg, Germany
University of Tübingen	Tübingen, Germany
Western General Hospital	Edinburgh, Scotland

### PAN AMERICAN COUNTRIES : 24

Buenos Aires, Argentina	Bogotá, Columbia
Curiliba, Argentina	Santa Domingo, Dominican Republic
La Paz, Bolivia	San Salvador, El Salvador
Belo Horizonte, Brazil	Port-Au-Prince, Haiti
Sao Paulo, Brazil	San Lorenzo, Honduras
Porto Alegre, Brazil	Mexico City, Mexico
Ottawa, Canada	Neuvo Leon, Mexico
Montreal, Canada	Asuncion, Paraguay
Vancouver, Canada	Lima, Peru
Santiago, Chile	San Juan, Puerto Rico
Cali, Columbia	Montevideo, Uruguay
San Juan, Costa Rica	Caracas, Venezuela

## Research

RRF provided funding for 11 pilot study research projects conducted at leading research institutions. Eight of the projects were named in recognition of generous support of gifts.

Pilot studies are experimental studies designed to test the waters or break new ground. Findings may lead to larger ongoing studies in the future.

### Named Basic Research Projects



*Samuel Wu, PhD*

#### *Adolphe G. and Josephine Roberts Gueymard Research Project*

**Samuel Wu, PhD**

Cullen Eye Institute

Baylor College of Medicine, Houston, TX

#### *Pharmacological and Genetic Mechanisms Underlying Retinal Cell Death in Glaucoma and Age-Related Macular Degeneration (AMD)*

Dr. Wu's research project is focused on molecular and synaptic mechanisms underlying retinal cell death in age-related macular degeneration (AMD) and glaucoma, designing early detection/diagnostic devices and identifying new drug treatments and gene therapies for AMD and glaucoma patients.

A gene therapy strategy for preventing photoreceptor death in a mouse model of Bardet Biedl Syndrome (BBS) has been developed in Dr. Wu's lab. This is the first successful gene therapy for this blinding disease, and it constitutes a major step towards a cure for BBS in human patients.

His group has studied major synaptic connections in the retinal neuronal network, which allows them to construct a comprehensive model for retinal function. This model will serve as a blueprint for future research efforts in fighting various types of retinal diseases such as AMD, which are associated with retinal synaptic dysfunctions.

#### *Emmett A. Humble Research Project*

**Louise C. Strong, MD**

Molecular Genetics

University of Texas M.D. Anderson Cancer Center, Houston, TX

#### *Genetic Etiology of Retinoblastoma*

Dr. Strong has found that many of the children who were successfully treated for retinoblastoma in infancy and early childhood went on in older age to develop new cancers. Her lab discovered that there was an underlying genetic risk of certain tumor types in hereditary retinoblastoma patients, and that perhaps the radiation further increased that risk, and shortened the time to tumor.

One of the ongoing aims of her research has been to understand the factors that contribute to the second cancers, with the hope that the information could be useful in identifying those at highest risk, and in identifying the molecular pathways involved that might suggest potential intervention or treatment targets.



*Louise C. Strong, MD*

## Research

### *The Paul Kayser Research Project*

**Ramon Font, MD**

Cullen Eye Institute

Baylor College of Medicine, Houston, TX

#### *Immunohistochemistry and Molecular Biology in Ophthalmic Pathology*

The IgG4-positive related inflammatory condition is a novel clinico-pathological entity that is characterized by increased serum levels of IgG4 associated with the increased presence of IgG4-positive plasma cells in the involved tissues including the lacrimal gland, orbit and ocular adnexa associated with the infiltration of T-lymphocytes in various organs. The immune mechanism is mediated by T-cells (mainly CD4-positive T-cells), and the increased expression of IgG4-positive plasma cells within the involved tissues could play an important role in the pathogenesis that modulates the inflammatory conditions of the affected ocular tissues.

This condition must be considered in the differential diagnosis in order to offer new modalities of treatment for these patients, as has been suggested by some researchers. Dr. Font's preliminary results strongly suggest that the main immunologic mechanisms involved are more dependent on the role of T4 helper/inducer lymphocytes rather than T8 suppressor/cytotoxic lymphocytes.



**Ramon Font, MD**



**Milan Jamrich, PhD**

### *Joe M. and Eula C. Lawrence Research Project*

**Milan Jamrich, PhD**

Molecular and Cellular Biology

Baylor College of Medicine, Houston, TX

#### *Function of Rx in the specification, differentiation and survival of vertebrate retinal cells*

Vertebrate retinal formation is a complex process that requires the formation of the anterior neural plate as well as the specification and differentiation of retinal cells. This requires the interplay of several genes essential for eye formation.

Dr. Jamrich has shown previously that Rx, a paired like homeobox gene, has a critical role in vertebrate eye formation, as mice missing Rx function do not develop eyes. Furthermore, his preliminary evidence suggests that Rx also has a role in the survival of differentiated retinal cells.

