

EyeWitness

Newsletter of the Harvard Medical School Department of Ophthalmology



HARVARD
MEDICAL SCHOOL

DEPARTMENT OF
Ophthalmology

April 2014 #24



Joan W. Miller, MD, FARVO
Chief and Chair

NOTES FROM THE CHAIR

At the Heart of Technology

Without a doubt, our department is full of talented and compassionate problem-solvers. Daily, I witness the efforts of our innovative faculty who possess a staunch commitment to finding creative solutions to new problems. It is clear that our department does not accept that blindness need be either unavoidable or incurable. By merging our individual efforts and conducting bold research that pushes boundaries and tackles old problems in new ways, we are keeping our focus on preserving and restoring sight for our patients *and* improving the quality of their lives.

Technology, of course, is integral to our efforts at every level. Outside of the human element, it is arguably the most valuable catalyst for driving significant advancements in medicine, education, and research. We use it every day to teach and perform our research, enhance our ability to diagnose and treat ophthalmic conditions, improve surgical outcomes, and most importantly, enhance the well being of our patients at every level.

The department has played a major role in several of the most important breakthroughs in technology in the history of eye and vision science, and our dedication to further advances keeps us among the leaders in this effort. Our faculty and their colleagues are at the heart of emerging technological innovations in patient care, ranging from vector-based gene therapies that may cure some forms of inherited retinal diseases, to video games that improve way-finding, to smartphone apps that make it easier to detect pediatric eye cancer. A new contact lens delivery system capable of dispensing

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Smartphone Fundus Photography and Beyond

With an estimated one billion smartphones in use worldwide, iPhones, Droids and their apps have become indispensable tools in our technology driven society—changing how we live, work, sleep, eat, play, and (yes) breathe. Now, their impact is being felt in how we see, thanks to collaborations among ophthalmologists, researchers, and engineers who are creating new vision- and diagnostic-enhancing technologies. For example, patients now can benefit from SuperVision+—a free magnifier app that has an image-stabilization feature to “lock” magnified images in place.

Clinicians also are using the smartphone platform and apps in patient care for inexpensive fundus photography. Given light speed advances in technology, it's no surprise that the development of systems capable of self-diagnosis, self-monitoring, or even automated diagnosis, i.e. “smart” ophthalmology, are hot topics.

Accurate and clear representation and documentation of the eye are important for ophthalmologists to assess the health of the eye. Before advances in fundus photography, ophthalmologists largely relied on drawings made during examination to record and track their findings over time. The development of fundus cameras replaced fundus drawings as the primary method for documenting the retina and the optic nerve.

Today, fundus photography plays a vital role in documenting ophthalmic conditions; teaching students, residents, and fellows as well as patients and families about ophthalmic disease; and enabling off-site retinal screenings via telemedicine. While the applications of fundus photography are increasing, some of its current limitations include its high cost, machine maintenance and obsolescence, (lack of) portability, software and networking issues, and difficulty of use.

According to Shizuo Mukai, MD, HMS Associate Professor of Ophthalmology, “There was a need to develop a readily available, inexpensive, easy-to-use system for portable digital fundus photography.” Thus, for almost a decade, Dr. Mukai and his team have been working to make fundus photography simpler.

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Darlene A. Dartt, PhD, FARVO: Promoted to Professor of Ophthalmology

A leader in ophthalmic research, Darlene A. Dartt, PhD, FARVO has been promoted to Professor of Ophthalmology at Harvard Medical School. A well-known and respected cell physiologist, Dr. Dartt studies the neural regulation of tear production and has made seminal and important contributions to her field. In addition, she has made a broad impact on young scientists during her tenure, including medical students, postdoctoral fellows, and corneal fellows.

Dr. Dartt's scientific training began at the University of Pennsylvania, where she earned her PhD in Physiology. She completed a postdoctoral fellowship in Medical Physiology at the University of Copenhagen in Denmark and another in Physiology at Tufts University School of Medicine, where she became a Research Assistant Professor. In 1985, she joined Schepens Eye Research Institute as an Assistant Scientist and Assistant Professor in the HMS Department of Ophthalmology. Seven years later, she was promoted to Senior Scientist, and today, she is the Harold F. Johnson Research Scholar & Director of the Vecellio Dry Eye Laboratory at Schepens.

Dr. Dartt has served in numerous leadership roles at Schepens. From 2004 to 2009, she led research efforts as the Associate Director of Research, Acting Director of Research, and Director of Scientific Affairs. She has frequently chaired committees for national research societies, editorial boards, National Institutes of Health (NIH) study sections, and has served as an officer for national and international research societies. Additionally, she was the Editor-in-Chief of the *Encyclopedia of the Eye*, a four-volume major reference work from Elsevier.

The National Eye Institute, among other funding agencies, has supported Dr. Dartt's research for more than 30 consecutive years. With the advent of refractive surgery and its ablation of corneal nerves and resultant dry eye, the neural regulation of tear production has taken on new importance. Dr. Dartt's research has focused on how tears are produced by the lacrimal gland and the mucin-secreting goblet cells of the conjunctiva under normal conditions and in animal models of dry eye syndrome. Her research has been vital to the advancement of her field, and one of Dr. Dartt's articles in *Experimental Eye Research* was noted at the 2008 International Conference on Eye Research to be one of that journal's most highly cited recent articles.

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Cornea and Refractive Surgery Service: A Half Century of Achievement

The Cornea and Refractive Surgery Service at Mass. Eye and Ear celebrates a storied history marked by a distinguished record of achievement lasting more than 50 years. Established in 1960 by corneal pioneer, Claes H. Dohlman, MD, PhD, the service was the first organized subspecialty of its kind in the country and the first to offer a structured cornea fellowship program in conjunction with Schepens Eye Research Institute. Over the years, the growth of the service has been punctuated by innovations in patient care, education and research – many led by Dr. Dohlman and his hundreds of protégées and trainees – that have shaped, defined and revolutionized the field.

One of those protégées, corneal expert Reza Dana, MD, MSc, MPH, FARVO and the Claes H. Dohlman Professor of Ophthalmology at Harvard Medical School, carries on this tradition of excellence as director of the service, a role he has held since 2006. Today, the Service is the largest in the country and home to 14 members (12 full-time and 2 part-time) whose in-depth and multidisciplinary expertise keeps the department at the forefront of innovation. Offering unparalleled expertise that spans the entire spectrum of corneal and external disease disorders, the Service handles over 14,000 patient visits each year, in addition to offering state-of-the-art laser vision correction. It also serves as an important regional, national, and international resource and center of excellence for managing complex and sight-threatening diseases, including corneal ulcers, severe viral disease, and dry eye syndrome.

Over the last five decades, new programs have been developed for patients with severe corneal scarring, including stem cell transplantation, ocular surface reconstruction, lamellar keratoplasty, and keratoprosthesis (artificial cornea) surgery. Several surgical innovations are now available for treating keratoconus—a condition in which the ocular surface thins and changes shape. These include corneal transplantation (penetrating keratoplasty) and deep anterior lamellar keratoplasty (DALK).



Cornea expert and Director of Refractive Surgery at Mass. Eye and Ear, **Roberto Pineda II, MD** has advanced expertise in treating complex cataract and refractive surgery cases and was a co-investigator on the clinical trials that led to the first FDA approvals for excimer laser surgery. Under Dr. Pineda's direction, Mass. Eye and Ear physicians perform more than 1,200 vision correction procedures annually.

Dr. Pineda is widely consulted for his expertise in anterior segment reconstruction. He has brought many

new techniques to Mass. Eye and Ear and New England, including the use of specialized infrared lasers and novel corneal transplantation techniques. More recently, he performed the first successful corneal transplant using preloaded donor tissue, an innovative technique that preclinical studies show can minimize cell damage in donor tissue by as much as 25 percent. In collaboration with other Mass. Eye and Ear clinician scientists, including **Ula Jurkunas, MD** and **Claes Dohlman, MD, PhD**, Dr. Pineda is developing strategies for reducing complications after various corneal procedures—including LASIK, PRK, and Boston KPro.



