Knights Templar Eye Foundation, Inc.

SPONSORED BY THE GRAND ENCAMPMENT OF KNIGHTS TEMPLAR

SOMEWHERE IN THE WORLD, SOMEONE GOES BLIND EVERY



"To Improve Vision through Research, Education, and Supporting Access to Care."



"A Masonic Charity"

From the President

The Knights Templar Eye Foundation, Inc. is pleased to announce the latest publication of our informational booklet. The booklet provides a brief history of the formation of the Foundation as well as information on the programs and sponsorships the foundation offers and sponsors to fulfill the mission to "improve vision through research, education, and supporting access to care."

We have learned over past decades that our efforts in funding pediatric ophthalmology research have been the primary reason that we have had fewer and fewer children with strabismus



(crossed eyes) to treat. Our research dollars have helped develop new, non-surgical treatments for this problem, and additional research and endowment programs are all being funded by your faithful support.

Every donation will assist in making a tremendous difference in the lives of children by helping the Foundation to fulfill its mission.

Sir Knights, aside from his salvation, there is no greater gift for man on this earth than the gift of sight. Through your generous contributions, lives are being changed; research is being funded, which is allowing mankind to lead more fruitful and blessed lives.

God is THE giver of every good and perfect gift (James 1:17). As His image-bearers we are called to copy His giving, to be "mini-pictures" of His infinitely large heart. The larger our hearts (and the wider our hands), the larger the picture we paint of God's character.

I hope you will assist us in our efforts in finding a cure for the many eye diseases in pediatrics.

Our mission continues...

Inquiries & Requests for materials regarding the Knights Templar Eye Foundation, Inc. should be made directly to:

Robert W. Bigley Office Administrator/Assistant Secretary

Knights Templar Eye Foundation, Inc. General Correspondence: 3201 Cross Timbers Road Bldg. 4, Suite 300 Flower Mound, TX 75028

Donations:

Knights Templar Eye Foundation, Inc. P. O. Box 271118 Flower Mound, TX 75027-1118

> Phone: 214-888-0220 Fax: 214-888-0230 Email: Manager@ktef.us Website: ktef.org

J. Kussman

David J. Kussman President



The report of the Knights Templar Eye Foundation, Inc. as of June 1, 2023.

\$170 million has been spent on research, patient care and education.



OFFICERS

President David J. Kussman, Anaheim, CA

Vice President Jeffrey A. Bolstad, Lakeside, MT

Vice President Jack M. Harper II, Waller, TX

Vice President David W. Studley, Mountain Ranch, CA

TRUSTEES

Jeffrey A. Bolstad, Lakeside, MT David M. Dryer, Indianola, IA Kenneth B. Fischer, Friendswood, TX David D. Goodwin, Vestal, NY Jack M. Harper II, Waller, TX James C. Herndon, Blackfoot, ID William H. Koon II, Columbus Grove, OH David J. Kussman, Anaheim, CA Rodney A. Mann, Shelbyville, IN Treasurer Bobby B. Simmons, Bonaire, GA

Secretary Lawrence E. Tucker, Sugarland, TX

Assistant Secretary & Office Administrator Robert W. Bigley, Flower Mound, TX

email: Manager@KTEF.us

Jeffrey N. Nelson, Bismarck, ND Terry L. Plemons, Chattanooga, TN Daniel R. Sherry, MD, Ellsworth, WI Bobby B. Simmons, Bonaire, GA David W. Studley, Mountain Ranch, CA Lawrence E. Tucker, Sugarland, TX Duane L. Vaught, Bloomington, IN James M. Ward, Water Valley, MS Benjamin F. Williams, Littleton, CO

GENERAL COUNSEL

David W. Studley, Mountain Ranch, CA Benjamin F. Williams, Littleton, CO James C. Herndon, Blackfoot, ID

Who are the Knights Templar?...

Today's organization known as the Knights Templar does not claim to be a direct descendant of the ancient order of Knights Templar that was founded during the crusades in the 12th century. The purpose of those crusader knights was to protect pilgrims from danger when on their way to the Holy Land. These men took vows of poverty, chastity, and obedience, and were renowned for their courage in battle. In 1118 A.D., nineteen years after the successful crusade, these Poor Fellow Soldiers of Christ and the Temple of Jerusalem, as they termed themselves, were officially recognized, sanctioned, and given, for their headquarters, a building on Mount Moriah, the site of the Temple of King Solomon. Consequently, they became known as Knights of the Temple, or Knights Templar.

What are Knights Templar doing today?...

Eight centuries after the crusades, the current organization is still dedicated to assisting those in need and in using its efforts for the prevention of blindness. Because sight is a most precious gift, The Knights Templar Eye Foundation is often referred to as "A Great Humanitarian Charity."

History of Foundation



Walter Allen DeLamater Most Eminent Grand Master - 1958 First President and Founder of The Knights Templar Eye Foundation

A history of the Knights Templar Eye Foundation must begin with knowing something about its founder, Walter Allen DeLamater, a truly remarkable man. He was born in New York City, April 18, 1880, son of Washington Irving and Clara DeLamater, descendants of the DeLamaters who, under the name of DeLamater Iron Works, were the builders of the Monitor of the historic Monitor-Merrimac Battle during the War between the States. DeLamater, Sr. was the first president of the Village of Rhinebeck, New York, founded in 1688.

Walter DeLamater's illustrious career covered a broad range of interests. He was a soldier with a brilliant WWI record in both combat and important staff assignments. He was an executive in a broad range of industries and businesses focusing primarily on matters of organization, management,

research and development, sales promotion and was a public relations consultant.

With all these diverse fields of interest in which he excelled, one ponders his decision to choose the Great Order of Templary to be his life's work.

Young DeLamater was educated in New York City public schools and St. Mark's private school. In 1901, at the age of 21, he married Marie West, who died March 31, 1940. They had two children, Marie Lillian (Mrs. Herbert Norton) and Walter, Jr.

His public career began March 2, 1900, when he enlisted as a Private in the 71st Infantry, New York National Guard. He became the only person in the Regiment's long history, dating back to 1850, to rise from a Private to a Major General. In 1916 he served in the Mexican Border affair for which he received special commendation for action under extremely trying circumstances.

Remaining in the service through WWI, he was engaged in several difficult campaigns in France, received a number of awards, decorations and citations for exceptional bravery and distinguished service under heavy shell fire without regard for his personal safety, repaired roads, opening them to traffic, and supervised the evacuation of wounded under deadly shell fire.

He had been promoted from Major to Lieutenant Colonel in the 106th Infantry. Soon he was transferred to the 79th Division in France, and became Assistant Chief of Staff, then to the 77th Division, Chief of Staff and a full Colonel by 1920.

By the end of the war he had received numerous awards and citations for exceptional bravery as well as for brilliant staff work many times performed under deadly shell fire. For this he was awarded the Distinguished Service Medal. He had been promoted to the rank of Major General.

Although a Republican, Major General Walter A. DeLamater, RET. then a Soldier Citizen, upon request by Major Fiorello LaGuardia, approved by President Franklin D. Roosevelt was appointed Federal Civil Works Administrator of New York City. Several other important civilian assignments followed.

His Masonic Career

He was raised a Master Mason in Halteman Lodge #412 at Middletown, New York, July 26, 1917. As might be expected, this extraordinarily energetic and talented individual joined and rose rapidly in the many degrees, orders, and rites of Masonry.

He was Knighted in Yonkers Commandery #47, New York State, March 17, 1921, and moved up rapidly through the lines. He served as Right Eminent Grand Commander, State of New York, 1934, and was elected to the Grand Encampment Line in 1937.

He told of being stricken and paralyzed in 1941 for a period of two months from a clot on the brain. During those two months the doctors said it was impossible for him to live and there wasn't one chance in a million of his doing so. After the physicians gave him up, why then and for what purpose was he saved? It was during the Grand Conclave in 1946 that we first heard the story of Sir Knight DeLamater's vision he had while still anesthetized for an operation. In his vision, heavenly bodies, angels, admonished him that if he lived he must do something to heal the blind as Jesus had done when on earth. After his miraculous recovery from near death he firmly believed that his recovery must have been for this divine purpose.

Prior to the September 20-26, 1952, Triennial Conclave in New Orleans, Louisiana, then Deputy Grand Master Walter Allen DeLamater, began his campaign in earnest. With all the skills of a public relations consultant he launched his campaign promoting Knights Templar Eye Hospitals in connection with existing hospitals throughout the United States. Thus fulfilling the admonitions of his vision "to heal the blind."

The idea of a hospital or hospitals for the blind lead to many long debates and bitter arguments, prior to and during the Grand Encampment meeting. Arguments were still going on in the halls and cloakrooms before the meeting was called to order by Most Eminent Grand Master William Catron Gordon. At the conclusion, the original resolution was amended to include instead of "Eye Hospitals" the words "Eye Foundation". After a vote, the Grand Master declared "the chair rules that the resolution is adopted by the required three-quarters vote", but following a break another 3 hours of debate resulted in around 25 additional proceeding pages containing resolutions and clarifications which finally resulted in a final and conclusive vote which again passed by three-quarters vote.

From the very beginning, a Medical Advisory Council consisting of able and dedicated ophthalmologists from all over the country guided the Foundation. For a good many years funds for research were granted somewhat haphazardly on recommendations from knowledgeable Sir Knights but without particular focus. This would be corrected in 1985 when the distinguished Dr. Alfred Edward Maumanee, Jr., Director of the Wilmer Eye Institute at Johns Hopkins University in Baltimore, established a Scientific Advisory Committee. The Scientific Advisory Committee consists of five distinguished ophthalmologists from throughout the United States. This committee screens all proposals for grants for research in pediatric ophthalmology.

(Taken from "A History of the Founding of the Knights Templar Eye Foundation", written by the late Edmund F. Ball K.G.C., H.P.G.M. and Trustee of the Foundation.)

Knights Templar Eye Foundation, Inc.

Where we are today . . .

The Knights Templar Eye Foundation, incorporated in 1956, is a charity sponsored by the Grand Encampment of Knights Templar. The Foundation is governed by a Board of Trustees comprised of the six elected officers of the Grand Encampment, all Past Grand Masters of the Grand Encampment, and six trustees-at-large elected from and by the membership for a term of nine years. It is exempt from federal income taxation under Section 501(c)3 of the Internal Revenue Code and contributions made to the Foundation are deductible by donors.

The original mission of the Foundation was "to provide assistance to those who face loss of sight due to the need for surgical treatment without regard to race, color, creed, age, sex or national origin provided they are unable to pay or receive adequate assistance from current government agencies or similar sources and to provide funds for research in curing diseases of the eye."

On December 31, 2010, the Knights Templar Eye Foundation, Inc., by direction of the board, shifted the Foundation's focus and adopted a new mission statement "to improve vision through research, education, and supporting access to care." The Foundation now only participates in direct patient care through the Seniors Eye Care Program in partnership with EyeCare America and the Foundation of the American Academy of Ophthalmology. With this change, the Foundation is benefitting untold millions in generations to come through grants that support research and education. Our research dollars have helped develop new, non-surgical, treatments for strabismus (crossed eyes) and ophthalmologists have told us that our efforts in funding pediatric ophthalmology research have been the primary reason that there are fewer and fewer surgeries for strabismus. The Knights Templar Eye Foundation, Inc., annually announces its call for research grant applications. The Foundation invites eligible investigators to submit applications for pediatric ophthalmology research grants for the award period which normally runs from July 1 to June 30. From the applications received, the Scientific Advisory Committee recommends to the Trustees which requests should be funded.

Since its inception, the Foundation has expended over \$170 million on research, patient care, and education. Research grants totaling in excess of \$36 million have been awarded to researchers working in the fields of pediatric ophthalmology and ophthalmic genetics.

Pediatric Ophthalmology Grants

The Knights Templar Eye Foundation, Inc. is committed to support research that can help launch the careers of clinical and basic researchers focused on the prevention and cure of potentially blinding diseases in infants and children. Grants supported by the Knights Templar Eye Foundation, Inc. are awarded to impact the care of infants, children, and adults. Clinical and basic research on conditions that may be potentially preventable or correctable such as amblyopia, cataract, glaucoma, optic nerve hypoplasia, nystagmus, retinopathy of prematurity, and hereditary diseases that occur at birth or within early childhood, such as retinoblastoma, is encouraged. Proposals for support of basic research on eye and visual system development also are welcome.

Each year the Knights Templar Eye Foundation, Inc., invites eligible investigators to submit applications for pediatric ophthalmology research grants:

Career-Starter Research Grants

up to \$90,000 per grant. Applicants for these grants must be at the beginning of their academic careers and must have received an M.D., Ph.D., or equivalent degree.

Competitive Renewal Grants

up to \$90,000 per grant to extend the original grant project for one additional year when the data collected from the original grant is compelling enough to apply.



Knights Templar Eye Foundation, Inc. General Correspondence:

3201 Cross Timbers Road | Bldg. 4, Suite 300 | Flower Mound, TX 75028

Donations:

Knights Templar Eye Foundation, Inc. | P. O. Box 271118 | Flower Mound, TX 75027-1118

Telephone: (214) 888-0220 | Fax: (214) 888-0230 | E-mail: manager@ktef.us



Sources of Funds

Funds for the operation of the Knights Templar Eye Foundation (KTEF) are obtained from an annual assessment of each Knight Templar, contributions made by Masons from throughout the Masonic Family, fund-raising activities, memorials, wills and bequests, and donations from endowment funds or similar sources.

Special award programs for contributions include:

- * Life Sponsor Available to Sir Knights (members of a Commandery) who donate \$30.
- * Associate Patron Available to any person or organization that makes a donation of \$50.
- * Patron Available to any person or organization that makes a donation of \$100.