Since Rx genes appear to be the key gene in vertebrate eye formation, Dr. Jamrich is examining the molecular network that mediates Rx function in the specification, differentiation and survival of vertebrate retinal cells.

### *The W.O. Manning Research Project*

**Rui Chen, PhD**

Molecular and Human Genetics

Baylor College of Medicine, Houston, TX

#### *Identification and functional analysis of genes involved in retinal diseases and development*



**Rui Chen, PhD**

Leber congenital amaurosis (LCA) is one of the most common hereditary causes of visual impairment in infants and children, which accounts for more than five percent of all retinal dystrophies. The clinical phenotype of LCA can be

## Research

extremely severe and it is characterized by several visual perturbations identifiable at birth or within the first year of life.

Dr. Chen's project aims to identify the underlying mutations for LCA, which is the essential first step for understanding the molecular mechanisms and designing proper treatment for this disease. Based on homozygosity mapping of all the consanguineous LCA families with no known mutations (Li et al., 2009), his lab has identified numerous LCA disease candidate loci. In total, they have completed homozygosity mapping for 23 LCA families, each containing homozygous regions that range in size from 2 Mb to more than 200 Mb.



*Curtis R. Brandt, PhD*

### *The Kathryn and Latimer Murfee Macular Degeneration Project*

**Curtis R. Brandt, PhD**

Ophthalmology and Visual Sciences

Medical Microbiology and Immunology

University of Wisconsin School of Medicine and Public Health,  
Madison, WI

### *Gene Therapy for Retinal Degenerative Diseases*

Dr. Brandt's laboratory is focusing on using viral-based vectors for ocular gene delivery. They and others have shown that vectors based on several different viruses can deliver genes to various cells in the retina. Other work in his laboratory and in collaboration with others has shown that introduction of many of these viral vectors into the primate eye triggers a transient inflammatory response. Interestingly, inflammatory responses are not triggered in rodent eyes.

For ocular gene therapy to move forward in people, it is necessary to identify the cause of the inflammatory response so strategies to block the effect can be developed. Dr. Brandt's lab is focusing on several pre-inflammatory signaling molecules that could be the signal that initiates the process.

### *Bertha and I.L. Miller Research Project*

**Graeme Mardon, PhD**

Pathology, Molecular and Human Genetics

Baylor College of Medicine, Houston, TX

### *Genetic and Molecular Analysis of Retinal Development and Disease*

The long-term goal of Dr. Mardon's research is improve our ability to prevent, diagnose, and treat human retinal disease. His laboratory employs a three-pronged approach.

First, they are actively mapping and identifying new human retinal disease genes using cutting-edge genomic technologies. Specifically, they are mapping new genes that cause Leber Congenital Amaurosis (LCA), the most common form of congenital blindness in humans. Second, they use the mouse as a model system to study the function of conserved genes required for normal retinal development, including genes identified in our screen of LCA patients.

Finally, they use their mouse models to test new treatments to cure blindness, including gene therapy. This combination of approaches comprises an efficient and comprehensive plan to advance our understanding of the molecular and genetic mechanisms of human retinal disease.



*Graeme Mardon, PhD*



## Research

### *Mary Ellen Wilson Research Project*

#### **Richard L. Hurwitz, MD**

Associate Professor of Pediatrics,  
Ophthalmology and Molecular and Cellular Biology  
Director, Retinoblastoma Center  
Texas Children's Cancer Center  
Center for Cell and Gene Therapy  
Baylor College of Medicine, Houston, TX



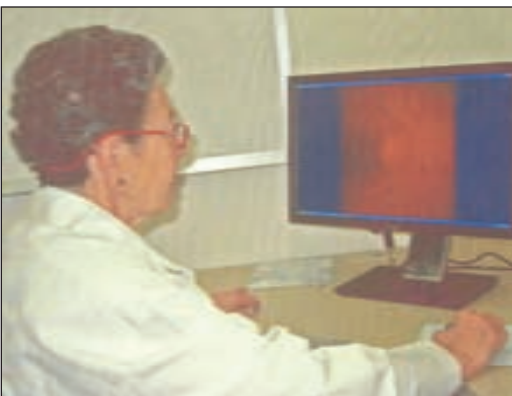
**Richard L. Hurwitz, MD**

### *Immune Consequences of Gene Therapy for Ocular Disorders*

Disorders such as retinoblastoma, retinitis pigmentosa, and Stargardt disease are good candidates for gene therapy in the eye. Dr. Hurwitz has created an embryonic mouse model of retinoblastoma, a cancer of the eye that occurs in children. This model conclusively shows that proliferating, undifferentiated retinal cells can form tumors.

A small percentage of cells that express the neural stem cell related protein CD133 can be isolated from a cell line that was created from this murine tumor. These CD133 positive cells can preferentially recreate the retinal tumor in mice, and this tumor appears identical to primary retinoblastoma tumors in both mice and children. Therefore, a proliferating tumor cell that expresses the neural stem cell marker CD133 is responsible for retinoblastoma tumor initiation in a mouse model of the disease.

