Research Excellence

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Learn More About Our Research
As we wrap up the Institute’s 60th anniversary year, it is a good time to reflect on what exactly we have been celebrating. Personally, this past year has been an opportunity to acknowledge where we have been and where we are going, and to honor an essential element of what has made this organization the most respected eye research institute in the world. That element is collaboration— the bringing together of the best minds, ideas and resources to meet the complex challenges of our mission—to preserve and restore vision.

Shortly after Dr. Schepens founded The Institute in 1950, he collaborated with two physicians with specialties in other parts of the eye – Dr. Claes H. Dohlman, a cornea expert, and Dr. Endre A. Balazs, a vitreous expert. Together, with Dr. Shepens’ expertise in the retina, they went on to recruit scientists in both clinical and basic research, and later they forged an affiliation with Harvard Medical School that opened up connections with the entire Harvard scientific community. The Institute has also, in recent years, worked with clinical practices and research institutions in Boston, Florida, California and other parts of the country and the world to share ideas and hasten new clinical applications.

Today, 156 scientific staff—including 29 principal investigators within SERI—are working in a variety of collaborations to solve nearly every aspect of eye disease. Also, in the past two years, the creation of our four Centers of Excellence has formalized, intensified and defined those relationships to maximize their impact on discovery. Each center shares its expertise with the others to speed the transfer of knowledge gained in the laboratory from the bench to the bedside.

This issue of Sightings will give you a snapshot of what those collaborations look like at the most intimate level—scientist to scientist. In one instance, you will see how an emerging scientist learned from and continues to be guided by her mentor. In another, you will get a better understanding of how two senior investigators with different specialties hope to regenerate an entire eye. In yet another, an optometrist joins an engineer to help the visually impaired continue to drive. And, finally, you will get a glimpse of two experts from two different centers combining their talents to regenerate a damaged retina.

We cannot afford a lapse in support or commitment to these collaborative research projects. What was once science fiction just 10 years ago can soon be reality for people suffering the effects of devastating diseases such as macular degeneration, glaucoma, retinitis pigmentosa and others. The need for monetary resources is greater than ever to provide support for new ideas before government funding can be secured, for recruiting the next generation of talented scientists, and for development and maintenance of the infrastructure necessary to support this critical research.

I hope you find this edition of Sightings to be helpful and informative. As we explore the best ways for the Institute to collaborate to meet the future, we continue to look to you, our long-time dedicated friends, to continue your generosity and support.
Blindness can strike anyone at any age – from the infant with retinopathy of prematurity to the grandmother losing her independence to macular degeneration to the person with diabetic retinopathy or glaucoma. Today, 20 million Americans suffer from visual impairments that severely limit their quality of life. As baby boomers age in the coming decade, we face an epidemic of blindness from eye diseases that cannot yet be cured.

**Taking blindness out of the picture**

Schepens Eye Research Institute is dedicated to eliminating blindness, both for today’s aging population and for future generations. To make the best use of our resources for the most prevalent blinding eye diseases, we have reorganized our research program into four Centers of Excellence.

In the Centers of Excellence, our world-renowned scientists collaborate with each other and with clinicians in a translational research environment focused on four areas: AMD, corneal disorders, regenerative medicine and mobility.

Schepens Eye Research Institute President, Ken Fischer, is confident that the Centers will accelerate the transformation of ideas into progress:
“Our four centers enable faculty to interface freely within and between groups. We can more easily share ideas related to understanding the intersecting facets of eye disease. This is how we move discovery more rapidly from laboratory to clinic. And it’s how we make the biggest difference to patients struggling with vision loss.”

Looking ahead

The following pages tell four stories. Each illustrates how enhanced collaboration among experts is helping to move vision research forward in the four Centers of Excellence, which include: The Minda de Gunzburg Center for Ocular Regeneration, The Center for Age-Related Macular Degeneration Research, The Center for Corneal & External Eye Disease Research, and the Mobility Enhancement & Rehabilitation Center.

In the Cornea Center, we profile the mutually-rewarding relationship between an active cornea surgeon and researcher and her renowned research mentor. In the AMD Center, you’ll meet a young scientist who has experienced eye disease in her personal life and learn how that experience inspires her work to treat AMD. The Mobility Center story tells of an engineer and optometrist who are joining forces to keep visually impaired people safe behind the driver’s wheel. Finally, in the Ocular Regeneration Center, two world-class scientists focus on different parts of the eye and prepare to collaborate to regenerate the whole eye.
Dr. Magali Saint-Geniez is a young scientist in demand. After turning down attractive job offers from premier European universities, she came to Schepens to work with Dr. Patricia D’Amore, Director of the Center for Age-Related Macular Degeneration Research.