Ula Jurkunas, MD (left) is a clinician scientist who performs corneal and refractive surgery and focuses her research in two main areas: the pathogenesis of Fuchs endothelial corneal dystrophy and the development of cultivated epithelial (stem) cell transplantation for the treatment of patients with limbal stem cell deficiency. Collaborating with the Center for Human Cell Therapy Boston—a unique resource that functions across different departments and affiliated institutions of Harvard Medical School—Dr. Jurkunas is currently in the process of filing an Investigational New Drug application to the FDA for performing a Phase I/II study to treat corneal blindness with stem cells.

For the treatment of advanced Fuchs' dystrophy, a degenerative corneal disease, a technique called Descemet's stripping endothelial keratoplasty (DSEK) is now available. More recently, an exciting collaboration with MIT and Boston Children's Hospital has resulted in a drug-dispensing contact lens that may one day change how medication is delivered to the eye—an innovation that could save the sight of millions of glaucoma patients.

Besides his role as director, Dr. Dana is a Senior Scientist at Schepens Eye Research Institute and Director of the HMS Department of Ophthalmology Cornea Center of Excellence. The latter was launched in 2008 to facilitate translational collaborations among HMS Department of Ophthalmology faculty in order to accelerate advances in ophthalmic medicine, teaching, and science; the center is now integral to all of their efforts.

"In my laboratory, we study the fundamental biological processes that lead to inflammatory disorders of the eye and define potential therapeutic targets, bringing these findings to the clinic for testing and proof of concept. In many cases, we also procure information from the clinic—for example, collecting tears—and then we analyze it in the lab, so it's very much a circle," explained Dr. Dana. "We've made significant progress to bridge the gap between research and clinical application, and we owe this to the amazing colleagues I have on the Cornea faculty."

Co-director of the Cornea Center of Excellence, Ula Jurkunas, MD, is another clinician scientist who performs corneal and refractive surgery as well as conducting research. In addition to investigating the pathogenesis of Fuchs endothelial corneal dystrophy, she also is interested in the development of cultivated epithelial (stem) cell transplantation. Stem cell transplantation may be a potential treatment for patients with limbal stem cell deficiency, a blinding, un-treatable condition. To further the development of this stem cell work, Dr. Jurkunas is collaborating

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Schepens Receives Generous Donation from the American Macular Degeneration Foundation

Last December, the American Macular Degeneration Foundation (AMDF) generously donated \$150,000 to Schepens Eye Research Institute/Mass. Eye and Ear to support investigations into the genetic causes of age-related macular degeneration (AMD).

Since 2003, the AMDF has supported Mass. Eye and Ear and Schepens with annual charitable donations totaling \$220,000. Thus far, their largest annual contribution has been \$25,000. According to Chip Goehring, President of the Board of Trustees at the AMDF, "We have been exceptionally pleased with the progress of Drs. Joan Miller and Demetrios Vavvas for their research into AMD. Without a doubt, Mass. Eye and Ear is a top-notch leader in the research field, and we hope to continue and deepen our relationship with them to assure a brighter tomorrow."

During the summer and fall of 2013, trustees of the AMDF toured laboratories at Schepens Eye Research Institute and Mass. Eye and Ear. During one of their visits, they met Neena Haider, PhD, an Associate Scientist at Schepens. After learning about her work using mouse models to identify the genetic causes of AMD, the trustees decided to support this cutting-edge translational research, committing \$150,000 over two years to support Dr. Haider's project entitled, "Genetic Cause of AMD." Dr. Haider already has identified some genes that she believes are "master regulators" of genetic networks.



Neena Haider, PhD

"While we are all born with 'faulty' genes, it is the combination with a 'faulty' environment that creates a disease state. Master regulator genes control the overall expression of entire gene networks. They play a key role in modulating disease by affecting when a disease becomes apparent and when it becomes worse. These regulators also have the power to prevent or attenuate disease."

Support from the American Macular Degeneration Foundation will help Dr. Haider identify the genes in these networks and then test genetic mutations in mice. "I am hopeful that in the next couple years, we'll have some answers that will lead to better diagnoses and better prognoses. Perhaps, we will be able to use this information to further personalize medicine and identify which patients will benefit from injections. Right now, many patients aren't seeing benefits from injections, and I hope to change that."



Dr. Haider has been involved in the field of genetics and retinal disease for over 15 years. She received her PhD in Genetics from University of Iowa and completed a postdoctoral fellowship at the Jackson Laboratory, where she created some genetically altered mouse models to study AMD. She has published more than 25 original papers in such journals as *Nature Genetics*, *Human Molecular Genetics*, and *PLoS ONE*, focusing on human genetics, mouse model systems, and genomics in regulation and modulation of human retinal disease. The long-term goal of Dr. Haider's laboratory is to identify and evaluate genetic determinants underlying retinal diseases and develop appropriate therapeutic interventions to prevent and treat blindness associated with these disorders. ■

Understanding Macular Degeneration



Chip Goehring, AMDF President

"When I was diagnosed with macular degeneration at age 39, I called it 'molecular degeneration' for a long time. I didn't know what my diagnosis meant, and I wanted to learn more about it and share that information with others. Today, I understand my condition better, and I see very well."

Macular degeneration is an incurable eye disease and is the leading cause of vision loss for those aged 55 and older in the United States, affecting more than 10 million Americans. The AMDF is committed to the prevention, treatment, and cure of macular degeneration and provides high-quality brochures and DVDs to help educate patients, families and caregivers about macular degeneration. One of the educational DVDs includes Don Knotts, an American comedic actor best known for his portrayal of Barney Fife on the television sitcom, *The Andy Griffith Show*. "I think a lot of people are frightened when they receive a diagnosis and go through periods of depression," said Mr. Goehring. "We created these educational materials to help newly diagnosed individuals understand that what they are feeling is normal and that they are not alone."

For more information about AMDF or to request information, please visit macular.org or call 1-888-MACULAR. ■

MEMORABLE PATIENTS

The Schwartz Center Rounds program offers healthcare providers an opportunity to openly and honestly discuss social and emotional issues that arise in caring for patients. In December 2013, members of the Mass. Eye and Ear community joined together to reflect on the topic of “Memorable Patients” and several ophthalmologists shared their unique stories. These reflections serve to remind us of the special relationships that develop between doctors and their patients and also to pay tribute to the unsung heroes—the team of researchers and philanthropists that are equally integral as developers and supporters of innovative treatments.

“I remember a patient in her eighties with macular degeneration... she loved baking, but her deteriorating eyesight was making it difficult to continue enjoying her hobby. Other retina specialists at other institutions had called her situation “hopeless.” So she came to Mass. Eye and Ear and we gave her a series of injections. After maybe the 5th injection, she came into my office with a big apple pie and lots of other baked goodies... With her sight improving, she was able to enjoy her favorite hobby again. And I was able to enjoy some delicious apple pie!”
— John Loewenstein, MD



“Sometimes I don’t realize the impact that we have on people, but one patient reminded me that restoring an individual’s sight can have broad-reaching effects. For instance, I recently operated on a patient with cataracts and glaucoma. I remember it being a complicated surgery, but a successful one. I didn’t understand the importance of this surgery until I read a letter this patient had written to me after his surgery. He explained that had he not regained his vision, he would not have been able to continue leading an important project in Africa, building a team of healthcare leaders for 4,000 villagers. The project was still in its infancy and would have folded without his oversight. Because we were able to give him back his vision, he was able to continue his important work in Africa. I was very moved that he took the time to write that letter explaining the significance of this surgery and to share it with me.”
— Lucy Shen, MD

“Bryan and Elizabeth Shaw not only made a big impression on me, but likely, they are heroes to parents of infants around the world. When their son, Noah, was three months old, Elizabeth noticed that when she used the flash to take digital photos of Noah, she would sometimes see a white reflection come back from his eyes instead of the usual red dot. This “white eye,” technically known as leukocoria, was an early indicator of retinoblastoma. Unfortunately, the tumor was large enough that Noah needed chemotherapy, radiation, and ultimately surgery to remove one of his eyes.

