Sightings

Winter 2011

Schepens Eye Research Institute
Massachusetts Eye and Ear

Schepens Eye Research Institute & Massachusetts Eye and Ear Join Forces to Fight Blindness

An affiliate of
Harvard Medical School

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On the cover: *Schepens research scientist instructs a patient on the driving simulator*

Changing and Growing

As scientists, our faculty know better than any of us that living "organisms" which adapt positively to change and remain flexible and nimble will grow, thrive and become even more creative. This is even truer of beings that seek and embrace change. These evolutionary principles apply to living "organizations" as well.

This year, our scientists and their counterparts at Mass. Eye and Ear decided it was time to make a change, one they believed would lead us to the next creative stage in our battle against blinding disease. As the President and Chair of the Board of Schepens Eye Research Institute, we listened carefully and trusted our collective instincts.

After 60 years of independent scientific pursuit, Schepens Eye Research Institute had reached a new milestone in its development. On the verge of bringing many laboratory discoveries to real people, we were ready for a clinical research partner as committed to our goals as we were.

Mass. Eye and Ear is the right partner, at the right time, with the right leadership. A full-service ophthalmic hospital, with a rich research history, programs and commitment to nurturing new scientists, Mass. Eye and Ear's Department of Ophthalmology is led by its chief, Dr. Joan Miller, who is also Chair of Ophthalmology at Harvard Medical School.

Joan, who will lead our research efforts, is a retinal specialist who pioneered two historic scientific breakthroughs in ophthalmology: the use of photodynamic therapy as the very first treatment for wet AMD, and identifying the role of vascular endothelial growth factor (VEGF) in the development of abnormal blood vessels, a hallmark of AMD. Among her collaborators in this effort was Dr. Patricia D'Amore.

John Fernandez has served as President & Chief Executive Officer of the Massachusetts Eye and Ear Foundation and Infirmary since 2007. John came to these roles from Brigham and Women's Hospital where he served for 14 years, the last eight as vice president of clinical services. With his leadership team at Mass. Eye and Ear, John has developed and

Schepens Director and former President Ken Fischer & Chairman Ken Burnes

implemented a strategic growth plan to ensure Mass. Eye and Ear and Schepens thrive for many years to come.

Both Joan and John are great champions of collaboration and its benefits for science and patients. Since she began her chairmanship in 2003, Joan has put tremendous emphasis on teamwork throughout the HMS department, including faculty development, publications, educational meetings, research collaborations and funding, especially K-12 grants. Joan has brought together ophthalmologists and scientists from all the Harvard teaching hospitals and affiliates to work together to solve the most prevalent and pressing problems in vision research and care. Since John's arrival in 2007, Mass. Eye and Ear has forged new clinical relationships with Mass General, Brigham and Women's Hospital, Children's Hospital and Compass Medical.

While these two distinguished leaders will take over the day-to-day leadership of the Institute, our work is not done. We shall each remain as stewards and advocates for Schepens scientists as members of the Schepens Board of Directors. Additionally, four of our Directors have accepted appointments to the Board of the Massachusetts Eye and Ear Foundation.

We are excited about the future and about the promise of this creative change for all of us. We urge all our long-time supporters to join us in welcoming the partnership and the new leadership team.

Sincerely,

Schepens Director and former President Ken Fischer
Chairman Ken Burnes

Dear Schepens Community

When we announced last spring that our organizations were joining forces, more than a few colleagues and patients told us, "But we always thought you were together."

It was a natural assumption. For decades, as colleagues in the Harvard Department of Ophthalmology, we have shared faculty and teaching programs, research projects, a campus and a community. As scientists and teachers, we have mentored and consulted each other and collaborated on life-changing science.

Dr. Charles Schepens spent much of his clinical career in the operating rooms at Mass. Eye and Ear and luminaries allied with both institutions, like Dr. Claes Dohlman, have long advocated for this union.

But most of all, we have always shared the same mission, one understood even by those without close ties to either institution. That mission is the relentless quest to find treatments and cures for the blinding diseases that devastate millions worldwide.

So when scientists from both Schepens and Mass. Eye and Ear began discussing the possibility of a union, the alliance seemed natural. With that ground-level support from our faculty, it was easy to proceed quickly in order to bring this possibility to reality.

As we begin our future together, we want you to know that the commitment to the mission you have long supported is stronger than ever, and that our new partnership will only hasten its fulfillment.

The strengths of each organization complement the other. Mass. Eye and Ear has a long history of clinical research and patient care, while Schepens has the latest cutting-edge basic science. The combination will streamline and speed discoveries to those in need and keep our scientists attuned to the true needs of patients.

As a complete basic and clinical research team, now the largest and most robust of its kind worldwide, we can apply for foundation and government funding together rather than as competitors.

Mass. Eye and Ear President & CEO John Fernandez and Chief and Chair Joan W. Miller, M.D.

Together we can also attract the best and brightest young investigators and the most experienced and talented senior scientists to help us in our search for solutions.

We have already attracted and engaged Dr. Eric Pierce, a world-class expert in genetic research who will work with all our scientists to build a unique center of excellence in this area.

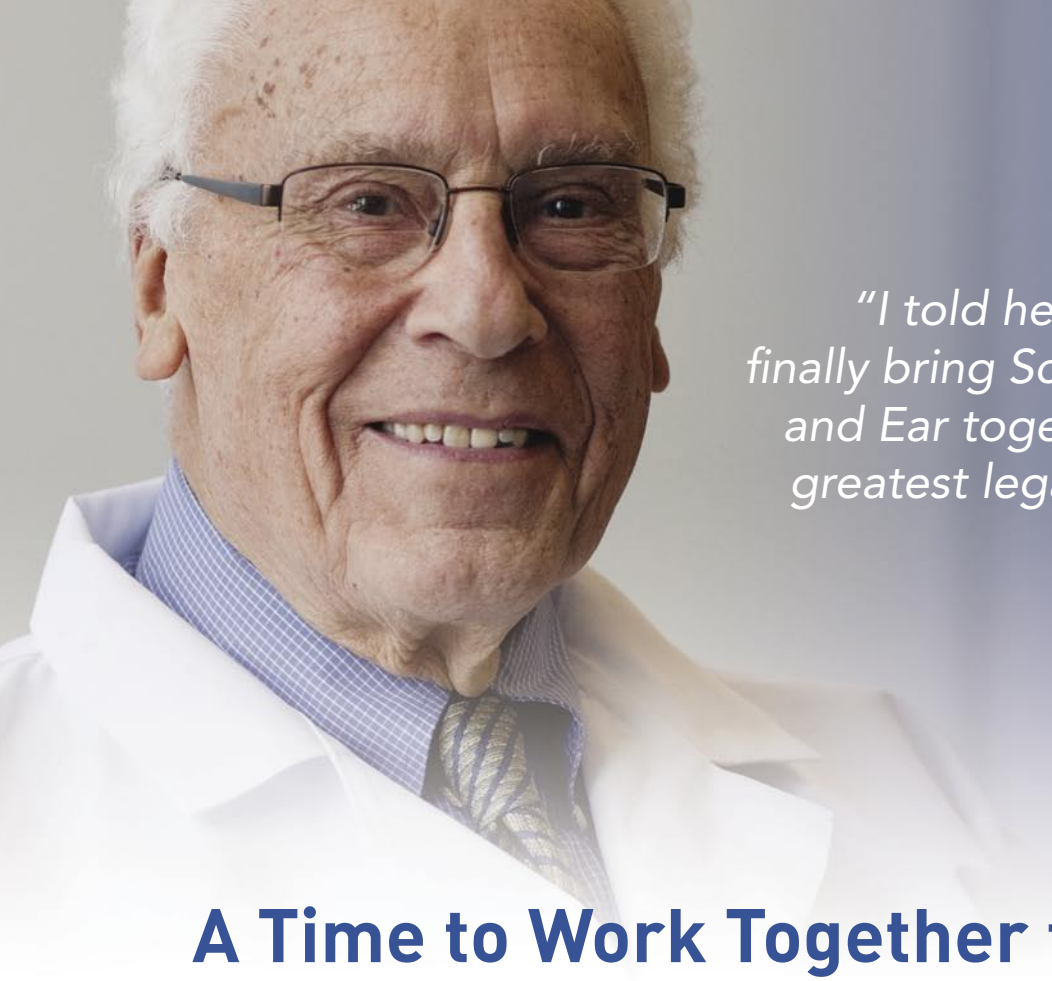
And, science is already reaping the benefits of collaboration. In the following pages you will learn how each Schepens center of excellence is forging new connections with Mass. Eye and Ear faculty and what they hope to achieve.

