

Schepens
Eye Research
Institute

2007 vision 2007 annual report 2007



An affiliate of
Harvard Medical School

Schepens Eye Research Institute fights blindness by developing new technologies, therapies and knowledge to preserve and restore vision. Through a continuum of discovery, the Institute works toward a future in which blindness is prevented, alleviated, and, ultimately, cured.

Founded in 1950 by famed retinal surgeon Charles L. Schepens, M.D., Schepens Eye Research Institute is the largest independent eye research institute in the nation and an affiliate of Harvard Medical School. Since our inception, we have trained more than 600 postdoctoral fellows in various disciplines of eye research; trained more than 500 eye surgeons who now practice around the world; and published more than 4,600 scientific papers and books about health and eye disease.

Collaborating on a future without blindness

Age-related eye disease affects one out of three people over age 65, and one out of two over age 80. It is estimated that 43 million Americans will suffer significant vision loss or blindness from these diseases by the year 2020.

But we can change this situation. Through a continuum of discovery, Schepens Eye Research Institute works towards a future in which blindness is prevented, alleviated and, ultimately, cured. What will that future look like? In this Annual Report, Schepens scientists share their view of how clinical approaches to vision problems will look in 2020—transformed by innovative therapies and technologies now in the last stages of development. You will get the insider's view of what lies just beyond the horizon for treating age-related macular degeneration, glaucoma, diabetic retinopathy, and dry eye syndrome, as well as advances in low vision rehabilitation. It's a handful of years away, but some of the research that will bring us there has been underway for 10 or 20 years.

So why are we looking into our scientific crystal ball? Our greatest strengths are in pioneering new innovations and applying our expertise where it can make the biggest impact. To that end, Schepens Eye Research Institute is working with its partners—including trustees, faculty, industry and government advisors—to chart our future course. Together we are analyzing the greatest areas of medical need based on the projected incidence of eye disease in the next decade. We are evaluating data regarding existing treatments, the projected market for new therapies, and the

planned strategic investment in external research by pharmaceutical companies, the National Institutes of Health and other funding agencies. With these challenges and opportunities in mind, Schepens Eye Research Institute will build on its internationally recognized expertise and grow towards the breakthroughs of the future.

This look ahead is an extension of the Institute's commitment to collaboration—bringing together all those who are working towards a future without blindness. This is a new model of scientific leadership, one that positions us to anticipate future needs, and to realize strategic goals. Together we can accelerate the pace of discovery, to the benefit of all who struggle with limited vision.

Join us on this exciting journey.



Michael S. Gilmore, Ph.D.

President, CEO and Dewalt and Marie Ankeny Director of Research



Vision Research 2020

As leaders in the fight against blindness, Schepens Eye Research Institute scientists have a complex view of the future. By the year 2020, they hope to celebrate some major victories in the battle, but are also aware of the realities of funding priorities and market forces.

We asked some of these world-class researchers to give their perspectives on how they and the Institute are likely to contribute to that future.

Age-related Macular Degeneration

Digging deeper, refining drugs

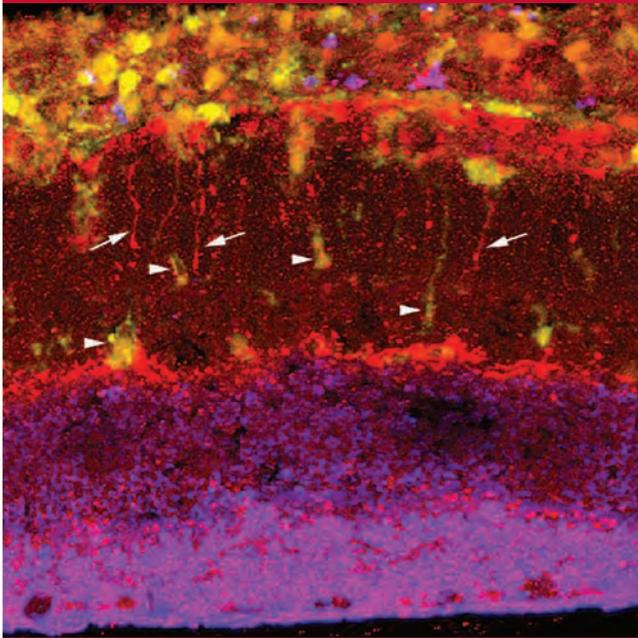
“Technology is changing so quickly that it is almost impossible to predict what vision research will look like in ten years,” says Senior Scientist Patricia D’Amore. “So many tools we have today did not exist even a decade ago. But, that said, I believe we will have a real handle on the underlying causes of both wet and dry macular degeneration in ten years. And, with that knowledge will come a whole new wave of therapeutic possibilities,” she says.

Macular degeneration, or AMD, is caused by the deterioration of the central portion of the retina, the inside back layer of the eye that records the images we see and sends them via the optic nerve from the eye to the brain. The retina’s central portion, known as the macula, is responsible for focusing central vision in the eye, and controls

our ability to read, drive a car, recognize faces or colors, and see objects in fine detail. Most AMD patients have the “dry” form of the disease, which is poorly understood and currently has no effective treatments. The “wet” form of the disease is caused by the growth of abnormal blood vessels that leak into the retina causing blinding damage.

Dr. D’Amore’s research on blood vessel growth (angiogenesis) helped to lay the groundwork for the first anti-angiogenic drugs—Lucentis™ and Macugen™—which help to slow the progression of wet macular degeneration. She predicts that the next big challenge will be understanding the etiology of and developing treatments for dry macular degeneration. Currently no therapies for dry macular degeneration exist beyond nutritional supplements and antioxidant cocktails, which may slow the damage but cannot reverse it.

She also sees improvements in the drugs for wet macular degeneration, which stop the growth of abnormal blood vessels in the retina. “The current drugs, while quite effective, are also flawed and



Transplanted stem cells (stained green) stimulate the production of the protein MMP2 (red), priming the retina for regeneration. As we learn more about this and other mechanisms of stem cell biology, the way is opened for new clinical therapies to recover lost vision.

are beginning to show some side effects. I believe therapies to target wet macular degeneration will be more refined and sophisticated in ten years.”

Dr. D’Amore and her laboratory are working on understanding the regulation of the molecules involved in wet macular degeneration, information that they believe is essential to the development of more targeted drugs. They are also investigating the pathogenesis of dry macular degeneration. She and her team are working to create an animal model that accurately mimics the human disease. Such a model will make it possible for her team and others to determine how growth factors and other variables contribute to this less rapidly developing, but equally debilitating form of AMD.

“Macular degeneration (both wet and dry) is primarily a disease of aging. Thus, though we aim to find a cure for AMD, what we really want to do is to identify ways to prevent the development of these degenerative changes,” says Dr. D’Amore. “Regardless, I do believe that Schepens is now and will continue to contribute to the foundation of more sophisticated interventions for preventing and treating these disorders.”

Repairing the damage

“I think the recent progress in fundamental research, and specifically in stem cell biology, will lead to clinical therapies for a number of diseases in the near future. And, the eye will be the perfect site for such innovations,” says Associate Scientist Dr. Michael Young. Dr. Young is hopeful that stem cell therapies will be changing the lives of patients suffering from AMD by 2020.

“Clinical trials for retinal stem cell transplants in human beings will happen in three to five years. In ten years, we should be well on the way to using them to give people back at least some of their vision,” he says.

Dr. Young and his team are on the forefront of this research worldwide. The first to transplant stem cells into mice and watch them transform into retinal cells, they are now seeing positive results in pigs. Human beings are next, he says.