A leader in vascular biology with an international reputation, D’Amore’s discoveries about the normal and abnormal growth of blood vessels, especially in the retina, laid the groundwork for drugs such as Lucentis®, that block pathologic blood vessel growth in the retinas of age-related macular degeneration (AMD) patients.

**Finding strength in partnership**
To expedite her mission to find a cure for AMD, Saint-Geniez joined forces two years ago with the Minda de Gunzburg Center for Ocular Regeneration, which is led by one of the top stem cell scientists in the world, Dr. Michael Young. Young has been at the forefront of research to explore the use of stem cells to regenerate damaged retinas for more than a decade.

Young and other scientists in the Minda de Gunzburg Center enthusiastically partnered with Saint-Geniez and the Center for AMD Research in her fight, bringing with them valuable

**A personal journey in AMD research**
For Saint-Geniez, vision research is a personal journey. It began in childhood on a farm in the scenic Aveyron region of France, where Saint-Geniez spent summers watching her beloved aunt go blind from AMD. With each passing year, her aunt’s ability to appreciate the beauty of the land waned. And she grew less and less capable of working the farm and recognizing people she loved, including Saint-Geniez.

This experience left a lasting impression on Saint-Geniez and motivated her to pursue a career fighting AMD. Starting a family only reinforced her dedication to finding a cure.
experience in the generation and transplant of retinal stem cells grown on an innovative biopolymer scaffold.

Working with the Minda de Gunzburg Center was an ideal complement to Saint-Geniez’s expertise in retinal pigment epithelium (RPE) physiology and knowledge of choroid damage. The choroid is the layer of blood vessels that nourishes the retina and where AMD damage begins.

**Approaching a cure**

Together, Saint-Geniez and Center scientists launched an aggressive approach to curing AMD. The four-step process they designed included: 1) Reprogramming skin cells to become induced pluripotent stem cells (iPSCs), which—like embryonic stem cells—can transform into any other kind of cell; 2) Chemically coaxing the iPSCs to become photoreceptors and RPE cells; 3) Growing photoreceptor and RPE cells on a tiny polymer scaffold; and 4) Transplanting the grown cells to replace disease-damaged tissue and regenerate the retina.

They also determined that these iPSCs could ultimately be derived from cells harvested from patients’ own skin, which would eliminate concerns about rejection. Using these adult stem cells would also eliminate the ethical and political issues surrounding the use of embryonic stem cells.

Saint-Geniez, who received the 2009 “New Innovator” Award from the National Institutes of Health, is committed, as is Young and his Center, to eventually bringing this novel laboratory research to the clinic to help patients with AMD.
When Charles de Gunzburg decided to fund a center for regenerative medicine in 1997, the concept of tissue engineering was in its infancy. Less than 15 years later, scientists in the Minda de Gunzburg Center for Ocular Regeneration are succeeding in laboratory experiments to re-grow retinal and optic nerve tissue.

Dr. Michael Young, director of the Center, predicts that the eye is likely to be one of the first parts of the body to reap the benefits of regenerative medicine. “This is because the eye is so accessible,” Young says. “It’s much more so than other parts of the brain, the spinal cord or even internal organs.”

With a Ph.D. in anatomy, Young began his career studying neurology. He eventually zeroed in on the eye because, as an extension of the brain, it’s the most available and ultimately “treatable” part of the nervous system.

Meeting of the minds
To keep the eye at the head of the regeneration race, Young is joining forces with Dr. Darlene Dartt, a senior scientist and assistant director at the de Gunzburg Center. Their goal: To regenerate the entire eye.

What makes the collaboration between Young and Dartt so promising is the years, even decades, each has spent studying opposite ends of the eye. While Young has primarily focused on the retina at the back of the eye, Dartt’s main interest has been the lacrimal glands near the eye’s outer surface. In essence, their partnership is a true meeting of the minds.

The process Young and Dartt have mapped out to achieve their goal is to start at opposite ends of the eye and begin regenerating, piece by piece. Young will work on the retina, the tissue that captures images, and when damaged, results in diseases such as macular degeneration. Dartt will focus on stimulating the re-growth of cells in the lacrimal glands, where tears are produced to keep the eye moist and protect it from debris and bacteria. As studies progress, Young and Dartt and their fellow de Gunzburg Center scientists will collaborate regularly to share their successes, challenges and creative solutions.

The model mouse
The factor making this undertaking even remotely possible is a new animal model known as the reprogrammable “pluripotent” mouse. Created by Konrad Hachedinger, the mouse model includes cells that are all capable of being chemically stimulated into stem cells. These in turn can be transformed into any kind of tissue in the body.
“The mouse model will allow us to test theories and techniques to grow each separate part of the eye,” says Dartt, a Ph.D. in physiology who had planned to go to medical school until falling in love with research. Dartt’s many discoveries have contributed to our understanding of how the eye protects and defends itself, and what triggers dry eye syndrome. She credits her choice of career path to the inspiration and mentorship of several renowned women scientists in the 1970s and 1980s.