This is a very exciting time for all of us, and we have an important job to do. Strengthened by our new partnership, we are ready to move together towards our goal of improving the lives of those stricken with blinding diseases. And with your continued support and devotion, we will reach it.

Sincerely,

Joan W. Miller, M.D.
Chief and Chair
Department of Ophthalmology

John Fernandez
President & CEO



"I told her that if she could finally bring Schepens and Mass. Eye and Ear together, it would be her greatest legacy in her new role."

– Dr. Claes Dohlman

A Time to Work Together for the Future

In a tiny room at a scientific meeting in 1993, three talented young scientists told a handful of attendees about their study that confirmed the link between a protein called VEGF and the runaway growth of abnormal blood vessels in models of eye diseases like age-related macular degeneration (AMD). The trio consisted of two clinician scientists and one basic scientist.

"A year later at the same meeting, we were presenting to a packed ballroom," says Dr. Joan Miller, one of the two clinician scientists on that team, which also included basic scientist, Dr. Patricia D'Amore, now at Schepens, and clinician scientist, Dr. Anthony Adamis, who later went on to work at Genentech.

This small clinical/basic research collaboration laid the groundwork for drugs, such as Lucentis, that block VEGF and were the first to actually improve vision in AMD sufferers. It was the combination of their clinical understanding and scientific know-how that helped to shepherd the discovery from laboratory and clinical research, and then to doctors' offices in a little more than a decade.

"It is this intersection of clinical and basic expertise that makes the real difference in finding cures for patients," says Dr. Miller, now Chief and Chair of Ophthalmology at Mass. Eye and Ear and Harvard Medical School and who is also–since the partnership–overseeing research at Schepens.

Maximizing the numbers and potential of this type of collaboration is the goal of the Schepens/Mass. Eye and Ear partnership, says Dr. Miller, who had embraced the concept even before she was offered the Chair eight years ago and made a commitment to forge the relationship when she accepted it.

She wasn't alone. In fact, the renowned Dr. Claes Dohlman, who founded corneal research at Schepens and the Cornea Service at Mass. Eye and Ear in the 1960s, has believed for decades that the world-class institutions belonged together. During his tenure as Harvard's Chair of Ophthalmology in the 70s and 80s, he attempted negotiations, but did not succeed. "It wasn't the right time," he says.

Then when Dr. Miller became Chair, "I told her that if she could finally bring the two together, it would be her greatest legacy," he says.

Dr. Miller knew the time was right when scientists at Schepens began discussions with her and counterparts at Mass. Eye and Ear. "They wanted to talk about how to make it happen and what it would look like," she says, adding that the Boards of both institutions, who had been talking informally since 2006, saw the enthusiasm of the scientists as a green light and then a deal-sealer.

"We all have a better chance of helping patients by joining forces," says Dr. Miller, citing organizations, such as Johns Hopkins that apply for funds as sole entities. "Our division was working against us," she says. "In fact, there was an unwritten rule at NIH that Schepens and Mass. Eye and Ear scientists need not recuse themselves during grant discussions, since they were regarded as so competitive, even though we were all faculty at Harvard Medical School."

Successful Teamwork ...

Even before formal negotiations began, Dr. Miller says, the two organizations were experimenting with and experiencing success as a team. For instance, the previous year, she, Dr. Ivana Kim at Mass. Eye and Ear and Dr. Patricia D'Amore at Schepens, organized and presented an international conference on AMD. "People who came to this conference from all over the world said it was the best AMD program they had ever attended," says Dr. Miller, who anticipates many more such conferences in the future. Another group focused on glaucoma and optic neuropathies, composed of clinician scientists and basic scientists from both institutions have also been meeting and collaborating for several years.

Dr. Joan Miller - Chair of the Department of Ophthalmology at Mass. Eye and Ear and Harvard Medical School

Taking the First Steps—Thinking Together

While scientist-to-scientist collaborations have already begun (See page 8-16), the momentum is just beginning. To help keep it building, Dr. Miller is planning a two-day retreat. "It will be a time to share ideas and creative ways of working together," she says, "Collaborations should be natural, since our strengths are complementary," she says. "Mass. Eye and Ear is strong in retina, retinal degeneration, genetics and glaucoma, while Schepens scientists are particularly skilled in ocular surface, immunology, mobility and stem cell regeneration."

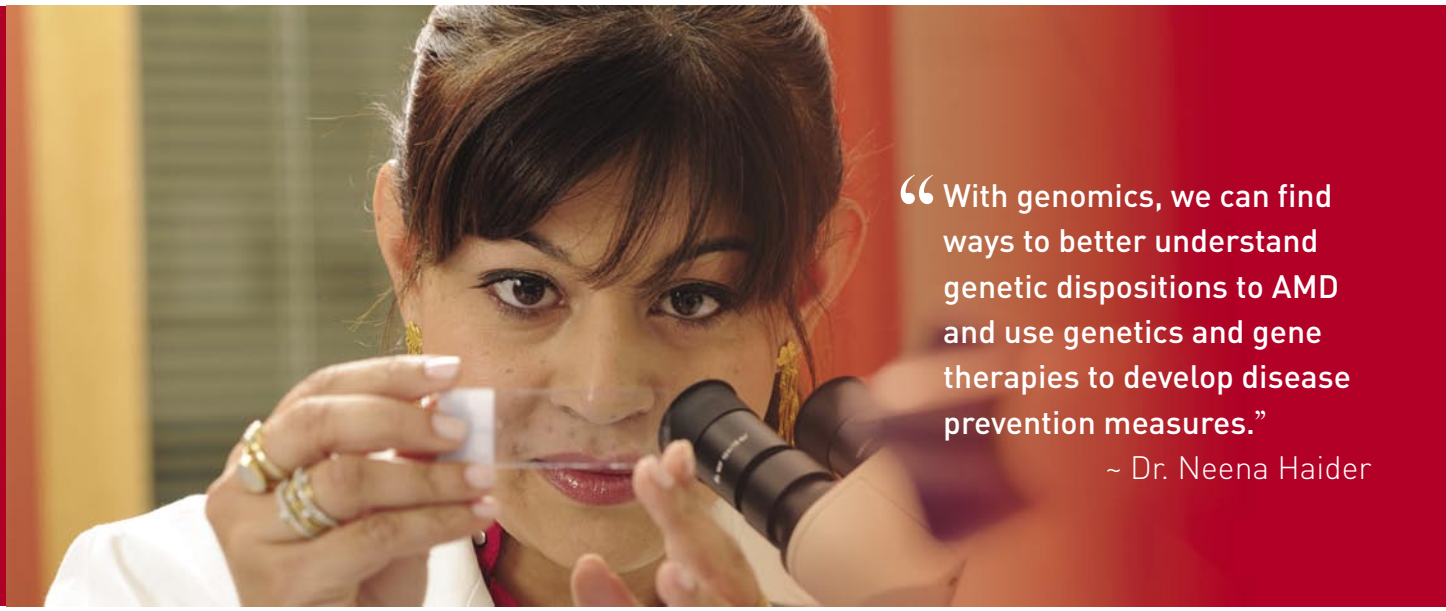
Dr. Miller describes her approach to collaboration as both "top down and grassroots." "Top down because senior management is completely committed to providing resources to support collaboration; grassroots because I believe innovation and productivity comes from individuals working and thinking together," she says.