- **A legacy of discovery**

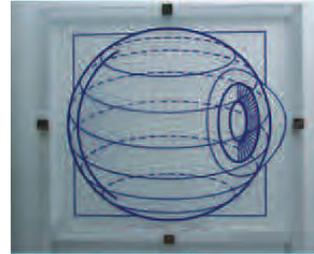
- When George Grimshaw, a fastener manufacturer and entrepreneur, was diagnosed with Age-related Macular Degeneration (AMD), he felt overwhelmed by the idea of living in a world with impaired vision. His search for the best care led Mr. Grimshaw to Schepens Eye Research Institute, then the Retina Foundation, and the clinical practice of Dr. Schepens. He was able to find both treatment and hope at Schepens Eye Research Institute as he learned about the Institute's research into the causes of AMD. In gratitude for his care, he decided, along with his companion Irene Gudewicz, to support AMD research at Schepens Eye Research Institute through the Grimshaw-Gudewicz Charitable Foundation. Even now, twelve years after his death, the partnership between the Institute and his charitable foundation is going strong.

Roughly 7% of those over age 75 and 20% of those over age 90 suffer from AMD, a progressive deterioration of the central retina that occurs with increasing prevalence as people age. Severe vision loss due to AMD results from choroidal neovascularization, retinal pigment epithelium (RPE) detachment, and geographic atrophy (GA) of the RPE. In 2006, funds from the Grimshaw-Gudewicz Charitable Foundation supported research being conducted by Dr. Francois Delori, Senior Scientist. Dr. Delori is assessing the progression of geographic atrophy in AMD to find clues to allow for earlier therapeutic intervention, in hopes of increasing the possibility that vision can be preserved.

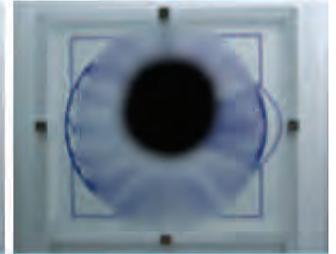
Dr. Delori's laboratory is studying the possible role of lipofuscin, a fluorescent pigment that accumulates throughout life in the RPE. Excessive accumulation of lipofuscin is a common causative factor in various retinal diseases. The goal of his project is to determine

Advanced dry age-related macular degeneration (AMD) can lead to severe darkening and blurring of central vision (top panel). Local degeneration of the retinal pigment epithelium (RPE), the loss of underlying choroidal blood vessels and the atrophy of the photoreceptors are the classic changes associated with this currently untreatable condition. Creating a model that accurately mimics these changes will help Dr. D'Amore in her search for a cure.

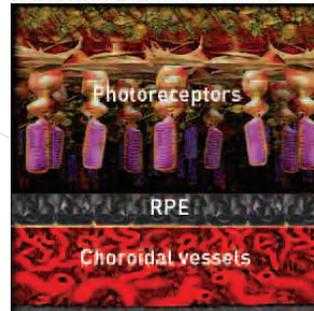
Normal vision



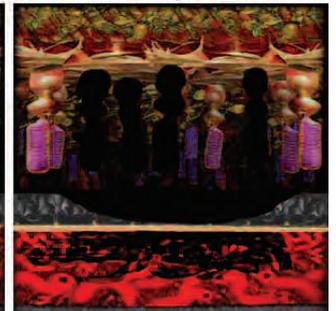
Dry AMD



Normal retina



Retina with dry AMD



whether high focal levels of lipofuscin are a precursor to disease progression of geographic atrophy, which may allow for earlier disease detection and earlier therapeutic intervention. and perform a retrospective study of GA progression in patients with AMD.

A trustee of the Grimshaw-Gudewicz Foundation notes that, "During his lifetime, George was enthusiastic about the work being conducted at the Institute. He felt immensely lucky that Dr. Schepens was able to help restore his vision. As trustees of the foundation and as long-time friends we relish the opportunity to support the critical research to find cures for people coping with vision loss from macular degeneration."

Diabetic Retinopathy

An ounce of prevention

“There are the hopes, and the realities,” says Chiara Gerhardinger, Assistant Scientist at Schepens Eye Research Institute. “Our hope would be that in ten years diabetes will disappear and with it diabetic retinopathy. But that is not likely, given that the incidence of diabetes is increasing rapidly as the population experiences an epidemic in obesity in children and adults.”

“On the other hand,” she adds, “I am confident that in ten years we will—through improved science and technology—know the most critical cellular and molecular processes triggered by diabetes in the eye. And, once we know that, we can really start designing effective drugs to prevent vision loss.”

“But in the meantime we should not underestimate the potential of pursuing aggressively what is known today, and translating it into a well articulated prescription for the prevention of retinopathy,” concur Dr. Gerhardinger and Dr. Mara Lorenzi, Senior Scientist.

Dr. Lorenzi is confident that the increasing attention to good control of the high blood glucose of diabetes and the high blood pressure that sometimes accompany diabetes will slow greatly the rate of development and progression of retinopathy. “On this less rapid course, I foresee that we could then intervene with well-tolerated drugs and make prevention of diabetic retinopathy a reality.”

By 2020? Drs. Gerhardinger and Lorenzi are optimistic. “We have on hand interesting candidate drugs and processes, and if we get the funding necessary to address some critical questions, we could approach target within that time frame.” This would be a wonderful new day, they note, when considering that diabetic retinopathy is still the second most common cause of blindness in Americans.

The search for ways to prevent or arrest the effect of diabetes on the retina and retinal vessels is proceeding along several paths at Schepens Eye Research Institute.

Diamonds in the rough

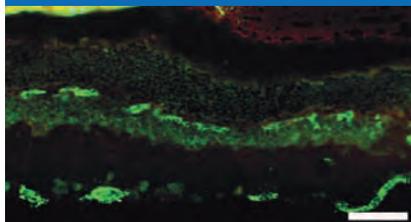
Dr. Lorenzi is taking a look at drugs that were abandoned because they were not found effective, but that, in her opinion, have potential and were not properly tested. For example, aldose reductase inhibitors were probably not given in proper doses. Aspirin has been tried in the past when retinopathy was very advanced, and yet it may provide its greatest help when started early, before retinopathy becomes detectable.

Dr. Gerhardinger is working on understanding how a molecule called interleukin-1 beta causes damage to the blood vessels in diabetic retinopathy. “If this molecule plays an important role, then we can create a drug that will block or modulate its activity,” she says. An additional strategy of the Schepens scientists is to identify if certain molecular responses of the retinal blood vessels to diabetes become mechanisms that amplify the damage caused by diabetes, and should therefore become prime targets for drugs.

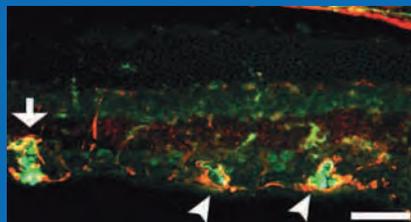
Drs. Gerhardinger and Lorenzi conclude, “The best outcome would be to cure diabetes. Second best would be to find a magic bullet that prevents or cures retinopathy. But working with what we know and have built here at Schepens Eye Research Institute will bear fruits in the more foreseeable future.”

The new aldose reductase inhibitor (ARI-809) prevents pro-inflammatory changes caused by diabetes in the retinal vessels by inhibiting an activated complement (shown as red mixing with the green-stained vessels in

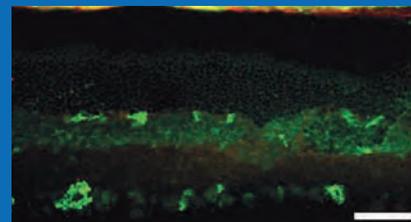
the middle image) that otherwise damages the endothelial cells and blood vessels. If ARIs can be used effectively in humans, the changes that lead to diabetic retinopathy and other complications of diabetes may be avoided.