Although a long way off, the future in Young’s view holds promise for patients with blinding eye disease. He says, “I look forward to the day when a patient with some blinding disease walks into a doctor’s office and receives an injection to regenerate whatever part of the eye that is damaged or destroyed.”
"Take your hair dryer each morning and dry your eye!" You may find this strange advice from your doctor. But often it is the only treatment available for Fuchs’ corneal dystrophy, as Dr. Ula Jurkunas knows well. A dedicated corneal and refractive surgeon, Jurkunas is determined to change this fact.

"Fuchs’ dystrophy accounts for up to one-third of corneal transplants, and yet we have appallingly little knowledge of the causes of this condition," says Jurkunas, who is exploring several theories she hopes will reveal causes and possible treatments. A clinician, scientist, and wife and mother to two young children, Jurkunas is busy. But she wouldn’t have it any other way. “I have a very full life,” Jurkunas says.

In both her clinical and laboratory work, Jurkunas has turned to experienced mentors for guidance. As a medical trainee, she was encouraged by Dr. Reza Dana to consider adding research to her clinical career. As a new scientist, she was mentored by senior scientist Dr. Nancy Joyce; and today, Jurkunas continues to sharpen her skills under the guidance of senior scientist, Dr. Ilene Gipson.

**Fuchs’ dystrophy at-a-glance**
Fuchs’ dystrophy occurs in one percent or more of the US population, and it is the second most common cause of corneal transplantation in patients over age 60. It damages the cells that pump water out of
the cornea, causing acute swelling. Patients experience blurry vision, glare, loss of corneal transparency, and corneal blisters that can be quite painful. The cause is unknown. Hair dryers and salty eye drops that absorb moisture are the only treatments short of corneal transplantation.

With no lab models on which to test new therapies or ideas, Jurkunas has her work cut out for her. But she is embracing the challenge and exploring a variety of avenues she believes might reveal a cause or cure.

The mutual rewards of mentorship

Though not directly involved in Jurkunas’ research, Gipson sees the role of mentor as essential. “Mentors can have a long-lasting impact on a science career,” says Gipson, who still looks to her mentor of 35 years for counsel.

Growing up in rural Missouri, Gipson was one of the first in her family to go to college and the very first to get a Ph.D. Finding her first mentors at the University of Oregon was a life-changing experience. A husband and wife team, they were clinician/scientist and cell biologist, respectively. “The most important thing they taught me was to never forget the real purpose of our science—ameliorating human disease,” Gipson says. “I have never forgotten.”

This is precisely why Gipson finds mentoring a scientist/clinician like Jurkunas, now an independent scientist, so gratifying. With Jurkunas, mentoring is an ongoing conversation. The two talk more than once a week individually and as part of the group of young scientists in Gipson’s laboratory.

Gipson’s goals as a mentor are two-fold: First, to help Jurkunas perfect her grantsmanship (applying for grants) skills; and second, to help position her as a leader in the field by introducing her to senior scientists that can also serve as role models.

With Gipson’s subtle guidance and the support of the entire cornea center team, Jurkunas has high hopes that some day soon, people with Fuchs’ dystrophy will have more treatment options than hair dryers and transplants.
At first glance, it may not appear that an optometrist from the UK and engineer from China would have much in common. Yet first impressions can be deceiving. And today at the Mobility Enhancement & Rehabilitation Center, Drs. Alex Bowers and Gang Luo share a connection they couldn’t have imagined a decade ago, when they came to Schepens Eye Research Institute from opposite ends of the world.

Luo grew up in China, where he launched an engineering career before moving to Singapore. Bowers’ career in vision rehabilitation took root when she was a hospital optometrist and a researcher in Scotland and Australia.

**Two journeys. One destination: Schepens Eye Research Institute**

Luo’s journey to Boston started with a visit from Dr. Eli Peli, head of the Institute’s Mobility Center in Singapore, who was following up with Luo’s response to the Internet job ad he had placed. Bowers packed her bags for the US the same year, after meeting Peli when he stopped by her research lab in Australia.

The rest is history. At the Mobility Enhancement & Rehabilitation Center, Luo and Bowers combine their skills and knowledge on several projects. Luo brings to the table engineering expertise and a fresh perspective on human vision mechanisms. Bowers contributes her clinical knowledge and an appreciation of the role technology plays in rehabilitating those with blinding diseases.

The combination is powerful, as seen in Luo and Bowers’ most recent collaboration: A surveillance system that evaluates the effectiveness of using bioptic devices, such as a bioptic telescope, as driving aids for people who’ve experienced central vision loss from a disease like macular degeneration, for one.
Telescopic vision improves driving safety
A bioptic telescope is a small device attached near the top of a lens of a pair of glasses. It enables a person with central vision loss to see road signs and other details. To use it, a driver simply tilts his or her head downward to shift vision to the telescope. The result is a clearer view of important details that impact safety.