The Even Bigger Picture

Dr. Miller sees the alliance with Schepens as a major step to unite all Harvard eye specialists, including those at Children's Hospital Boston, Joslin Diabetes Center, Brigham and Women's Hospital and Beth Israel Deaconess Medical Center. "I envision growing our Harvard-wide centers of excellence in AMD, cornea, genetics, mobility, among others," she says. "Together we will be a much more powerful research engine to fight blinding diseases. It is a very exciting time." ■

Center for Age-Related Macular Degeneration

Pursuing New Directions in Research



Dr. Neena Haider is in demand. A geneticist who joined the Center for Age-Related Macular Degeneration (AMD) in July, Dr. Haider gives talks to packed audiences of Schepens scientists and Mass. Eye and Ear clinicians seeking her insight on genetic conditions affecting their patients' vision. She's already teamed up with Dr. Eric Pierce—a preeminent, clinician-scientist recruited to Mass. Eye and Ear for his expertise investigating the genetics of retinal degeneration.

To Dr. Haider, the joining of Schepens Eye Research Institute and Mass. Eye and Ear was a big selling point when she brought her laboratory to the Institute this summer. "I wanted to be in an environment that complements our work in genetics and extends our research into the clinic," says Dr. Haider. "In this setting, we can get to the next level—doing translational work to develop gene therapies for patients and bringing it to fruition."

Looking at AMD from a New Vantage Point

Dr. Haider's background in genetics is unique to the AMD Center. Her expertise, combined with the collaborative research she's doing with Dr. Pierce, brings the Center exciting new ways to approach treatments and cures for AMD.

Dr. Haider explains, "With genomics, we can find ways to better understand genetic dispositions to AMD and use genetics and gene therapies to develop disease prevention measures. The access to the clinic is important because it lets us approach it from a more holistic point of view."

From Clinic to Lab and Back Again

The collaborative process between Dr. Haider and Dr. Pierce starts in the clinic where Dr. Pierce identifies patients with genetic abnormalities that can be traced to a blinding eye disease. With his training as a scientist and clinician, Dr. Pierce is able to sequence the patients' DNA and share his findings with Dr. Haider. Dr. Haider then takes the information to her lab at the AMD Center to develop models for studying how genes function and impact disease.

When Dr. Haider talks about "models," she's referring

to the mice her lab uses to study disease progression, severity and how genes interact to impact biological processes that lead to AMD. She explains, "In mouse models, we can generate animals that are normal minus the mutation that causes the human disease in order to recapitulate the human disease. We then perform tests to figure out how the disease is contracted and ways to treat it. Our research helps Dr. Pierce form diagnoses and prognoses. This brings it all full circle."

With Drs. Haider and Pierce, the circle spins both ways. There are times when Dr. Haider's research leads to a clinical opportunity for Dr. Pierce. Says Dr. Haider, "Sometimes when we develop pathways to see how different genes come together, we find master regulators that show the effects of specific gene interactions on disease. When this happens, we bring the data to Dr. Pierce so he can profile it in patient DNA sequences."

Closing Gaps and Opening Doors

To Dr. Patricia D'Amore, Director of the AMD Center at Schepens, the work between Drs. Haider and Pierce is just one example of how the partnership closes a gap. It also opens doors to new, more mutually rewarding opportunities for her team at Schepens and clinicians at Mass. Eye and Ear.

Says Dr. D'Amore, "Although we've built a strong research foundation for understanding the development of AMD, we've lacked the ability to take our basic science and apply it to the patient's problem. The union changes that."

Dr. D'Amore looks at the collaborative work between Drs. Haider and Pierce as just the tip of the iceberg. Dr. Kameran Lashkari, an M.D. on the AMD Center team, expects to be working with his Mass. Eye and Ear colleagues to obtain tissue samples for his research on eye fluid biomarkers. Dr. D'Amore will be looking for clinician contributions to her studies of inflammation in AMD. To make interactions between the lab and the clinic even more seamless, a combined AMD Center is in the formative stages.

Taking AMD Research in New Directions

To Dr. D'Amore, the merging of talent and resources promises to take the AMD Center in directions that before the alliance, were difficult to pursue. "We have more resources, both financial and intellectual," says D'Amore. "We also have easier access to clinical patient populations. All these things are necessary for pursuing new ideas."

Dr. Eric Pierce - Associate Director of the Berman-Gund Laboratory for the Study of Retinal Degenerations

Although Schepens scientists and Mass. Eye and Ear clinicians have been collaborating for years, the formal alliance knocks down the barriers that often made the process bumpy in the past. "We have a straighter line to overcome time- and resource-related obstacles to collaboration," says Dr. D'Amore. "We were already on the right track. The alliance takes us all the way." ■

The Minda de Gunzburg Center for Ocular Regeneration

Collaborating for Progress — Around the World and Around the Block

Dr. Michael Young works with retinitis pigmentosa patient Ryck Lent

The Promise of Human Stem Cells in Retinal Regeneration

Dr. Michael Young and his team at the Minda de Gunzburg Center for Ocular Regeneration know full well the value of collaboration. For years, they've been collaborating with scientists around the globe to regrow retinal tissue with human stem cells.

Yet the opportunity to collaborate with world-class retinal clinician scientists around the block is a dream come true as the Center pursues FDA approval to progress to the next milestone: a clinical trial with patients at Mass. Eye and Ear.

"There's a very small subset of ophthalmologists and retinal surgeons who are experts in the field of retinal regeneration," says Dr. Young, Director of the Minda de Gunzburg Center and one of the world's top stem cell scientists. "We're fortunate to have the best at Mass. Eye and Ear. Now that Schepens and Mass. Eye and Ear are one, we're hopeful the FDA approval process will go much faster."

Retinitis Pigmentosa At-A-Glance

Motivating Dr. Young's research is his mission to develop treatments and ultimately cures for retinitis pigmentosa, a genetic disorder that affects about 75,000 people nationwide. Retinitis pigmentosa attacks the photoreceptor cells in the retina — the layer of tissue at the back of the inner eye and part of the central nervous system that converts light images to nerve signals.