Normal



Diabetic



Diabetic treated with ARI-809

● Partners in pathbreaking

Challenges draw curious people to science. To some, a medically important, unexplained problem has an irresistible call. Once heard it must be solved, even if it takes a lifetime.

Peter Oates—a Research Advisor at Pfizer, one of the member companies of the Institute’s corporate alliances program—is one such seeker. His career-long pursuit has been in the field of aldose reductase inhibitors (ARIs) as a therapy for diabetic retinopathy and other complications of diabetes. But as Dr. Oates warns, “This is definitely not an undertaking for the faint of heart.”

There is reason to be hopeful about the therapeutic potential of ARIs. These drugs inhibit aldose reductase, the enzyme that sends glucose into a pathway of metabolism called the polyol pathway. The high glucose of diabetes makes the pathway very active and this causes damage to the cells in multiple ways. Laboratory research has shown that genetic deletion of aldose reductase prevents all early effects of diabetes on the cells of the retina.

But there’s a catch. When used in human clinical trials, ARIs have shown only modest benefits. Many have taken those results to suggest that the polyol pathway is of minor importance in the development of diabetic retinopathy in humans, and have dismissed ARIs as a viable therapy. Dr. Oates, however,

persisted, believing that past failures have been due to an inappropriate paradigm and a misleading biomarker. In his view the best hope for treating the disease still might lie with the ARI mechanism, but further evidence was needed to bolster this case.

New research in the laboratory of Dr. Mara Lorenzi gave Dr. Oates an important demonstration of the type of key supportive evidence he was looking for and launched a collaboration that has put both researchers on the path to confirming that the ARI mechanism is indeed a potentially important treatment for this devastating disease. Drs. Oates and Lorenzi recently began studying a new ARI discovered at Pfizer for its effects on the retina in experimental diabetes, and their close collaboration resulted in shared authorship of a paper in the journal *Diabetes* in October of 2006. They are now working together on a chapter in a forthcoming book on diabetic retinopathy in order to further elucidate what, according to Dr. Oates, “still appears to be the most upstream and best approach to slowing diabetic complications, (namely) ARI.”

Together they hope to re-energize the field of ARI research and in so doing to give renewed impetus to all those working towards new treatments for the complications of diabetes. “Hopefully,” says Dr. Oates, “all the good science will triumph in the end. As we say at Pfizer and as Dr. Lorenzi frequently reminds us all, “The patients are waiting!”

Glaucoma

Two steps ahead

By 2020, there will be a shift in the way we treat glaucoma, according to Associate Scientist Dr. Dong Feng Chen. “Today our only real option is to give people drugs that rescue the eye from elevated intraocular pressure that chokes the optic nerve and cuts off nutrients to the retinal nerve cells, called ganglion cells,” she says. “But this doesn’t stop the disease process in glaucoma. The disease continues even when there is no increased pressure. And, ultimately, there is damage to vital nerve cells.”

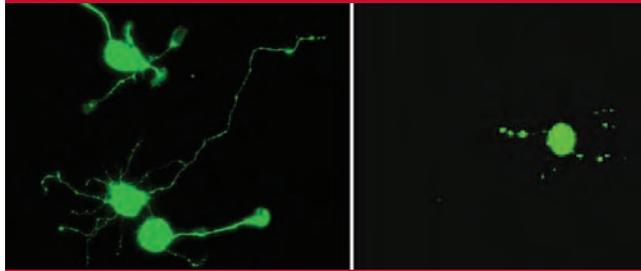
Dr. Chen believes that in the future the focus will be on stopping or preventing glaucoma before it can begin its damaging journey. And, if the damage is already done, then “we will regenerate the nerves,” she says.

Although she admits “We don’t know exactly what causes glaucoma or the increasing intraocular pressure, by 2020 we should have a better understanding of why the whole process begins and why neurons die as a result.”

When it comes to nerve regeneration, Dr. Chen and her research team are world pioneers. They were first to regenerate optic nerves in mice by turning on a gene and eliminating scar tissue the body forms to block regeneration after birth. She and her team are now studying a final barrier to regeneration—the tissue covering the nerve (known as the myelin sheath) to unlock the barrier and further enhance nerve repair. The team is also involved in regenerating retinal ganglion cells, stimulating quiescent (quiet or inactive) stem cells in the retina to become neurons and retinal ganglion cells and regenerate damaged tissue, which is a different approach than transplanting cells from the outside.

Other Schepens scientists are joining her as leaders in this new frontier, one that could ultimately impact many disorders of the central nervous system.

Cut nerve cells healed and even grew when cultured with a new growth factor (left) while the control group (right) barely survived. Dr. Chen is looking for ways to harness the therapeutic potential of this growth factor to treat optic nerve damage and glaucoma.



● Through the eyes of child

● Holding your newborn for the first time, kissing your baby, and staring in the eyes of your beautiful child is a cherished event. Motherhood is a frightening yet rewarding journey, especially for a first time parent, but even more so for Stacey Strath. In the last days of her pregnancy, Stacey was focused on delivering a healthy baby and was anticipating all the joys that come with being a parent. After the birth, she realized that her sight was severely compromised by undetected—and therefore uncontrolled—glaucoma. Within days of delivering her son, she had almost completely lost vision in one eye, and had lost 75% of her vision in the other.

There is no pain associated with glaucoma and no changes in vision at first, even though the optic nerve is slowly being damaged. Of the approximately three million Americans that have open-angle glaucoma, approximately half don’t know they have the disease. After the birth of her second child, Stacey’s father, Stanley, learned about the research and developments in regenerative medicine at Schepens Eye Research Institute. Especially optimistic about the success of Institute scientist Dr. Dong Feng Chen and her laboratory’s work to regenerate the optic nerve, Stacey and her family renewed their sense of hope. Stanley, an

employee of the U.S. Postal Service informed the Institute of availability of support from the Combined Federal Campaign for employees of the federal government, postal service, and the uniform services—the largest workplace-giving program in the world. “As a person of limited means, it is encouraging to know that even our small gifts, when pooled together, create a greater impact on the Institute’s ability to advance vision research,” said Stanley.

Stacey, now 33 years old and the mother of two healthy children, is fighting hard to ensure that her children don’t suffer from vision loss as she does. She anticipates the day when her vision is restored and she can watch her daughter walk down the aisle. Until then, Stacey and her family continue to champion the efforts of the Institute and the scientists working to eliminate blindness.



Low Vision Rehabilitation

Making lives better now

“Progress has been slower than one would hope in this field, and without additional funding it will continue to lag,” says Dr. Eli Peli, Senior Scientist and the Institute’s low vision expert. “Low vision aids have been refined in recent years, but they have not changed dramatically. Any real innovations have come from general technological leaps that the low vision community adopted for its needs.”

Computers are a good example of recent borrowed technology. Smart cars equipped with warning systems and global positioning devices will be a technological step forward that extends mobility for low vision patients, according to Dr. Peli.

But neither is designed specifically for the visually impaired. Dr. Peli’s hope is that resources will increase for the development of devices to make life better for the visually impaired “right now” as they await major medical and scientific breakthroughs. For instance, he would like to see the following:

- The availability and enhancement of implantable and wearable telescopes to help people drive and maneuver better in their everyday lives.
- Enhanced education for the professional vision community so they can be better advocates for patients and better able to train patients to use existing visual aids.

- Increased training opportunities for both researchers and practitioners of low vision rehabilitation, which are currently sorely limited.