* Payments for Life Sponsor, Patron, and/or Associate Patron will exempt your Grand Commandery from further assessment to the Knights Templar Eye Foundation, Inc.

• **** The Grand Master's Club** – One Thousand Dollars enrolls you as a concerned individual in the humanitarian work of the Foundation. The Grand Master's Club is available to all individuals, whether Templars or others, but not to organizations. Your membership in the Grand Master's Club entitles you to a **lapel pin**, an **engraved wall plaque and the Crusaders Cross issued for the first 25 Grand Master Clubs**.



•****** The Grand Commander's Club – You can enroll in the Grand Commander's Club by sending in your first installment of \$100.00 or more. At the time of your enrollment, you will receive a lapel pin and wallet card (signifying your membership). In addition, members of the Grand Commander's Club pledge to make annual contributions of \$100.00 or more for nine more years until the total of \$1,000.00 is reached. Once contributions total \$1,000.00, the individual is enrolled in the Grand Master's Club.

** The Grand Master's Club and Grand Commander's Club are available to all individual Templars or others, but not to organizations. (As of 2/1/2015 once 25 Grand Master's Clubs are reached, a Sword of Merit will be awarded.)

• **Memorial Donations** – These donations are of any amount in memory of a deceased person. A form is provided on the donor envelope.

• Honorary Gifts – These donations are given in honor of a living person in recognition of service or friendship.

• Wills and Bequests – Anyone who believes in the service provided by the Knights Templar Eye Foundation, Inc. may leave a bequest to the Foundation in their will.

• Sight Crusader – Anyone who designates the KTEF in their will and provides suitable notification to the Knights Templar Eye Foundation, Inc. will be designated a Sight Crusader.



The Golden Chalice

The Chalice is awarded in recognition of a single donation of \$10,000 or more.



The Grand Master's Sword of Merit This coveted award is given in recognition of a single donation of \$25,000 or more, or 25 Grand Master's Clubs.

Endowed Professorship Awarded

In 2011, the Board explored the feasibility and desirability of establishing endowed professorship programs focusing on ophthalmic education at leading research universities and teaching hospitals. Preliminary groundwork proved constructive and in 2012 the President formed a committee of Board members to further explore this idea. This concept was approved and the endowed professorship program was subsequently created. In 2020, the Board expanded the endowment program by authorizing funding for research endowments. Research endowments support research programs as a whole and increase the number of investigators who benefit from the endowment.

Each endowed professorship and research endowment is awarded \$2 million which is matched dollar for dollar by the partner institution. Each one-time investment provides a perpetual benefit to both the Foundation and the recipient institution and is consistent with the Foundation's mission statement.

Research endowments create new partnership legacies for the Foundation. As the Foundation is credited on all publications that result from endowment funding, it receives valuable publicity and recognition which serve to further its mission.



AUGUST 2013 "Knights Templar Eye Foundation Inc., Professor in Ophthalmology Research" Michael Brodsky, M.D. The Mayo Clinic | Campuses in: Rochester, MN, Phoenix, AZ, Jacksonville, FL

AUGUST 2015

"Knights Templar Eye Foundation Inc., Professor of Ophthalmology" Thomas McCarthy Bosley, M.D. The Wilmer Eye Institute of Johns Hopkins University | Baltimore, MD



AUGUST 2017 "Knights Templar Eye Foundation Inc., Presidential Chair in Ophthalmology" Wei Li, Ph.D. Baylor College of Medicine | Houston, TX



JANUARY 2021 "Knights Templar Eye Foundation Directorship in Pediatric Vision Research" Honoring Dr. John S. Penn, Ph.D. Vanderbilt University | Medical Center | Nashville, TN



JANUARY 2021 "The Knights Templar Eye Foundation Research Endowment" The Vision Center Children's Hospital Los Angeles | Vision Center | Los Angeles, CA

Knights Templar Eye Foundation, Inc.

How to join the Grand Commander's or the Grand Master's Club

G

Grand Commander's Club: Any individual may send a check in the amount of \$100 or more specified for the purpose of beginning a Grand Commander's Club. (Make payable to the Knights Templar Eye Foundation). This initial contribution will begin your Grand Commander's Club membership. In addition, members of the Grand Commander's Club pledge to make annual contributions of \$100 or more.

Grand Master's Club: Once contributions total \$1,000, the individual is enrolled in the Grand Master's Club. Membership is open to individuals only, and commandery credit is given for participation.

Qualified Charitable Distributions

Congress has now made the qualified charitable distribution (QCD) option permanent for those who wish to make direct contributions from their IRA to charity. The tax law allows individuals required to make minimum distributions due to age to transfer up to \$100,000 a year from their IRA to a qualified charity. This distribution counts toward their required minimum distribution but isn't added to their adjusted gross income the way a normal IRA distribution is. This can provide a tax savings of up to 40% depending upon an individual's tax situation. Please discuss with your tax professional whether this option could benefit you in your charitable and retirement planning.

Planned Giving Create a Charitable Legacy

Your Foundation now has a full web site dedicated to Planned Giving which you can access from our web site, shown at the bottom of this page. So if you're thinking of ways to make a lasting legacy for yourself please check out the tab on the home page that says "Planned Giving". Leaving your mark on the future is so simple with a gift in your will. To leave a gift in your Will or Trust it is as easy as asking your attorney to include a sentence that says:

I bequeath (lump sum) or (%) of my estate to:

Knights Templar Eye Foundation, Inc.

3201 Cross Timbers Road Bldg. 4 Ste. 300 Flower Mound, TX 75028 Thank You!



Knights Templar Eye Foundation, Inc. The New Grand Master Club

Crusader's Cross Levels and Jewels



At the 25 Grand Master Club level a Sword of Merit will also be issued.

The Crusader's Cross

The Knights Templar Eye Foundation, Inc. has a number of donation programs, most with associated recognition programs. One primary contribution program that has grown in popularity is the Grand Master's Club which issues **a Crusader's Cross** as a thank you which also represents the number of Grand Master's Clubs a person has. Grand Master's Clubs are contributions of \$1,000 which can be accumulated over time. These accumulations are known as the Grand Commander's Club (\$100 each until \$1,000 is reached).

Currently, Grand Master's Club donors receive a **plaque**, **lapel pin**, and a **Crusader's Cross** up to the first twenty-five Grand Masters Clubs.

However, many of our members have asked the foundation to make a change to the Jewel.



Because of these requests, the Jewel now includes five tiers with five levels within each tier, each tier has a different colored center but still has quadrants representing the different levels. Remember this jewel is a thank you for the donation to the Grand Master's Club (GMC).Each GMC represents a contribution of \$1,000.



Note: Tiers 1-4 have a silver jewel where tier five is a gold jewel and once a donor reaches 25 GMC's a sword of merit is awarded. Each additional GMC within a specific tier is represented by a smaller cross within the quadrant. Once the four quadrants are occupied within a jewel additional GMC's will be recognized by a different tiered jewel.

Because this is one of the Grand Encampment's philanthropies. It is a Grand Encampment jewel and your highest leveled jewel may be worn on the right side of the uniform. However, generally all medals are worn on the left of the uniform as space permits.

Knights Templar Eye Foundation, Inc P.O. Box 271118 | Flower Mound, TX 75027-1118



Fund Raising Can be Fun

There are numerous ways to raise funds for the Annual Voluntary Campaign of the Knights Templar Eye Foundation, Inc. You can be creative, put on your thinking cap and ask other Sir Knights to get involved. One project may raise enough to reach the Goals set for the Campaign or more.

PURPOSE OF THE ANNUAL VOLUNTARY CAMPAIGN

The purpose of the Annual Voluntary Campaign is to supplement the income of the Knights Templar Eye Foundation, Inc. through bequests, gifts, endowments and other sources so that sufficient funds are available to provide the assistance as stated in the Mission Statement of the Knights Templar Eye Foundation, Inc. The Voluntary Campaign runs from October 1st to April 30th annually. Funds received in the office at any time throughout the year will be credited to a campaign. It should be noted that bequests and wills are counted for credit of the Commanderies or Grand Commanderies during each Campaign.

Commanderies reaching the goal of \$10.00 per member or more will receive a plaque and seal, and those Commanderies reaching a contribution of \$5.00 per member but less than \$10.00 per member will receive appropriate recognition for their efforts.

THE QUESTION IS OFTEN ASKED: "HOW CAN WE RAISE FUNDS?"

FIRST METHOD (The Easy Way)

Even though it may seem painful to some Sir Knights, an out of pocket or check donation from ALL SIR KNIGHTS requires the least effort. It does require a charitable attitude which we have all committed ourselves to in the Order of the Temple. The Knights Templar Eye Foundation is THE RESPONSIBILITY OF EVERY SIR KNIGHT. This method is almost painless. "Your attitude will determine your altitude."

SECOND METHOD (Special Approach)

Donations from outside of our membership may be accomplished with a tactful approach. These sources are businesses, fraternal organizations, foundations, and generous individuals.

THIRD METHOD (Efforts of many)

Projects require special effort, dedication, and enthusiasm of many Sir Knights who enjoy fund raising and believe in the purpose. Fun and Fellowship are part of working on projects. Give it a try.

SOME FUND RAISING METHODS FOR CONSIDERATION

- 1. Dinners before Conclaves
- 2. Public Dinner/Dance/Entertainment
- 3. A "Big Band" Dance
- 4. Hoagie Sale
- 5. Flea Market
- 6. Auction
- 7. Jewelry Sale
- 8. Fish Fry
- 9. Spaghetti Dinner

- 10. Bake Sale
- 11. Candy Sale
- 12. Fruit Cake Sale
- 13. Pancake/Sausage Breakfast
- 14. Plant Sale
- 15. Shirt Sale
- 16. Baseball Cap Sale
- 17. Fruit Sale
- 18. A collection following a Conclave

Your imagination will provide many other ways and methods to provide funds so "That Others May See."

AN IDEA FOR 100% PARTICIPATION:

Pass a collection plate at your Christmas Observance as you would at any other religious service. By doing this, every Commandery in the Grand Encampment will have participated in the Voluntary Campaign before the end of December. PLEASE EXPLAIN THIS TO THE MEMBERS AND TRY IT. YOU WILL BE SURPRISED AT THE SUCCESS.



Knights Templar Eye Foundation, Inc.

Supports the ONE® Network: Pediatric Ophthalmology Education Center

In the pursuit of our mission to improve vision through research, education and supporting access to care, your Knights Templar Eye Foundation has partnered with the American Academy of Ophthalmology, the largest ophthalmic organization in the world, to create a Pediatric Ophthalmology Education Center. This Center, a part of the Academy's Ophthalmic News and Education (ONE®) Network, will be comprehensive in scope, and global in reach.

Our support of this global educational resource will be an important step toward addressing a large and growing burden of vision loss. More than 285 million people globally are blind or visually impaired, and at an estimated economic cost of \$3 trillion annually. Childhood blindness is among the top five causes of visual loss worldwide. An estimated 500,000 children become blind annually, and up to 60 percent of these children in developing countries are thought to die within one year. Nearly half of all blindness in children is due to avoidable causes that could be prevented with interventions using existing knowledge.

The purpose of the Pediatric Ophthalmology Education Center (Education Center) is to ensure a strong educational foundation for current and future generations of ophthalmologists, and by doing so, eliminate a lack of ophthalmic education as a contributor to global blindness. It will speed the adoption of new knowledge, technology and treatments. No such resource currently exists, even though the pace of innovation is increasing, and there is a real and growing need for the Education Center among pediatric ophthalmologists.



AMERICAN ACADEMY OF OPHTHALMOLOGY* ONE[®] Network The Ophthalmic News and Education Network The Education Center will enable pediatric ophthalmologists throughout the United States and worldwide, including countries where we have Subordinate Commanderies, to access a single online resource of the highest quality content, vetted by experts. In combination with an extensive surgical simulation library, this virtual skills transfer center will address the needs of residents and fellows, mid-career practitioners, and international training programs in less-developed countries. The Education Center will teach:



- · Basic science principles
- · Pathology and pathogenesis of disease
- Specific disease content
- Diagnosis and differential diagnosis
- · Medical and surgical management
- · Risk management
- Complications management
- Patient instructions
- Outcomes assessment



Visit: www.aao.org/one

In recognition of our support, the American Academy of Ophthalmology has named the ONE® Network pediatric ophthalmology subspecialty center:

The Knights Templar Eye Foundation, Inc., Pediatric Ophthalmology Education Center in perpetuity

By supporting the Pediatric Ophthalmology Education Center within the American Academy of Ophthalmology's ONE[®] Network, we have a real opportunity to make a difference and improve the outcomes in eye care for children worldwide.



EyeCare America provides eye care at no cost to those who qualify through volunteer ophthalmologists (Medical eye doctors) nationwide.



To see if you qualify, visit their OnlineReferral Center at www.aao.org/eyecareamerica

WHY

One-in-three Americans has some form of vision impairing eye disease by age 65, and nearly three million people of all ages have glaucoma. Most people do not know it either because there are often no early warning symptoms or they assume that poor sight is a natural part of growing older. Detecting and treating eye disease early through annual, dilated eye exams can prevent unnecessary vision loss and preserve sight well into the future.

WHO

Through its Online Referral Center, EyeCare America, one of the largest public service programs in American medicine, EyeCare America provides eye care to the underserved through a pool of more than 5,000 volunteer ophthalmologists. Since 1985, EyeCare America has helped more than 2 million people. Ninety percent of the care provided is at no out-of pocket cost to the patient. EyeCare America offers the Seniors EyeCare Program for eligible seniors 65 and older, and the Glaucoma EyeCare Program for those eligible and uninsured, providing a baseline exam for those who are not aware they have glaucoma.