There are two types of photoreceptor cells: rods for

Patient's eye with retinitis pigmentosa

controlling night vision and cones that are sensitive to color and dependent on rods for survival. In most instances of retinitis pigmentosa, the rods deteriorate first, causing night blindness. Peripheral vision is lost as the rods break down. In severe cases of the disease, cones are also impacted, and total blindness is the debilitating end result.

Mission Collaboration

Today, there is no way to replace cells in the central nervous system that are lost to disorders like retinitis pigmentosa. "There's no regeneration in the mature, mammalian central nervous system," Dr. Young says. And that's exactly what Dr. Young and his de Gunzburg Center colleagues Petr Baranov, Ph.D., and Caihui Jiang, M.D./Ph.D., hope to change. Their mission: Using human stem cells to induce regeneration in the central nervous system.

Working towards this mission has been a collaborative effort between Drs. Young, Baranov and Jiang and scientists in all corners of the globe including Denmark, Brazil and Iowa. Under Dr. Young's direction, Drs. Baranov and Jiang run experiments to transplant human stem cells to the retina and transform them into photoreceptor cells. Collaborators in Denmark, Brazil and Iowa test and validate the safety and effectiveness of human stem cells transplanted in pigs that are congenitally blind from retinitis pigmentosa.

Setting the Stage for a Clinical Trial

Vision tests over time provide the team with data to assess whether human stem cell transplantation contributes to better sight in transgenic pigs. With positive results, Dr. Young is confident he'll be able to approach the FDA with a rationale for a clinical trial using human patients.

Dr. Young is so confident, in fact, he is in the early phases of forming a clinical trial advisory board with clinicians at Mass. Eye and Ear. "The ability to collaborate with M.D.s on the board is essential for coordinating an effective trial," Young says. One reason is the importance of patient selection for determining the safety and efficacy of cell transplantation. Another is the complexity of the procedure itself. Subretinal space injection is a relatively new technique that requires highly specialized skills.

Once the trial is underway, Dr. Young will rely on Mass. Eye and Ear clinicians to closely observe patients' visual functions and retina health in the post-op phases of the transplantation.

"A lot of divergent expertise is needed to tackle a problem like this (retinal and optical regeneration)," says Dr. Young. It takes surgeons and tissue engineers and chemists working closely together to get us to a treatment. As a part of Mass. Eye and Ear, we have all that talent in-house, which makes FDA approval for a clinical trial with Mass. Eye and Ear patients all the more likely."

Looking Forward

As retinal regeneration gets closer to the clinical trial stage, Dr. Young is already looking forward to collaborating with his Mass. Eye and Ear associates in more areas of human stem cell research. At the top of his wish list is working with Mass. Eye and Ear clinicians and scientists that study regeneration in other sensory organs, such as the ear. Says Dr. Young, "In the next year, my hope is to expand the de Gunzburg Center to include research on hearing and balance—both at the bench and in the clinic with our Mass. Eye and Ear colleagues." ■

Center for Corneal and External Eye Disease Research

Championing the Case for Productive Collaboration

> "A great deal of exchange takes place between my laboratory at Schepens and the Mass. Eye and Ear Cornea Service. It's a tremendously robust clinical and translational research program that will only strengthen as we complete the transition to one institution."
>
> ~ Dr. Reza Dana

Dr. Reza Dana at lab meeting

As a chief architect of the new partnership between Schepens and Mass. Eye and Ear, Dr. Reza Dana, who serves as Vice Chairman for Academic Programs for the Harvard Department of Ophthalmology, has long been a champion of translational research and collaboration between scientists and clinicians. He's in a unique position to do so. A clinician scientist, Dr. Dana is both Director of the Cornea Service at Mass. Eye and Ear and Director of the Harvard Medical School Department of Ophthalmology Cornea Center of Excellence. He is also Senior Scientist and Co-Director of Research at Schepens Eye Research Institute.

Continuing a Tradition of Exchange

Together, the Schepens/Mass. Eye and Ear corneal program includes about 80 M.D.s, Ph.D.s and M.D./Ph.D.s who collaborate on laboratory and clinical research. The team also comes together regularly for cornea-related education activities and opportunities for information exchange.

To Dr. Dana and his team across Schepens and Mass. Eye and Ear, the joining of the two institutions is a resounding validation of what the group has been doing for years. "It's a tremendously robust clinical and translational research program that will only strengthen as we complete the transition to one institution," says Dr. Dana.

Bringing Research Full Circle

At Schepens Corneal Center, most researchers are not clinicians and scientists – unlike Dr. Jurkunas, M.D. She holds dual posts as Assistant Scientist at the Center for Corneal and External Eye Disease Research at Schepens and clinician at the Mass. Eye and Ear Cornea and Refractive Surgery Service.

Dr. Jurkunas leads a project engaging clinicians and scientists to study the expansion of stem cells for ocular surface reconstruction and transplantation.

Her research target is corneal limbal stem cell deficiency—a condition caused by the loss of stem cells at the periphery of the cornea.

With stem cell deficiencies in the cornea, standard corneal transplants are ineffective. So, Dr. Jurkunas and her team are studying ways to grow stem cells from a corneal limbal patient and transplanting them onto the patient's cornea. Studying the problem in the laboratory and clinic is vital.

Says Dr. Jurkunas, "As a clinician, I can identify patients with the problem I want to address, then collaborate with other clinicians to take the problem back to the laboratory. At the lab, I can work at the bench to expand the stem cells and study how to transplant them onto the patient's eye. The ultimate goal is to return to the clinic for transplantation surgery and bring the research full circle."

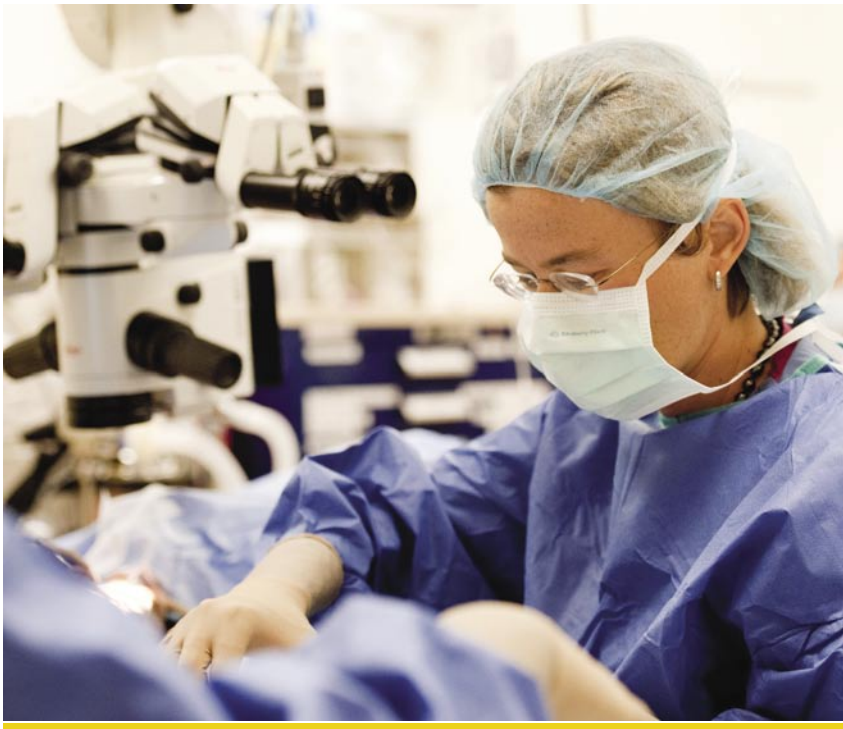
The Collaborative Process At-A-Glance

From start to finish, Dr. Jurkunas relies on contributions from clinical and scientific experts at Schepens, Mass. Eye and Ear and beyond. Her main collaborator is Dr. Dana, an immunologist by training. He works with Dr. Jurkunas to identify patients with corneal stem cell deficiencies who are appropriate clinical trial candidates.