Dr. Peli is a world leader in creating new devices and adopting evolving technology for the needs of the low vision population.

For instance, his laboratory pioneered the search for ways to improve television images so that low vision patients can enjoy watching television and has already created a remote-controlled, contrast-modifying device that serves this purpose.

And, with the help of a driving simulator, he and his laboratory team are looking at the impact of various low vision conditions on driving ability and at the benefit of optical and other technological aids.

In addition, his group is working on devices to improve walking mobility and obstacle avoidance. These devices, such as one he has developed for people with tunnel vision and another for patients with hemianopia, for whom half the visual field is missing, have proven effective in early studies. The device for hemianopia is going into clinical trials this month and he is currently looking for corporate partners to help him advance the tunnel vision device to this stage.

In both the natural driving environment (second image) and in the simulator (third image), Dr. Peli and his colleagues evaluate the impact of visual aids and assistive technologies on the driving behaviors of patients. With the enhancement these devices provide, patients with vision impairments could drive safer longer.



- **The keys to independence**

- Across the vast parking lot you scan across the sea of vehicles. Suddenly, you spy what you were looking for and slowly start your trek over. Eventually you reach your destination and start rifling through your bag. Among the papers, chapstick and wallet, you stumble upon the black remote and you locate the proper button. The sound of a gentle ding, ding, ding greets you. The door closes and you slowly put the key in the slot and turn on the ignition. The dinging is now replaced with a soft purr of the engine.

This is a scene that many of us take for granted each day. It is also one of the most cherished rites of passages for teenagers. A driver's license gives an individual a sense of mobility—of independence. The world spreads out before the driver, inviting him to explore each street, vista and corner café.

A young man named Mark wants to enjoy this simple freedom, but when he was diagnosed with Stargardt's Disease, a juvenile form of macular degeneration, he worried the disease would rob him of it. Through his family's foundation, he and his family have supported Schepens Eye Research Institute's research into new treatments for degenerative retinal diseases. Also, through support from people like them, Schepens scientists are developing technologies to make the most of existing vision to make every day activities, like driving, easier. One such scientist is Senior Scientist Dr. Eli Peli. Recently, Dr. Peli fitted Mark with a spectacle-mounted telescopic system. The system incorporates a wide-field telescope that is built completely inside the spectacle lens, which can

be altered to include the wearer's prescription, and uses embedded mirrors inside the carrier lens for optical pathway folding, and conventional lenses or curved mirrors for magnification power. The system allows the wearer to simultaneously see the magnified field above the unmagnified natural view.

Currently, 36 states, including Mark's home state of New York, allow Bioptic telescopes as driving visual aids for people with low vision. As Mark prepares to take the road test for his driver's license, he is quickly adjusting to wearing Dr. Peli's low vision driving aid. Thanks to Dr. Peli's low vision equipment, Mark, and thousands of Americans just like him, can answer the call of the open road and experience the freedom and independence that driving allows us.



Dry Eye Syndrome

All together now

“Looking ten years down the road, I frankly do not see a cure for dry eye syndrome, but what I do see are some novel therapies that will certainly relieve this common and debilitating disorder more effectively than what we can offer these patients today,” says Reza Dana, Senior Scientist at Schepens Eye Research Institute. “In 2020 we will be successfully treating dry eye syndrome like other chronic conditions, such as heart disease, with effective drugs on an ongoing basis.”

More effective therapies are almost inevitable, he says, because interest in dry eye syndrome is rapidly growing now and will continue in the future. The reason for this increased focus is threefold. First, the scientific and medical community has finally come to understand that this is a real and prevalent disorder that can cause true suffering. Second, scientists have learned much more about the disease process in the past ten years. And, third, pharmaceutical companies have become aware of the need for the development of new drugs, and there is significantly more interest in R&D in dry eye today as compared to a decade ago.

Some of the new therapies that Dr. Dana believes will exist in the coming decade will probably begin at Schepens Eye Research Institute. “Schepens is unquestionably a world leader in corneal research, and it is certainly an international leader in dry eye syndrome.

Schepens scientists are involved in the three main areas of investigation—inflammation, lubrication, and the role of hormones. Dr. Dana is exploring how the eye regulates and modulates inflammation on the cornea, which is one of the critical target tissues in dry eye syndrome. “We are trying to identify molecular mechanisms that cause the disease and identify targets for drugs that we can first test in animals before taking them to the clinics for translational research.”

Drs. Ilene Gipson and Darlene Dartt, both Senior Scientists, are studying mucins, molecules that are on the surface of the eye that seem to keep the cornea lubricated. Dr. Pablo Argueso, an Assistant Scientist, is looking at what role these mucins might play in dry eye syndrome. Dr. Dartt is additionally studying the lacrimal gland, the major producer of water, electrolytes, and proteins in tears.

The third area has to do with hormonal treatments for dry eye syndrome, which is being spearheaded by Dr. David S. Sullivan.

The CEC developed by Dr. Dana's laboratory replicates human dry eye syndrome by regulating airflow and humidity. This system has allowed researchers to look into the causes of dry eye and to test new treatments.



- **Sharing the fight**

- A little more than 10 years ago, the Institute launched a military vision research program that partnered with the Department of Defense to address the needs of a then peacetime military community. The program quickly shifted gears when the Iraq war started, and paired Schepens scientists with military ophthalmologists to target new threats posed by the combat environment. Senior Scientist Dr. Darlene Dartt was tapped to lead this initiative, and as she and other Institute researchers have since discovered, working with the Department of Defense is an unexpected delight, generating new ideas and pushing researchers to solve immediate problems faced by troops in the field.

Dr. Dartt's own research offers a perfect example of how well this partnership has worked. In 2003, Dr. Dartt started looking into the challenges associated with refractive surgery for military personnel. Over the last few years, the military has embraced refractive surgery as a low risk, low cost means to improve the fighting forces. However, a common complication of this surgery is dry eye syndrome, which while not blinding, causes pain and discomfort, decreased

blinking, slows washout of foreign bodies especially in dry and windy conditions, and predisposes the eye surface to flap displacement and wrinkles. Needless to say, this undesirable condition can impair function in the battlefield, where there is little to no ability to treat it.

Dr. Darlene Dartt and her collaborators completed a project that identified a reliable means to prescreen candidates who might be at elevated risk of developing chronic dry eye syndrome after the procedure for LASIK (Laser-Assisted in Situ Keratomileusis) vision correction surgery. They identified parameters that were clearly predictive of dry eye complications and plan to continue the study with the assistance of collaborators at Walter Reed Army Medical Center to look into relationships between chronic dry eye and other forms of corrective surgery, like PRK (photorefractive keratectomy)—a procedure commonly used on military personnel.

Dr. Dartt presented her results at a product line review at Ft. Detrick in July 2007. They were met with enthusiasm, as they provide guidance on when to most safely deploy military personnel after their refractive correction procedures. Currently, military personnel may be deployed as early as 24 hours after surgery, and consequently enter theater without the medications they may need to manage dry eye complications. According to Col. Karl Friedl, the Commanding Officer of the program's partner research center within DoD, "This is the ideal example of what we like to see. Seed money used to establish proof of concept, direct military relevance and involvement, and success competing for additional funding. We want to help this reach conclusion with more support."

-

International recognition

Faculty awards and presentations

Dr. Pablo Argüeso was the Keynote Speaker at the 5th International Conference on the Tear Film & Ocular Surface: Basic Science and Clinical Relevance held in Taormina, Italy.

Dr. Patricia D'Amore received the 2007 A. Clifford Barger Excellence in Mentoring Award from Harvard Medical School.