TWO PROGRAMS OFFERED:

The Seniors Program

Connects eligible seniors 65 and older with local volunteer ophthalmologists who provide a medical eye exam often at no out-of-pocket cost, and up to one year of follow-up care for any condition diagnosed during the initial exam, for the physician services.

The Glaucoma Program

Provides a glaucoma eye exam at no cost to those who are eligible and uninsured. Those who are eligible and insured are billed normal office procedure, and responsible for any co-payments. (This is an awareness program to provide a baseline glaucoma eye exam to those who may not be aware they are at increased risk).

ELIGIBILITY FOR EACH PROGRAM:

Seniors Program:

- U.S. citizen or legal resident
- Age 65 or older
- Not belong to an HMO or have eye care benefits through the VA
- Not seen an ophthalmologist in three or more years

Glaucoma Program:

- U.S. citizen or legal resident
- Not belong to an HMO or have eye care benefits through the VA
- Not had an eye exam in 12 months or more
- At increased risk for glaucoma, determined by your age, race and family history



SERVICES THAT ARE NOT COVERED

Additional services necessary for your care such as, hospitals, surgical facilities, anesthesiologists and medications, are the patient's responsibility and beyond the scope of EyeCare America services. The ophthalmologist is a volunteer who agrees to provide only services within these program guidelines.

EYEGLASSES ARE NOT COVERED:

EyeCare America provides medical eye care, only. The program does NOT provide eyeglass prescriptions or cover the cost of eye glasses. If you are concerned about the cost of these items, please discuss this with the doctor BEFORE the examination, or visit our eye glasses resources webpage.

ADDITIONAL REFERRALS:

If you were eligible for the Seniors Program, and require a re-referral to another ophthalmologist for specialty care, you or the EyeCare America volunteer ophthalmologist MUST contact EyeCare America in order to continue receiving care through the program. We may be able to locate another EyeCare America volunteer to provide the care.

HOW

Visit:

www.aao.org/eyecareamerica for more information or to see if you qualify for a referral to one of EyeCare America's 5,000 volunteer ophthalmologists nationwide.

EXCLUDED

- Eyeglasses
- Prescription drugs
- Hospital services
- Fees of other medical professionals

CONTACTS

Christie L. Morse, MD Chair, EyeCare America

ECA staff 877.887.6327 Fax 415.561.8567 PO Box 429098 San Francisco, CA 94142

Visit: www.aao.org/eyecareamerica

EyeCare America is co-sponsored by the Knights Templar Eye Foundation, Inc., with additional support provided by Alcon and Regeneron. EyeCare America is endorsed by state and subspecialty ophthalmological societies.

A public service program of the American Academy of Ophthalmology, EyeCare America's mission is to reduce avoidable blindness and severe visual impairment through education and public service.

Scientific Advisory Committee Meeting

Pediatric Opthalmology Grant review 2023

Annually the Knights Templar Eye Foundation holds a meeting mid-March, this year it was held in Grapevine, Texas with the officers and trustees of the Foundation along with fourteen doctors specializing in pediatric ophthalmology from many leading hospitals and research institutions throughout the country to review the applications and recommend which applications based on the merits of the proposal should be funded up to a \$90,000 grant.

For the past two years this annual meeting has been held through ZOOM, this year was a welcome change to be in person and discuss in person.

The meeting started at 8:30am CST and concluded at 4:30pm CST – being in person allowed more dialog as our SAC doctors had to review in detail thirty-seven Career Starter Grants and nine Competitive Renewal Grants.

At the end of the review process thirty Competitive Renewal & Career Starter grants for a total of \$2,699,449.00 were recommended by the SAC Committee and later approved by the KTEF officers.

Our website www.ktef.org/grants has a complete list of the grants that were approved along with the specific research.



Knights Templar Eye Foundation, Inc.

IRIS Registry Pediatric Ophthalmology Research Fund

The American Academy of Ophthalmology was awarded \$2 million from the Knights Templar Eye Foundation, Inc. to establish a permanent research fund to advance the practice of pediatric ophthalmology in 2018. This fund is being used to support the work of researchers investigating both rare and common eye diseases affecting children and to uncover optimal, real world approaches to prevention and treatment.

Insights for these projects are being gleaned from the Academy's IRIS Registry (Intelligent Research in Sight), the world's largest clinical specialty data registry. The Academy developed the IRIS Registry to provide insights on eye disease, and to empower ophthalmologists to effectively improve their practices and their patients' lives. Having amassed data on 75 million patients, this data-rich resource has already improved the quality of eye care for adult patients.

The fund is enabling the Academy's IRIS Registry team to enhance the capture of data collected on pediatric patients to reveal patient characteristics associated with disease and better approaches to their prevention and treatment. The IRIS Registry team has also attracted more pediatric ophthalmologists and more academic medical centers to contribute to the database, further enhancing the power of its data-driven insights.

The IRIS Registry has also been used to drive individualized learning for pediatric ophthalmologists, providing them with information on their performance, outcomes of treatment, and adherence to best practices. It has also connected ophthalmologists to an online tool offering the best educational resources in pediatric ophthalmology. In summary, the KTEF IRIS Registry Pediatric Ophthalmology Fund is providing pediatric ophthalmologists and patients with the tool of "Big Data" to identify patterns of disease and treatment that lead to better care of children's vision in the United States.

"This grant is an extraordinary gift for ophthalmology," said David W. Parke II, MD, CEO for the American Academy of Ophthalmology. "It will build upon the strengths of the world's largest clinical data registry to drive insights on children's eye health. I have no doubt that it will improve the care of individual children. The Knights Templar Eye Foundation is a tremendous partner for our profession and our patients."



VIDEO CLIPS

Available for viewing and can be downloaded from the Knights Templar Eye Foundation webpage

www.ktef.org/videos

Dr. John S. Penn, Ph.D.

Past Chair of the KTEF Scientific Advisory Committee Vanderbilt University Professor of Ophthalmology and Visual Sciences Snyder Chair in Ophthalmology and Visual Sciences Received KTEF Grants 1986 1987 Research on Retinopathy of Prematurity (ROP) Clip:

Message from the Former Chair for KTEF and Grant recipient

Dr. Thomas C. Lee, M.D.

Member of the KTEF Scientific Advisory Committee Children's Hospital Los Angeles Director, The Vision Center Associate Professor of Ophthalmology Received KTEF Grants 1997 1998 CLIPS:

> Curing Childhood Blindness Making a Difference

Dr. Christie L. Morse, M.D.

Executive Vice President, American Association for Pediatric Ophthalmology & Strabismus EyeCare America, Chair American Academy of Ophthalmology Foundation Advisory Board CLIPS: FAAO ONE Network Pediatric Center

AAPOS All Children See Program (2 clips)

OTHER CLIPS-FUNDED BY KTEF:

Intelligent Research in Sight (IRIS) Registry Gene Therapy to Cure Childhood Blindness EyeCare America Seen Through Doctors and Patients Eyes

KTEF GRANT RECIPIENT CLIPS:

Dr. Jesse Berry, M.D. Director Ocular Oncology and Retinoblastoma Children's Hospital Los Angeles Dr. Ash Jayagopal, Ph.D. Chief Scientific Officer, Opus Genetics Durham, North Carolina

Dr. Megan E. Collins, M.D., M.P.H. Allan and Claire Jensen Professor of Ophthalmology

John Hopkins University

KNIGHTS TEMPLAR EYE FOUNDATION, INC. AWARDS TWO MILLION DOLLARS TO CEF OF AAPOS ALL CHILDREN SEE



WHAT

All Children See, a program of the Children's Eye Foundation of the American Association for Pediatric Ophthalmology and Strabismus (CEF of AAPOS), provides an eye exam and a year of follow up care at no cost to children who qualify nationwide.

WHY

Vision impairment is common among young children. More than 2% of children under age 18 years are blind or visually impaired and up to 5% of young children are at risk for permanent vision loss from conditions such as amblyopia (also known as "lazy eye") and strabismus.

Uncorrected significant need for glasses (nearsightedness, farsightedness and astigmatism) are the most common vision disorders in children. 5-10% of preschoolers and 25% of school age children have vision problems that affect their learning and quality of life. Because 80% of learning is visual, vision plays a critical role in the cognitive, physical and social development of a young child. Vision is a strong predictor of school readiness and academic success.

We cannot afford to allow our children to forego care. The consequences of delaying treatment for children with visual impairment can be life-long—and include blindness.

WHO

To qualify as an All Children See patient, a child must be:

- under the age of 18
- a legal citizen or resident of the United States
- uninsured or under-insured
- financially unable to provide their physician with a co-pay

HOW

Visit *allchildrensee.org* for more information or to see if a child qualifies for a referral to one of All Children See's volunteer ophthalmologists nationwide.

EXCLUDED

Eyeglasses, prescription drugs, hospital services, and fees of other medical professionals. Information about how to access these resources are available on the allchildrensee.org website and the patient's physician may be able to help navigate a pathway to ensuring the child has the care he/she needs.

CONTACTS

Mona Panchal | Mpanchal@aao.org | Visit: allchildrensee.org

VISION OF THE FUTURE

How Predictive Medicine is Curing Childhood Blindness

by Ben Williams



hen you meet Dr. Tom Lee, Director of the Vision Center at Children's Hospital, Los Angeles, he's quick to point out the role of the Knights Templar Eye Foundation (KTEF) in spurring the most important research in pediatric ophthalmology today.

"It's the only foundation in the entire world that is exclusively devoted to childhood blindness," he says. "Every major contributor to pediatric ophthalmology has been touched by this foundation. I can't tell you how important [KTEF] is."

KTEF is at the center of pediatric ophthalmology. By identifying key areas of research for seed funding, KTEF accelerates research into experimental areas where, over the last few decades, the greatest advances in pediatric ophthalmology have been made. The Knights Templar have launched some of the most important careers in the field, including Dr. Lee's.

"None of us in the field would be there [without KTEF]," Dr. Lee says. "Everything we've been able to accomplish is because of this foundation "

Understanding this impact is complex. Restoring sight for even one child is a worthy goal in and of itself (if you've ever seen the video of a young girl running jubilantly around exclaiming, "I can see in the dark! I can see in the dark!" then you know what I mean)1 but curing childhood blindness doesn't just help the blind. Preventing blindness early on impacts society as well. We're a visual society: Everything we do from watching Netflix to reading this article in the Knight Templar - overemphasizes sight as a primary means of accessing information. As a result, it's no surprise that 35% of blind students drop out of high school. More than half of blind people are unemployed (55%) and those that find work are frequently chronically underemployed: The average salary of a blind person is under

¹ You can watch the video here https://vimeo. com/591006151?embedded=true&source=vid eo title&owner=63966369



Dr. Tom Lee, a member of the Scientific Advisory Committee for the Knights Templar Eye Foundation, is busy curing childhood blindness with his team at the Vision Center, Children's Hospital Los Angeles.

\$22,000. As a result, Dr. Lee estimates a lifetime cost to society of between \$800,000 and \$1 million for each blind person, realized in lost earnings, taxes, and the opportunity cost of needed care (often a family member takes time to provide care for blind relatives, for example). When you consider that 85% of childhood blindness is preventable, the impact of Dr. Lee's work comes into focus.

There are many types of disease and congenital problems that contribute to childhood blindness. Dr. Lee and his team have dedicated their careers – each initiated by KTEF starter grants over the decades – to solving several of them.

One project of Dr. Lee's team at Children's Hospital in Los Angeles substitutes genes in retinas of children having rare mutations that create blindness. A few years ago, the author of this column experienced firsthand the results of this work – a friend and Sir Knight, Darren Klinefelter's, daughter was born with a rare mutation. Her vision was 20/2,500, and declining. She was born legally blind, able to distinguish only shapes and shadows. She was set to become completely blind as a teenager. However, after this treatment at Children's Hospital, Livie now tends goal for her soccer team, BC United. She has a blue belt in karate. It's an incredible thing to witness – a miracle.

"I couldn't play outside after dusk," she told a group at the Foundation for Fighting Blindness in July. "After my surgery I started seeing butterflies and birds...I am now at a fifth-grade reading level, where I should be. I now have 20/60 vision and am a member of a competitive soccer team."

Four years ago, the procedure involved positioning engineered viruses to insert genetic sequences into the retina in vivo and essentially reprogram the patient's retinal cells. Cellular division thereafter repaired the mutation, and the retinas were restored. Even four years ago, this was cutting edge. But things have been changing fast. Now a whole new field is opening up: using white blood cells from a patient's blood, Dr. Lee's team is now able to grow duplicate retinas in vitro and then, through a biochemical process, tailor an individualized enzyme for transcription in the patient's eyes that will substitute the single mis-sequenced base in the gene that creates the mutation. This is known as "ocular disease focused exome sequencing." It replaces a single molecule in the genetic code rather than a whole gene.

By growing duplicate retinas in vitro, the procedure is testable over shorter timeframes to tweak the medicine for a specific patient. Then, when statistically maximized, it can be used to optimal effect.



E Olivia "Livie" Klinefelter, (left) sharing her story with the Foundation for Fighting Blindness and (right) tending goal for her soccer team, BC United.

The era of bespoke medicine has begun. And this procedure does not require embryonic stem cells - simple white blood cells are harvested from a standard blood sample. These cells are placed in a sort of cytoplasmic soup wherein, stimulated with the right biochemistry, protein synthesis assembles a genetic replica of the patient's retina. Once grown over a period of a few weeks, the base editing can be initiated by engineered enzymes capable of resequencing the missense strand of DNA. Then, when the DNA is transcribed by mRNA, the base sequences are corrected, and the aberrant protein structures are avoided. A healthy retina results.