Today, 39 states permit driving with bioptic telescopes. Yet little is known about how and when these devices are used.

Shedding light on driver behavior
To shed more light on the problem, Luo and Bowers collaborated on a proposal to build a system that captures a person’s daily driving behaviors for an entire month. Supported by a grant from the NIH (National Institutes of Health), their proposal includes the installation of tiny cameras in cars to detect the subtle shifts a visually-impaired person makes to view the world through a bioptic device. At the same time, recorded GPS data captures the itinerary and tracks each turn and twist in the road.

A month of driving can produce literally hundreds of hours of video that could overwhelm any researcher. This makes preventing information overload imperative. “My role is to design software and create algorithms that capture the information that is most useful to Alex’s evaluations,” says Luo. Bowers then uses that information to work with a driving instructor to improve training programs.

Says Bowers, “I apply my clinical knowledge to evaluate whether patients are using the bioptics appropriately and whether further training is necessary.”

Reaching common ground
The combined result of Luo’s and Bowers’ different areas of focus is greater freedom of mobility and a higher quality of life for the visually impaired. So it seems that people from diverse worlds can reach common ground. In the case of Gang Luo and Alex Bowers, it’s where different perspectives and disciplines meet to enhance vision.
Can your personality predict your tolerance to changes from glasses and surgery? Dr. Russell Woods says YES.
Driving toward the rising or setting sun can make for a miserable trip for many reasons. Traffic reporters routinely cite sun glare as a cause for major morning backups and driver irritability. Even more intolerable for many people is when the glaring windshield is also covered with squashed bugs, bird droppings, pollen or general road dirt – perhaps with just a bit of moisture for smearing. Some drivers must immediately rinse off even the smallest smudge while others never use a drop of washing fluid. Having experienced this situation himself, Russell set out to study why humans react so differently to exactly the same visual challenge. One of those people who likes his windshield sparkling, Russell hypothesized that personality factors might predict who will tolerate or even notice higher levels of blur.

Partnering with a psychologist, Dr. Randall Colvin at Northeastern University, Russell designed a two-part study to investigate the relationship between individual variability in tolerance of blur and measures of personality in two populations, hypothesizing that bug splats would torment a perfectionist.

The first study measured responses to 512 items from personality scales in 100 subjects with normal eyesight and a median age of 21. The tests measured traits like perfectionism, neuroticism, extraversion, agreeableness, conscientiousness, openness to experiences and others.

The second study tested the robustness of the relationship found in the first study using 63 personality items derived from the first study and similar established scales in 86 older subjects with a median age of 58. In both studies, a computer-controlled instrument was used to measure “just-noticeable blur” and “objectionable blur” responses as the lens focus gradually became more blurred.

The study results indicated that “blur tolerance,” defined as the difference between when people first noticed blur and when it became objectionable to them, was related to two personality factors: “low self-confidence” and “disorganization”.

Aside from casting light on who might respond quickly to bug splats, this study gives evidence of how personality traits might be useful to predict how people will respond to vision correction with progressive lenses, intraocular lenses, multifocal contact lenses or refractive surgery, that often introduce some blur all of the time. Knowing in advance who is likely to be dissatisfied with the vision changes associated with these may help in choosing the best candidates for each type of vision correction.

The study was hailed as one of the nine most newsworthy presented at the annual meeting of the American Academy of Optometry in 2009, a meeting of over 4,500 vision professionals.

Russell L. Woods, Ph.D. is an Assistant Scientist at Schepens Eye Research Institute. Dr. Woods received his Ph.D. in Visual Sciences from City University in London, UK in 1992. His research focuses on central vision impairment (the most common visual impairment in “western” countries due to the prevalence of AMD), problems with pedestrian mobility, and image enhancement to assist people with reduced vision watch television and movies.

C. Randall Colvin, Ph.D. is an Associate Professor in the Psychology Department of Northeastern University. Dr. Colvin received his Ph.D. in personality psychology from the University of Illinois at Urbana-Champaign in 1991. His research interests include personality judgments of self and others, the processes associated with positive psychological functioning, and how individual differences in social perception influence psychological adaptation across social settings.
However, the old ways were changing. His parents foresaw that a bright, ambitious, young student needed more education than local schools offered. When Budd graduated from the regional high school, he was the first in his family and the first in Reef’s Harbor to go to college and earn a Ph.D., paying his way by fishing.

He enrolled in Sir Wilfred Grenfell College on Newfoundland’s West Coast, the closest college to home, planning to be a clinical psychologist, but he also had electives in science. He soon caught the attention of Professor Daniel Stewart, who saw potential in this eager young student, and steered him deeper into science, urging him to take classes in sensation and perception. Budd became fascinated by the possibilities of a new field: regeneration.