Dr. Reza Dana was accepted into the *American Ophthalmological Society*, is a newly selected member of the editorial board of *Investigative Ophthalmology and Visual Science*, was selected as Chair of the *ARVO Awards Committee*, and was awarded a Service Recognition Award by the *American Academy of Ophthalmology*. Dr. Dana made notable invited presentations at the following events and institutions:

→ Johnson and Johnson, Jacksonville, FL

- Kresge Eye Institute, Wayne State University. Detroit, MI
- Allergan Fellows Day, Newport Beach, CA
- American Academy of Ophthalmology, Cornea Subspecialty Day, New Orleans, LA
- Second Cullen Symposium on Corneal and Ocular Surface Inflammation, Baylor College of Medicine, Houston, TX
- Conference Co-organizer and Invited Speaker, Inflammation and Ocular Surface Focus Group, Paris, France
- Combined Meeting of the European Ophthalmology Society and the American Academy of Ophthalmology, Vienna, Austria
- Grand Rounds, Combined Mass. General Hospital and Brigham and Women's Hospital Rheumatology Rounds (MGH)
- Bayer Schering Pharma AG Lipoxin Exploratory Workshop, Brigham and Women's Hospital

- Grand Rounds, Dana-Farber/ Harvard Cancer Care Blood and Marrow Transplantation Center
- 25th Boston Biennial Cornea Conference

Dr. Darlene Dartt delivered an invited lecture and chaired a section at the August 2007 meeting of International Society for Contact Lens Research in Whistler, BC, Canada and at the Tear Film and Ocular Surface Society Meeting in Taormina, Italy.

Dr. Marshall Doane delivered an invited lecture at the August 2007 meeting of International Society for Contact Lens Research in Whistler, BC, Canada.

Dr. Michael Gilmore presented invited lectures on new strategies for targeting antibiotic resistant pathogens at the following events and institutions:

- National Institutes of Health Rocky Mountain National Laboratories, Hamilton, MT; University of Missouri Kansas City, Kansas City, MO; University of Louisville, Louisville, KY ; University of Maryland, Baltimore, MD; Juntendo University, Tokyo, Japan; Tufts Sackler School of Medicine; Biofilm research unit, Pasteur Institute, Paris, France; University of Texas, Austin, TX; Microbial Adhesion and Signal Transduction Gordon Conference, Salve Regina College, Newport, RI

→
Keynote Address, Advances in Infection Biology and Vaccinology University of Würzburg, Germany

→
Platform talk and member, European Commission Network of Excellence in Pathogenomics, International Advisory Board, Menaggio, Italy

→
Keynote Address Japanese Society for Cataract and Refractive Surgery, Matsuyama, Japan

→
Co-Organizer “Functional Genomics of Gram-Positive Microorganisms,” Tirrenia, Italy

→
Voted Chairman elect, Microbial Adhesion and Signal Transduction Gordon Conference, Salve Regina College, Newport, RI

→
Section chair, International Society for Contact Lens Research, Whistler Canada Platform talk, Tear Film and Ocular Surface Society, Taormina, Italy

→
Appointed Member, INRA (Institut National de la Recherche Agronomique, France) External Review Committee, Paris, France

→
Appointed Member, NIH CSR Bacterial Pathogenesis Study Section

Dr. Ilene K. Gipson, Ph.D.
received the Friedenwald Award, which is presented annually for outstanding research in the basic or clinical sciences as applied to ophthalmology by the Association for Research in Vision and Ophthalmology.

Dr. Meredith Gregory-Ksander
was an Invited Speaker at the October 2006 meeting of the European Vision and Eye Research Annual Meeting, held in Vilamoura, Portugal. In June 2007, she delivered a talk at the International Society of Ocular Oncology Meeting held in Siena, Italy.

→
Dr. Gregory-Ksander also received The Thomas R. Lee Award for National Glaucoma Research from the American Health Assistance Foundation.

Dr. Andrius Kazlauskas was awarded the Research to Prevent Blindness Lew R. Wasserman Merit Award.

Dr. Mara Lorenzi, since November 2006, has been a Visiting Professor at the Università Vita-Salute of the San Raffaele Medical Center in Milano, Italy. She has also served as Visiting Professor in the Departments of Ophthalmology and Pharmacology at the University of Florida, Gainesville. Dr. Lorenzi was an Invited Speaker at the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Workshop entitled “Advances toward Measuring Diabetic Retinopathy and

Neuropathy: From the Bench to the Clinic and Back Again”, in Baltimore, MD. Dr. Lorenzi was the Keynote Speaker at the European Association for the Study of Diabetes Eye Complications Meeting in Rome, Italy and a Lecturer at the Neuroscience Institute, Consiglio Nazionale delle Ricerche, in Pisa, Italy. She delivered the Plenary Lecture at the Regional Assembly of the Italian Diabetes Association in Milan, Italy, and gave the Honor Lecture at the Annual Scientific Meeting of the Italian Diabetes Association in Olbia, Sardinia, Italy.

Dr. Eli Peli was appointed a Program Committee member (Chair, Clinical) of the Optical Society of America at the Vision Meeting 2007 held at University of California, Berkeley. He was appointed a Fellow of the International Society for Optical Engineering (SPIE). Dr. Peli made notable invited presentations at the following events and institutions:

→
Envision 06 & 07 conferences, Kansas City, MO

→
Keynote talk, 2nd International Symposium on Visual Computing (ISVC06), Lake Tahoe, NV

→
SID International Symposium, Society for Information Display, San Francisco, CA

→ Institute of Ophthalmology, University College, London, UK

→ IMT-UK Study Investigator's Meeting, Institute of Ophthalmology, University College, London, UK

→ SPIE Conference on Current Developments in Lens Design and Optical Engineering VIII, San Diego, CA

→ Workshop on Computer Vision Applications for the Visually Impaired. OSA Fall Vision Meeting, Berkeley, CA

Dr. Joan Stein-Streilein was an Invited Speaker at the "Immunology of Ocular Allergy" Workshop held in Ettal, Germany. Dr. Stein-Streilein was Speaker and Co-Chair of "Immune privilege and Regulatory cells" at ImmunoRio 2007: 13th International Congress of Immunology, Rio de Janeiro, Brazil. She was an Invited Speaker at the 9th IOIS International Congress held in Paris, France. Dr. Stein-Streilein also headed a Special Interest Group at 2007 Annual Meeting of the Association for Research in Vision and Ophthalmology.

Dr. David Sullivan was elected President of the Tear Film & Ocular Surface Society, and was

Co-Organizer of the International Dry Eye Workshop (DEWS). He was also the Organizer of the Special Interest Group Meeting, "Conclusions and Recommendations of the International Dry Eye Workshop (DEWS)", held at the Annual Meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL and at the European Association for Vision and Eye Research, Portoroz, Slovenia. Dr. Sullivan was the Co-Organizer of the 2007 Report of the International Dry Eye Workshop (DEWS), published in *The Ocular Surface*, Volume 5, Number 2, pp. 65-204, 2007; additional material placed online at www.TearFilm.org. Dr. Sullivan was the Organizer of the 5th International Conference on the Tear Film & Ocular Surface: Basic Science and Clinical Relevance held in Taormina, Sicily. Dr. Sullivan made notable invited presentations at the following events and institutions:

→ Symposium on Dry Eye, Fermo, Italy

→ Symposium on Immunology of Dry Eye, International Congress of Eye Research, Buenos Aires, Argentina

→ The 2nd World Congress on Gender-Specific Medicine and Aging: The Endocrine Impact, Rome, Italy

→ Pfizer, La Jolla, CA and New York City, NY

→ International Dry Eye Workshop Symposium, Association for Research in Vision and Ophthalmology Meeting, Fort Lauderdale, FL

→ Resolvyx Pharmaceuticals, Bedford, MA

→ International Dry Eye Workshop Symposium, European Association for Vision and Eye Research Meeting, Portoroz, Slovenia

→ American Academy of Optometry/Association for Research in Vision and Ophthalmology Symposium on Advances in Dry Eye Disease: Women, Nutrition, and Impact on Vision and Quality of Life, Tampa, FL

→ Management & Therapy of Dry Eye Syndromes, International Dry Eye Workshop Symposium, European Association for Vision and Eye Research Meeting, Portoroz, Slovenia

Andrew Taylor was appointed to the ARVO Animals in Research Committee, and became President of the Cora Verhagen Award Committee. The Cora Verhagen Prize is awarded for the best ocular immunology poster or paper presentation at the Association for Research in Vision and Ophthalmology Annual Meeting.