“Throughout this experience, Bryan wondered whether there could have been a way to prevent the loss of his son’s eye by finding the tumor earlier and so he set out to trace the tumor back to when it first began. By analyzing thousands of digital photographs of Noah, Bryan detected the first sign of leukocoria at 12 days old. Bryan, Elizabeth and I presented these findings and the potential for developing automated detection software in a paper in *PLOS One*. It is our hope that these findings might pave the way for new diagnostic tools that enable earlier diagnosis and treatment.

This was a memorable experience and a great example of how patients, families, and doctors can collaborate to help save other kids’ eyesight.”

— Shizuo Mukai, MD



Deep Collaboration with Biopharma: A Revolution in the U.K.

The clinical success of anti-VEGF therapies, such as Lucentis®, for age-related macular degeneration (AMD) transformed ophthalmic care in the last decade while fueling wild speculation in the healthcare industry about the number of ophthalmic pharmaceuticals that could potentially penetrate the biopharma market. In reality, crippling research and development costs mean that few new ophthalmic agents make it to market. Many healthcare experts are searching for ways to bridge this impasse and to ensure a strong, viable future for translational research.

Among them is Dr. David Shima, a biomedical research scientist and biotechnology executive, and the Rothes Professor of Translational Vision Research in the Department of Ocular Biology and Therapeutics at the University College London's Institute of Ophthalmology (UCLIO). During a lecture at Mass. Eye and Ear last fall, Dr. Shima discussed the concept of “deep collaboration” between UCLIO and biopharma as an opportunity to overcome funding and other barriers in order to grow translational medicine in the U.K. This concept may be applicable in the U.S. as well.

According to Dr. Shima, the concept of “deep collaboration” involves working directly with biopharma on multiple drug development projects in order to expedite the progress of drug compounds through the discovery pipeline to preclinical proof of concept and, eventually, human trials. At UCLIO, his laboratory works collaboratively with biopharma to create a multidisciplinary

environment for exploring fundamental questions in basic neovascular research and to turn new innovations into medical treatments.

Deep collaboration has two key advantages: it allows laboratory members to share research know-how, experience, and problem solving prowess with small companies that may be lacking in infrastructure, and secondly, it shares the burden of funding among government entities, private industry funders, and academia.



One of the main differences between the U.K. and the U.S. involves intellectual property (IP), which is a legal concept that recognizes the rights of intangible assets, and how it is licensed to industry. In Dr. Shima's experience, big pharma and smaller biotech start-ups in the U.K. are more flexible in how they manage IP.

Deep collaboration is particularly successful in the U.K., according to Dr. Shima, because of governmental support, flexibility with intellectual property (IP) rights, and acceptance of—and transparency with—potential conflicts of interest by everyone involved. More than pump priming, Dr. Shima believes this initiative is central to the U.K. government's overarching mission of building the health (new drugs) and wealth (increased revenue) of the U.K. In creative ways, deep collaboration is increasing the number of pharmaceuticals being brought into clinical trials, and helping to meet translational medicine demand more effectively. ■



Dr. Shima earned his PhD in cell and developmental biology at Harvard University, working in the laboratories of Drs. Judah Folkman and Patricia D'Amore. He played a key role in the HMS angiogenesis research team that demonstrated the role of VEGF in neovascular eye disease, forming the basis for anti-VEGF therapy in AMD, retinal vein occlusion, and diabetic macular edema. He has enjoyed a professional career that spans translational research in academia, the challenges of biotech start-up ventures, and executive roles in publicly traded biopharmaceutical companies with commercialized products and developing pipelines.

Corporate Relations Task Force

Mass. Eye and Ear created the Corporate Relations Task Force (CRTF) in 2011 to develop ideas and opportunities for Mass. Eye and Ear researchers to pursue strategic alliances with pharmaceutical, biotechnology, and device companies. Currently, the CRTF operational subcommittee, which consists of Ojas Mehta, Bonnie Brodowski, John Marengi, Reza Dana, and Alan Long, is working toward a number of goals.

Their goals include: 1. Securing strategic corporate alliances with key pharmaceutical, biotechnology, and/or device companies; 2. Establishing multi-year research/clinical collaborations; and 3. Accelerating the development timelines of new drugs, devices, and diagnostics.

Future strategic alliances in ophthalmology will be bolstered by expanding efforts in several key subspecialty areas through the HMS Ophthalmology Centers of Excellence. The six

disease-based Centers—which span diabetic eye disease, age-related macular degeneration, cornea/ocular surface disorders, glaucoma, mobility enhancement and vision rehabilitation, and ocular oncology—unify the resources and expertise of clinicians and researchers department-wide with the goal of advancing scientific discovery and bench-to-bedside success, and expanding training opportunities. Likewise, the multidisciplinary focus of the Ocular Genomics Institute, the Ocular Regenerative Medicine Institute, and our recently launched Infectious Disease Institute, are bolstering advances in the disciplines of ocular genetics/genomics, imaging, and stem cell regeneration.

To date, budding industry interactions have occurred with Bausch + Lomb, GlaxoSmithKline, Regeneron, Sanofi-Fovea, Shire, and Allergan. Other companies of interest include: Genentech, Novartis/Alcon, Merck, Roche, and J&J (Vistakon). ■

Symbols of Change: New Logos for Centers of Excellence and Institutes

As part of our HMS branding effort, we launched new logos for the Centers of Excellence and Institutes in January 2014. These symbols serve to: 1) promote and unify the look and feel of our Centers and Institutes; 2) build trust credibility within the healthcare community; and 3) give us a unique identity. Look for these logos throughout departmental electronic and print publications:



Centers of Excellence – three intertwined rings with a shield in the middle (negative space). The rings symbolize the three missions: premier clinical care, transformational research, and training the next generation of leaders.



Ocular Regenerative Medicine Institute – a modern take on the ancient *ouroboros* symbol; a serpent eating its own tail. This graphical representation symbolizes renewal, cyclicity, and constant re-creation.



Ocular Genomics Institute – an abstract DNA helix. This logo captures the goal of translating genomic research into clinical care, delivering on the promise of personalized medicine for ophthalmic disorders.

2014 ARVO Annual Meeting and HMS Ophthalmology Reception



Just a few weeks away, the 2014 ARVO annual meeting is fast approaching. This year's meeting will be held May 4-8 in Orlando, Florida. HMS Ophthalmology will be hosting a reception on Sunday, May 4 from 7:30 pm to 10:00 pm at the Hyatt Regency Orlando, located at 9801 International Drive, directly next to the convention center. Invitations will be emailed in early April to alumni, current and full-time faculty, industry leaders, philanthropic foundations, national funding agencies, and ARVO officers and trustees. ■



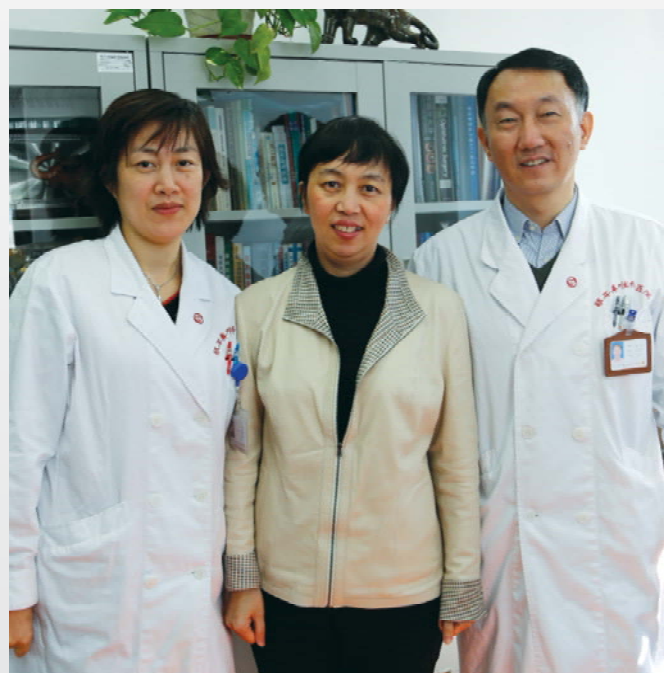
Let the tweeting commence.