## Basic Research Grants



**Barbara Klein, MD, MPH**

#### **Barbara Klein, MD, MPH**

Ophthalmology and Visual Sciences  
University of Wisconsin School of Medicine and Public Health,  
Madison, WI

### *Prevalence and Incident Changes in Retinal Vascular Caliber Associated with Medication and Supplement Use*

Retinal vessel diameters (RVD) are associated with cardiovascular diseases such as hypertension, myocardial infarction and cardiovascular mortality. RVDs are affected by many factors.

A class of exposures that is often ignored in examining associations between cardiovascular endpoints and RVD is medications and supplements. Dr. Klein is completing the analyses of recently collected data during a period of time when use of new vasodilator drugs as well as ACE inhibitors and ARBs became more common to determine the effects of these powerful medications on retinal vessel diameters.

## Research

### **Lih Kuo, PhD**

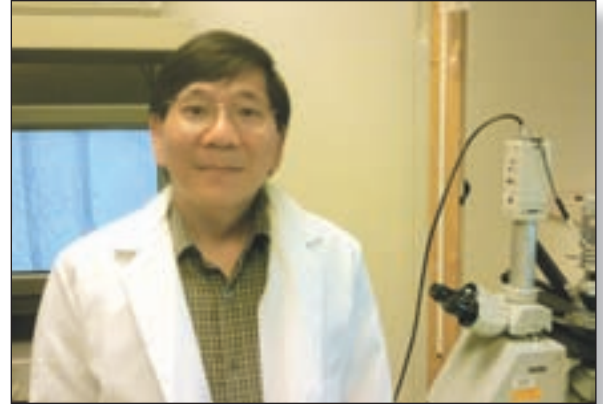
Departments of Systems Biology and Translational Medicine  
and Ophthalmology  
Scott & White Memorial Hospital  
Texas A&M Health Science Center, Temple, TX

#### *Activation of Endothelin-dependent RhoA/ROCK by C-Reactive Protein Elicits Retinal Arteriolar Dysfunction*

Retinal vascular disease such as diabetic retinopathy is one of the leading causes of blindness in the USA, but the etiology and development of vascular and visual pathology in this disease is not fully understood. Elevated plasma level of inflammatory marker C-reactive protein (CRP) is associated with patients with diabetes and various cardiovascular diseases.

Interestingly, Dr. Kuo's lab found that CRP elicits retinal vascular disorder by losing endothelium-dependent vasodilatory function. However, the mechanistic action of CRP on retinal vasomotor function remains elusive.

His lab also examines the therapeutic potential of statins in the protection and treatment of vascular dysfunction elicited by CRP. They use an isolated vessel approach to directly assess retinal microvascular function and use molecular tools to address the signaling pathways leading to vascular dysfunction by CRP.



*Lih Kuo, PhD*



*Leonard Levin, MD, PhD*

### **Leonard Levin, MD, PhD**

Dept. of Ophthalmology and Visual Science  
University of Wisconsin, Madison, WI

#### *Pharmacological Protection of Endothelial Cells For Retinal Vascular Disease*

Dr. Levin's laboratory continues to develop novel pharmacological approaches to treating endothelial cell death in retinal disease. These focus on molecules (phosphine-borane complexes) that reduce disulfide bonds and thereby block the signaling of cell death.

In 2010 his group was able to show that the phosphine-borane complexes not only could protect retinal endothelial cells against radiation injury, but that they did so without affecting the levels of a reactive oxygen species, superoxide, which resulted from the radiation. This means that these drugs might work through a different mechanism than other drugs, and might represent a new approach to retinal disease for the future.

## Grant Recipient from The Macula Society

### *The Margaret and Mills Cox Macula Research Project*

**Rajendra Apte, MD, PhD**

Washington University School of Medicine  
St. Louis, MO

### *Wnt Signaling in Choroidal Neovascularization*



Dr. Apte was chosen to be the Macula Society Grant Recipient based on the following criteria in his application: originality, description of his methods, clinical relevance, clarity and organization of the presentation.

Dr. Apte's research has advanced our understanding of how the innate immune system regulates angiogenesis in the eye. His laboratory has discovered age-related changes in macrophages that provide an explanation for the increase in pathologic angiogenesis seen with aging. Dr. Apte's findings have profound implications for understanding age-related macular degeneration, as well as other age-related diseases such as coronary artery disease and cancer.

*Rajendra Apte, MD, PhD*

## Established Research Awards

These awards were presented to known scientists in recognition of their lifetime achievement.

### *The Award of Merit in Retina Research*

**Eliot L. Berson, MD**

Harvard Medical School  
Massachusetts Eye and Ear Infirmary  
Boston, MA

### *Retinitis Pigmentosa: Advances in Diagnosis and Treatment*

In being chosen for the Award of Merit, Dr. Berson gave the Charles L. Schepens Lecture at the 43rd Annual Scientific Meeting of The Retina Society in San Francisco, CA, which was held in September.

Dr. Berson completed his medical degree at Harvard Medical School. He is the author of over 250 papers on hereditary retinal degenerations with a particular emphasis on retinitis pigmentosa and allied night-blinding disorders.