"When growing cells for human transplantation, it is important to avoid the use of animal-derived materials and to maintain high levels of stem cells at the same time," says Dr. Jurkunas. "These have been main challenges in developing stem cell therapy for human transplantation, but not impossible with a collaborative effort involving the diverse scientific expertise we have at Schepens."

Another important collaborator is Dr. Leila Mankarious at Mass. Eye and Ear. An otolaryngologist, she provides small tonsil biopsies that Dr. Jurkunas uses as a source of human stem cells, along with leftover cornea rims from cornea surgeons at Mass. Eye and Ear. Dr. Jurkunas works with these human tissue biopsies to perform stem cell cultivation and imaging experiments with her research colleagues at Schepens.

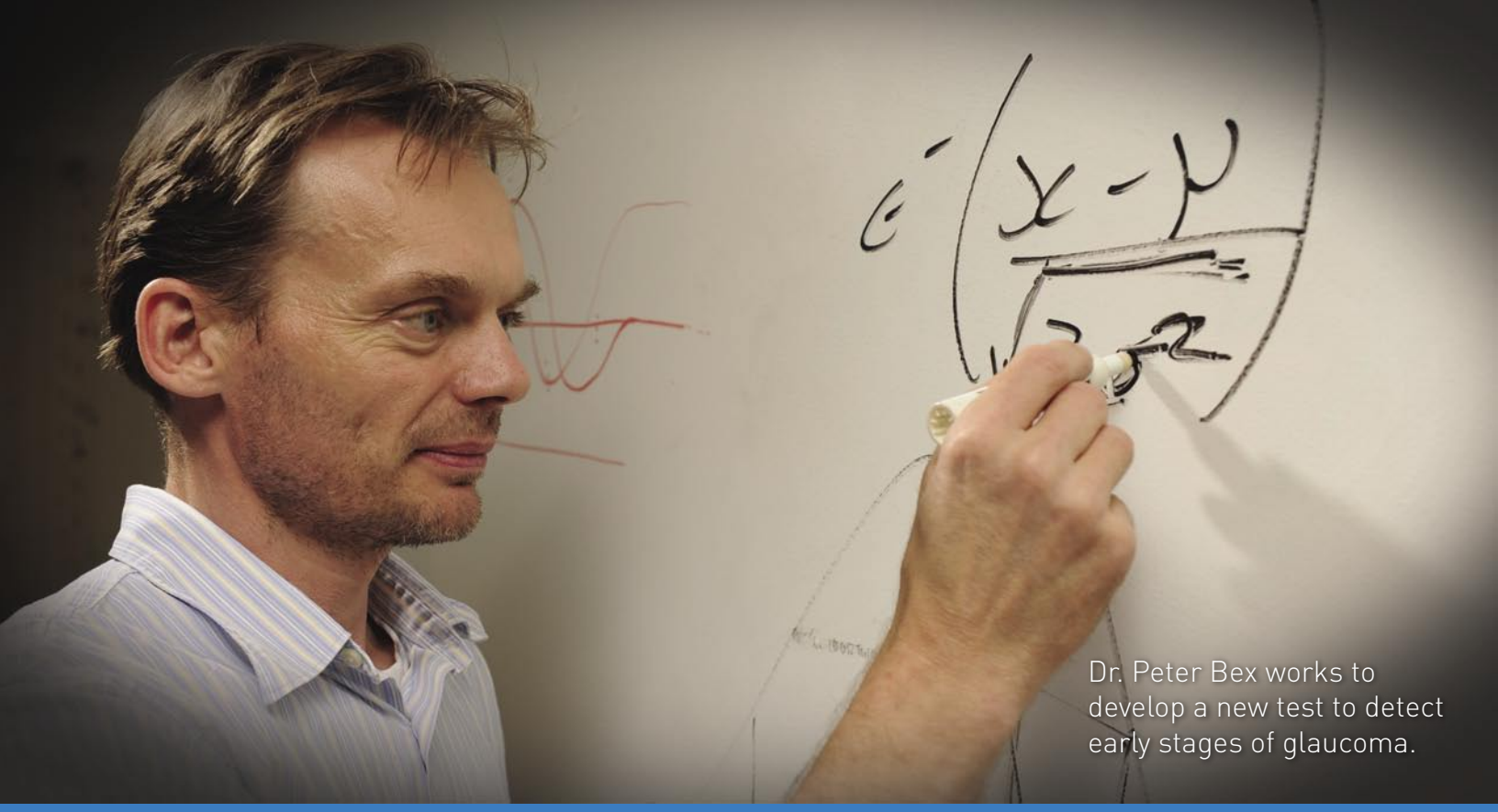
Thanks to a grant from the National Heart Lung and Blood Program, Dr. Jurkunas is on the path to developing a protocol for a clinical trial at Mass. Eye and Ear. To reach this next step, she's collaborating with scientists at the center for Human Cell Therapy at the Immune Disease Institute in Boston. Dr. Jurkunas' research has also benefitted from the support of Dr. Joan Miller and the Mass. Lions Eye Research Fund at Mass. Eye and Ear—before Schepens joined with Mass. Eye and Ear.



Dr. Jurkunas operating at Mass. Eye and Ear

Returning to Roots

That Dr. Miller and Mass. Lions Eye Research helped get Dr. Jurkunas' research off the ground is testament to the collaborative goodwill that has always existed between Schepens and Mass. Eye and Ear. Dr. Dana agrees. "With this union we're revitalizing the old spirit of exchange that's part of our history. This is a restoration of our original identity." ■



Dr. Peter Bex works to develop a new test to detect early stages of glaucoma.

Mobility Enhancement and Rehabilitation Center

Finding better ways to detect glaucoma and help patients navigate daily life

"If you don't see what you're looking for, you've come to the right place," is the motto of the Mobility Enhancement and Rehabilitation Center at Schepens Eye Research Institute. As the baby boomers age and vision disorders increase rapidly in coming years, low vision patients and the public will be grateful that Dr. Eli Peli founded this center and that he committed himself and his team two decades ago to exploring, refining and inventing ways for people with impaired vision to stay mobile despite their disabilities.

"People with impaired vision deserve freedom of mobility and the higher quality of life that comes with it," says Dr. Peli. The Center focuses on the development of new low-vision aids and evaluation techniques for those with partial visual field loss from stroke and traumatic brain injuries, central vision loss from AMD, and peripheral field vision loss from glaucoma and retinitis pigmentosa so they can navigate and move more safely on foot and by car. This Center has a long history of clinical research, and many of its scientists are also clinicians. According to Dr. Peli, the partnership with Mass. Eye and Ear will help expand the opportunities for Center members to work with an even larger pool of patients and to collaborate with respected counterparts at Mass. Eye and Ear.