#HMSARVO

#ARVO2014

Coming Soon... to Shanghai Television and Beyond

Production for the new Women's Eye Health.org (WEH)-inspired television series, "Little Eyeball, Big World," is set for Spring 2014 with the season premier airing in China next year. Consisting of five programs, each devoted to a specific aspect of eye health, the lineup will include age-related macular degeneration, cataracts, dry eye, glaucoma, and low vision. In addition to broadcasting in China, producers hope to make the series available on the WEH website, its YouTube channel and other US media outlets as well.



Yiwei Wu, Director of Public Education at Shanghai EENT Hospital, Dong Feng Chen, MD, PhD of Schepens Eye Research Institute, and Xinhuai Sun, MD, PhD, President of Shanghai EENT Hospital.

According to HMS Associate Professor of Ophthalmology and Chair of Women's Eye Health, Dong Feng Chen, MD, PhD, "Many Chinese women and families are resistant to going to a hospital. They prefer home remedies and traditional Chinese medicines or simply ignore the eye problem until it becomes too late to be treated. The hope is that knowledge gained from these programs will inspire people suffering from eye diseases to seek care earlier."

Dr. Chen played a vital role in bringing this project to fruition by collaborating with Shanghai's EENT Hospital—an affiliate of Fudan University—and the Harvard Medical School Department of Ophthalmology. The series will be filmed by China Education Television in Boston and in Shanghai. The project is funded primarily by Shanghai's EENT Hospital with support from the Harvard Medical School Department of Ophthalmology. ■

Dartt continued from page 2...

Among Dr. Dartt's many research discoveries are studies that have unraveled novel signaling pathways activated by nerves and growth factors to stimulate lacrimal gland protein. Her work has revolutionized the area of conjunctival goblet cell mucin secretion. Of particular note, the Dartt laboratory is the only laboratory able to culture both rat and human goblet cells and to investigate the regulation of proliferation and secretion of these cells in a purified culture. With several technological innovations, she holds patents for the stimulation of tear secretion and therapeutic regulation of abnormal conjunctival goblet cell mucous secretion.

Today, Dr. Dartt and members of her laboratory are studying the novel signaling mechanisms used by P2X7 receptors, sometimes referred to as death receptors, to stimulate lacrimal gland secretion rather than cause cell damage. She also is determining the role of thrombospondin-1, an anti-inflammatory molecule, in the development of dry eye disease in both humans and a mouse model. Additional projects include investigation of the role of lipoxin and annexin pro-resolution mediators in goblet cell function and comparison of the effect of toxigenic, non-toxigenic, and commensal bacteria on goblet cell function.

Dr. Dartt has been the Principal Investigator on multiple-project Department of Defense grants since 2002 and has organized five symposia on the needs of military vision professionals. She also was the Principal Investigator on an NIH 2004 Roadmap grant—one of only 21 such grants funded by NIH that year—for interdisciplinary research on blinding eye diseases. Earlier in her career, Dr. Dartt received a Research to Prevent Blindness Lew R. Wasserman Merit Award and later became a Gold Fellow of the Association for Research in Vision and Ophthalmology in 2009. She has authored over 130 articles, chapters, editorials and abstracts.

Allocating significant time to teaching and mentoring, Dr. Dartt has formally supervised more than 30 trainees in the laboratory, helping to advance their scientific careers. Additionally, as Director of the HMS Department of Ophthalmology Molecular Bases of Eye Diseases Training Program, she has contributed extensively to the fundamental growth of medical education throughout the department. ■

Dartt Laboratory Scientific Discoveries

- Characterized the three major G protein linked signaling pathways critical for regulation of lacrimal gland secretion
- Developed cAMP-dependent compounds that activate post-receptor signaling pathways as topical treatments for dry eye syndromes
- Highlighted the role of nerves in secretory dysfunction in mouse models of Sjogrens syndrome and aging, which suggested new mechanisms to induce lacrimal gland secretion by bypassing the action of the nerves
- Isolated precursor cells from the lacrimal gland that appear to be a subset of myoepithelial cells and could repair the damaged lacrimal gland and cure dry eye
- Discovered that the inflammatory and allergic leukotrienes cause goblet cell secretion that can be resolved by resolvins that actively terminate inflammation
- Found that pathogenic *Staphylococcus aureus* activates the NLRP3 inflammasome to produce mature IL-1 in conjunctival goblet cells that protects the ocular surface from infection

Notes From The Chair continued from cover...

glaucoma medication for up to a month is now a very real possibility for patients. Retinal prosthetic implants that use 256 individually-controllable stimulation channels (as opposed to the currently available 60-channel devices) are also under development, offering greater hope for patients to see more than just patterns of light and dark. These clinical innovations take root in the work that is conducted in both our clinics and laboratories.

We are also driving innovations in technology for today's modern, hands-on classroom experience, offering creative ways to transfer knowledge and clinical skills across generations of ophthalmologists. Within our department's ever-evolving HMS Ophthalmology Residency Training Program, a progressive surgical curriculum and modular stepwise training for cataract surgery have dramatically improved the resident experience (see page 12 for more information). New computer simulation tools, like the Mass. Eye and Ear Cataract Master™, are exponentially expanding our ability to train in-house and on a global scale. Another computer-based teaching tool in development is designed to teach ophthalmology trainees and physicians how to screen premature infants for retinopathy of prematurity. Yet another online training tool in development aims to teach U.S.

medical students and interns the core ophthalmology curriculum so they can effectively triage and manage a wide variety of ophthalmic diseases.

Some say that medicine is losing its humanity in the face of technology. This is not a perspective that I share because of what I witness every day in our department: devoted and compassionate researchers, scientists, and physicians who are working together to improve the quality of life for our patients and to eliminate blinding disease in this generation. Yes, we are leveraging technology at every turn to develop exceptional and innovative tools that will help our patients. But only within the context of the human side of medicine, which flourishes across the department.

With that in mind, I hope you will read through this edition of *EyeWitness* with an eye on the many ways our department and patients benefit from technology that springs from our dedicated efforts. ■


Joan W. Miller, MD, FARVO
Chief and Chair

Smartphone continued from cover...

In 2004, Dr. Mukai and Paul Yates, MD, PhD—an HMS Department of Ophthalmology resident (2002-2005)—created prototypes of fundus cameras using off-the-shelf digital cameras. They presented their findings in a poster entitled, “Design of a Low-Cost, Portable, Digital Camera System for Fundus Photography,” at the Association for Research in Vision and Ophthalmology annual meeting in 2005. The concept was well received, but the prototypes were still relatively difficult to use.

By 2007, smartphones had entered the consumer marketplace and clinicians started using smartphones as camera attachments to existing ophthalmic devices. The smartphone was used as both an image-recording device and as an image-transfer device. But even slit-lamp adapters for smartphones proved expensive, and cost, on average, between \$250 and \$600. In addition, a different adapter was needed for each smartphone-slit lamp combination.