He and his colleagues are responsible for developing the first treatment regimen for adults with typical retinitis pigmentosa. Vitamin A palmitate 15,000 IU/day, lutein 12 mg/day, and one or two, three-ounce servings of omega-3 rich fish per week of which DHA is a major constituent are part of the recommended regimen.

His continuing research is aimed at further slowing the rate of progression of retinitis pigmentosa, detecting causative genes, and defining the course of disease among patients with known mutations.



*Eliot L. Berson, MD*

## Established Research Awards



**Julia A. Haller, MD**

### ***Gertrude Pyron Award for Outstanding Achievement in Retina Research***

**Julia A. Haller, MD**

Wills Eye Institute  
Thomas Jefferson University  
Philadelphia, PA

#### *Ties That Bind: The Vitreo-Retinal Relationship*

As the Pyron Award recipient, Dr. Haller presented her lecture on August 29 at the Annual Meeting of the American Society of Retina Specialists (ASRS), which was held in Vancouver, Canada.

Dr. Haller completed her medical degree at Harvard Medical School. She has published more than 220 articles and 20 book chapters on the treatment of age-related macular degeneration and other eye disorders.

A prominent scholar and lecturer, Dr. Haller's research interests have focused on age-related macular degeneration, complicated retinal detachments, diabetic retinopathy, macular edema, retinal venous occlusive disease, and retinal infectious diseases.



**William Tasman, MD**

### ***Charles L. Schepens, MD/AAO Award***

**William Tasman, MD**

Wills Eye Institute  
Thomas Jefferson University  
Philadelphia, PA

#### *Retinopathy of Prematurity: Do We Still have a Problem? A Global Perspective*

In being selected for the Charles L. Schepens, MD/AAO Award, Dr. Tasman gave the Charles L. Schepens, MD/AAO Lecture at the Retina Subspecialty Day of the American Academy of Ophthalmologists (AAO) Annual Meeting in Chicago, IL. on October 15.

Dr. Tasman completed his medical degree at Temple University Medical School. He was first exposed to the diagnosis and management of retinal diseases while serving in the US Air Force in Wiesbaden, Germany.

When Dr. Tasman returned home in 1959, he was one of only a handful of people in the United States who had seen or used the xenon photocoagulator. He learned to appreciate its use, specifically in the treatment of diabetic retinopathy.

He participated in developing the protocol for effective use of cryotherapy in retinopathy of prematurity and later coauthored a study confirming that laser therapy was as good as, or better than, cryotherapy. Aside from retinopathy of prematurity, Dr. Tasman also has a strong interest in other pediatric vitreoretinal conditions, such as Stickler's syndrome.



## Established Research Awards



**Frank Werblin, PhD**

### ***Paul Kayser International Award in Retina Research***

**Frank Werblin, PhD**  
University of California  
Berkeley, CA

#### ***The Retina, Simplified: A 40 Year Review of Retinal Neuroscience***

The XIX Biennial Meeting of the International Society for Eye Research (ISER), held in Montreal, Canada, from July 18 to 23 was the setting for Dr. Werblin's Lecture as recipient of the Kayser International Award.

Besides teaching a variety of courses at both the graduate and undergraduate levels in the area of neuroscience at the University of California at Berkeley, Dr. Werblin has been leading research studies on retinal function at many different levels.

He was the first person in the world to make intracellular recordings from all major types of retinal neurons with dye labeling and characterize their receptive fields. He discovered the presence of two types of center-surround antagonistic receptive fields in retinal bipolar cells. His studies cover details of synaptic transmission, retinal pharmacology, transporter function, retinal circuitry, neuronal behavior, the functional significance of retinal processing, and finally retinal prosthetics.



**Anthony Adamis, MD**

### ***Club Jules Gonin Lecturer***

**Anthony Adamis, MD**  
**Napoleone Ferrara, MD**  
South San Francisco, CA

#### ***Vascular Endothelial Growth Factor: A Key Regulator of Intraocular Neovascularization***

Two scientists, Dr. Adamis and Dr. Ferrara, gave the Gonin Lecture and shared the award presented by Club Jules Gonin at the XXVII Meeting in Kyoto, Japan, on November 5. This award is given every two years.

Dr. Adamis' research focused on mechanisms of AMD and diabetic retinopathy, as well as ocular drug delivery. He is best known for his co-discovery of the role of VEGF in ocular disease, and for the causal role of inflammation in the pathogenesis of diabetic retinopathy. Dr. Ferrara's research studies on the role of VEGF in intraocular neovascularization led to a potential therapy for wet age-related macular degeneration.



**Napoleone Ferrara, MD**



**Alan C. Bird, MD**

### ***Club Jules Gonin Medalist***

**Alan C. Bird, MD**  
Moorfields Eye Hospital  
London, England

#### ***Retinitis Pigmentosa and Inherited Retinal Degeneration***

Every four years the Gonin Medalist is selected by the Board of the International Council of Ophthalmology (ICO) in conjunction with the University of Lausanne and the Swiss Ophthalmological Society.