One member of his Mobility Center team, Dr. Peter Bex, has been taking full advantage of the more formalized connection to Mass. Eye and Ear to enrich his research aimed at helping patients with glaucoma, a disease that will impact nearly 80 million people worldwide by 2020. Working closely with two Mass. Eye and Ear clinicians scientists, Dr. Louis Pasquale, the Director of the Glaucoma Service at Mass. Eye and Ear, and Dr. Mary Lou Jackson, who heads the Vision Rehabilitation Service there, he hopes to improve the early detection and evaluation of glaucoma and the ability of patients to use existing vision more effectively and safely in daily life.

"People with impaired vision deserve freedom of mobility and the higher quality of life that comes with it"

Glaucoma is a disease that slowly destroys cells in the optic nerve, which transmits images from the retina to the brain where they are translated. Glaucoma first destroys peripheral vision, causing tunnel vision and can ultimately result in total blindness if untreated. If detected early, however, medications can protect the optic nerve cells that are beginning to die and slow the progression of the disease.

A Better Test

"So the earlier it is detected and the more accurately we can follow its progression, the better," says Dr. Bex, who notes that the standard methods for detecting the existence and the extent of the disease, which use static points of light to map the visual field, are tiring for patients, insensitive and inaccurate. That is why he and Dr. Pasquale are developing and testing a new method, based on multiple moving dots of light and a statistical analysis of what a patient is able to see.

This new test can determine not only how much vision loss there is, but also what cells are beginning to die. "This is important because we can then treat those cells and keep them alive," says Bex. Dr. Pasquale and he have already published an initial paper that shows the effectiveness of this new diagnostic tool.
After detecting the extent of the disease, the next step is to help a patient live as well as possible with whatever vision loss he/she has. "That's what Mary Lou and I are working on," says Dr. Bex, who describes peripheral vision as the ability to detect motion and signals in the environment that warn us to look more directly at something (with our central vision) to avoid tripping or colliding.

A Better Test

Assessing how people currently use their eyes and how they can be trained to use them differently to compensate for losing this peripheral signaling skill will be their first step in their research. "For instance," says Dr. Bex, "if a person has lost her peripheral vision on the left side, we would want to create a training program that encourages her to scan frequently (with her existing vision) the scene to her left to avoid unexpected obstacles no longer visible automatically."

Dr. Bex says that they are just ramping up and he is looking forward to future collaborations with clinicians and scientists at Mass. Eye and Ear on other mobility projects. ■

Dr. Peter Bex navigates a busy city neighborhood with a patient using a mobile eye tracker.

Ford "Whiz Kid"

J. Edward Lundy

J. Edward Lundy was a private, reserved man who became one of America's most influential businessmen. After completing a fellowship at Princeton and joining the Economics Department as a beloved professor, he enlisted in the Army Air Corps in 1943. Holding ranks from private to major, he eventually worked in the Office of Statistical Control in Washington. At war's end, his superior, Charles B. Thornton, read in LIFE magazine about the quickly disintegrating finances of Ford Motor Company. At that time it was losing $1 million a day. Mr. Thornton immediately telegraphed young Henry Ford II, offering the services of his nine closest war colleagues (including Lundy). There was a catch. Ford had to welcome all ten men into his company. The following day, Ford invited them to Dearborn, MI.

The "Whiz Kids," as they became known, turned the Company around, Two of them later became president (Robert McNamara and Arjay Miller), and six vice presidents. Mr. Lundy preferred to work quietly behind the scenes, but his talent for numbers and innovative thinking led him to become Chief Financial Officer.

He reinvented the company's finance department, taking from simple accounting to financial forecasting, a business management tool still used today.

Never married, Mr. Lundy devoted his life to the company and its employees, often taking a personal interest in their well-being.

When he wasn't at Ford, you could find him at St. Joseph's Catholic Church, where he frequently had the company's weekend finance reports dropped off. One Ford colleague described him as the St. Thomas Aquinas of Motor City—living a rare ascetic life in the midst of ostentation.

In 1974, he became a patient of the Institute's founder, Dr. Charles Schepens, who told him of the cutting-edge research taking place there. Mr. Lundy became a devoted benefactor, supporting events like the "Night for Sight" in Detroit, and giving to specific research projects and the Annual Fund, often in honor of Dr. Schepens and his wife, Cette.

Mr. Lundy shared his passion for the Institute's work with his Ford colleagues and even secured a large company gift for the vision rehabilitation program. After his death in 2007, he continued supporting the Institute through his estate.

In this way, his private, yet generous personality was well-represented even after death. ■

The William Wolff Society honors donors who include Schepens in their estate plans. The society is named in memory of William (Billy) Wolff, a dedicated former member of the board of directors. His legacy is carried on by his wife, Babbette, an Honorary Director, 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 the Institute in your will or trust, please contact: The Development Office at (617) 573-3350 or melanie.saunders@schepens.harvard.edu.

Tyler, Champion for the Visually Impaired

The birth of a child is a monumental occasion; full of hope and promise. For the family of Tyler DeLuca, however, this new life was an immediate challenge as doctors discovered his pupils would not dilate properly and his retina and optic nerve were underdeveloped. In time, they determined that these problems were caused by albinism – a disorder that affects one in every 17,000 Americans – in which the body fails to produce the photoreceptive pigment, melanin.

Though legally blind, there is no slowing nine-year-old Tyler down. His family is determined to let him live as actively as his peers, encouraging him to participate in outings with people of all visual acuities.

At the public school he attends, he sits at a specially designed desk with a stand to allow him to look at books straight on rather than at a downward angle; the straight-on angle makes his nearsightedness manageable.

However, special challenges do result from the conflux of his legal blindness and love for exploration. Often he will go off on his own to investigate, only to return to the wrong cart, area or even person.

Tyler's family discovered Schepens Eye Research Institute while his father, a US postman, was delivering mail. One average day of delivery, he glimpsed an issue of our newsletter, Sightings, featuring the optic nerve regeneration research conducted by Dr. Dong Feng Chen. He immediately made a note to research the Institute when he got home.

As he learned more about the Institute, he was inspired by the promise our work held for Tyler regaining his vision one day. Intrigued by what he read, Tyler's father looked further into the mission and progress of Schepens scientists with the hope that someday his son might be able to drive a car or participate in organized sports.

During the fall of 2009, the Institute invited Tyler's family to participate in the "Beauty in the Eyes of a Child" calendar drive. The project was started by Pam Spielberg of Little House Art Studio in Massachusetts, in honor of a close friend with vision impairment. All proceeds raised from the calendar benefit research conducted at the Institute. Each year, visually impaired children and their siblings create works of art inspired by items they love. Tyler's artwork was chosen for the cover of the calendar two consecutive years.

Tyler became a celebrity of sorts in his small town. He was even asked to autograph purchased calendars.

As they continue to raise awareness and funding for the Institute's research through the calendar drive, Tyler and his family are also looking forward to a time when he can create artwork and explore with the aid of renewed sight.