“This is typical of the medical-device market... devices are overpriced and nonflexible,” noted Dr. Mukai, who at the time wondered, “Can we make something simpler, cheaper, and universal?” The answer was yes: Dr. Mukai and his fellow, David Kim, MD, created a prototype for under \$1 using a piece of architectural modeling wood with a hole cut into it and some rubber bands that held the smartphone in place. Made in the “retina garage,” this inexpensive piece of technology laid the foundation for the next phase of research, which was to reduce the size of the ophthalmoscope and increase portability.

For Dr. Mukai, the ultimate goal was to use the smartphone as the medical device itself, i.e. the retinal camera, rather than as an attachment to an existing device. His team came up with a simple method of fundus photography using the smartphone as an indirect ophthalmoscope. To keep it simple, no hardware attachment was required, and the only other instrument required was a 20 diopter lens used for indirect ophthalmoscopy that is readily available in most eye clinics. Two advances made this possible. First was the placement of the light source next to the camera lens in the newer smartphones that allowed for the required coaxial light source. Second was a nifty app from a film company that allowed for manual control of focus, illumination, and exposure.

To make sure that this system was safe for use in human eyes, Dr. Mukai consulted with his former mentor and now Mass. Eye and Ear/Schepens Eye Research Institute colleague, François Delori,

PhD, who is a world expert on measuring light safety in eyes. Drs. Kim, Mukai and Delori set up a model eye system to verify the safety of the iPhone 4’s light source. They found that the iPhone’s light and energy levels were ten times less than that of a commercially available indirect ophthalmoscope, suggesting that the iPhone light source was indeed safe (Kim et al., *Ophthalmology*, 2012).

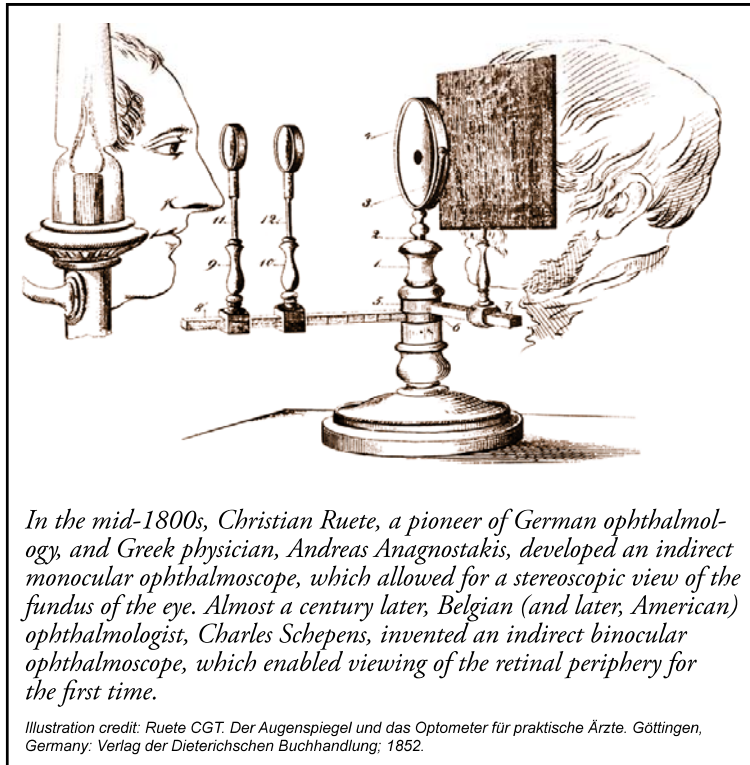
The detailed, multistep method of smartphone fundus

photography was described by Dr. Mukai’s fellow, Luis Haddock, MD in a recent paper (Haddock et al., *Journal of Ophthalmology*, 2013). In addition, this technique has been useful in fundus photography of rabbits, and Dr. Haddock has been using it to document rabbit retinas in projects on proliferative vitreoretinopathy in collaboration with Schepens colleague, Andrius Kazlauskas, PhD.

Researchers outside of Mass. Eye and Ear have been investigating the usability of mobile devices simultaneously. For instance, researchers from Switzerland and Germany described a novel portable handheld smartphone-based retinal camera capable of capturing high-quality, wide field fundus images (Tietjen et al., *Klin Monatsbl Augenheilkd*, 2013). Similarly, researchers

affiliated with the F.I. Proctor Foundation and University of California demonstrated the usability of a mobile phone-based retinal camera for portable wide field imaging (Maamari et al., *Br J Ophthalmol*, 2013). In addition, researchers from the University of Tennessee and the University of Pittsburgh found that a smartphone handset was comparable to a standard office computer workstation for teleophthalmology fundus photo assessments of diabetic retinopathy (Kumar et al., *Telemed J E Health*, 2012).

Going forward, Dr. Mukai is working with Ramesh Rashkar, PhD and his team at the Media Lab at Massachusetts Institute of Technology to start a proof-of-concept telemedicine trial at Mass. Eye and Ear, and bring this technology to Uganda as part of the Mass. Eye and Ear Global Surgery and Health initiative led by Dr. Mack Cheney. There is even interest from Mass. Eye and Ear’s Otolaryngology Department to modify this system for imaging the ear drum. “It is exciting to see that a project that started as a “garage” project of sorts is now expanding in all directions with tremendous potential,” said Dr. Mukai. ■



Cornea Service continued from page 3...

with the Center for Human Cell Therapy Boston, a unique cross-institutional program within HMS that translates laboratory cell therapies to clinical application. This collaboration has led to the filing of an Investigational New Drug application to the FDA for performing a Phase I/II study to treat corneal blindness with stem cells.

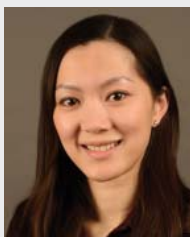
The size and diversity of the Service ensures an exceptional training experience for residents and fellows. Case in point: the intensive, one-year cornea fellowship program at Mass. Eye and Ear equips trainees with advanced diagnostic and surgical skills across the entire spectrum of corneal and external eye disorders. Fellows care for a wide variety of patients with complex disorders

both at Mass. Eye and Ear and Massachusetts General Hospital and come away with superb clinical and leadership skills that prepare them to evaluate and manage the most difficult cases. Numerous graduates of this fellowship are now serving in positions of academic leadership throughout the world. At last count, over 60 Professors of Ophthalmology and Department Chairs were graduates of the Mass. Eye and Ear Cornea Fellowship—an unparalleled history in training and mentoring the leaders of this field. There also is a two-year corneal fellowship that involves one year of laboratory research. More details can be found in the ophthalmic education section at www.MassEyeAndEar.org. ■

Members of the Cornea and Refractive Surgery Service at Mass. Eye and Ear



Sheila Borboli-Gerogiannis, MD



Han-Ying Peggy Chang, MD



James Chodosh, MD, MPH
Associate Director,
Cornea Service



Joseph Ciolino, MD



Kathryn Colby, MD, PhD



Reza Dana, MD, MSc,
MPH, FARVO
Director, Cornea Service



Claes Dohlman,
MD, PhD



Pedram Hamrah, MD



Deborah Jacobs, MD



Ula Jurkunas, MD



Deborah
Pavan-Langston, MD



Zhonghui Katie Luo,
MD, PhD



Samir Melki, MD,
PhD



Roberto Pineda II, MD
Director, Refractive Surgery

The Boston KPro: Saving Sight around the World

Claes Dohlman, MD, PhD began development of the Boston Keratoprosthesis (KPro) in the early 1960s. Cleared by the FDA in 1992, the Boston KPro today is the most widely used artificial cornea in the world. The device has helped restore sight to more than 9,000 patients—in 53 countries—whose corneas have been severely damaged by chemical burns, disease, or trauma, and are not candidates for conventional transplantation. Improvements to the device over the last two decades have solved many of the problems of post-operative infection that characterized early prosthetic procedures. Dr. Dohlman and the Boston KPro team at Mass. Eye and Ear and