So far, Children's Hospital Los Angeles has 227 children with genetic ocular disorders; of these, 114 have had their mutations already identified. Customized treatment is the next step. In the future, this type of procedure may individualize medicine in astounding ways. Imagine bespoke medicine that can cure cancer, Alzheimer's, Parkinson's, really any cellular deformity corrected by restoring missense DNA in the body. It's remarkable. And it's progressing fast.

At the annual meeting of the KTEF in August this year, your Board voted to continue funding this exciting research in predictive medicine. It's all possible because of your donations.



100% & 200% Life Sponsorships

342 COMMANDERIES AT 100%

The Officers and Trustees of the Knights Templar Eye Foundation wish to thank all Grand Commanderies that have become either 100% or 200% Life Sponsors within their jurisdiction and to those Grand Commanderies that are actively working towards the 100% goal.

Grand Commanderies at 100%

- 2023 NORTH DAKOTA & IDAHO
- 2022 MARYLAND & UTAH
- 2021 ILLINOIS
- 2021 IOWA & CONNECTICUT
- 2020 OHIO & TEXAS
- 2017 VIRGINIA & GEORGIA
- 2015 DISTRICT OF COLUMBIA
- 2015 WYOMING
- 2014 TENNESSEE & MONTANA
- 1996 SOUTH CAROLINA & OREGON
- 1995 ALABAMA
- 1994 NEW HAMPSHIRE

Grand Commanderies at 200%

2020 – TEXAS & OHIO





AMERICAN ACADEMY OF OPHTHALMOLOGY* Protecting Sight. Empowering Lives.

Knights Templar Eye Foundation, Inc.

Pediatric Ophthalmology Virtual Reality (VR) Simulation Program



The KTEF Pediatric Ophthalmology VR Simulation Program would be a first-of-its-kind educational initiative, offering free, open, cutting-edge simulation training to ophthalmologists worldwide through the use of VR headsets, other hardware, and web browsers widely available to consumers.

The VR program will provide residents, trainees, and practicing ophthalmologists with a simulated and safe learning environment that targets our youngest patients and diseases critical to pediatric eye care, and pushes beyond the boundaries of two-dimensional spatial learning.

Through the sponsored program from the Knights Templar Eye Foundation of \$5 Million over 10 years, the Academy plans to build both a virtual ecosystem and the first simulated ophthalmic patient encounters designed specifically for children's eye care, including but not limited to retinopathy of prematurity (ROP) and strabismus surgery.

The platform will be robust enough to support these first groundbreaking simulators and eventually patient encounters that span the spectrum of ophthalmology. The platform will benefit trainees across the globe, providing an individualized learning path for students on their own time. By first practicing skills in a virtual environment, residents and fellows will be better prepared to manage childhood eye diseases, reducing the risk of complications in patients and accelerating their competency from classroom to the clinic and operating room.

Why is VR simulation needed in pediatric ophthalmology education?

In the medical simulation field, studies show that students gain more knowledge, retain that knowledge, and apply it more quickly and competently with VR than two-dimensional web-based or traditional print education. Virtual reality has been used extensively in surgical training programs and is increasingly being used in healthcare education and to provide objective clinical assessments of resident core competencies. Studies of dozens of randomized controlled trials during the past 10 years have also found that high-fidelity simulation (like VR) is more effective than low-fidelity simulation (such as web-based activities) for teaching clinical skills.

By using a program that simulates clinical patient encounters in lieu of a young, vulnerable patient, and having the unique ability to confront a wide variety of childhood eye diseases— some rarely seen in clinic—residents and fellows will advance their knowledge and skills without risk to the patient.

Retinopathy of prematurity remains one of the most heartbreaking eye diseases in infants an infant who survives the challenges of prematurity only to be potentially blind or visually impaired. As smaller and smaller premature infants survive, the percentage with ROP increases and reaches epidemic proportions in some parts of the world. And this is only one of the ophthalmic diseases that specifically impacts infants and children.

This program would initially focus on ophthalmology resident pediatric ophthalmologists in training, providing a powerful new tool for students and lifelong learners who need to understand how to diagnose eye disease in children and treat them with care and competently.

How are simulators used today, and how do we anticipate these simulations could change the way patient care is provided?

Learning how to approach pediatric patients, understanding how various conditions present, and mastering the skills of various examination techniques can be achieved only by practice, repetition, and feedback. Usually this is achieved by seeing many patients with similar conditions, shadowing another more senior physician, and mentorship.

Simulators allow ophthalmologists to observe the infinite variation of conditions, such as eye misalignment and refractive error, while alleviating the need to see conditions in a real patient. In pediatric patients, who are often challenging enough to examine and treat for many clinicians, simulation is a fundamental educational paradigm.

Simulators also allow communities of learners and faculty to engage together remotely, sharing and teaching in real-time through the same system. Sometimes it takes months or even years to see patients with various conditions—some childhood eye disorders are rare and unlikely to present during an ophthalmology residency. Video recordings of patients or photographic representations of eye disease can be educational, but they still cannot substitute for a patient's response to an examination, or the decision-making and dexterity needed when performing surgical maneuvers.



AMERICAN ACADEMY OF OPHTHALMOLOGY® Protecting Sight. Empowering Lives.

Largest Grant in the History of the American Academy of Ophthalmology Makes Virtual Reality a Reality

by Ben Williams

t the 2022 annual meeting of the American Academy of Ophthalmology (AAO), held in Chicago, Chief Operating Officer, Dr. Stephen D. McLeod, announced how education in ophthalmology is about to change.

A new tool is in development, a tool designed to assist surgeons hone skills in a harm-free, instructive, yet experiential environment. This is state of the art, the first of its kind.

Any surgery incurs risk. Cutting into tissue to access beneath the surface causes harm – at the very least, from scar tissue forming after convalescence, let alone post-operative infection and other, more serious complications. These issues are yet compounded in the eye.

Think about it. The eye is small – on average less than 25 mm in diameter. The eye doesn't grow; its diameter was 25 mm when you were born. It's hard to access – the ocular cavity requires an anterior entry through a limited approach. Precise and expert hands are imperative. Instruments must be extended through the ocular orbit to touch a distal surface; thence wielded in constraint of a proximal opening. Movement effectuated along any extent creates an exaggerated distal impression. This is tricky. And the retina is packed with specialized cells. There's no room for error. The smallest mistake can cause blindness. Even the sharpest implement must seem blunt in the eye.

As a result, most eye surgeons develop skills over years of mentorship. They shadow more practiced hands and learn how to adapt in real time to new discoveries that can arise during surgery. They learn the techniques that minimize damage through a series of trials, like a relay race ran over decades.

Now, Dr. McLeod explained, a new way to learn may assist to speed up this process, getting doctors to patients sooner, and prepared like never before.

"We are committed to innovation in education," Dr. McLeod said, "and this is what was behind an ambitious project to introduce a new technology platform through virtual reality. Now, our goal is to build the first of "Our goal is to build the first of its kind virtual platform for ophthalmologic education." – Dr. Stephen D. McLeod, CEO AAO



its kind virtual platform for ophthalmologic education, and this is meant to encompass anatomy, clinical concepts, simulated patient encounters, and even simulated surgery within a virtual operating room environment."

Thanks to a grant from the Knights Templar Eye Foundation (and your donations, Sir Knights), AAO will build the first virtual platform for ophthalmologic education, ever. This is an immersive, 3D environment where medical students and doctors can work in simulation to diagnose conditions interior to the eye, interact with child patients, and practice real word scenarios in a virtual space. Wearing headsets, holding networked representations of equipment and instruments, they will conduct surgery in the air.

At the AAO conference, Dr. McLeod thanked the KTEF for its support. Applause erupted from the audience, more than 16,000 medical attendees. Whistles blew through the auditorium. You may not believe it, but at the AAO, Knights Templar are like rock stars.

The KTEF Board voted to fund the project in August, committing \$5 million over a decade to prototype the platform. This is directed to pediatric ophthalmology, but the technology will engender proofs of concept that will surely spill over to other disciplines. Once up and running, the platform will be accessible over the AAO's Ophthalmic News & Education (ONE) network, a global platform accessible online to share cutting-edge expertise worldwide.

During the conference, the AAO recognized KTEF as a Platinum Level Visionary Society member. With this donation, the KTEF is now the largest contributor in AAO's history.

Sir Knight David Goodwin, Past Grand Master and Past President of the KTEF, and Sir Knight Robert Bigley, Office Administrator, were present to receive a certificate on behalf of the Foundation.

Knights Templar Eye Foundation ARVO TRAVEL GRANTS - 2023

The Association for Research in Vision and Ophthalmology (ARVO) has awarded 95 travel grants this year to help student/trainee members attend the 2023 annual meeting in New Orleans, Louisiana, thanks to a grant to the ARVO Foundation for Eye Research from the Knights Templar Eye Foundation, Inc. (KTEF)

These funds from the KTEF represent 23% of the total travel grants awarded by ARVO and the ARVO Foundation annually. In total, 424 travel grants were awarded in 2023.

As the KTEF has grown since its 1955 inception, we have expanded the number and size of our grants, and we have commenced new initiatives in ophthalmology research and education. Our research grants are targeted to new research which are those in the early stages of their careers.

After years of funding and observing the ARVO program we dramatically increased our funding over the years. We believe this is an ideal expansion of our funding concept. By stretching out a helping hand to those just starting their careers, we hope to encourage and expedite successful careers.

For these PhD and MD students, travel grants can make all the difference in whether they can attend and present their research.



Representing the Knights Templar Eye Foundation, Inc. at this year's ARVO Annual meeting pictured above with the travel grant recipients was David J. Kussman, President and Trustee, Robert W. Bigley, Assistant Secretary and Marci L. Martinez, Director of Operations KTEF Office

Ashwath Jayagopal, Ph.D.

Section Head, Ophthalmology Division, Roche Pharmaceuticals AG



The Importance of KTEF funding

I recall very fondly the year I received a Knights Templar Eye Foundation grant, as that award enabled me to dedicate my career toward the prevention and treatment of childhood blindness. As a biomedical engineer, my career goal has always been to develop solutions for treating patients. Historically, biomedical engineers have made contributions to medicine that we see every day, including cardiac pacemakers, prosthetics, MRIs, and robotic surgery. After obtaining my undergraduate degree from Vanderbilt University in this field in 2003, I wanted to sharpen my engineering skills with a Ph.D. so I could hopefully make a mark of my own, to develop the next big thing in medicine.

In graduate school, my mentor was John Penn, Ph.D.**, who himself was once a Knights Templar Eye Foundation Awardee when he began his career. He wanted me to apply my engineering skills to a difficult problem in ophthalmology: drug delivery to the eye. When drugs are delivered to the eye, a needle is inserted and the injected drug is exposed to the entire eye. Therefore, both diseased and healthy tissues receive the drug. This is particularly a problem for treating a major cause of childhood blindness, called Retinopathy of Prematurity (ROP). In ROP in newborns, who at this stage are still developing their eyes' blood supplies, some of the vessels that develop are abnormal, and if this abnormal vessel growth is not corrected, some patients can experience irreversible vision loss. However, in the newborn eye, many blood vessels, which are growing normally, can be adversely affected if any drugs are injected, since the drugs are designed to combat blood vessel growth and cannot distinguish between healthy vessels and abnormal, diseased ones.

To address this problem, Dr. Penn wanted me to engineer the surface coating of drugs with polymers, in order to make the drugs "smarter," such that the drug could only bind to abnormal vessels and correct them, while leaving healthy blood vessels alone. I proposed an engineering strategy for achieving this goal, and Dr. Penn helped me land a faculty position at the Vanderbilt Eve Institute and gave me a laboratory next to his in order to test my drug delivery strategy. He suggested that, like him, I ask the Knights Templar Eye Foundation to obtain financial assistance for developing the ROP treatment strategy so that I could prove it works. The Sir Knights and their families came through with a generous grant which enabled me to prove that targeted drug delivery can be achieved in ROP. Seven years later, I am now a head of R&D for a major drug company, Roche Pharmaceuticals in Switzerland, and it hired me to further develop my drug delivery strategy in order to make smarter drugs for diseases like ROP. Thanks to the KTEF, my dream of developing a new therapy to stop childhood blindness from ROP is a very tangible reality. I will never forget the pivotal role that the Foundation played in my career development, and I am excited to make a substantial return on its investment in the form of new treatments that will improve clinical outcomes for children facing vision loss.

** John S. Penn, Ph.D. as referenced above is currently Vice Chair of the Department of Ophthalmology and Visual Sciences at Vanderbilt University and Chair of the Knights Templar Eye Foundation Scientific Advisory Committee.

John S. Penn, Ph.D.

Vice Chair of the Department of Ophthalmology and Visual Sciences at Vanderbilt

In this article Dr. Penn outlines what effect KTEF funding has had on the development of his career.



In 1986 I was an assistant professor of ophthalmology at the Cullen Eye Institute at Baylor College of Medicine, and I was just embarking on my research career. I was interested in a particularly tragic form of blindness known as retinopathy of prematurity or ROP. This condition is tragic because it blinds premature infants at the very onset of life, before they have an opportunity to appreciate the wonder of their visual surroundings. At the time we didn't know much about how ROP developed in infants or how it progressed to its blinding form. I applied to the Knights Templar Eye Foundation for two years of financial support, and I used that support to develop an animal model of the ROP condition so its pathogenesis could be investigated. Two years later, when my KTEF funding ended, I submitted an application to the National Eye Institute of NIH, relying on the model I'd developed with KTEF support.