Dr. Stewart encouraged him to get an advanced degree in medicine and research. His path was now clear. He entered Memorial University in Newfoundland and earned his Ph.D. Budd now attracted the attention of Dr. Karen Meadow, Assistant Dean of the Medical School, who offered him a technician...
job in her lab. An expert in spinal cord regeneration, she urged him to continue his education in regeneration.

Again his path was clear. She urged him to participate in the Woods Hole Fundamental Issues in Vision Research program. In that intensive two-week course, Budd studied the eyes of mice, crayfish, frogs, and zebra fish. He was back to fish – he worked on zebra fish and frogs, whose eyes regenerate quickly.

He also had a personal reason to find answers. His high school girlfriend, Gillian – soon to become his wife – had suffered Juvenile Rheumatoid Arthritis when she was 12, and the disease affected her eyes. Knowing that scientists were working with stem cells to replace damaged retinal cells, he had a dramatic reason to intensify his research and come up with answers that would help Gillian and people all over the world with Retinitis Pigmentosa and other diseases of the eye.

The next step? What better place to continue his research than at the famed Schepens Eye Research Institute in Boston as a post-doc with Dr. Michael Young, head of the Minda de Gunzburg Center for Ocular Regeneration.

Budd was a long way from Newfoundland and his Viking ancestry, but like his forefathers, he is an explorer. In the lab, under Mike’s guidance, Budd helped transform human skin cells into stem cells to regenerate mice retinas and explored the technique in pig eyes.

Budd recently took the next step in his journey and is now an Assistant Professor of Ophthalmology at the University of Iowa, Carver College of Medicine. He continues to learn and collaborate with his mentor and colleagues at the Institute. In fact, they recently published a paper together on the work that Budd did while at the Institute, titled Transplantation of Adult Mouse iPS Cell-Derived Photoreceptor Precursors Restores Retinal Structure and Function in Degenerative Mice.

In this issue of Sightings, a friend of the Institute, Jeanne Campbell, makes her debut as a guest columnist, telling the story of how one young scientist found his way to the Schepens Eye Research Institute and launched a promising career in research to regenerate the human retina. The scientist, Dr. Budd Tucker, has since completed his post-doctoral work and taken a position as an Assistant Professor of Ophthalmology at the University of Iowa, Carver College of Medicine. But he continues to collaborate with his Schepens mentor, Dr. Michael Young, on groundbreaking research.

We hope this will be the first of many contributions by Jeanne, who has a very personal stake in the success of vision research.

Jeanne says: “I am a writer/photographer who suffered a retinal detachment several years ago. When people see my photographs they exclaim ‘you have a good eye!’ I agree that I have a good eye, but only one. I eagerly await the time when Schepens Eye Research Institute tells the world that doctors are now ready to take my skin cells, create retinal cells to implant into my eye, and once again I will see the world with two good eyes – their vision and discoveries making possible my vision and opening the world to millions like me.”

By Jeanne V. Campbell
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When Kenneth Danielson got a devastating diagnosis of a detached retina he felt frightened, lost and confused. He enlisted the help of the man for whom Kenneth served as a personal accountant. W. Clement Stone, the legendary entrepreneur, philanthropist, and author of “Success Through a Positive Mental Attitude” told him the four words that would change life for the Danielson family: “See Dr. Charles Schepens.”

Kenneth and his wife, Marie, credit that journey to Boston to meet with Dr. Schepens for saving his ability to continue working in the accounting job he so loved. Although he
never regained vision in one eye, his other eye was saved, enabling Kenneth to enjoy a better quality of life and provide for his family.

Marie’s life was also touched by Dr. Schepens who helped treat her severe glaucoma. Throughout the years, she fostered a warm friendship with Dr. Schepens and his family, visiting with him whenever her travels brought her to Boston.

The friendship between Dr. Schepens and the Danielsons grew as Kenneth and Marie’s daughter Carol aged. Carol was oxygen deprived at birth, which caused her a number of physical and psychological challenges. But Carol, much like her mother, grew to love Dr. Schepens and even saw him as a member of their extended family.

Given the love, respect and gratitude that Marie and Carol felt toward Dr. Schepens, it was only natural that they would both join Schepens Eye Research Institute’s William Wolff Society for planned giving. Their decision to include the Institute in their estate plans was the most fitting way to honor their dear friend, Dr. Schepens. Furthermore, they were adamant that their bequests come without restrictions. Carol’s cousin, Linda Ellis stated, “Our family feels the best gift is a free gift, without any strings attached. It was Marie and Carol’s hope that their simple act of gratitude serves as an inspiration for others to donate to the best of their ability.”