MIT continue to make improvements, with special focus on lowering post-surgical infection rates, addressing glaucoma-related issues, and improving retention rates in patients. In particular, **James Chodosh, MD, MPH, Roberto Pineda II, MD**, and colleagues are formulating a less expensive KPro device and have developed several pilot programs around the world—among them India, China, Sudan, Thailand, Africa and Central and South America—to bring this sight-saving technology to developing countries and millions of people who would otherwise remain blind. ■

Cornea Center of Excellence Hosts 3 Days of Unparalleled Learning and Discussion

The HMS Department of Ophthalmology Cornea Center of Excellence (COE) took center stage October 17th through 19th when it hosted its 28th Biennial Cornea Conference and its first International Workshop. Since the 1960s, the Biennial Cornea Conference has brought together the best minds in corneal science and medicine to explore current basic and translational research developments of the cornea and anterior ocular surface, and promote interaction and discussion among leaders in the field. This year's conference, co-chaired by James Chodosh, MD, MPH, and Reza Dana, MD, MSc, MPH, FARVO, drew more than 200 participants and was held at the Schepens Starr Center for Scientific Communications. Program sessions included Epithelial and Ocular Surface Biology, Microbiology and Innate Immunity, Adaptive Immunity, New and Emerging Technologies, Pain and Neurogenic Inflammation, and Transplantation and Regenerative Medicine. Over 70 scientific posters were displayed during the poster session.

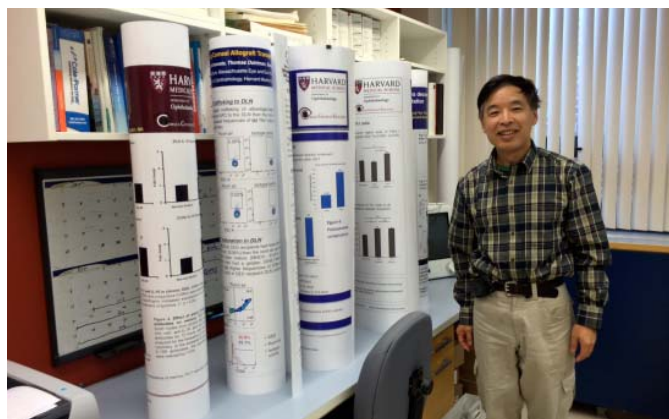
An inaugural International Workshop was held the day before the Conference and brought together a multidisciplinary group of more than 20 scholars. Both physicians and scientific researchers



International Workshop participants presented and discussed recent scientific findings.

presented current research findings, exchanged scientific ideas, and strengthened international collaboration in the field of cornea and ocular surface research. The scientific program focused on virology, immune regulation, ocular surface, new imaging technologies, and regenerative medicine. Notably, Schepens alumnus and Professor and Chair of Ophthalmology at Kyoto Prefectural University of Medicine, Shigeru Kinoshita, MD, PhD, attended the workshop and also presented “Future Therapeutic Modalities for Devastating Ocular Surface and Corneal Disorders” during Grand Rounds earlier in the day.

Directed by Dr. Dana and co-directed by Ula Jurkunas, MD, the Cornea Center of Excellence houses one of the most unique and robust programs in the world and its global reach continues to expand year to year. According to Dr. Dana, “Both the cornea conference and international workshop were a tremendous success in terms of multidisciplinary collaboration. What we learn here from our speakers and from each other helps pave the way on a worldwide scale for ongoing advancements in the cornea field.” ■



Qiang Zhang, MD, Dana Laboratory

Seeing Up Close and Afar



with way finding. Since currently available telescope attachments are bulky, Dr. Luo is developing a sleeker model: a flat telescope that will attach to the back of a smartphone.

Developed by HMS Assistant Professor, Gang Luo, PhD and his team members—postdoctoral fellow, Shrinivas Pundlik, PhD and internship student, Zewen Li—SuperVision+ is a free, smartphone magnifier app, now available through Apple, that offers two great benefits: magnification of small print and a unique image stabilization feature that steadies shaky images caused by hand tremors. It is particularly useful for the elderly when magnifying small text, such as on medication bottles and restaurant menus. In distant viewing situations where the print is not too small. The SuperVision+ app allows users to stabilize live images by simply pressing the iPhone screen. The app also can be combined with inexpensive telescope attachments that can stabilize shaky images so users can read street signs and airport information boards and assist

In the first six months since its debut in October 2013, the SuperVision+ app has been downloaded by more than 1000 people in 50 countries.

Broadly Applicable Surgical Teaching Method Published in *Journal of Surgical Education*

Although cataract surgery is one of the most frequently performed surgeries in the country, it is a complex, microsurgical procedure that is difficult to learn and to teach. Trainees must assimilate both technical and cognitive skills while performing the procedure, which involves seven distinct steps along with hundreds of potential decision-making issues. To better prepare residents in the operating room, Carolyn Kloek, MD and John Loewenstein, MD created an innovative curriculum, launched in 2009, in which residents are introduced to cataract surgery in a structured, guided, step-wise manner.

Currently available online through ScienceDirect, the assessment and results of this curriculum were also published in the March-April, 2014 issue of the print journal, *Journal of Surgical Education*.

“The step-wise curriculum—which we now teach to second year residents—definitely helps them feel more prepared for their surgeries,” commented Dr. Carolyn Kloek, Program Director of the HMS Department of Ophthalmology Residency Training Program. “Residents learn cataract surgery in a step-wise

manner, by performing isolated steps of surgery in the operating room and on a surgical simulator, before being challenged with performing an entire cataract surgery. This step-wise introduction to cataract surgery has boosted residents’ skills, confidence and comfort level.”

The authors investigating this curriculum’s effectiveness include Carolyn Kloek, MD, Sheila Borboli-Gerogiannis, MD, Kenneth Chang, MD, Mark Kuperwaser, MD, Lori Newman, MEd, Anne Marie Lane, MPH, and John Loewenstein, MD. This group also showed that although the new curriculum is focused on residents performing isolated steps of surgery, the residents who participated in the curriculum ended up performing more entire cataract surgeries during their training than those who did not.

“This surgical teaching method has broad-reaching applications,” noted Dr. John Loewenstein, HMS Vice Chair for Ophthalmic Education. “It can be applied to other surgical specialties, and that is good news for our residents, our patients, and hopefully other surgical specialties as well.” ■



“Focusing on a different step on each surgical day allowed me to understand and improve my technique under direct faculty guidance, and it relieved much of the stress of performing intraocular surgery as a beginner. By the end of the step-wise training I felt confident and comfortable performing a whole case.”

—Sotiria Palioura, MD, Resident



“By isolating and mastering each key step of cataract surgery, the step-wise curriculum allowed me to gain a mature understanding of each step and its relation to the entire surgery. On the first day of the third year’s intensive surgical curriculum, I felt very comfortable in the OR doing full cases in a safe, efficient, and deliberate manner.”

—Yoshi Yonekawa, MD, Resident

Carolyn E. Kloek, MD Appointed Program Director of HMS Department of Ophthalmology Residency Training Program

After serving alongside John Loewenstein, MD as Associate Program Director for six years, Carolyn E. Kloek, MD was appointed Program Director of the HMS Department of Ophthalmology Residency Training Program, effective January 1, 2014. In this role, she has assumed the day-to-day oversight and strategic management of this nationally lauded program.