This year Dr. Bird was chosen for this honor and gave a special lecture in Lausanne on March 12 at the Jules-Gonin Eye Hospital. The Gold Medal was awarded to Dr. Bird during the XXXII World Ophthalmology Congress held on June 5-9 in Berlin, Germany.

Dr. Bird is internationally recognized for his leadership research into inherited retinal degeneration, particularly retinitis pigmentosa. His highly collaborative research effort has developed novel technology to define the clinical characteristics of retinal disease. His body of work has significantly contributed to a better understanding of degenerative diseases of the retina and impacts upon clinical management in terms of more effective genetic counseling of patients and the exploration of new treatment approaches, including gene therapy.

## Research Chairs and Professorships

A fifth chair at University of Wisconsin was established this year thanks to a gift from Kathryn and Latimer Murfee. This chair is created to support basic science research regarding the diagnosis, treatment and cure of all types of macular degeneration.

Now a total of five chairs in retina research provide funds to vision scientists engaged in original excellent research that has the potential to increase understanding of the retina or retinal diseases. Four chairs have been established at University of Wisconsin and one at Baylor College of Medicine.

Funding is provided by gifts from Margaret and Mills Cox, Gertrude D. Pyron, W. H. Helmerich, III, RRF Advisory Trustee, and gifts given in honor of Emmett A. Humble, RRF Board Chairman for many years.



*Curtis R. Brandt, PhD*

### ***Walter H. Helmerich Chair***

**Curtis R. Brandt, PhD**

Ophthalmology and Visual Science

University of Wisconsin School of Medicine and Public Health, Madison, WI

### *Gene Therapy for Retinal Degenerative Diseases*

Viral-based gene delivery vectors are being extensively investigated for therapeutic use in a wide variety of ocular diseases. In fact considerable success has been achieved for some diseases. Because many viruses are

human pathogens, our host defense systems can be activated even when replication defective viruses are used for gene delivery.

Our bodies have innate recognition systems that can see these viral vectors, and when they recognize the presence of a vector, they trigger a defensive response. This response has a number of negative consequences that can affect therapeutic use of the vector. These include the activation of an immediate inflammatory response that can cause pathology or negatively affect the efficiency of the gene delivery.

Dr. Brandt's lab has recently found that the activation of some of these defense systems is actually required for efficient replication of viruses in the retina, raising the possibility that these defense systems might affect the efficacy of viral gene delivery. He is currently studying how these systems are activated by viral gene delivery vectors and whether this has an effect on gene delivery. In particular, one particular receptor system seems to be required for expression of the very early herpes simplex virus proteins that are essential for replication.

### **Nansi Jo Colley, PhD**

Ophthalmology and Visual Sciences

Eye Research Institute

University of Wisconsin, Madison, WI

### *Molecular Genetic Studies of Retinal Degeneration in Drosophila*

Dr. Colley utilizes *Drosophila* as a model for studying hereditary retinal diseases in humans, such as retinitis pigmentosa (RP) and age-related macular degeneration (AMD). Her lab has focused on those events in the secretory pathway that ensure the proper folding, modification, oligometric assembly, quality control, transport and targeting of newly synthesized proteins.

An ongoing challenge in diagnosing and treating AMD and RP is that they are highly complex diseases with multiple subtypes, each with a distinct genetic and biochemical basis. *Drosophila* is a powerful animal model for studying inherited retinal degeneration disorders. Flies have a strong genetic similarity to humans, are amenable to genetic manipulation and experimentation, and have a short life span, making it possible to study the onset and progression of retinal degenerations over relatively short time periods.



*Nansi Jo Colley, PhD*

## Research Chairs and Professorships

### *RRF Chair*

**Nader Sheibani, PhD**

Ophthalmology and Visual Science

University of Wisconsin School of Medicine and Public Health, Madison, WI



*Nader Sheibani, PhD*

*Understanding the Molecular and Cellular Mechanisms that keep Retinal Vascularization in Check*

The growth of new blood vessels from pre-existing capillaries (angiogenesis) contributes to the pathogenesis of many diseases, including retinopathy of prematurity, diabetic retinopathy, and age-related macular degeneration.

Understanding the molecular and cellular mechanisms that regulate angiogenesis and how their alterations contribute to growth of new blood vessels, has significant clinical impact. Dr. Sheibani is working to develop new modalities to treat a variety of eye diseases with a neovascular component.

### *Emmett A. Humble Distinguished Directorship*

**Daniel Albert, MD, MS**

Director, Eye Research Institute

University of Wisconsin, Madison, WI

The UW Eye Research Institute, of which Dr. Albert is Director, fosters a multi-disciplinary community of scholars working in collaboration to advance knowledge about the science and art of vision and apply it to the prevention of blindness.

Dr. Albert's research focuses on ocular tumors, specifically melanoma and retinoblastoma. His work with retinoblastoma utilizes transgenic mouse models of the tumor to investigate the molecular biology of the disease and to learn whether vitamin D analogs produce tumor regression in these animal models. He also studies melanoma in a transgenic mouse model.