In my NEI application, I proposed experiments to better understand the onset and progression of the ROP condition. I was fortunate enough to receive NEI funding for that project, and I'm proud to say that grant has been renewed multiple times and is now in its 28th year of consecutive funding. That simply would not have happened if not for the Knights Templar grant. Our findings, first in Houston, then in Little Rock at the University of Arkansas for Medical Sciences and finally in Nashville at Vanderbilt University where I've been for the last 15 years, and those of other labs during this nearly three-decade period, have altered the way in which premature infants are cared for and the way in which ROP is treated. And I'm proud of that legacy and appreciative of the pivotal role that the KTEF played in it.

The primary pathologic feature of ROP is abnormal capillary growth in the retina of the eye. The ROP model I developed proved to be applicable to abnormal capillary growth in a wide variety of non-ocular tissues and diseases. So, the model became a valuable tool for use beyond the realm of eye disease...for studying these other conditions and for testing pharmacotherapies to address them. Over the last three decades, we've used the model to conduct drug efficacy trials in partnership with the pharmaceutical industry, and this activity has contributed to the development of a number of drugs that are on the market today.

Thus, KTEF funding had a clear and direct impact upon my early professional development and on the success of my research program. Also, it led to findings that had a significant impact on patient care in a particularly vulnerable population, tiny infants. I believe that my experience can serve as an example of what the KTEF can do for young vision scientists throughout the country. I know that's the case, because KTEF funding has catapulted the careers of four of my trainees, each of whom have gone on to make their own mark in vision science.

Thomas C. Lee, M.D.

Director, Vision Center Children's Hospital Los Angeles Member of the Knights Templar Scientific Advisory Committee



When I think of the impact the Knights Templar Eye Foundation has had on my career, I am reminded of my high school motto, ("Finis origine pendet") which is Latin for "The end depends upon the beginning." Early events can have a profound impact on the ultimate direction we take. In my case, receiving a Knights Templar Eye Foundation grant was one such event.

Growing up in Minnesota, I was sure I would become either a farmer or an astronaut. Little did I know what the future would have in store for me. My education took me out of Minnesota to Johns Hopkins in Baltimore for college, then further north to New York City where I went to medical school at Cornell and then finally up to Boston where

I completed a retina fellowship at Harvard. During that journey, I knew that to create a better future, we needed to discover new treatments that would help us in our fight against childhood blindness. In my case, I focused on a hereditary cancer, retinoblastoma, which occurred in the eyes of newborn babies. In 1998, I was awarded a Knights Templar Eye Foundation grant to study the fundamental aspects of this blinding cancer. Through this work I realized that there was much more we could do to protect childhood sight. Since then, I have devoted my life to this cause, and now as Director of the Vision Center at Children's Hospital Los Angeles, I oversee seven doctors who are all equally dedicated to eradicating childhood blindness.

This path I took all started with a simple grant application 14 years ago to the Knights Templar Eye Foundation, and I am very grateful for the generosity of all of the members and their families for supporting doctors and scientists like myself. Our motto at the Vision Center is that every child should be able to see a sunset. Through the support from the Knights Templar Eye Foundation, we are now closer to making that a reality. Thomas C. Lee, M.D.

Knights Templar Eye Foundation, Inc.

A Predictive Medicine Approach to Childhood Blindness

David Cobrinik, MD, Ph.D., Associate Professor of Ophthalmology and Biochemistry & Molecular Medicine, The USC Roski Eye Institute and Norris Comprehensive Cancer Center, Division of Ophthalmology, Children's Hospital Los Angeles and a member of the Knights Templar Eye Foundation Scientific Advisory Committee (KTEF).

As indicated I am a member of the KTEF Scientific Advisory Committee for the past five years and a member of a team of childhood blindness researchers at Children's Hospital Los Angeles (CHLA). However, I was not always a vision researcher. In college, my research focused on genes that cause tumors in plants. This got me interested in understanding how genes cause human diseases, and I continued studying cancer because that was the first area to which I was exposed. After graduate school at Case Western Reserve University, I took a postdoctoral position in an MIT laboratory that was studying a childhood eye cancer called retinoblastoma. They and others had been in a race to clone the gene that causes retinoblastoma, and by the time I arrived the challenge had turned towards understanding how this gene causes the eye cancer in children. Continuing as a faculty member at Columbia University, I realized that we had to understand the retinal origin of retinoblastoma in order to develop preventive strategies. Around this time I met Dr. Tom Lee, who passionately shared this interest and recruited me to pursue this at Cornell Medical School. As a pediatric ophthalmologist, Tom also enlisted me in efforts to study childhood blindness more broadly. He later recruited me to join the Vision Center at CHLA and the KTEF scientific board. This increased my understanding and appreciation of important childhood blinding conditions.

Of late, these experiences have enabled me to participate in the CHLA team that aims to model inherited retinal dystrophies (the main genetic cause of childhood blindness) and curative genetic approaches. (See below picture for team member details.) The team seeks to develop a predictive medicine approach that was initiated by Dr. Lee, in which a blinding disease can be modeled and a therapy developed in the interval between the first detection of the condition and the irreversible retinal damage. Unfortunately, there is no one-size-fits-all cure, so we aim to tailor approaches to the unique blinding mutations in each child. I am privileged to work with the CHLA team and the Knights Templar Eye Foundation in this endeavor - to save the vision of every at-risk child, one child at a time. Time is short and there is much to do.

David Cobrinik



CHLA Predictive Medicine Team members from left: David Cobrinik MD, Ph.D.; Jennifer Aparicio Ph.D.; Aaron Nagiel MD, Ph.D., and team originator Tom Lee MD, Additional members Jesse Berry MD and Paula Cannon Ph.D. (not shown).

Bibiana Jin Reiser, M.D., M.S.

Associate Professor of Ophthalmology at USC Roski Eye Institute Director of Cornea and Glaucoma Services at Children's Hospital Los Angeles



The Knights Templar Eye Foundation, Inc. grant was a game changer for me.

Dr. Bibiana Jin Reiser, an Associate Professor of Ophthalmology at USC Roski Eye Institute and Director of Cornea and Glaucoma Services at Children's Hospital Los Angeles, and is a former KTEF grant recipient.

As I was finishing up my last training year on my way to becoming a cornea and refractive surgeon for adults, my mentor suggested that I do a year in pediatrics. In order to be the best, he said that I should be able to work with babies and children. He called it the "final frontier", where only the few and the brave would dare venture forth. After hearing the "to be the best"

comment, I was all in. I jumped in, head first, and never looked back. This extraordinary year was only made possible with financial support of the KTEF, and today I serve as the Director of the Cornea and Glaucoma services at the Vision Center at Children's Hospital of Los Angeles, one of the busiest in the country specializing in critical eye care for children.

Growing up a daughter of immigrants, I wanted to dream big in America, and my dream was to be a doctor. My mother, a nurse, strongly discouraged it. She felt that work as a doctor would not let me be a mother to her future multiple grandchildren. Ever-stubborn and driven, I wanted to prove her wrong. I believed that I could do it all, and I have. Today, I have two children, one in college and the other in junior high school. And as my children grow older, I have many others, my patients and their parents, for whom I am a caregiver. What a privilege and honor it is to be part of their lives, shepherding care, saving a child's vision.

In these 10 years since my year supported by the KTEF educational grant, I have built one of the largest anterior segment practices in the country that serves not only families in Southern California but families across the globe. Today, we are developing techniques and innovations resulting in better clinical outcomes and decreased complications in very rare, blinding eye diseases, such as congenital cataracts, Peter's anomaly, and glaucoma. So, since progress cannot happen in a vacuum, we present our work internationally so others can benefit from our experience.

The fight that we fight to preserve a child's vision is not always rewarded by easy success. Sometimes, keeping and not losing vision is a hard-fought victory. Because this is the struggle pediatric eye specialist's face, it is not always the path that is chosen by many. The financial support of the KTEF grant allowed me the breathing room to give this challenging area a hard, close look. Past my gaze, staring back at me, were the eyes of a child. Behind this child stood his parents and, behind them, the will and support of many others. This includes the many who will never be in the exam or operating room but those who are tirelessly fundraising for this noble cause, the fight to prevent childhood blindness.

Thank you for your support, my work today would not have been possible without it.

Jesse Berry, M.D.

Associate Professor of Ophthalmology and Associate Director of Ocular Oncology at USC Roski Eye Institute at Children's Hospital Los Angeles, is a former KTEF grant recipient.



Knights Templar Eye Foundation funding is sky-rocketing careers and creating significant advances for children with ocular cancer

In addition to a busy clinical practice treating ocular tumors in adults and children, she trains residents and fellows in ophthalmology and ocular oncology, and leads an exciting research team in developing the first ever liquid biopsy for retinoblastoma from the aqueous humor – which is the clear fluid in front of the eye. The team calls this the 'surrogate tumor biopsy'. With funding from the Knights Templar Eye Foundation Career Starter Grant, Berry et.al. extracted and sequenced DNA from the retinoblastoma tumor, in the aqueous humor. Her initial work was published in JAMA Ophthalmology on October 12th

(which also happened to be Dr. Berry's birthday!) with a commentary from another prominent ocular oncologist, Bill Harbour, MD. The media response to the manuscript has been immense. To date the paper has been viewed over 500 times, released by four news outlets, and tweeted 75 times. The research was presented at the American Academy of Ophthalmology in November 2017 in New Orleans where it was awarded best paper and featured on the One Network of the American Academy of ophthalmology as well as the Knights Templar Eye Foundation Pediatric Ophthalmology Education Center.

To say that the Knights Templar Grant has started my career is an understatement; it skyrocketed it. On March 30th I heard the official news that I was selected. I was quite literally over the moon and immediately we started sequencing our banked samples of aqueous humor with stunning results: tumor-derived DNA was present – but more exciting – certain chromosomal changes correlated with aggressive tumors that responded poorly to therapy and these changes were absent in eyes where the tumors that did well. This suggests that genomic evaluation of the aqueous could be used to predict the ability to save the eye and maybe in the future help direct more intensive therapy to the more aggressive tumors.

The Knights Templar grant has been revolutionary for me and my career – but more importantly, the research it supports will dramatically change the way we care for the children who suffer from this blinding – and deadly --- ocular cancer. Imagine a world where a tiny sample of aqueous from an eye in a child with retinoblastoma can be used for diagnosis, for prognosis of treatment response and maybe even, to provide a means for the first ever attempts at personalized, directed therapy for retinoblastoma. With the support of KTEF, that world is now within reach. Thank you for giving me the chance to jumpstart my career – thank you even more for helping me to change the paradigm of retinoblastoma management and to contribute to a new future of personalized, predictive medicine for my patients. I could not be more grateful for this opportunity.

Irina De la Huerta, M.D., Ph.D.

Assistant Professor Department of Ophthalmology and Visual Sciences, Vanderbilt University School of Medicine and was awarded the Knights Templar Eye Foundation 2019 Career Starter grant and 2020 Renewal grant



The Impact of KTEF Funding

I am a practicing vitreoretinal surgeon with subspecialty training in pediatric retinal disorders. I have always wanted to be both a physician and a scientist, and to run a laboratory dedicated to developing solutions for treating children who suffer from diseases thought of as incurable. My interest in the pediatric retina grew from learning about retinal development during my Ph.D. in neuroscience. This experience inspired me to pursue clinical training in ophthalmology, and to start developing research ideas focusing on the role that retinal neurons play in pediatric disorders of the retinal vasculature. Throughout my ophthalmology residency, I continued to participate in laboratory research in retinal diseases. Following residency. I pursued

fellowship training in vitreoretinal surgery with a special focus on pediatric retinal conditions. Having acquired both the laboratory and the clinical training necessary to develop new therapies for retinal diseases in children, I joined the faculty in the Department of Ophthalmology at Vanderbilt University.

When I started in my position at Vanderbilt, I was ready to begin building my research program. Yet I quickly learned that most foundations as well as the National Institutes of Health require a substantial amount of preliminary data in order to fund grant applications. This is a significant obstacle for many early career scientists, and the difficulties are further compounded for those of us who at the same time are building a medical and a surgical practice. John Penn, who is one of my mentors and who was awarded research funding from the Knights Templar Eye Foundation early in his career, understood well my predicament. He advised me to apply for a KTEF Career Starter Grant. The support I received from the Knights Templar Eye Foundation allowed me to form a laboratory team and to start putting my scientific ideas in action. I will never forget the role that the Foundation's grant played in getting my research program up and running.

Funding for research in pediatric eye disorders is extremely important and critically needed. The Knights Templar Eye Foundation is one of the few organizations that provide support for pediatric ophthalmology research. I have learned from my mentors who are successful and respected principal investigators about the difficult times they faced early in their careers due to the uncertainty of funding. The grants awarded by the Foundation are invaluable in helping early career scientists and clinician scientists like me to develop laboratories dedicated to vision research.

David K. Wallace, M.D., M.Ph.

Chair, Department of Ophthalmology, Marilyn K. Glick Professor of Ophthalmology, Indiana University School of Medicine.



Doctor Wallace is also a Member of The Knights Templar Eye Foundation Scientific Advisory Committee, and was awarded the Knights Templar Eye Foundation 1997 Career Starter grant.