Program Director for the past 12 years, John Loewenstein, MD will continue in his current roles as HMS Vice Chair for Education, and Associate Chief of Education and Associate Clinical Chief for Mass. Eye and Ear. This shift in leadership will allow Dr. Loewenstein to pursue other key educational initiatives as well as devote more time to the increasing demands of the department’s clinical activities. A formidable team, Drs. Kloek and Loewenstein have spearheaded major advancements to the residency program, including: introducing a progressive surgical curriculum and modular stepwise training of cataract surgery, adding a structured schedule of customized wet lab sessions formally proctored by faculty and fellows, and adding a state-of-the-art wet lab including an EYESI® Virtual Reality Simulator. These innovations—enthusiastically embraced by trainees over

the years—have enhanced residents’ core surgical skills and significantly improved their surgical learning experience.

According to Chief and Chair, Joan W. Miller, “Drs. Kloek and Loewenstein’s accomplishments and contributions have raised the national prominence and caliber of our residency program.”

An innovative and devoted educator, Dr. Kloek was one of six Harvard Medical School faculty to receive a prestigious HMS Rabkin Fellowship in Medical Education in academic year 2011-12. Her Fellowship project, now nearing completion, is a standardized, on-line curriculum designed to enhance ophthalmic training of medical students across the country.



Dr. Kloek also was recognized at the 2014 Pinnacle Award luncheon, held on January 30, 2014 at the Boston Marriott Copley Place Hotel. She received the award for Achievement in the Professions. ■

Mass. Eye and Ear Awarded Coveted Leapfrog Top Hospital Distinction

The Leapfrog Group named Massachusetts Eye and Ear for the first time to its annual list of Top Hospitals, while Boston Children's Hospital was named a Top Children's Hospital. The announcement came at Leapfrog's Annual Meeting on December 3, 2013 in Arlington, Virginia, which gathered key decision-makers from Leapfrog's network of purchaser members, industry partners, healthcare stakeholders and national collaborators.

The Leapfrog Group was founded in November 2000 with support from the Business Roundtable and national funders, and is now independently operated with support from its purchaser and other members. It is a national organization that uses the collective leverage of large purchasers of health care to initiate breakthrough improvements in the safety, quality, and affordability of health care for Americans. ■

A Focus on Strabismus Case Management: Lively Discussion at the Inaugural Strabismus Fall Festival



(Left to right) Dean Cestari, MD, Linda Dagi, MD, David Guyton, MD, Gena Heidary, MD, PhD, and David Hunter, MD, PhD.

A series of adult and pediatric strabismus cases were presented to an expert panel for lively real-time management discussions during the First Strabismus Fall Festival, held November 7, 2013 in Meltzer Auditorium at Massachusetts Eye and Ear. During this one-day educational event, each panelist also presented a lecture focused on techniques and advances in strabismus surgery and pediatric ophthalmology. Of particular note, David Guyton, MD, Professor of Ophthalmology at the Wilmer Eye Institute, Johns Hopkins University, was the guest of honor and lead panelist. Dr. Guyton is considered one of the world's leading pediatric ophthalmologists and strabismus surgeons and his inaugural guest lecture, "Dissociated Vertical Deviation: Mechanism and Purpose," sparked enthusiastic discussion. Co-directed by Dean M. Cestari, MD and Gena Heidary, MD, PhD, the course was offered by Mass. Eye and Ear and Boston Children's Hospital. ■

HMS Department of Ophthalmology Annual Meeting & Alumni Reunion Weekend



June 20-22, 2014: Celebrating the 10 graduating classes of 1964, 1969, 1974, 1979, 1984, 1989, 1994, 1999, 2004, and 2009, this 3-day flagship departmental event combines scientific exchange with networking events and social activities. For event and registration details, visit www.MassEyeAndEar.org/AlumniReunion. CME credit is available, supported by the HMS Department of Ophthalmology.

Course Directors: Lucia Sobrin, MD, MPH, Ula Jurkunas, MD, Joseph Rizzo III, MD, FARVO, and Joan W. Miller, MD, FARVO

Friday, June 20: Annual Meeting

Schepens Starr Center, 185 Cambridge Street, Boston

- Basic/clinical poster session showcasing the current research activities of our trainees
- Mariana Mead Lecture: "Global Citizenship in Ophthalmology" presented by Roberto Pineda II, MD, Associate Professor of Ophthalmology, Harvard Medical School
- Tour of new Mass. Eye and Ear and Schepens facilities
- Reception and dinner celebration

Saturday, June 21: Alumni Reunion

Mass. Eye and Ear, 243 Charles Street, Boston

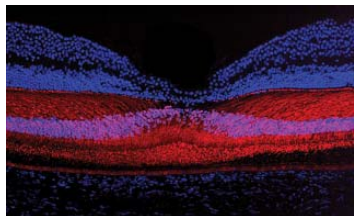
- Scientific and clinical lectures presented by alumni
- Presentation of the 2014 Distinguished Research Achievement Award: Thaddeus Dryja, MD presents, "A Personal Voyage in the Genome: Identifying Genes Causing Ophthalmic Diseases"
- Presentation of the 2014 Distinguished Clinical Achievement Award: Alfred Sommer, MD, MPH presents, "Preventing Blindness, Saving Lives, with Vitamin A"

Sunday, June 22: Optional Recreational and Cultural Activities

Visit MassEyeAndEar.org/AlumniReunion

OCULAR GENOMICS INSTITUTE

Mass. Eye and Ear First in Northeast to Offer Comprehensive Genetic Diagnostic Testing for Eye Disease



A new comprehensive genetic diagnostic test for inherited eye diseases is now available. The Genetic Eye Disease (GEDi) test uses two DNA sequencing technologies to simultaneously analyze

multiple genomic regions for potential disease-causing mutations in 234 genes associated with inherited retinal disease (IRD), early-onset glaucoma and optic atrophy. Mass. Eye and Ear is the first and only location in the northeast to offer this service.

“Comprehensive testing is valuable since genetic diagnoses can be more accurate than those that are based on clinical features alone and can help us better predict the course of the disease,” said Eric Pierce, MD, PhD, Director of the Ocular Genomics Institute (OGI) at Mass. Eye and Ear/Harvard Medical School Department of Ophthalmology.

The OGI also offers genetic counseling to patients to explain their diagnoses and potential treatment options so they can

make informed decisions about disease management and family planning. “For many patients, genetic testing and counseling removes the uncertainty and anxiety that comes from living with an undiagnosed disease. It’s also very helpful to families who may want to know what the risks are of passing their disease on to their children,” added Dr. Pierce.

The GEDi diagnostic panel is subdivided into two separate tests: GEDi-R for IRDs (226 genes) and GEDi-O for early-onset glaucoma and optic atrophy (8 genes). Both GEDi genetic diagnostic tests have been validated in compliance with Clinical Laboratory Improvement Amendment (CLIA) requirements, and are offered through the OGI’s CLIA-certified Genetic Diagnostic Laboratory.

Genetic testing may only be ordered by a medical professional. For more information associated with GEDi clinical diagnostic testing, including pricing, please visit <http://oculargenomics.meei.harvard.edu/index.php/gdt> or contact the Ocular Genomics Institute at OGI_Diagnostics@meei.harvard.edu. ■

First Ocular Genomics Institute Symposium Generates Important Dialogue around Global Research Efforts

On October 21, 2013 some of the most profound thought leaders in ophthalmic genetic and genomic science shared their latest research, insights and advances during an intensive, one-day symposium hosted by the HMS Department of Ophthalmology Ocular Genomics Institute (OGI). The inaugural event, held at the Schepens Eye Research Institute Starr Center was titled, “Genetics and Genomics of Eye Disease,” and explored current research for a wide a range of inherited eye diseases and their impact on patients and their families. The strategic timing of the symposium – held the day before the American Society of Human Genetics convention at the Boston Convention & Exhibition Center – helped draw a diverse audience of 100 geneticists, ophthalmologists, genetic counselors and researchers, as well as an international mix of distinguished presenters. Among them: Stuart MacGregor (Queensland Institute of Medical Research), Nico Katsanis, PhD (Duke University), Jonathan Haines, PhD (Vanderbilt University), and Rob W. J. Collin, PhD (Radboud University Medical Centre, Nijmegen Netherlands).