All of us at Schepens are delighted that Marie and Carol Danielson chose to honor Dr. Schepens by supporting his work and continuing his legacy for future generations. Their simple act of joining the William Wolff Society will have a lasting impact on the lives of others for years to come. Members of this special group have provided the Institute with vital funds for ongoing research in the most vexing vision ailments such as macular degeneration, optic nerve damage, and retinitis pigmentosa.

The William Wolff Society honors donors who have included the Institute in their estate plans. The society is named in memory of William (Billy) Wolff, a dedicated Institute corporator. His legacy is carried on by his wife, Babbette, an Honorary Trustee, who shares his vision of a future free of the debilitating effects of blindness. Friends who provide for bequests, charitable gift annuities, charitable remainder trusts, designation of retirement assets, or other planned gifts benefiting the Institute are eligible for membership in the William Wolff Society.

To learn more about how you can include Schepens Eye Research Institute in your will or trust, please contact: George Constant at (877) 724-3736 or at george.constant@schepens.harvard.edu.
Champions of Vision Research

Ethan and Seth

Two of Schepens Eye Research Institute’s youngest champions are Ethan and Seth Martinez. Born at 23 weeks and five days and weighing less than two pounds each, these identical twin boys fought for survival for the first five months of their life in the neonatal intensive care unit. Thankfully, after many surgeries for a variety of health issues, the boys were able to come home to their parents, Rich and Debbie. However, before they left the hospital they received a devastating diagnosis. Both boys were blind from Retinopathy of Prematurity.

Debbie recalls being overwhelmed. “When we left the hospital, we were essentially told by the doctors ‘good luck’. I remember looking at my husband, relieved that the boys were healthy enough to come home, but with a nervous sense of ‘Now what?’” said Debbie. She and Rich took the twins to Michigan where a vision specialist performed retinal reattachments and tested Ethan and Seth’s ability to perceive light and dark. Through the Illinois State Board of Education’s “Birth to Three Program” they were matched with a teacher who was proficient in Braille and helped the twins learn to be more independent.

“There really aren’t any books for new parents who are raising blind children. The milestones are completely different for fully-sighted, visually impaired and blind infants and toddlers . . . It’s a difficult journey,” said Debbie.

Armed with this new awareness of the complexities
of raising children with vision problems, the Martinez family created the “Ethan and Seth Future of Vision Foundation” in hopes of enhancing the lives of children and adults with disabilities and of finding a cure for blindness.

In an online search for solutions, the couple quickly found Schepens Eye Research Institute and was inspired by its efforts to regenerate the damaged human retina. The Institute soon became one of the Foundation’s first beneficiaries.

In addition to keeping up on the latest research, the Martinez family supports a number of vision-related charities and advocates for new rehabilitation technologies. For example, Ethan and Seth were the first blind students to take part in Northern Illinois’ Special Recreation Association programs that provide social opportunities for disabled children.

Though their boys are now happy, healthy third graders, the couple’s most fervent wish is for their children to one day regain their vision. “It would be life altering and such a gift for them to be able to see! It already amazes me that these little guys who were the size of Beanie Babies are these happy, well-adjusted boys with a passion for music.”

The faculty and staff at Schepens Eye Research Institute are committed to the highest quality science to help patients of all ages live full and productive lives. By developing new technologies, therapies and knowledge, our hope is to truly create a clearer and brighter tomorrow for millions.

To learn more about how you can assist Schepens Eye Research Institute in helping children like Ethan and Seth, please contact Melanie Saunders at (877) 724-3736 or at Melanie.Saunders@schepens.harvard.edu.
Dr. Charles L. Schepens left a legacy of numerous outstanding achievements during his lifetime: as an inventor of medical instrumentation and surgical procedures, mentor and teacher of physicians and scientists, researcher, author, and skilled surgeon and retina specialist. Thousands throughout the world have had their lives changed by the treatments and tools he developed. To honor him and perpetuate his legacy, our goal is to present a living tribute in a special resource library at The Schepens Eye Research Institute (SERI) with exhibits showcasing the life and accomplishments of Dr. Schepens, institutional memory, past and current research at SERI, and also a vision of future science at SERI.

In preparation for this endeavor, Ann Beha, renowned architect, has provided architectural plans for the renovation of the SERI library, showing space for exhibits, collections, and a study center for faculty and students. This room will also be suitable for small gatherings or meetings. Renovation of the library will require work on the infrastructure as well as the purchase of items such as floor coverings and furniture. Museum curator, Meg Ostrum, author of the book about the WWII resistance work of Dr. Schepens, “The Surgeon and the Shepherd,” will do the curatorial planning.

We have formed a Schepens Collection Committee, composed of members internal and external to SERI. We are currently in the process of raising the funds necessary to bring this project to fruition.