Fellows' presentations and awards

Dr. Jorge Aranda received the Pew Latinamerican Fellowship in the Biomedical Sciences.

Dr. Fuensanta Vera Diaz received the Alice J. Adler Fellowship of the Schepens Eye Research Institute, a part of the Eleanor and Miles Shore 50th Anniversary Fellowship

Program for Scholars in Medicine at Harvard Medical School.

Dr. Ula Jurkunas received funding through Harvard Medical School's Center of Excellence in Women's Health.

Dr. Flavio Mantelli was awarded the Young Investigators Award for significant achievement in tear film and ocular surface research by the Tear Film and Ocular Surface Society.

Dr. Daniel Saban was awarded a Postdoctoral Fellowship Award granted by Fight For Sight (FFS) and American Society for Cataract and Refractive Surgeons (ASCRS). Dr. Saban received the Howard Lieberman Paper Award (ASCRS), and a Travel Award from the Transplantation Society.

Meet our new investigator



We are delighted to welcome a new member to our research faculty. Each addition to our team brings fresh insights, openness, and enthusiasm for advancing our shared goals.

Peter Bex, Ph.D. **Associate Scientist**

*1994 Ph.D. Cardiff University
(Wales, UK)*

Dr. Bex's doctoral thesis project was an applied study of perceptual failures experienced by pilots reading dynamic information on computer-generated cockpit displays. This was followed by post-doctoral research positions at McGill University in Montreal and at the University of Rochester, NY. He studied optics, used laser systems

to present images directly on the retina, and began to examine visual function in the natural environment. Under natural conditions, existing computational models of visual processing are frustrated because of the complex and dynamic content of real scenes compared with laboratory or clinical stimuli. Dr. Bex then returned to the United Kingdom to take up a faculty position at the Institute of Ophthalmology in London in 2000, where he concentrated on translational research between basic and clinical vision

science. Our understanding of visual processing is largely based on studies of the central vision of healthy, young subjects; he began to update our understanding of visual processing to deal with the effects of ageing and eye disease. This year, Dr. Bex joined Schepens Eye Research Institute where he is continuing this work and applying it to clinical populations, including those suffering from glaucoma, age-related macular degeneration, and amblyopia.

Meet our new Trustees and Corporators

We're pleased to introduce you to the Institute's new Trustees and Corporators. They join our other volunteers – engaged, committed people from all walks of life who together are focused on governing the Institute and helping it to realize its vital mission.

Trustees

Joseph F. Rizzo III, M.D.

Dr. Rizzo, Associate Professor of Ophthalmology at the Harvard Medical School, has served as the Director of the Neuro-Ophthalmology service at the Massachusetts Eye and Ear Infirmary since 2004. A native of New Orleans, Dr. Rizzo is a graduate of Louisiana State University and Louisiana State University Medical School in New Orleans, where he received the "Dean's Award" in recognition of outstanding leadership and performance.

In 1988, Dr. Rizzo first conceived of the possibility of developing a microelectronic retinal prosthesis to restore some vision to patients with degenerative retinal disease,

like retinitis pigmentosa and age-related macular degeneration.

This concept led to the founding of the Boston Retinal Implant Project, which has been a multi-disciplinary collaboration among the Massachusetts Eye and Ear Infirmary, the Massachusetts Institute of Technology and more recently the Boston VA hospital, where Dr. Rizzo serves as the Director of the "Center for Innovative Visual Rehabilitation", which he established in 2001. In addition to co-directing this research, Dr. Rizzo has also regularly conducted clinical research, mostly related to the diagnosis of retinal and optic nerve diseases. Dr. Rizzo divides his professional time nearly equally between the evaluation of patients with Neuro-Ophthalmologic disease and his research activities. Dr. Rizzo also maintains an active teaching schedule that is primarily directed toward the training of medical students, residents and fellows.

Corporators

B. Thomas Hutchinson, M.D.

Dr. Hutchinson is a founding partner and current President of Ophthalmic Consultants of Boston. His practice focus is on glaucoma and cataract; his professional interests also include quality assurance, credentialing and public service programs. He is an Associate Clinical Professor of Ophthalmology at Harvard Medical School, a consulting editor for the Harvard Medical School Health Newsletter and a past president of the medical staff and Surgeon at the Massachusetts Eye & Ear Infirmary. Dr. Hutchinson was a founding officer and is a Past-President of the Massachusetts Society of Eye Physicians and Surgeons, a Past-President of Prevent Blindness America-Massachusetts and a Past-President of the New England Ophthalmological

Society. He served for nine years as a Director, one as Chairman of the American Board of Ophthalmology. He is a member of the Massachusetts Medical Society, the American Medical Association, the American Glaucoma Society, a past president of the Chandler Grant Glaucoma Society and is a incorporator of the Schepens Eye Research Institute. He has served in several capacities within the American Academy of Ophthalmology including Vice-chair and Chairman of the Council, the first Secretary of Ophthalmic Practice, and as President. He is the founding Chairman of the Academy's National Eye Care Project (Now known as EyeCare America, the largest public service program in American medicine). He has served 10 years as a director of the Ophthalmic Mutual Insurance Company, an Academy subsidiary. He now serves as a member of the Board of Trustees of the Academy and is the Chairman of the Academy's Foundation.

Joseph C. McNay

Mr. McNay is Chairman, Chief Investment Officer and Managing Principal of Essex Investment Management Company, LLC. He has direct portfolio management responsibilities on a variety of funds and on behalf of private clients and is a member of the firm's Management Board. Prior to founding Essex in 1976, Mr. McNay was Executive Vice President and Director of Endowment Management & Research Corp. for nine years. Before 1967, Joe was Vice

President and Senior Portfolio Manager at the Massachusetts Company. Currently he is serving as Trustee of National Public Radio, Trustee and Chairman for the Investment Committee of Simmons College, Trustee of the Dana Farber Cancer Institute, and is a Trustee and member of the Children's Hospital Investment Committee. He received his A.B. degree from Yale University and his M.B.A. degree from the Wharton School of Finance.

Anne Moran

Ms. Moran graduated from Framingham State College with a B.S. degree and taught school in the Los Angeles County and Boston school systems for more than 10 years. Ms. Moran has dedicated more than 25 years to program development in the public schools and community-based fundraising. She served on the Board of Trustees of the Mount Saint Joseph Academy in Boston for six years, and advised Notre Dame Academy in Hingham, Newton Country Day School in Newton and Rosie's Place in Boston on their fundraising efforts. For the last ten years, Anne has been on the Steering and Development Committee of the Boy's and Girl's Club of Boston and has chaired three of their major fundraising events. She advises Beth Israel Deaconess Medical Center on fundraising, as well as Good Samaritan Hospice.