His other interests include medical ethics and the history of medicine and ophthalmology.



*Daniel Albert, MD, MS*

### *Kathryn and Latimer Murfee Chair*

**David M. Gamm, MD, PhD**

UW Eye Research Institute

University of Wisconsin, Madison, WI



*David M. Gamm, MD, PhD*

*Deriving Photoreceptors from Human Embryonic Stem Cells*

Dr. Gamm's success in producing multiple retinal cell types from induced pluripotent stem (iPS) cells has led to development of human retinal disease-specific models advancing stem cell-based therapies. These iPS lines will aid the study of the pathogenesis of inherited and acquired retinal dystrophies and provide a means to test pharmacologic agents and develop customized stem cell treatment strategies.

In a mouse model of Type 2A Usher Syndrome, he has demonstrated that human neural stem cells could rescue dying photoreceptors. It is clear that this cell type has great promise as a treatment for retinal and neurodegenerative diseases.

**The RRF Chair at Baylor College of Medicine has yet to be named.**



## Research Chairs and Professorships

### *Edwin and Dorothy Gamewell Professor*

**Arnold E. Ruoho, PhD**

UW Eye Research Institute

University of Wisconsin, Madison, WI



**Arnold E. Ruoho, PhD**

### *Retinal Neuroprotection by the Sigma-1 Receptor Chaperone*

Dr. Ruoho's research is directed at understanding the molecular mechanisms underlying neurotransmitter release and receptor activation. He has discovered a new class of compounds that are high-affinity inhibitors of the Sigma-1 receptor, a transmembrane chaperone protein expressed in many different tissue types and particularly concentrated in multiple layers of the retina.

Sigma-1 may be utilized to diminish neurodegeneration of retinal photoreceptors and ganglion cells. His goal is to prevent blindness by applying pharmacological and genetic approaches that will enhance the biological activity of the Sigma-1 receptor in the retina.



### *M.D. Matthews Research Professor*

**Arthur S. Polans, PhD**

UW Eye Research Institute

University of Wisconsin, Madison, WI

### *Studies of the Resveratrol-Stimulated Calcium Response in Endothelial Cells*

There are significant problems associated with current treatment regimens involving the use of radiation and chemotherapy agents. Dr. Polans' lab has demonstrated that resveratrol, a natural plant product, can inhibit tumor growth in different mouse models of uveal melanoma, retinoblastoma and other types of cancer and can cause tumor regression when the bioavailability of the compound is increased.

The same compounds that are useful in reducing tumor growth may now be used to treat other neovascular diseases of the eye, including forms of

AMD, diabetic retinopathy and retinopathy of prematurity.

### *Rebecca Meyer Brown Professor*

**Bikash Pattnaik, PhD**

UW Eye Research Institute

University of Wisconsin, Madison, WI



**Bikash Pattnaik, PhD**

### *Mechanisms Underlying Kir 7.1 Mutation Causing Snowflake Vitreoretinal Degeneration (SVD)*

Macular degenerative diseases are hard to study because the aging process and consequences are hard to replicate in a laboratory setup. Studying disease mechanism of genetic eye diseases with parallel retinal degenerative phenotype is the best possible alternative.

Snowflake vitreoretinal degeneration (SVD) is a genetic disorder due to a mutation in the RPE potassium channel causing pigment appearance on the retina. Dr. Pattnaik has made significant advances in understanding of the disease cause in SVD.



## International Fellowships

RRF funds two programs of international fellowships, one a 12-month fellowship and the other a six-month fellowship.

### ICO/Helmerich International Fellowships

The International Council of Ophthalmology (ICO), in cooperation with the International Council of Ophthalmology Foundation (ICOF), and Retina Research Foundation, has established two international fellowships with income from an endowment created by Walter H. Helmerich.

These two, 12-month fellowships of \$25,000 each provide advanced subspecialty training for young ophthalmologists from developing countries who are recommended by the head of a teaching or public service institution and who are committed to returning to a position at a teaching institution or public service hospital in their home country following the fellowship.

#### 2010 Recipients:



*Lala Ceklic, MD, PhD*

**Lala Ceklic, MD, PhD**, Bosnia and Herzegovina, for training in retina and vitreoretinal surgery at Bern University Hospital in Switzerland. After fellowship Dr. Ceklic will return to the position of Chief of the Eye Department Kasindo Clinical Center of Eastern Sarajevo.



*Afsun Sahin, MD*

**Afsun Sahin, MD**, Turkey, for training in corneal disease and surgery at the Schepens Eye Research Institute at Harvard University. After fellowship Dr. Sahin will return to teaching and research at the University Medical School in Eskisehir, Turkey.

### Gillingham Fellowships/PAAO

Established by W. J. Gillingham, this program is administered for RRF by the Pan-American Association of Ophthalmology (PAAO). Two six-month fellowships, providing stipends of \$10,000 each, were awarded this year to Latin American ophthalmologists for training at leading institutions in the United States.