It's been a pleasure for me to join the Knights Templar Scientific Advisory Board in 2021. When asked to serve in this role, I accepted without hesitation, because I recall fondly how the Knights Templar Eye Foundation helped launch my clinical research career back in 1997. At that time, I was an Assistant Professor of Ophthalmology and Pediatrics at the University of North Carolina (UNC). We had a small group of investigators interested in studying retinopathy of prematurity (ROP), but we did not have any funding to support this

work. Retinopathy of prematurity is one of the most common causes of blindness in children worldwide. With the funds from the Knights Templar Eye Foundation, we were able to collect video images of the retina of infants with ROP. We completed studies that helped us understand important risk factors for severe ROP, such as poor rate of weight gain early in life, early blood vessel changes ("pre-plus disease"), and small tufts of tissue above the retina ("popcorn").

In 2004, I had the opportunity to be a member of the committee that revised the International Classification of ROP, and to learn from some of the "giants" in our field. A few years later, I participated as an investigator, and then as an Executive Committee member, in the Early Treatment for ROP randomized trial. These experiences piqued my interest in contributing to the development of better treatments for ROP. Later I received an NIH K23 Career Development Award in Patient-Oriented Research, and I obtained a Master's in Public Health in Epidemiology, which provided a deeper understanding of research design and statistics. In 2014, I assumed the role of network chair for the Pediatric Eye Disease Investigator Group (PEDIG), an NIH-funded national clinical trials network.

ROP care has rapidly evolved. Until 5-10 years ago, most infants with severe ROP were treated using laser. Now many infants are treated with injections of drugs that reverse the sight-threatening effects of severe ROP. However, much remains unknown about which drugs are best and what dose we should use. Our PEDIG group recently completed a multi-center study that helped to establish that a much lower dose can be used, which is potentially safer for infants and better for their developing vision. Our research group is now planning 2 simultaneous multi-center randomized clinical trials to help determine the best care for premature infants with severe ROP; one will compare laser to a low-dose injection, and the other will compare 2 different doses of injections.

When I reflect back on my early career, it could have gone in any of several different directions – private practice, industry, or academic medicine with a focus on education, administration, or research. The grant I received from the Knights Templar Eye Foundation in 1997 gave our group the support we needed to study ROP, and it allowed me to begin to develop skills as a clinical researcher. Subsequently, I chose to devote a large part of my career to helping find better treatments for ROP and other pediatric eye diseases.

Bela Anand-Apte, MBBS, Ph.D.

Importance of Funding



Chair, Department of Ophthalmic Research, The Llura and Gordon Gund Endowed Chair in Ophthalmology Research; Professor, Cleveland Clinic Lerner College of Medicine-CWRU-Dept. of Ophthalmology, Cole Eye Institute, Cleveland Clinic Foundation. Dr. Anand-Apte serves as Chair of the Knights Templar Eye Foundation Scientific Advisory Committee.

A blind child is more likely to live in socioeconomic deprivation. A blind child is more likely to be developmentally delayed. A blind child is more likely to be hospitalized frequently and die during childhood.

Approximately 14 million children worldwide are legally blind, although this number is likely an underestimate. Knights Templar Eye Foundation is the only entity that provides funding for research specifically addressing childhood blindness.

There is a particular urgency in finding cures for pediatric vision loss that is different from adult blinding diseases. Children born blind or who become blind early in childhood face a lifetime of blindness. The associated emotional, economic and social costs to the child, family and society are immense. Children's eyes are not just a smaller version of adult eyes-they are unique not just in their stage of development but also in their response to medical and surgical interventions. Children are born with an immature visual system, and for normal vision to develop, the brain must learn to process clear, focused images. Failure of normal vision maturation cannot be corrected in adults, suggesting that correcting these defects early is critical.

My research over the past 20 years has focused on understanding what makes blood vessels in the eye grow and leak abnormally to cause vision loss in a variety of diseases including retinopathy of prematurity-a condition leading to blindness in premature infants. As a Scientific Advisory Committee member since 2016 and as Chair since 2020, I am humbled and grateful for the opportunity to play a role in ensuring that the KTEF funding is awarded to projects that will have an impact on pediatric blinding disease. It is also critical to develop the careers of young scientists who share the passion and urgency in combating this debilitating condition. These young investigators are the future of research in this area and a beacon of hope for finding cures for pediatric blinding diseases.

Bela Anand-Apte, MBBS, Ph.D., MBA

Aaron Nagiel, MD, PhD

Assistant Professor of Ophthalmology - USC Roski Eye Institute, Director, Retina Service - Children's Hospital Los Angeles, California



Gene Therapy for Blinding Retinal Diseases

Six years ago, I celebrated the completion of fellowship training in retinal surgery, which capped 17 years of education since I graduated from high school. It felt like quite an accomplishment after seemingly endless study, test-taking, and clinical rotations. But looking ahead, I also faced the daunting prospect of laying the groundwork for what would come of my 30+ year career in academic ophthalmology. It felt like I had climbed to the top of the mountain—only realizing that what I had climbed were just the foothills of an even bigger mountain!

I knew that I wanted to specialize in pediatric retina, and I had been offered a position at Children's Hospital Los Angeles, affiliated with the USC Keck School of Medicine. But I also wanted to make a difference beyond patient care by performing cutting-edge research in retinal diseases through research. Thankfully I had received excellent training in laboratory research in my undergraduate years at Harvard and then in the MD/PhD program at Cornell and Rockefeller Universities in New York City. But I hadn't lifted a pipette in almost 7 years by that point. And I needed grant money to hire personnel and reagents to get my research program off the ground. That's where the generosity and vision of the Knights Templar Eye Foundation came to the rescue.

I crafted a research proposal to study how connections form between cells of the human retina by using adult stem cell technology to grow mini-retinas in the laboratory. The goal was to get cells of the retina to connect to one another after new treatments such as gene or cell therapy. KTEF funded a Career Starter Grant in my first year as Assistant Professor, allowing me to quickly gain momentum and then go on to receive significant funding from other organizations including the Baxter and Thome Foundations, the National Eye Institute, and Research to Prevent Blindness. None of these awards would have been possible without this "seed" funding from KTEF.

But the generosity and support of the KTEF did not end there, with subsequent funding of our Predictive Medicine program and divisional endowment support. These mechanisms have allowed us to capitalize on our success as a retinal gene therapy center—the only one in California—and begin to devise new treatment paradigms for rare retinal diseases affecting children. The idea is that we can identify clinic patients with incurable retinal degenerations, devise personalized gene editing treatments for them, and then test these treatments on their own retinal cells in the laboratory. Looking back at how far we've come since setting out on this path, I truly believe the Knights have provided—and continue to provide—the critical footing I need to march ahead as we devise new approaches to curing these blinding retinal diseases.

Aaron Nagiel, MD, PhD

Knights Templar Eye Foundation, Inc. Research Grant Recipients

2023 - 2024



Dr. Ashrifa Ali from the University of Texas at Austin was awarded a \$90,000 grant for *Identifying novel neuroprotective factors that increase RGC survival using zebrafish and human retinal organoid-derived RGCs.*

Approximately 500,000 children become blind every year. A common denominator in both pediatric glaucoma and many types of pediatric ocular traumas is the loss of retinal ganglion cells (RGCs). RGCs are the sole projection neurons of the retina and have complex functions because they process the light patterns that fall on the photoreceptors and send processed information to the optic centers in the brain. In addition, RGCs in the human retina have no regenerative ability. Therefore,

death of RGCs in children and adolescents because of pediatric glaucoma or ocular trauma can lead to irreversible loss of vision. While there has been substantial progress in identifying the

molecular and cellular events that lead to RGC death, there are still no FDA approved drugs to prevent death of RGCs or promote their survival.

Unlike mammalian RGCs, zebrafish RGCs show remarkable survival properties with no significant loss in number of RGCs after severe optic nerve injury. Dr. Ali will use this unique zebrafish system to identify novel protective pathways in RGCs that preserve them after damage and validate their neuroprotective potential in human RGCs. This work is significant in that protective pathways they discover can be leveraged to develop new therapies to preserve RGCs in children with pediatric glaucoma or who suffer ocular trauma. Dr. Ali's long-term goal is to start an independent research laboratory focused on RGC survival; factors identified here will be further investigated in her laboratory as potential gene therapies to maintain RGC health in children suffering from glaucoma.





Dr. Anil K. Chekuri from the Massachusetts Eye and Ear, Schepens Eye Research Institute, Boston, Massachusetts was awarded a \$90,000 grant for *Mechanism and therapeutic opportunity for Familial Dysautonomia associated optic neuropathy.*

Familial dysautonomia (FD) is a severe neurodegenerative disease caused by a mutation in the *ELP1* gene leading to a reduction of ELP1 protein in the central and peripheral nervous system. Although FD patients suffer from multiple severe neurological symptoms, progressive blindness

drastically reduces the quality of life and is a major concern of patients and their families.

Over the past years, we have worked to generate and characterize new FD mouse model that both recapitulates the optic neuropathy phenotype and the tissue-specific splice defect. In this proposal, Dr. Chekuri outlines a novel gene editing strategy to target *ELP1* splicing in the retina as a potential therapy for retinal degeneration in FD. Over the past years he has tested novel pharmacologic and genetic approaches to modulate *ELP1* splicing and showed the rescue of neuronal defects in a mouse model of FD. Since FD is a systemic disease it is likely that combination therapies will ultimately be necessary to ameliorate the disease phenotype.

In this proposal Dr. Chekuri will test a novel gene editing strategy specifically in the retina. Given the speed with which AAV directed gene therapy for retinal disease is moving into the clinic, he is confident that his novel gene editing strategy will open new avenues in the treatment of FD. The studies out lined in the proposal will not only address a critical unmet medical need in FD but will also allow him to uncover the precise mechanism by which retinal ganglion cells are selectively lost in FD. Successful completion of the stated aims will certainly have implications for treating FD.





Dr. Parisa Emami-Naeini from the University of California, Davis located in Sacramento was awarded a \$90,000 grant for her research entitled: *Non-Invasive and Quantitative Imaging Biomarkers for Pediatric Uveitis.*

Uveitis, an inflammation of the eye, is a major cause of visual impairment and blindness in children. Accurate and prompt

diagnosis, treatment, and frequent monitoring is necessary to prevent permanent damage and vision loss. Posterior inflammation (inflammation in the back of the eye) is the more common type of uveitis in children and is associated with worse visual outcomes, but diagnosis is often delayed due to lack of non-invasive, accessible imaging options for younger children. Currently, fluorescein angiography (FA) is the only imaging modality available for diagnosis of posterior inflammation, but it is invasive, lengthy, and difficult to perform particularly in children.

Optical coherence tomography (OCT) and OCT angiography (OCTA) are fast, non-invasive and can be performed in young children, however, it is currently unknown if they can be used to accurately diagnose and monitor uveitis in children. This project aims to generate quantitative and objective measures of disease activity based on OCT and OCTA findings for use in clinical practice and research. This will lead to improved screening, monitoring, and treatment of inflammation in children, resulting in better long-term vision outcomes and preventing vision loss.





Dr. Marta Grannonico from the University of Virginia School of Medicine, Charlottesville, Virginia was awarded a \$90,000 grant entitled: *Establishing In Vivo Biomarkers for Retinal Developmental Damage in Aniridia.*

Aniridia is a developmental eye disorder which occurs in 1 in 75,000 newborns with no gender predilection. Although a

complete or partial absence of the iris is the most obvious clinical feature of aniridia, visual defects are mainly caused by retinal damages, including foveal hypoplasia, optic nerve hypoplasia, and

progressive development of glaucoma. Timely initiation of treatment can prevent ongoing neural damage and preserve long-term vision. However, detecting the disease at its earliest stages and monitoring disease progression continue to be substantial clinical challenges. About 90% of aniridia cases are related to mutations in the PAX6 gene, which plays a critical role in the early development of the eyes and the brain. Pax6 small-eye mice have been used as a model for aniridia disease, since they share the same nonsense mutation found in most aniridia patients. Dr. Grannonico plans on establishing a sensitive and accurate biomarker for monitoring the developmental neural damage by



applying visible-light optical coherence tomography fibergraphy (vis-OCTF) technology in Pax6 small-eye mice, which mimic aniridia pediatric eye disease. By the end of this project, she will have new *in vivo* biomarkers for the developmental damage in the retina, which will profoundly impact broader pediatric ophthalmology. This work will represent the first vis-OCT application to pediatric diseases; and the findings of this research can be translated to human studies by using the same technology platform.



Dr. Rafal Holubowicz from the University of California, Irvine was awarded a \$90,000 grant for his research entitled: *Restoration of MFRP rd6 mutation using prime editor ribonucleoprotein delivery*.

S. Statute

Genetic mutations are a leading cause of vision loss in young people. Although scientists are working hard to understand why and how it happens, addressing early onset blindness with conventional drugs has been unsuccessful, and low-vision aids often remain the only option for those who will inevitably become blind. Gene therapy provides hope, as some forms of Leber congenital amaurosis (LCA)

are treatable by delivering a correct form of the damaged gene; however, only a fraction of the patients can benefit from this therapy, and the damaged gene remains in place along with the new copy. CRISPR-Cas technology, for which a Nobel prize was awarded in 2020, provides tools that have the potential to cure vision by converting mutated genes into their healthy versions.

Dr. Holubowicz has shown that base editing, a DNA-modifying tool, enables vision to be restored in a mouse model of LCA, and he is refining it for use in humans. However, many mutations remain out of reach of base editing. Prime editing, a next generation tool, writes new DNA, allowing for repair of extensive regions that may contain several mutations; thus, it is more versatile than base editing, which modifies only very localized regions of DNA. Therefore, prime editing could repair almost all known blinding



mutations. In this project, Dr. Holubowicz is working towards delivery of a prime editor as a purified protein-RNA complex to accomplish precise and efficient repair of a blindness-causing mutant gene. His approach will facilitate the development of therapies that would restore vision after single administration.