She is the past Co-owner of Quinlan Publishing Company, which published over 40 legal newsletters monthly and was

sold in 2006. She is the President and Owner of Sea Charmers LLC, a company that buys homes and renovates them in resort areas. She is the past owner of HD Designs, a company that decorates and renovates commercial and residential properties all over New England.

Anne lives in Boston and Osterville, Massachusetts and Palm Beach, Florida.

Sally Ankeny Reiley

Mrs. Reiley is the daughter of Institute trustee Pete (and Margie) Ankeny of Wayzata, Minnesota and the granddaughter of the late Marie Hamm Ankeny who was a longtime supporter of the Institute and its research. She graduated from Dartmouth College 1981 and is currently "at home" raising five children and working part-time as professional photographer after many years in the advertising business on the agency side. Mrs. Reiley has served on boards and sat on committees at the Tower School, the Marblehead YMCA, Dartmouth Class of 1981, the Junior Aid Society, the North Shore Childrens' Hospital, and Deerfield Academy. She is an active volunteer in numerous capacities at Deerfield Academy and Tower School.

Carol Scheman

Ms. Scheman has been vice president for external affairs at The Uniformed Services University of the Health Sciences since January 2006. In this position she coordinates and directs the university's relationships with the media, university publications and electronic communications, alumni, the Board of Regents, various communities as well as governmental agencies and the U.S. Congress. Prior to her service at USU, she was vice president for government, community and public affairs at the University of Pennsylvania from September 1994 until July 2005. During the course of her tenure in this position, she developed, coordinated and implemented the university's activities and responses to public policy issues at the federal, state and local levels of government. In addition, Ms. Scheman worked closely with community leaders to enhance Penn's relationship with its neighbors. Prior to coming to the University of Pennsylvania, Ms. Scheman was deputy commissioner of the U.S. Food and Drug Administration. She also served as director of federal relations at the Association of American Universities for thirteen years and then became vice president in 1991. Prior to working at the AAU, she worked as a legislative assistant on Capitol Hill. Ms. Scheman has a B.A. degree from Boston University and a M.S.S.A. from Case Western Reserve University.

Baldo Scassellati Sforzolini M.D., Ph.D., M.B.A.

Dr. Sforzolini has extensive experience of ophthalmology R&D. As Head of the Early Development Organization and Scientific Officer for Novartis, he has global responsibility for exploratory ophthalmic projects up to Phase II, review and approval of protocols and clinical development plans, scientific evaluations and external collaborations. He is a core member of several management boards in Development, Discovery and Licensing, and has experience as a clinical leader of projects at all stages of development.

Dr. Sforzolini also has in-depth clinical experience in ophthalmology. He spent eight years practicing ophthalmology in teaching hospitals in the EU & US, and has been an investigator in multicenter clinical trials.

Dr. Sforzolini received his M.D., residency in Ophthalmology, Ph.D. and research fellowship in retinal diseases. His MBA and Postgraduate Diploma focused on Pharmaceutical Medicine. He has published over 60 papers and book chapters, and has received scholarships and awards from academic institutions and private sector organizations.

-

Statement of
activities

Statement
of financial
position

The Schepens Eye Research Institute, Inc.

Year ended June 30, 2007

	Unrestricted	Temporarily Restricted	Permanently Restricted	2007 Total
Operating:				
Federal grants and contracts	\$ 14,444,506			\$ 14,444,506
Contributions	1,255,015	234,325		1,489,340
Bequests	1,309,512			1,309,512
Nonfederal grants and contracts	4,922,397			4,922,397
Income on long-term investments	772,232	694,799		1,467,031
License and royalty fees	517,287			517,287
Corporate sponsorships	700,000			700,000
Other sources	148,653			148,653
Total revenues	24,069,602	929,124		24,998,726
Net assets released from restrictions	1,248,810	(1,248,810)		
Total revenues and other support	25,318,412	(319,686)		24,998,726
Expenses:				
Research	21,553,787			21,553,787
Management and general	6,812,493			6,812,493
Fundraising and public relations	1,026,970			1,026,970
Total expenses	29,393,250			29,393,250
Change in net assets from operations	(4,074,838)	(319,686)		(4,394,524)
Nonoperating:				
Net unrealized gains on investments	979,465	1,684,319		2,663,784
Realized gains on investments	263,241	1,661,675		1,924,916
Change in split interest agreements	(28,193)			(28,193)
Spending policy allocation		(691,259)		(691,259)
Change in pledges receivable		50,913		50,913
Net assets released from restrictions for endowment	846,000	(896,000)	50,000	
Change in net assets from nonoperating activity	2,060,513	1,809,648	50,000	3,920,161
Change in net assets	(2,014,325)	1,489,962	50,000	(474,363)
Net assets, beginning of year	12,633,265	15,774,808	13,631,765	42,039,838
Net assets, end of year	\$ 10,618,940	\$ 17,264,770	\$ 13,681,765	\$ 41,565,475

	2007	2006
Assets		
Cash in interest-bearing accounts	\$ 223,658	463,038
Funds held in trust by others	622,528	604,101
Trustee held bond funds	3,501,979	3,393,979
Contributions receivable, net	719,539	896,126
Grants and contracts receivable	1,005,041	1,074,658
Prepaid expenses and other assets	932,377	715,117
Land, buildings, and equipment, net	26,158,762	29,259,079
Investments	38,178,697	35,639,324
Total assets	\$ 71,342,581	72,045,422
Liabilities and net assets		
Liabilities:		
Accounts payable and other accrued expenses	\$ 1,943,824	1,580,142
Deferred credit	8,573,761	8,966,360
Accrued payroll	612,166	589,865
Deferred support	3,069,641	3,134,179
Deferred rent	2,449,865	2,332,814
Annuity obligations	287,849	302,224
Debt	12,840,000	13,100,000
Total liabilities	29,777,106	30,005,584
Commitments and contingencies		
Net assets:		
Unrestricted	10,618,940	12,633,265
Temporarily restricted	17,264,770	15,774,808
Permanently restricted	13,681,765	13,631,765
Total net assets	41,565,475	42,039,838
Total liabilities and net assets	\$ 71,342,581	72,045,422



Preparing the way for progress

When we describe research as a pipeline, one might get the impression that the development of new technologies and treatments is an orderly affair. New ideas quietly get in line behind those that have come before, and only 15 or 20 years later do they emerge from the other end as new treatments in the clinic. While we all understand that research can't produce solutions overnight, science is more chaotic, and more exciting, than our pipeline analogy lets on. Insights that might be considered basic can have a major impact in a relatively short period of time. A perfect example is the work of Drs. Craig Mellow and Andrew Fire who shared the 2006 Nobel Prize in Medicine—bringing a basic, unanticipated discovery to advanced clinical trials and a company that sold for \$1.1 billion in just 8 years. Their project proposing to observe the tiny worm *C. elegans* could hardly have hinted at the enormous therapeutic potential of the insights they would make.

Vision research is no different. Two Schepens scientists collaborating on an innovative idea for treating an ocular surface disease moved their discovery from idea to mouse model to human clinical trials in three years and are now working with a company to bring their product to market. As these stories prove, it is not always the scientist

at the “end of the pipeline” who ends up delivering the insight that pushes new treatments forward. At Schepens Eye Research Institute, the research program is built to support the best research minds across the discovery continuum, from fundamental research into unanswered questions to research advancing products and therapeutics.