The 2012 calendars are available for a donation of $10 each. Purchase calendars online at www.schepens.harvard.edu/calendars or by calling toll free at 877-724-3736. ■

Keeping the Eye's Window Clear

Pioneer in Corneal Research, Nancy Joyce, Retires but Her Work Goes On

When Nancy Joyce applied at age 35 to a doctoral program at Yale, she had already spent a decade achieving as much as she could as a scientist with only a bachelor's degree. An admissions committee member asked her, "What makes you think you should take the place of a young person when you have fewer years to give to science?"

If that committee member knew then what we know now, he would have been proud that he and his committee decided to take a chance on this "late-bloomer," as Joyce calls herself.

Today, as she begins her retirement after 24 years at the Institute, Joyce is a world leader in the study of the corneal endothelium, a tiny layer of cells that keeps the "window of the eye" transparent and that can cause permanent clouding and blindness if impaired. Her peers would agree that much of what is known about this vision-essential, single-cell layer at the back of the cornea can be attributed to discoveries made by her and her team at the Institute during the past two decades.

As she passes the torch and takes on a new role in her life and her work, the next generation of scientists who share in her commitment stand ready—in the not too distant future—to translate her findings into therapies to save the corneas and the vision of millions.

A Puzzle of a Lifetime

"Even as a young child, I loved to work on puzzles of all kinds," she says. Later, her fascination with clue-finding and problem-solving shifted to science fairs and then to the biological sciences. Majoring in biology, she earned her bachelor's degree from Albertus Magnus College, New Haven, Connecticut. After graduation, she worked as a research assistant for the head of Infectious Disease at Yale School of Medicine, the Chief of Molecular Biology at the California Institute of Technology in Pasadena while her husband was in graduate school, and then the Chair of Pathology at Yale School of Medicine prior to entering graduate school herself.

When Joyce completed her doctorate, the corneal endothelium was not well understood and had been largely ignored, as it continues to be today, by the vision research community. "For just these reasons," she decided that this nearly invisible neglected layer of tissue would be a challenging enough "puzzle" to work a lifetime to solve.

A Balancing Act

The corneal endothelium forms a barrier between the cornea and the aqueous humor, which contains nutrients to nourish the cornea. The endothelium allows nutrient-rich fluid to seep into the cornea between its tightly linked cells, while proteins on the endothelial cells pump out the excess fluid.

When the fluid level is balanced, the cornea remains clear. To keep this balance, the endothelial layer needs to maintain a certain number of linked cells. Too few will allow fluid to flow through quickly and build up, causing the cornea to swell and become permanently clouded. Today, the major treatment for corneal clouding or blindness is corneal transplantation.

"Unfortunately, the number of corneas available for transplantation is diminishing as the population ages worldwide. Many countries and cultures prevent the donation of corneas. So finding alternative treatments is essential," says Joyce.

Joyce's Scientific Legacy

Finding ways to increase the number of cells in the endothelium to maintain that balance has been the focus of Joyce's research.

"We have had two goals—preserving and restoring a person's own endothelial cells if possible and, maximizing the number of endothelial cells in donor corneas to ensure the right number of cells over time and prevent re-transplant," she says. Joyce believes that her lab has made a number of critical discoveries towards those goals.

"First we were able to show that endothelial cells retain the ability to divide and regenerate, but need to be coaxed to do so," she says. For instance her team demonstrated that endothelial cells placed in culture with growth factors begin to divide and regenerate, even making sheets of endothelial cells.

They have identified some of the factors that prevent cell division in the mature endothelium, including contact between cell membranes and growth factors in the aqueous humor that signal cells to stop regenerating.

"We have also confirmed that endothelial cells obtained from the corneas of older donors are less able to divide than cells from younger donor corneas," says Joyce. "This is important because most donor corneas come from people over age 50, and most people who suffer from corneal blindness are also over 50."

She and her lab also discovered that older corneas have oxidative DNA damage from stress and UV light, which contributes to their inability to regenerate.

"We have some of the pieces of the puzzle," says Joyce. She adds, "The next steps will be to put the pieces of the puzzle together to create therapies to make donor corneas healthier, including possible antioxidant treatment before transplantation, and to prevent the need for transplantation by triggering the endothelial cell's own ability to divide and heal itself."

The Future

In the last few years, Joyce and her team have also been exploring the potential of stem cells in treating the damaged endothelium. In one study, still underway, she and her team used stem cells from umbilical cord blood to help repair injured endothelium in donor corneas.

"The results, though preliminary, were very promising," says Joyce, who adds that stem cells attached to the damaged endothelium and transformed into endothelial-like cells as part of the repair process.