Dr. Ying Hsu from University of Iowa, Iowa City, Iowa was awarded a \$90,000 grant entitled: *Investigating the Immune Response in Gene Therapy Treatment for Juvenile X-linked Retinoschisis.*

833-3B

Juvenile X-linked retinoschisis is an eye disease that primarily affects

male children and causes them to lose vision. In this disease, the connected layers of cells in the eye responsible for forming vision are separated by abnormal, fluid-filled pockets. This is because the function of the RS1 gene is disrupted. This disease can potentially be treated by gene therapy, which involves the delivery of the RS1 gene into the eye using engineered viruses as carriers. However, sometimes, the injections can cause undesirable side effects due to the immune system. Dr. Hsu



is investigating the effect of the immune system after treatment in order to better the design of this therapy.





Dr. Archana Jalligampala from the University of Louisville, School of Medicine, Louisville, Kentucky was awarded a \$90,000 grant to study: *Therapeutic efficacy of a novel stereopure antisense oligonucleotide* (ASO) - Wave1, to treat P23H autosomal dominant retinitis pigmentosa.

Humans navigate the world primarily using vision. Imagine a parent learning that their child has a disorder that will lead to impaired vision and loss of mobility by early adulthood. Among, inherited retinal diseases, retinitis pigmentosa (RP) is the most frequent inherited form of childhood

blindness. In autosomal dominant RP (adRP), rods photoreceptors (rods) degenerate followed by cones, eventually leading to blindness. The most common adRP among North Americans results from a mutation in rhodopsin (RHO) resulting from a proline to histidine substitution at position 23 (P23H) in the protein. Because there is no treatment currently available to these patients, Dr. Jalligampala is evaluating therapeutic strategies to delay/arrest vision loss.

This builds on promising preliminary data that shows that an intravitreal injection of a P23H RHO-specific stereopure antisense oligonucleotide, Wave1 [25ug total], arrests rod decline/dysfunction in a preclinical large animal model of adRP, the TgP23H hRHO pig. This occurs because Wave1 binds to P23H RHO mRNA and eliminates translation of the mutant (P23H) rhodopsin protein. Dr. Jalligampala hopes to refine the Wave1 dose/response curve; define the temporal window of efficacy using the optimal dose and evaluate its safety in intravitreal injections. To do so, she will quantify and compare across treated and untreated conditions how many rods



and how much rod function is retained/recovered. The data will define key features of Wave1 administration, and issues relevant to its clinical use.





Dr. Raulas Krusnauskas from Massachusetts Eye and Ear, Ocular Genomics Institute, Harvard Medical School located in Boston, Massachusetts was awarded a \$90,000 grant for the research entitled: *Proof of concept for twin prime editing of RP1 mutations for inherited retinal degenerations.*

Vision relies on the efficient conversion of light entering the eye into electrical signals by specialized cells of the retina - photoreceptors. These electrical signals later travel to the

brain to be interpreted by the visual cortex. Described process is termed phototransduction and involves the sequential activation of a series of signaling proteins. Mutations that result in defective proteins are a leading cause of inherited retinal degenerations (IRDs). IRDs show multiple inheritance patterns and show either early or later onset. Some success for treatment of Leber congenital amaurosis was with AAV based therapy for RPE65. However, AAV packaging limitations precludes similar strategies for the majority of the IRD genes, like *RP1. RP1* gene encodes a protein that localizes at the axoneme of the photoreceptor outer segment, where it is required for appropriate orientation and stacking of outer segment disks to ensure normal vision. CRISPR technologies enable genome editing by inducing double strand breaks (DBS) in DNA and causing non-homologous end joining. Improvements in CRISPR led to site specific and DBS free genome editing in the form of base (BE) and prime (PE) editing. PE was further developed into twinPE. In contrast to PE, twinPE uses two epegRNAs, which enable editors to repair many different mutations within a genomic fragment, hence benefiting a larger number of IRD patients. Dr. Krusnauskas will use *RP1* gene as an example to evaluate the therapeutic potential of twinPE approach for treating IRDs.





Dr. Dominik Lewandowski from the University of California, Irvine School of Medicine was awarded a grant for \$90,000 for his research entitled: *Identifying new strategies for lowering ceramides in the retina as a potential approach in retinitis pigmentosa and juvenile macular degeneration treatment.*

Retinitis pigmentosa (RP) and juvenile Stargardt macular degeneration (STGD) are inherited retina diseases that affect children and young adults, lead to visual impairment and can cause legal blindness. There are no approved therapies for

these diseases. Even though pathophysiology differs between these conditions, some common mechanisms could be involved. Dr. Lewandowski's findings and existing literature suggest that elevated ceramide, a cell death lipid messenger, could be a universal mechanism of retina degeneration in RP and STGD. He hypothesizes that reducing elevated ceramides can be used as a universal treatment approach to increase photoreceptor survival and improve vision in mouse models of RP and STGD.

He aims to test the effectiveness of his recently discovered ceramide-lowering formulation, composed of desipramine and L-cycloserine (DC), that improved vision in AdipoR1 KO – a mouse model of RP. Dr. Lewandowski wants to verify if the same approach can be used as a universal strategy for treating other models of retina degeneration in RP and STGD. Importantly, since the FDA approved both drugs over 30 years ago, they can be used safely in humans, particularly in pediatric patients. Additionally, he would like to explore the possibility of lowering ceramide in the retina by stimulating the activity of its ceramide-degrading enzyme, AdipoR1, with two agonists – AdipoRon and ALY688.

He hopes to get fresh insight into the therapeutic approaches for RP and STGD by targeting three different nodes of ceramide metabolism - inhibiting two key enzymes generating ceramide and stimulating AdipoR1 ceramide-degrading activity to lower pathologically increased ceramides.



Dr. Sumanth Manohar from the University of Kentucky, Lexington, Kentucky was awarded a \$90,000 grant for the research entitled: *Understanding the function of CHD7 during retinal development and the ocular complications of CHARGE syndrome.*

CHARGE syndrome is a multi-syndromic disorder that is a significant cause of pediatric vision impairment. Mutations in the chromatin remodeling factor CHD7 are

the major cause of this disease. Although pathogenic variants of CHD7 are strongly associated with ocular complications, the pathogenetic mechanisms underlying vision loss are not thoroughly understood. Dr. Manohar's lab has been investigating the function of CHD7 during retinal development using *chd7* mutant zebrafish, which demonstrate similar phenotypes to those observed in individuals with CHARGE syndrome. He has observed that loss of CHD7 causes a reduction in the number of retinal cone photoreceptors as well as abnormal photoreceptor outer segments. Other studies have also shown a reduction in the number of ganglion cells in *chd7* morphant zebrafish embryos. These results suggest that CHD7 plays a critical role in retinal cell type differentiation, particularly of the ganglion and photoreceptor cells.

Dr. Manohar's goal is to determine how CHD7 functions to regulate cell type differentiation in the retina, by utilizing single cell transcriptomic and chromatin binding assays in the zebrafish model. Results of these experiments will provide critical information on how CHD7 regulates retinal development, which could lead to development of new therapeutic approaches for the vision impairment associated with CHARGE syndrome.







Dr. Isdin Oke from the Boston Children's Hospital, Harvard Medical School, Boston, Massachusetts was awarded a \$90,000 grant entitled: *Newborn Genomic Screening Strategies to Reduce Disparities in the Visual Outcomes of Retinoblastoma Survivors.*

Retinoblastoma is the most common type of eye cancer affecting children in the US, responsible for 1 in 10 cancers in

the first year of life. A delay in diagnosis of retinoblastoma can mean the difference between life and death, yet children with limited access to healthcare are much more likely to be diagnosed at an older age. When these children survive retinoblastoma, they are more likely than their wealthier peers to have poor vision or to have their eyes removed as a necessary part of the treatment. Newborn genetic screening is a promising approach that may help identify children at risk of developing retinoblastoma at an early age, but it is not known whether a program of universal newborn screening for retinoblastoma would improve function and survival. Dr. Oke is developing a mathematical model based on one full year of US births that will predict whether newborn screening could prevent visual impairment in children with retinoblastoma. The result would be earlier access to care even for the most disadvantaged children within and outside of the US.





Dr. Anh H. Pham from the Bascom Palmer Eye Institute, University of Miami School of Medicine, Miami, Florida was awarded a \$90,000 grant entitled: *Development of a Mitochondrial CRISPR Therapy for the Treatment of Mitochondrial Optic Neuropathy.*

Mitochondria are unique organelles that have genetic content and serve as the powerhouse of the cell. Mutations in mitochondrial DNA (mtDNA) have been associated with many neuromuscular

disorders and irreversible blindness in children for which there is no effective treatment or cure. Dr. Pham is adapting the novel gene editing technology known as CRISPR towards eliminating mutations in mtDNA. She is exploring two modalities for delivering

the necessary components of CRISPR into the mitochondria. Dr. Pham is investigating the efficacy of CRISPR for treating several cellular models of pediatric ophthalmic diseases, including Leber Hereditary Optic Neuropathy (LHON), Mitochondrial Encephalomyopathy, Lactic Acidosis, and Stroke-like episodes (MELAS), and Leigh syndrome with ophthalmoplegia. Successful demonstration of CRISPR for targeting mitochondrial DNA will open a new therapeutic avenue for these rare and incurable diseases.







Dr. Muhammad Ali Riaz from The Wilmer Eye Institute, Johns Hopkins University School of Medicine, Baltimore, Maryland was awarded an \$89,630 grant for the research entitled: *Examining the efficacy of human iPSC-derived corneal endothelial cells injection as an alternative to pediatric endothelial keratoplasty.*

Loss or decrease of vision can dramatically impact the quality of life and the effects are particularly devasting for pediatric patients with their

entire lives ahead of them. The cornea is the outermost tissue of the eye comprising five layers with endothelium as the innermost layer. When the function of the endothelium is compromised due to either trauma or disease, corneal edema (swelling) develops, and if left untreated, results in blindness.

In congenital endothelial disease patients, the endothelium layer and the underlying Descemet's membrane are severely affected. Currently, the only treatment for endothelial disease in children is transplantation surgery using postmortem cornea. Transplantation has been effective in restoring vision; however, in many cases, the immune system of the patient rejects the transplanted tissue, which importantly, is much more common in children with active immune responses. The graft rejection leaves children



worldwide vulnerable to congenital corneal endothelial dystrophies and the situation is further exacerbated by the global shortage of transplantable-grade tissue.

To address these issues, Dr. Riaz has proposed a novel, minimally invasive treatment that can preserve eyesight. As demonstrated by his laboratory, he has developed cells that can serve as an alternative to donor tissue in treating adult animals with corneal edema. Importantly, the procedure did not result in immune rejection for up to two years in adult animals. The strategy

includes treating corneal endothelial edema using differentiated cells in juvenile rabbits and monkeys. The knowledge gained from this project will bring us one step closer to preventing childhood blindness.





Dr. Emily R. Sechrest from West Virginia University located in Morgantown, West Virginia was awarded a grant for \$90,000 for the research entitled: *Disease mechanism of blue cone monochromacy and gene therapy approaches to extend the therapeutic window.*

The fovea in the human retina is comprised mainly of two types of cone photoreceptors – L- and M-cones – and is responsible for our high acuity, color, daytime vision. Blue cone monochromacy (BCM),

is an inherited visual disorder that occurs when these cones do not function properly due to mutations in the genes that encode their highly important light-absorbing opsin proteins (Land M- opsin). From birth, patients with BCM experience reduced visual acuity, extreme light sensitivity, infantile nystagmus (involuntary eye movement), and myopia (near-sightedness). Unfortunately, to date, no effective treatment is available for this condition. Dr. Sechrest has

observed that gene therapy can rescue visual function in cones when treated early, but is ineffective when administered at older ages in two mouse models of BCM. Investigating the molecular changes between young and aged cones will provide insight into why the therapeutic window is limited in BCM cones and broadly in other cone degenerative diseases. She plans to target a signaling pathway for the resident immune cell of the retina, in order to delay cone degeneration, with the goal of improving long-term rescue following gene therapy. Together, these studies will allow



for development of new strategies to extend the therapeutic window in order to treat patients with BCM at all ages (infant to adult), as well as therapy longevity for treatment of BCM.





Dr. Sahil Shah from the Stanford University School of Medicine, Palo Alto, California was awarded a \$90,000 grant for the research entitled: *Role of kinesin cargo and adapter specificity in retinal dystrophies.*

Visual information from the world is first detected by cells in the retina, a photosensitive layer in the back of the eye. It is then converted into electrical signals and transmitted through the optic nerve to the rest

of the brain by retinal ganglion cells. These cells have long extensions, and transport of molecules through the entirety of the cells to their connections in the brain is vital for survival. When this transport is disturbed, this crucial link is disrupted leading to blindness or vision loss. Although Dr. Shah knows the importance of this transport, and has identified some candidates for regenerative therapy, he does not yet have a good understanding of the exact cargoes being transported. By deciphering this network of cellular transport, he can target specific molecules to restore normal function and preserve vision in pediatric eye diseases.



Dr. Ruchi Sharma from the National Eye Institute, Bethesda, Maryland was awarded a \$90,000 grant to study: *Developing Foveal iPSC-RPE from Albinism Patients to Discover Foveal Hypoplasia Associated RPE Defects.*

Lack of pigmentation results in visual problems in albinism patients due to the improper development of the central part of the retina (the fovea) that is responsible for our day, color, and high acuity vision. Dr. Sharma aims to use induced pluripotent stem cells (iPSCs) derived from albinism patients and differentiate them into fovea-specific retinal pigment epithelium (RPE), a monolayer of cells that support the photosensitive cells called photoreceptors. She believes that the completion of this project will help to understand how the lack of pigmentation affects the foveal RPE cell phenotype in patients with foveal defects and if the supplementation of metabolites of the pigmentation pathway can rescue the proper foveal phenotype in iPSC-RPE derived from albinism patients.