It is impossible to predict where the next great insight or technology will come from, but, to paraphrase the great research scientist Louis Pasteur, “Fortune favors the prepared mind.” And as any stock portfolio manager knows, it is important to have a diversified portfolio to be anywhere close to where the action is when the next breakthrough happens. By making a home for excellent scientists at every point on the continuum of discovery, we position ourselves to make discoveries and create change. Scientists at Schepens Eye Research Institute are among the best in the world, receiving international recognition from their peers and top awards in their fields.

It is our privilege as volunteers to support their work that brings us all closer to a future without blindness.

A handwritten signature in black ink that reads "Kennett F. Burnes". The signature is written in a cursive, slightly slanted style.

Kennett F. Burnes

Chairman of the Board, Schepens Eye Research Institute
President and Chief Executive Officer, Cabot Corporation

Trustees

Kennett F. Burnes, *Chairman*
Mark B. Abelson, M.D.
William F. Aikman
DeWalt H. Ankeny, Jr.
Charles de Gunzburg
Thaddeus P. Dryja, M.D.
Kenneth M. Fischer
Robert L. Gable
Gerard D. Goldstein, Esq.
Paul J. Gormisky, Esq.
Richard J. Harte, Jr.
Susan Hudson-Wilson CFA
David M. Knipe, Ph.D.
Donald R. Korb, O.D.
David T. Lawrence
Martin H. Loeffler, Ph.D.
Renée Manger
Victoria D. McCullough
Gerald Ostrov
Patricia M. Patricelli
Nancy Raquet
Eleanor G. Shore, M.D.
Sherman H. Starr
Kathryn C. Vecellio
Theodore N. Voss

Honorary trustees

Charles J. Cella
Michael J. Crimi
Alice R. Dietrich
Richard Harte, Jr.
J.H. Walton, Jr.
Babbette Wolff

Corporators

George Bell
William P. Benton
Judith A. Brodtkin
David M. Coit
Anthony DiGiovanni
Dean S. Edmonds, Jr., Ph.D.
Harold L. Emerson
Edith Exton
Roger C. Faxon
William G. Garrison
Michael S. Gilmore, Ph.D.
Judith Grubman
John G. Higgins
Tatsuo Hirose, M.D.
Sharon King Hoge
Mark S. Hughes, M.D.
B. Thomas Hutchinson, M.D.
Frances B. Kinne, Ph.D.
Louis J. Maret
Leland B. McDonough
J. Wallace McMeel, M.D.
Joseph C. McNay
Alice R. McPherson, M.D.
Anne T. Moran
John Palmer
Sally Ankeny Reiley
Roger Sametz
Baldo Scassellati-Sforzolini, M.D., Ph.D.
Carol R. Scheman

Augustin P. Schepens
Suzanne Harte Sears
George H. Shattuck, Jr.
Richard J. Simmons, M.D.
David A. Snyder, M.D.
Clement L. Trempe, M.D.
A. Raymond Tye
Leo A. Vecellio, Jr.
Stephen M. Weiner
Glenn L. Wing, M.D.
Marian Woolston-Catlin

Officers

Kennett F. Burnes
Chairman
Michael S. Gilmore, Ph.D.
President
David L. Conlon
Treasurer
Nina R. Collins
Secretary-Clerk

Administrative directors

Michael S. Gilmore, Ph.D.
President and Chief Executive Officer
Dewalt and Marie Ankeny Director of Research
Mary M. Chatterton, M.B.A., J.D.
Director of Corporate Alliances
Nina R. Collins
Chief of Staff
Sharon Comvalius Goddard, M.P.H.
Director of Grants and Contracts
David L. Conlon
Chief Administrative Officer
Chief Financial Officer
Patricia A. D'Amore, Ph.D., M.B.A.
Associate Director of Research
Darlene A. Dartt, Ph.D.
Director of Scientific Affairs
Frances Ng, M.B.A.
Director of Human Resources
Joseph Finnigan
Director of Plant Operations

Faculty of Schepens Eye Research Institute

Emeritus senior scientists

Adler, Alice J., Ph.D.
Cintron, Charles, Ph.D.
Doane, Marshall G., Ph.D.
Refojo, Miguel F., Sc.D.
Webb, Robert H., Ph.D.

Senior scientists

D'Amore, Patricia, Ph.D.
Dana, Reza, M.D., M.P.H.
Dartt, Darlene A., Ph.D.
Delori, Francois, Ph.D.
Gilmore, Michael S., Ph.D.
Gipson, Ilene K., Ph.D.
Joyce, Nancy, Ph.D.
Kazlauskas, Andrius, Ph.D.
Lorenzi, Mara, M.D.
Peli, Eliezer, O.D.
Stein-Streilein, Joan, Ph.D.
Sullivan, David A., Ph.D.
Zieske, James, Ph.D.

Associate scientists

Bex, Peter J., Ph.D.
Chen, Dong-Feng, M.D., Ph.D.
Ksander, Bruce, Ph.D.
Taylor, Andrew, Ph.D.
Young, Michael, Ph.D.

Assistant scientists

Argueso, Pablo, Ph.D.
Gerhardinger, Chiara, M.D., Ph.D.
Gregory-Ksander, Meredith, Ph.D.
Kishi, Shuji, M.D., Ph.D.
Lashkari, Kameran, M.D.
Masli, Sharmila, Ph.D.

Investigators

Chen, Lu, M.D., Ph.D.
Ng, Tat Fong, Ph.D.
Rawe, Ian, Ph.D.
Rios-Garcia, Jose, Ph.D.
Romeo, Giulio R., M.D.
Woods, Russell, Ph.D.

Adjunct associate scientists

Cursiefen, Claus, M.D.
Klassen, Henry, M.D., Ph.D.

Adjunct assistant scientists

Maruyama, Kazuichi, M.D., Ph.D.
Ruberti, Jeffrey, Ph.D.

Emeritus clinical senior scientists

Freeman, H. MacKenzie, M.D.
Tolentino, Felipe I., M.D.

Clinical senior scientists

Abelson, Mark, M.D.
Dohlman, Claes H., M.D.
Hirose, Tatsuo, M.D.
McMeel, J. Wallace, M.D.
Miller, Joan, M.D.
Trempe, Clement L., M.D.
Weiter, John, M.D.

Clinical scientists

Colby, Kathryn, M.D., Ph.D.
Greiner, Jack V., D.O., Ph.D.
Grosskreutz, Cynthia, M.D., Ph.D.
Pasquale, Louis, M.D.
Schaumberg, Debra Sc.D.
Velez, Gisela, M.D., M.P.H., M.A.

Adjunct clinical scientists

Arai, Mikki, M.D.
Bonini, Stefano, M.D.
Collins, James F., M.D.
Fletcher, Donald, M.D.
Ghuman, Thomas, M.D.
Hatton, Mark, M.D.
Hughes, Mark S., M.D.
Jurkunas, Ula, M.D.
Kenyon, Kenneth R., M.D.
Kinoshita, Shigeru, M.D., Ph.D.
Raskauskas, Paul, M.D.
Sang, Delia, M.D.
Usomoto, Nari, M.D.
Walker, Joseph, M.D.
Wing, Glenn L., M.D.

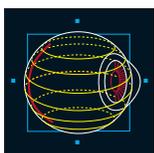
Visiting scientists

Marcos, Susana, Ph.D.
Garcia Perez, Miguel Angel, Ph.D.
Young, Conan, Ph.D.

Schepens Eye Research Institute
20 Staniford Street
Boston, Massachusetts 02114

T 617.912.0100 • F 617.912.0101

www.schepens.harvard.edu



**Schepens
Eye Research
Institute**



An affiliate of
Harvard Medical School