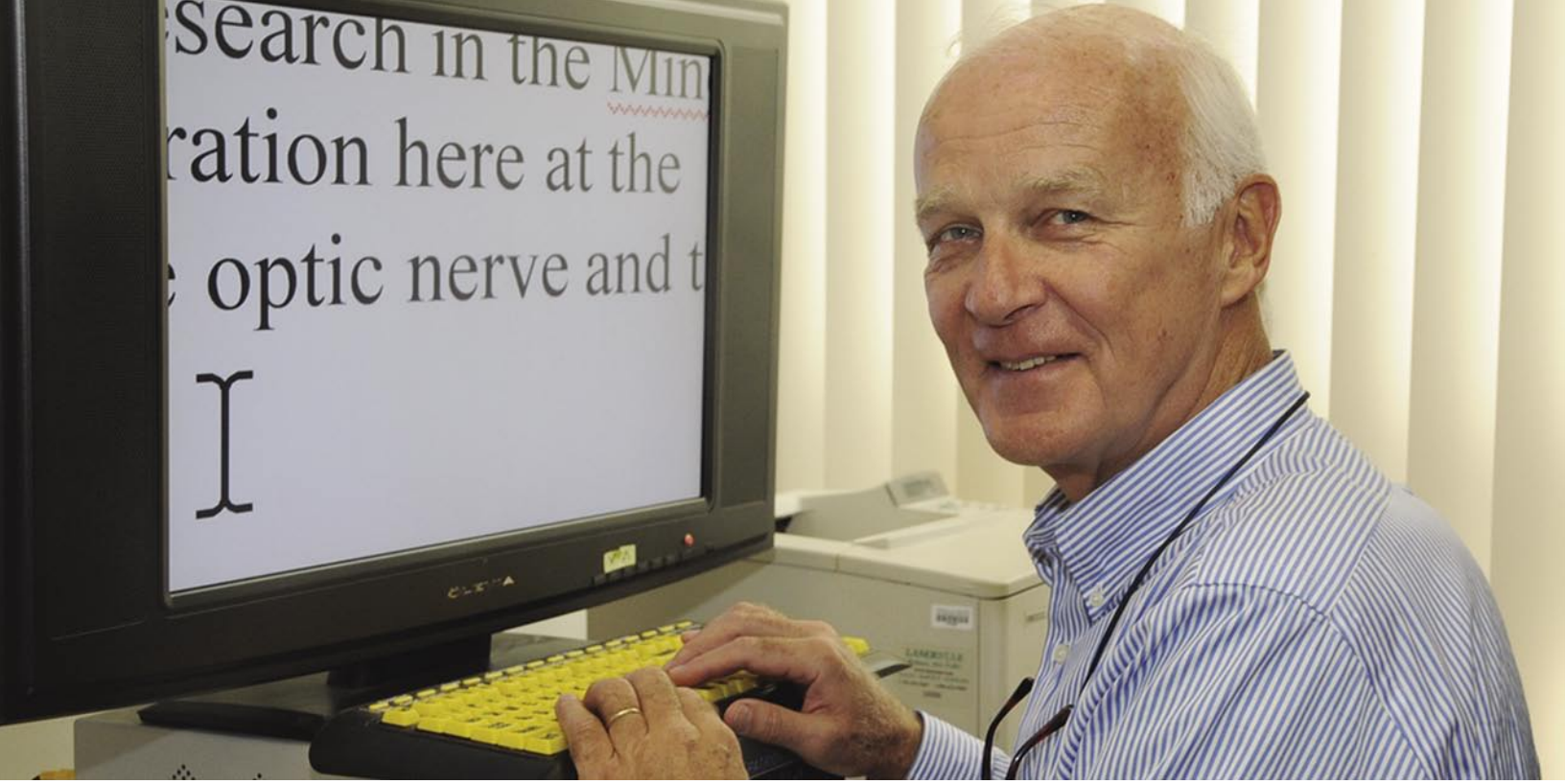
Continuing the Fight

While daily trips to her Schepens laboratory have ended, her commitment to contribute to the field she loves will not end.

She will remain an Emeritus Senior Scientist at the Institute, and *Experimental Eye Research* has asked her to put together a special issue, in her honor, on endothelial research. The issue, which was published in December, will feature reviews from ten world-renowned experts. "I am the first person who is still alive who has been honored in this way—and I intend to stay that way!" says Joyce.

In September, Joyce traveled to Japan as a Visiting Professor to work with Noriko Koizumi, M.D., Ph.D., a collaborator at Doshisha University in Kyoto. She gave several lectures to students in the Dept. of Biomedical Engineering at Doshisha and also gave a lecture at Kyoto Prefectural University of Medicine, where she met with another collaborator, Shiguru Kinoshita, M.D., Ph.D.

"I plan to continue to look for opportunities like these," says Joyce, who believes there are still too few scientists involved in this area of vision research. ■



Rich Godfrey responding to low vision inquiries

Life After Blindness

Rich Godfrey

by Jeanne Campbell

There's a saying we all use: "It is what it is." Followed by a shrug, indicating 'nothing you can do about it.' But, the following statement contains more truth."It is what it is, but it will be what you make it!"

That is the statement that guides Rich Godfrey, Patient Liaison at Schepens Eye Research Institute.

In 1988 at age 37, Rich, a Lieutenant Colonel in the Marine Reserves and successful computer systems salesman, was diagnosed with a rapidly progressing form of dry Macular Degeneration. A doctor told him it would probably take 10 to 15 years for him to be legally blind. His eyes deteriorated in three. He was 40.

Suddenly his business and military career ended. He had a home in the suburbs, two young children, a car in the garage, a valid driver's license, but he could no longer drive. To drive your car is to be independent; it's freedom from dependency on others, he believed.

Generally a cheerful, outgoing man, Rich experienced depression and frustration. He thought it through carefully, assessed the situation, and moved closer to the city to have access to public transportation.

He also found help from friends, in particular from Dr. Charles Schepens, founder of Schepens Eye Research Institute. "What can I do with the rest of my life?" he asked. Dr. Schepens assured him there were many opportunities for him to use his experience and comfort with meeting and talking with people. "Your life is not over, but you will have to do things differently," he told Rich. "Dr. Schepens didn't cure me, but he did save me," says Rich.

With Dr. Schepens' encouragement, Rich began helping at the Institute, talking informally with patients in the waiting room facing the prospect of losing their sight. Gradually, he took on greater responsibilities – speaking to larger groups, traveling to out of town meetings, and fund-raising for 'Swim for Sight' and other development activities.

"Don't be afraid to ask for help," he advised. "Most

people are very willing to help others, but those same people are reluctant, too proud or afraid of asking for help for themselves. People with vision loss need to overcome that," he says.

Rich does not wear dark glasses, use a white cane, or have a guide dog. "I ask for help all the time. If I didn't, nobody would think to help me because they wouldn't know," Rich explains.

"Every day researchers here at Schepens work hard to find new ways to preserve and restore vision, but until they do, the number of visually impaired and blind will continue to grow. Clinicians will do all they can to prevent vision loss and low vision specialists will do the best they can to help these patients better use their remaining vision. The rest is up to the patient to be willing to try to do things differently by using as many low vision aids as they can. The willingness to adapt and adjust can make a big difference in a patient's ability to retain independence," says Rich.

People talk to Rich when they cannot communicate their worries and fears to family members. Often a loving son or daughter, concerned about a parent's depression will ask him to talk to that parent. "I can say things a family member can't," he says.

"I played golf before I lost my sight. I didn't want to give it up. So my friends pick me up and bring me home. They have to watch my ball and help me find it. That's a lot to ask, even from a friend, so I always try to keep a positive attitude and be upbeat. No one wants to be around a whiner, " says Rich.

Schepens is dedicated to preventing and curing blindness, but until that happens, we have an enormous commitment to helping the low vision needs of patients now. Rich is looking forward to working closely with Mass. Eye and Ear staff and patients.

What about reading? "When we go to a restaurant, I don't try to read the menu. I ask the server, 'what's the best thing today?' And, just like most people today, I depend on my computer for e-mail and news. But, I have a special software program, developed for low-vision users; it's called ZoomText."

"I used to love to read. These days I listen to books on my ipod. If you like to read, you still can, though you do it differently."

"I really care about what I do," he says. "The wonderful thing is the chance to meet very special people. I get to share in a life, in a family, as I meet people who are going through what I do, and I can help them."

It is what it is, but it will be what you make it.

If you or a loved one is 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. ■

In this issue of Sightings, Jeanne Campbell, guest columnist and friend of the Institute, tells the story of how vision loss in the prime of one man's life inspired him to help others. This is Jeanne's second human interest article for Sightings. We look forward to her insightful interviews of our scientists, employees and friends of the Institute in future issues.

Jeanne 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 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."

SAVE THE DATE

For the Schepens Eye Research Institute's Annual Florida Symposia Series

Macular Degeneration and Other Blinding Diseases

LEARN ABOUT

- An overview of how the new union of Schepens Eye Research Institute and Mass. Eye and Ear will more quickly advance research targeting macular degeneration (AMD).
- An update of the latest treatment options and treatment combinations for macular degeneration (AMD).
- Understanding and living with low vision, including a display of low vision aids.

REGISTRATION

Seating is limited and advanced registration is required.
Register by phone 1-866-288-0741 or online at:
www.schepens.harvard.edu/symposia_2012/

MORE INFO

For more information, please contact Ann Marie Ware at:
annmarie.ware@schepens.harvard.edu, or 1-877-724-3736

FLORIDA VENUES

Vero Beach
Wednesday, February 8, 2012
Majestic Theater
940 14th Lane
9:00am Check-in
10-Noon Program

Palm Beach
Thursday, February 9, 2012
The Colony Hotel
155 Hammon Avenue
9:00am Check-in
10-Noon Program

Boca Raton
Friday, February 10, 2012
Boca Raton Marriott
5150 Town Center Circle
9:00am Check-in
10-Noon Program

Schepens Eye Research Institute
Massachusetts Eye and Ear

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