Dr. Dhiraj Srivastava from the University of Iowa, Iowa City, Iowa was awarded a \$90,000 grant entitled: *Mechanisms of CRX and NRL mutations in childhood retina diseases.*

NRL and CRX are two transcription factors required for the proper development of the retina. Mutations in genes encoding for these transcription factors result in diseases like early childhood night blindness and

Leber congenital amaurosis 7, an early-onset childhood retinal dystrophy. The two transcription factors cooperate in the regulation of transcription. Dr. Srivastava is studying the molecular mechanism of cooperation between NRL and CRX by structural and biophysical methods. A molecular-level understanding of the function and regulation of NRL and CRX will help to design better therapeutic interventions for these genetic diseases.





Dr. Chi Sun from Washington University St. Louis, located in St. Louis, Missouri was awarded a \$90,000 grant for the research entitled: *Adjunct biomolecular treatments to enhance gene therapy efficacy for CRX-associated pediatric retinal diseases.*

The photoreceptors are the cells that convert incoming light into an electrical signal that can be recognized in the brain. Cone-rod

homeobox (CRX) controls the photoreceptor development and make photoreceptors acquire the light-sensing function. Mutations (i.e. defective changes in DNA) in the CRX gene cause permanent damage to photoreceptors, leading to early-age vision loss. Unfortunately, these mutations can be inherited from a parent or acquired during a person's lifetime. Treatment is unavailable at this moment. An important finding with mouse models indicates that human patients with CRX mutations may suffer from insufficient normal CRX protein in photoreceptors. Therefore, a therapeutic answer is to supply additional CRX to sick photoreceptors by gene therapy, i.e. CRX augmentation. However, the treatment outcome by a single-step CRX augmentation is promising but not utterly desirable. This study aims to develop a combination therapy of gene augmentation and drug supplements to achieve better treatment outcome. One strategy is to boost the effectiveness of CRX augmentation by a type of drug called HDAC inhibitors. They

can promote genetic activities of CRX augmentation for more therapeutic actions. Another strategy is to provide protection to photoreceptors by a type of drug called neurotrophic factors. Neuroprotection benefits photoreceptor survival on top of gene therapy. This study endorses the theory of '1+1 is greater than 1' for effective treatment strategies. Morphological, functional, and genetic analysis will be performed to thoroughly assess the



treatment outcomes. The findings will be applicable to other preclinical trials of gene therapy dealing with early-age vision loss.





Dr. Aleksander Tworak from the UCI Center for Translational Vision Research, Gillespie Neuroscience Research Facility located in Irvine, California was awarded a \$90,000 grant for *Mer tyrosine kinase: functional study and therapeutic approach evaluation.*

Mer tyrosine kinase (MERTK) is a protein present in the human eye involved in phagocytosis, a crucial process which occurs daily

and supports health and functionality of photoreceptor cells. Mutations in the gene encoding MERTK lead to a progressive vision loss which begins in the early childhood.

Several important questions still exist, concerning what is the exact role of MERTK in ensuring retina health and sustained vision. More knowledge about this process may in the future help to develop new therapeutic approaches. No therapy is currently available to stop the development or cure the disease.

The first goal of this proposal is to study still unclear biological aspects of phagocytosis by imaging the process in live animals using advanced two-photon microscopy. Here, the infrared light, which does not cause damage to the eye and penetrates it better than the visible light, is used to visualize how the process starts and progresses in the live eye.

The second goal is to develop an approach to correct one of the mutations of MERTK gene that leads to blindness in humans. This approach will be based on novel gene editing techniques which allow to locally correct mutations present in the DNA. By completing this study, Dr. Tworak would like to prove that by this approach it is possible to stop development of the disease and stop the vision loss. The obtained data could be used as a starting point to design a clinical trial to test the therapy in humans.





Dr. Anna L. Vlasits from Northwestern University, Evanston, Illinois was awarded a \$90,000 grant for her research entitled: *The role of the retina in visual symptoms of Fragile X syndrome.*

Fragile X syndrome is a developmental disorder that causes learning disabilities and autism. Autism is a set of disorders that affects around 1 in 44 children in the US, with a wide variety of visual symptoms. In Fragile X, these symptoms include hypersensitivity to light, avoiding

eye contact, and sleep difficulties. These symptoms cause challenges, pain, and distress for children and challenges for their caretakers, who often highlight sleep disturbances and lack of eye contact as especially affecting quality-of-life.

Emerging evidence suggests that sensory symptoms of autism are caused, at least in part, by changes in sensory organs, in addition to changes in the brain. This includes the retina, which is the entry point to the visual system and is critical for sight and a wide variety of other visual functions, like regulating the sleep-wake cycle. However, little is known about how the retina is affected and whether changes in the retina contribute to visual symptoms in autism or Fragile X syndrome.

Dr. Vlasits is exploring the role of the retina in visual symptoms of Fragile X. This work will give her a better understanding of how retinal function is different in Fragile X and how those changes contribute to visual symptoms of Fragile X. This knowledge will provide inspiration for therapies to improve quality of life for people with Fragile X syndrome. In addition, this work can be extended to explore other forms of autism to achieve a wholistic understanding of visual function in these prevalent developmental disorders.





Dr. Sean K. Wang from the Byers Eye Institute at Stanford, Stanford University School of Medicine, Palo Alto, California was awarded a \$90,000 grant for his research entitled: *Circular RNA mediated gene editing for inherited retinal dystrophies.*

Genetic mutations in the retina, the tissue at the back of the eye responsible for sensing light, can cause debilitating and irreversible vision loss in children. One potential way to treat such mutations is with gene editing;

however, current gene editing approaches may lead to editing errors and unwanted inflammation, posing safety risks. Dr. Wang proposed a new strategy to perform gene editing in the eye using circular RNAs, a class of highly stable RNA molecules, delivered into retinal cells by nanoparticles. He envisions that this work will lead to safer treatments for childhood retinal diseases, and potentially other vision disorders.





Dr. Benjamin K. Young from the Casey Eye Institute, Oregon Health & Sciences University, Portland, Oregon was awarded a \$90,000 grant entitled: *Retinopathy of Prematurity Progression Kinetics.*

Retinopathy of prematurity (ROP) is a potentially irreversible cause of vision loss in infants. When born premature, their retinal blood vessels are not yet fully developed, and must continue

developing as they mature. Sometimes, this can result in abnormalities in how the vessels grow, ultimately leading to irreversible vision loss.

Therefore, the standard practice is to screen all at-risk infants to observe how their vessels develop. However, due in part to limitations in camera technology and previous assumptions, there is an incomplete understanding of the precise rate of vessel development, or the progression of vascular changes as ROP develops. Therefore, relatively crude estimates have been used of how far the vessels have grown to make clinical decisions. Because there is now access to cutting edge cameras which can produce 3D representations of the retina and vessels with high resolution, Dr. Young aims to precisely define the rate of vessel growth in prematurity and ROP, as well as characterize microvascular changes at the edge of ROP, with the goal to provide novel avenues to predict disease.



Dr. Brent K. Young from Stanford University School of Medicine located in Palo Alto, California was awarded a \$90,000 grant for his research entitled: *Survival and regeneration of retinal ganglion cells in Neurofibromatosis type-1*.

These studies aim to develop novel treatments to prevent and reverse vision loss due to vision loss in Neurofibromatosis type 1, or NF1. NF1 occurs in 1 out of every 3000 children born and frequently causes tumors around the nerve connecting the eye to the brain or

the optic nerve. These tumorous growths occur before age seven and cause vision loss due to the death of the neurons, retinal ganglion cells, that travel through the optic nerve. Chemotherapy is currently the only treatment available for children experiencing NF1. While chemotherapy can reduce the tumor size, this treatment is often not recommended due to the severe side effects and low success rate (~30%). Therefore, new treatment avenues are desperately needed. Dr. Young's focus is on developing new techniques which combine gene therapy with drug treatment to prevent retinal ganglion cell death in an animal model of NF1. He will also evaluate their effectiveness in maintaining vision. In addition, since these treatments may not work for those who have already experienced cell death, he will develop a method to replace lost retinal ganglion cells. To accomplish this, he will use cell replacement therapy, where donor cells are transplanted into a degenerated retina. Collectively this work will lay the groundwork for new therapies for children dealing with NF1.



Dr. Syed Adeel Zaidi from Augusta University, Vascular Biology Center located in Augusta, Georgia was awarded a \$90,000 grant entitled: *Targeting the ornithine decarboxylase 1/polyamine pathway to limit pathological neovascularization in ROP.*

Retinopathy of prematurity (ROP) is among the most common illnesses that affect premature or low birthweight infants and is a

major cause of long-term vision impairment and blindness. ROP is a disease that damages the vascular and neuronal parts of the retina and makes them go blind. The current clinical standard of care provides some relief. However, many children have a loss of vision even after these therapies. Dr. Zaidi seeks to develop a novel therapy to limit neuronal and vascular damage in ROP patients.

During pathologies, our body starts making specific metabolites in excess that cause more harm than benefit. Dr. Zaidi has discovered a previously unrecognized enzyme, ornithine decarboxylase 1 (ODC1), that is overactivated in ROP and causes toxic levels of polyamines in the retina. He will use an ODC1 inhibitor, α -difluoromethylornithine (DFMO, commercially known as Effornithine). This drug is FDA approved for Alzheimer's and other diseases. He will use this drug in a mice model of ROP and test whether it



helps rescue the neurovascular injury and let mice see well. Based on this study, he can repurpose this approved medicine for a clinical trial in ROP infants. He hopes this medicine will help the infants recover from such a blinding disease and let them see well again.



Knights Templar Eye Foundation, Inc. item order form				
Leat	ther Tie Case	A Templar Monitor	VETI Tumbler	President's Coin
Sédi	el Warrior Knife	\$150.00 QTY	\$100.00 QTY	S25.00 QIY Case Knife 50.00 QTY
Name:				
Address:				
City:			State:	Zip:
Phone Numb	oer:	Email	:	
If a Sir Knight give location:				
State Commandery Name:				No
Place an X in the appropriate box: [] Check or money order enclosed (Payable to the Knights Templar Eye Foundation, Inc.) [] Please charge to my credit card: [] Visa [] MasterCard [] American Express [] Discover Credit Card Number:				
Credit Card Number: Expiration Date:				
Signature:				

ALL Promotional items are separate from any other KTEF program that the Foundation offers.

All Checks are made payable to the Knight's Templar Eye Foundation, Inc. which is tax-exempt Charitable Organization under Section 501(c)3 of the Internal revenue Code.

Please mail this form with your contribution to the address below: (Please allow 1-2 weeks for delivery) If ordering by credit card, you can fax the completed form.

> The Knights Templar Eye Foundation, Inc. P.O. Box 271118, Flower Mound TX 75027-1118 Phone: 214-888-0220 Fax: 214-888-0230 E-Mail: Manager@ktef.us

Scientific Advisory Committee 2023-2024

Chair | Bela Anand-Apte, MBBS., Ph.D.

Cleveland Clinic Cole Eye Institute Department of Ophthalmic Research Cleveland, OH

John D. Ash, Ph.D.

E. Ronald Salvitti Professor of Ophthalmology Vice-Chair of Ophthalmology and Director of Research University of Pittsburgh School of Medicine Pittsburgh, PA

Kapil Bharti, Ph.D.

National Eye Institute Bethesda, MD

Brian P. Brooks, M.D., Ph.D.

National Eye Institute Bethesda, MD

Steven Brooks, M.D.

Medical College of Georgia Department of Ophthalmology Augusta, GA

David Cobrinik, M.D., Ph.D.

University of Southern California Division of Ophthalmology Children's Hospital Los Angeles Los Angeles, CA

Monte A. Del Monte, M.D.

University of Michigan W.K. Kellogg Eye Center Ann Arbor, MI

Arlene V. Drack, M.D.

Ronald Keech Professor of Pediatric Genetic Eye Disease Research Director, Electrophysiology Institute for Vision Research Department of Ophthalmology and Visual Sciences University of Iowa Iowa City, IA

Mary Elizabeth Hartnett, M.D., FACS, FARVO

Professor of Ophthalmology and Visual Sciences Director of Pediatric Retina Department of Ophthalmology / Stanford University Byers Eye Institute at Stanford Palo Alto, CA

Thomas C. Lee, M.D.

University of Southern California The Vision Center Children's Hospital Los Angeles Los Angeles, CA

Dr. Robert Mullins, MS, Ph.D.

Professor of Ophthalmology and Visual Sciences Institute for Vision Research Iowa City, IA

Budd A. Tucker, Ph.D.

Professor of Ophthalmology and Visual Science Institute for Vision Research Carver College of Medicine University of Iowa Iowa City, IA

David K. Wallace, M.D., MPH

Indiana University School of Medicine Department of Ophthalmology Glick Eye Institute Indianapolis, IN

The Mission

The mission of the Knights Templar Eye Foundation, Inc., is "to improve vision through research, education, and supporting access to care."

To that end, the Knights Templar Eye Foundation, Inc., annually announces its call for research grant applications. The Foundation invites eligible investigators to submit applications for pediatric ophthalmology research grants for the award period which normally runs from July 1 to June 30.

From the applications received, the Scientific Advisory Committee recommends to the trustees which requests should be funded.