**Sandra Rocio Montezuma, MD**  
Colombia  
Massachusetts Eye and Ear Infirmary  
Harvard Medical School, Boston, MA



*Sandra Rocio Montezuma, MD*

**Alfredo Rodriguez Castillejos, MD**  
Mexico  
New York Eye and Ear Infirmary  
New York, NY



*Alfredo Rodriguez Castillejos, MD  
(second from left)*

## Research Initiatives and Special Recognition Awards

RRF has endowed gifts with earnings applied to translational research and education to bring laboratory knowledge to the clinical level.

### American Academy of Ophthalmology Educational Trust Fund

Educational programs administered for RRF by the American Academy of Ophthalmology are funded by the endowed gifts from Laura I. Cannon, Burt L. Risley, and the Schlichting Family. This program will upgrade clinical research skills in the field of retina. The 2010 funding for this program was \$47,963.

### RRF Lawrence Travel Scholarships

This program is administered by the Association for Research in Vision and Ophthalmology (ARVO) and is made possible by a gift to RRF from the Joe M. and Eula C. Lawrence. A total of \$20,000 was funded to provide travel expenses for the students to attend the ARVO Annual Meeting in May in Ft. Lauderdale, FL, to present their papers or posters.



In 2010, 23 ophthalmology students were selected from these schools:

- Columbia University -N ew York, NY
- Ohio State University -C olumbus, OH
- Duke University -D urham, NC
- Medical College of Wisconsin -M ilwaukee, WI
- Cleveland Clinic -C leveland, OH
- NYU School of Medicine -N ew York, NY
- University of Oklahoma Health Sciences Center -O klahoma City, OK
- The Scripps Research Institute -L a Jolla, CA
- University of Utah Moran Eye Center -S alt Lake City, UT
- Georgia Institute of Technology - Atlanta, GA
- University of Houston -H ouston, TX
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- Massachusetts Eye and Ear Infirmary, Harvard Medical School - Boston, MA
- Burke-Cornell Medical Research Institute -N ew York, NY

## Pan-American Research Initiatives

### Paul Kayser Travel Scholarships

RRF established this program in memory of Paul Kayser to create opportunities for U.S. ophthalmologists to observe clinical research in Latin America. Funding provided was \$25,000.

Habeeb Ahmad, MD From Los Angeles, CA	to S o Paulo, Brazil
Netan Choudhry, MD From Cambridge, MA	to Caracas, Venezuela
Davinder S. Grover, MD, MPH From Miami Beach, FL	to Santo Domingo, Dominican Republic
Aziz A. Khanifar, MD From New York, NY	to Mexico City, Mexico
Nancy Kunjukunju, MD From Ashland, OR	to Mexico City, Mexico
Yannek I. Leiderman, MD, PhD From Boston, MA	to Santiago, Chile
Lauren E. Patty, MD From Los Angeles, CA	to Rio de Janeiro, Brazil
Anita R. Shirodkar, MD From Miami, FL	to Buenos Aires, Argentina



*Dr. Davinder Grover and Dr. Juan F. Batlle (front)*

### Tyson Research Initiative

The earnings from the gift of Nell Sue Tyson funded travel scholarships for Latin American ophthalmologists to attend the 2010 ARVO Annual Meeting. This year \$12,500 was provided.

Efrain Romo Garcia, MD	from Mexico City, Mexico
Juan Pablo Vel zquez Martin, MD	from Mexico City, Mexico
Ral V□ez Montoya, MD	from Mexico City, Mexico
Valeria E. Lorenc, PhD	from Cordoba, Argentina
Natalia Restrepo Galeano, MD	from Medellin, Colombia
Damian Dorfman, MD	from Buenos Aires, Argentina
Aldo Arturo Oregñ M iranda, MD	from Zapopan, Mexico
Lukas Saldarriaga Franco, MD	from Medellin, Colombia

### Special Recognition Awards

In 2010, RRF gave honoraria to two of its most outstanding grantees for their milestone accomplishments. These awards are named in honor of the families who funded them: Samuel and Bertha Brochstein, and a fund established in memory of James M. Barr.

Brochstein Award	Ramon Font, MD
James Barr Award	Richard Hurwitz, MD

## Combined Statement of Financial Position

**Retina Research Foundation**  
 Combined Statement of Financial Position  
 December 31, 2010  
 (With Summarized Information as of December 31, 2009)