We welcome your suggestions and donations:
Please contact Carolyn Bellefeuille in the Development Office at 617-912-2527 or visit www.schepens.harvard.edu/the_living_legacy
The New Schepens Eye Research Institute Library Design

Design and architectural services provided by:
AnnBeha Architects of Boston
First impressions of Dr. Tatsuo Hirose are of a soft-spoken and intensely humble man, not given to self-promotion—hardly Hollywood hero material. Yet for more than a thousand children worldwide, he is a hero—someone who has literally brightened up their lives. He has done that by giving them the ability to see when even most ophthalmologists considered it impossible.

Without the surgical breakthrough he pioneered with Dr. Charles Schepens, his own dedication and the sheer precision of his surgeon’s hands, these children, some as small as two pounds or even less at birth, would be living in darkness—victims of retinal detachment known as a severe form or end stage of Retinopathy of Prematurity. Instead many can not only see light, but can often read large letters, and some can even ride bicycles.

Each year, Dr. Hirose hears from many of the kids whose sight he saved and who are living more fully because of his work. Christmas cards, photos and progress reports come from parents and the kids themselves, as they grow up grateful for the vision they have because of Dr. Hirose’s skill.

And, last fall at its 60th Anniversary Celebration, the entire Schepens Eye Research Institute community honored this devoted surgeon and scientist by naming him the Institute’s Distinguished Alumnus of 2010. He received the award at the annual meeting and was recognized at the anniversary celebration the night before.

Dr. Hirose came to the Schepens Eye Research Institute in 1969 from Kanazawa University in Japan, where he received his M.D. and did his internship and residency in ophthalmology. He then went on to complete general ophthalmology courses at Harvard Medical School. His postgraduate studies also included a fellowship in electrophysiology at Cornell Medical Center in New York and a clinical fellowship in the Retina Service at Massachusetts Eye and Ear Infirmary in Boston.

Though now world renowned for his expertise in treating diseases and injuries of the retina in people of all ages, he is best known for his work with Retinopathy of Prematurity and other retinal diseases of childhood.

“Retinal detachment associated with Retinopathy of Prematurity really is the most difficult of retinal detachments to deal with and doesn’t always respond to traditional treatment methods,” says Dr. Hirose.

Premature babies are born with retinas that have not yet had enough time to form a normal system of blood vessels to give them oxygen and other nutrients. To compensate, the developing eyes start to produce vascular endothelial growth factor
(VEGF), which stimulates the growth of blood vessels. However, these blood vessels tend to be abnormal, fragile and leaky and ultimately form a scar that pulls on and detaches the retina from the wall of the eye unless they are treated with laser or more recently with injection of the anti-VEGF medication into the eye before the retinal detachment sets in.

That’s where Dr. Hirose comes in. Thirty years ago, he and Dr. Schepens created a way to reattach the tiny retinas, a technique called “open sky vitrectomy”. Though improved some over the years, the basics have remained the same, and it is still the standard for saving vision in premature babies in the advanced stage of Retinopathy of Prematurity.

The conventional surgeries such as scleral buckling procedure or closed vitrectomy may work in the infants with ROP who developed retinal detachment that are in an early stage and not very severe, but either method does not work in the most severe cases of retinal detachment presenting the closed funnel-shaped detachment leading to the “white pupil”. The open sky vitrectomy may be considered in such cases.

To be eligible for the surgery, a baby must be in good health to stand the general anesthesia and between age six months and one year, according to Dr. Hirose. “Any earlier and the eye is too weak, and the surgery fails,” he says. “Also infants with severe brain damage cannot benefit from the surgery, since the brain must be able to interpret the images it captures from the retina,” he adds.

During surgery, Dr. Hirose removes the cornea (the transparent tissue on the surface of the eye) and stores it in a tissue culture. He then takes out the lens and the membrane behind the detached retina, and injects a heavy liquid into the eye to push the tiny retina back against the wall of the eye, where it will reattach itself. After the injection, he replaces the cornea.

For some infants, matters are further complicated by tears in the retina which are considered beyond repair since stitching this delicate tissue is not possible. Dr. Hirose believes that the right kind of biological glue might be an option. He and his research team are now looking for such an adhesive substance to seal these tears, and have tested several in animals.

“One of my fellows, who is now back in Japan, has had some success in treating human beings with one of these glues, called Seprafilm,” he says, adding that he is also exploring glues that have been proven successful in healing human lungs and livers. “We are also looking for the best ways to deliver this very small amount of glue into the tiniest of human eyes.”

Determining if a baby actually sees better after surgery is the next step, and another dilemma. “Infants can’t tell you if they see or what they see,” says Dr. Hirose. His lab has already created a technique using a television screen. By attaching an electrode to the baby’s skull while the baby views varying patterns on the screen, he and his team can make judgments about visual ability.

Dr. Hirose has been committed to his field and these children for 40 years, and shows no sign of slowing down. Part of his commitment comes from having overcome his own life challenges. For instance, when he was 46 years old, his first wife died of breast cancer, leaving him to raise four small children alone. He was able to put his life back together and care for his children with the help of a woman who came from Japan to help him. “She came here without hesitation and without knowing me and with a commitment to make it work.” They have now been married for 25 years.