	General Funds			Endowment Funds				2010	2009
	Unrestricted	Temporarily		Unrestricted	Restricted	Permanently Restricted	Total	Total All Funds	Total All Funds (Memorandum Only)
		Restricted	Total						
<b>ASSETS</b>									
Cash and Cash Equivalents	\$ 323,449	150,000	473,449	-	98,692	-	98,692	572,141	1,343,788
Contributions Receivable	-	5,000	5,000	-	-	16,097	16,097	21,097	-
Investments	1,115,336	-	1,115,336	2,780,275	20,195,067	16,841,532	39,816,874	40,932,210	36,651,488
Furniture and Equipment, Net of Accumulated Depreciation of \$5,202	13,150	-	13,150	-	-	-	-	13,150	13,313
Charitable Remainder Trust	-	-	-	-	-	311,351	311,351	311,351	300,020
Intangible Assets	12	-	12	-	-	-	-	12	12
<b>TOTAL ASSETS</b>	<b>\$ 1,451,947</b>	<b>155,000</b>	<b>1,606,947</b>	<b>2,780,275</b>	<b>20,293,759</b>	<b>17,168,980</b>	<b>40,243,014</b>	<b>41,849,961</b>	<b>38,308,621</b>
<b>LIABILITIES AND NET ASSETS</b>									
Accounts Payable	\$ 7,095	-	7,095	-	71,936	-	71,936	79,031	94,800
<b>COMMITMENTS AND CONTINGENCIES</b>									
<b>NET ASSETS</b>	<b>1,444,852</b>	<b>155,000</b>	<b>1,599,852</b>	<b>2,780,275</b>	<b>20,221,823</b>	<b>17,168,980</b>	<b>40,171,078</b>	<b>41,770,930</b>	<b>38,213,821</b>
<b>TOTAL LIABILITIES AND NET ASSETS</b>	<b>\$ 1,451,947</b>	<b>155,000</b>	<b>1,606,947</b>	<b>2,780,275</b>	<b>20,293,759</b>	<b>17,168,980</b>	<b>40,243,014</b>	<b>41,849,961</b>	<b>38,308,621</b>



# Combined Statement of Activities and Changes in Net Assets

## Retina Research Foundation

Combined Statement of Activities and Changes on Net Assets  
for the year ended December 31, 2010  
(With Summarized Financial Information for the Year Ended December 31, 2009)

	General Funds			Endowment Funds			2010 Total All Funds	2009 Total All Funds (Memorandum Only)	
	Unrestricted	Temporarily		Unrestricted	Temporarily Restricted	Permanently Restricted			Total
		Restricted	Total						
<b>REVENUES:</b>									
Contributions	\$ 143,544	42,398	185,942	-	-	139,597	139,597	325,539	1,615,215
Interest, Dividend and Distribution Income	19,200	-	19,200	67,685	901,712	-	969,397	988,597	979,959
Realized and Unrealized Gains on Investments, Net	103,900	-	103,900	258,999	3,452,952	-	3,711,951	3,815,851	5,719,076
Mineral Interest Income and Other Income	91,100	-	91,100	-	-	-	-	91,100	161,852
Change in Value of Split-Interest Agreement	-	-	-	-	-	11,331	11,331	11,331	39,753
Income Transferred from Endowment Fund Investments	897,424	77,500	974,924	(67,309)	(907,615)	-	(974,924)	-	-
Net Assets Released from Restrictions- Satisfaction of Program Restrictions	67,398	(67,398)	-	-	-	-	-	-	-
<b>Total Revenues</b>	<b>1,322,566</b>	<b>52,500</b>	<b>1,375,066</b>	<b>259,375</b>	<b>3,447,049</b>	<b>150,928</b>	<b>3,857,352</b>	<b>5,232,418</b>	<b>8,515,855</b>
<b>EXPENSES:</b>									
<b>Program Services:</b>									
Research Projects and Grants	1,067,342	-	1,067,342	-	-	-	-	1,067,342	1,028,905
Public Education	31,945	-	31,945	-	-	-	-	31,945	37,350
Career Development and Awards	174,164	-	174,164	-	-	-	-	174,164	95,864
<b>Total Program Services</b>	<b>1,273,451</b>	<b>-</b>	<b>1,273,451</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,273,451</b>	<b>1,162,119</b>
<b>Supporting Services:</b>									
Management and General	108,193	-	108,193	19,718	246,492	-	266,210	374,403	398,842
Fund Raising	27,455	-	27,455	-	-	-	-	27,455	11,542
<b>Total Supporting Services</b>	<b>135,648</b>	<b>-</b>	<b>135,648</b>	<b>19,718</b>	<b>246,492</b>	<b>-</b>	<b>266,210</b>	<b>401,858</b>	<b>410,384</b>
<b>Total Expenses</b>	<b>1,409,099</b>	<b>-</b>	<b>1,409,099</b>	<b>19,718</b>	<b>246,492</b>	<b>-</b>	<b>266,210</b>	<b>1,675,309</b>	<b>1,572,503</b>
Changes in Net Assets	(86,533)	52,500	(34,033)	239,657	3,200,557	150,928	3,591,142	3,557,109	6,943,352
Transfer (Note 5)	-	-	-	-	478,011	(478,011)	-	-	-
Net Assets, Beginning of Year	1,531,385	102,500	1,633,885	2,540,618	16,543,255	17,496,063	36,579,936	38,213,821	31,270,469
Net Assets, End of Year	\$ 1,444,852	155,000	1,599,852	2,780,275	20,221,823	17,168,980	40,171,078	41,770,930	38,213,821

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