In addition to his award from the Institute, Dr. Hirose has been the recipient of numerous other honors, including a Fulbright Fellowship and the Honor Award and Senior Award of the American Academy of Ophthalmology, to name but a few. And, he was selected as one of “The Best Doctors in America” in US News and World Report in 1996 and “Boston’s Best Doctors” in Boston Magazine in 1999.

But, for his youngest patients, Dr. Hirose will be “Best Doctor in America” every year of their lives.
Dr. Hirose is presented with the 2010 Distinguished Alumni Award

Lions Club Members of Massachusetts
In 1950 the Lakers played basketball in Minneapolis, not Los Angeles. Harry S. Truman was president, and the cost of a postage stamp was only three cents. And, on the same day that Prince Rainier III ascended to the throne of Monaco, the Schepens Eye Research Institute opened its doors for the very first time.

Founder, Charles L. Schepens, M.D., considered the “father of modern retinal surgery,” conceived of the Institute following the creation of a successful retina clinic at Massachusetts Eye and Ear Infirmary. Considered to be one of the “Ten Most Influential Ophthalmologists of the Twentieth Century,” Dr. Schepens increased the rate of success for retinal reattachment surgery from 40 percent to 90 percent. He sought to create a place where incurable eye disease could be cured and where hope would be cultivated with the same care as the research.

Sixty years later, Dr. Schepens’ legacy and vision for a brighter, clearer future is alive and thriving at Schepens Eye Research Institute. Our scientists have produced over 5,000 scientific publications and trained over 1,200 postdoctoral fellows and eye surgeons. Yet, the real testament to Dr. Schepens’ foresight has been the countless patented technologies and therapies that have resulted from his vision that today provide much needed relief to the millions affected by vision loss.

In recognition of this legacy, Schepens Eye Research Institute celebrated its 60th Anniversary at the Mandarin Oriental Hotel in Boston on October 21st, 2010. Over 220 friends, family, and supporters were there to commemorate the past and commit themselves to future successes of the Institute. At that event, Dr. Tatsuo Hirose, M.D., received the 2010 Distinguished Alumnus Award, recognizing his lifetime commitment to eye and vision research. The entertainment featured the voices of Danya Katok and Matthew Anderson, who recently starred with the Boston Pops. The event raised over $100,000 to support eye research. The success was due in large part to the event’s Co-Chairs, Rosalie Cohen and Judith Brodkin, both long-time supporters of the Institute.

As we welcome a new decade, the Institute renews its commitment to creating a culture of collaboration; a culture that seeks to unite the brightest minds in the research, clinical and industrial sectors. The Institute owes much of its success to the loyal friends we have made throughout the years. So it is with a deep and heartfelt appreciation that the staff of Schepens Eye Research Institute says thanks to all of you for helping us fund Dr. Schepens’ dream of reversing what has been viewed as irreversible, and prevent the unpreventable.
Learn More About Our Research

If you would like to learn more about our current research to cure, treat and prevent blindness, please contact our patient liaison, Rich Godfrey.

For the last 23 years, Rich has been an integral part of the Schepens Eye Research Institute, having arrived here at age 37 shortly after receiving a diagnosis of macular degeneration. He discovered the organization while searching for a better understanding of his disease and how to live with it.

Legally blind himself, he understands firsthand the importance of having access to information about eye disease, the very latest in research, treatment options and low vision technologies to help enhance remaining vision.

“I believe it is extremely important for patients and their families to know that research centers like Schepens Eye Research exist and that the diseases afflicting them or their loved ones are being researched. And, that there is hope,” says Rich.

Rich serves as a bridge between Schepens scientists and the public they are working to help. Simply put, for 23 years, Rich has been helping people navigate the sometimes devastating and often confusing waters of a vision loss diagnosis, explaining to them the science behind the diagnosis and new discoveries in layman’s terms, and guiding them to low vision resources that can immediately enhance their daily lives as their vision diminishes.

If you or a loved one is in need of information on eye disease, related research, or low vision resources, please call Rich directly at (617) 912-2569 or email him at richard.godfrey@schepens.harvard.edu.
Save the Date

**When**: Wednesday, November 30, 2011

**What**: We’re celebrating the Vision of Beauty as a Night For Sight this year!!!

Join us for Schepens Eye Research Institute’s 60th Anniversary Dinner Celebration & fashion presentation by Neiman Marcus Palm Beach.

Cocktails at 6:30; Fashion Presentation at 7; Dinner at 8

**Where**: The Breakers, Palm Beach

**Who**: Hosted by Florida Friends of Schepens

For more information, call 1-877-724-3736 or visit: www.schepens.harvard.edu/breakers