“The Boston-Cambridge area, in particular, is one of the most concentrated regions for genomic science,” said Eric Pierce, MD, PhD, director of the OGI and the Solman and Libe Friedman Associate Professor of Ophthalmology at HMS. “We have an incredible wealth of information to share with the global community and them with us. Venues like this present a

unique opportunity to pool ideas, validate our research, refine our investigations, and move forward in a rational and strategic manner that speeds up the pace of discovery and clinical advancements worldwide.”

The highly anticipated symposium encouraged stimulating discussion and spontaneous exchange of ideas that centered on risk factors for common complex eye disorders including AMD, glaucoma and diabetic retinopathy, as well as disorders caused by highly penetrant mutations, such as inherited retinal generations, optic atrophy and strabismus. Presentations mirrored the natural progression of the OGI’s translational research approach, moving from identifying risk factors to discussion of clinical findings to the latest methodologies for gene-based tests and therapies. Lively didactic discussions centered on therapeutics, ethics and new methodologies for gene-based testing.

Enthusiastic feedback from attendees spoke to the caliber of speakers and the opportunity to get a first-hand look at some of the most cutting-edge work going on in the field. “Ultimately, our goal was to spotlight the great investigative work going on at HMS and elsewhere and to leverage that work as we move forward,” noted OGI Co-director, Janey Wiggs, MD, PhD, who organized the Symposium. “This kind of smart, focused collaboration is invaluable to our efforts at every stage of the bench-to-bedside pipeline.” ■

Barriers and Opportunities Facing the Contemporary Clinician Scientist

Reza Dana, MD, MSc, MPH, FARVO and Joan W. Miller, MD, FARVO teamed up to author “On the Edge: The Clinician-Scientist in Ophthalmology,” which was published September 26, 2013 in *JAMA Ophthalmology*. Drs. Dana and Miller opened their article with, “In the parlance of evolutionary biology, ‘on the edge’ refers to endangered species nearing extinction, which we believe aptly describes contemporary clinician-scientists.” According to the authors, one of the major hurdles for contemporary clinician scientists is economic pressure because of scant grant funding, declining clinical reimbursements, and rising educational expenses.

Drs. Dana and Miller propose several solutions. First, they suggest encouraging the National Institutes of Health and private foundations to aggregate data about the state of clinician scientists and to increase funding for them. Second, they assert the importance of providing stable resources, protected time, and flexibility for achieving scientific goals for rising young clinician scientists. Third, they observe that the future of translational research hinges on creating an environment that values patient-oriented translational research. Taken together, creating an open environment that values and leverages the clinician scientists’ unique skill set will benefit patients by fueling innovative translational research and cutting-edge medical education. ■

15th Annual Boston Angiogenesis Meeting

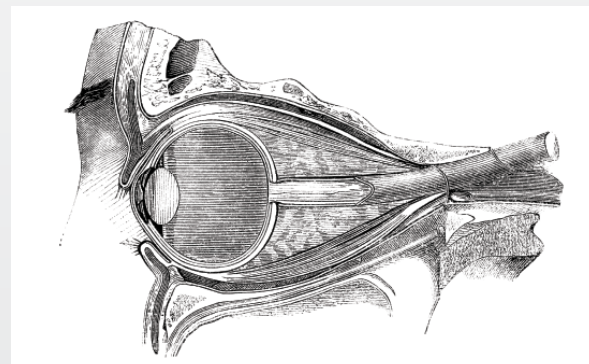
The 15th Boston Angiogenesis Meeting (BAM) took place on November 7, 2013 in the Starr Center. Over 250 attendees were present at the meeting, which was co-chaired by HMS Ophthalmology faculty members, Kip Connor, PhD, and Demetrios Vavvas, MD, PhD. BAM is the brainchild of Patricia A. D’Amore, PhD, MBA, Director of Research at Schepens Eye Research Institute, who first organized the meeting in 1999 after recognizing the “critical mass” of angiogenesis investigators in the Boston area and the lack of available venues for exchanging ideas, sharing resources, and forming collaborations in angiogenesis research. According to Dr. Connor, BAM has since “become a mainstay of our local angiogenesis community” and serves as a testament to the legacy of the late Judah Folkman, MD, who in the 1970s postulated that angiogenesis can lead to rapid tumor growth.

Several local and regional universities (including HMS, Boston University, MIT, Tufts, and UMass) and their affiliate institutions were represented by the speakers and attendees at the 15th BAM. Talks centered on topics ranging from vascular modeling and metabolic regulation to oncogenesis and vascular-targeting therapeutics. The keynote speaker was Elazer Edelman, MD, PhD, the Thomas D. and Virginia W. Cabot Professor of Health Sciences and Technology at MIT, Professor of Medicine at Harvard Medical School, and Senior Attending Physician in the coronary care unit at Brigham and Women’s Hospital. A prominent cardiovascular engineer, Dr. Edelman maintains that “the dumbest cell is cleverer than the cleverest of scientists,” and discussed the emerging role of endothelial cells in “angiocrine” regulation as well as their expanding functional importance in tumor biology. ■

Researchers Gain Insight into Retinal Detachment after Open Globe Injury

Ocular trauma causing open globe injury, or a breach in the wall of the eye, remains an important cause of vision loss, with more than 200,000 open globe injuries occurring worldwide each year. In many cases, retinal detachment follows the traumatic injury, causing significant vision loss or blindness.

HMS Ophthalmology faculty members Thomasz Strykowski, MD, MPP, Christopher Andreoli, MD, and Dean Elliott, MD reviewed the circumstances around retinal detachment after open globe injuries and described a new tool that may help ophthalmologists predict which patients are at higher risk after open globe trauma. Published in the January 2014 issue of *Ophthalmology*, these findings may help clinicians potentially prevent retinal detachment from happening or identify and repair—retinal detachments more quickly, thus saving vision.



Researchers performed a retrospective review of 1,036 consecutive open globe injuries evaluated by the Eye Trauma Service of Mass. Eye and Ear from Feb. 1, 1999, to Nov. 30, 2011. Demographic and clinical data from 893 charts were entered into a database. Variables included were age, sex, date, time and place of injury, mechanism of injury, initial clinical findings, date and time of open globe repair, ocular trauma score, zone of injury, date of retinal detachment diagnosis, date of retinal detachment surgery, and last date of follow-up.

Patients who developed retinal detachment were older, had a poorer median visual acuity, were less likely to have a visual acuity of $\geq 20/200$, were more likely to have an afferent pupillary defect, and were more likely to have vitreous hemorrhage compared with patients who did not develop retinal detachment. In both groups, most patients were male.

“We took this information, along with other variables, and created the Retinal Detachment after Open Globe Injury (RD-OGI) score,” said Dean Elliott, MD, senior author, Associate Director of the Mass. Eye and Ear Retina Service, and Stelios Evangelos Gragoudas Associate Professor of Ophthalmology, Harvard Medical School. “After prospective validation with independent cohorts, the RD-OGI score may be useful to help the ophthalmologist predict which patients are at higher risk for retinal detachment after open globe trauma.” ■

The HMS Department of Ophthalmology sponsors an extensive array of special lectures and courses. For details, please consult the Ophthalmology Education section at www.MassEyeAndEar.org or link to our HMS online calendar at www.MassEyeAndEar.org/hmscalendar



Ophthalmology Grand Rounds

Grand Rounds are held every Thursday from 8:00 - 9:00 am in the Meltzer Auditorium, 3rd Floor, Mass. Eye and Ear and simulcast to the Karp 11 conference room at Boston Children's Hospital and Mass. Eye and Ear, Longwood. Continuing Medical Education credit is available.

Upcoming Events

Boston Ophthalmic Pathology Lecture

Mass. Eye and Ear, Meltzer Auditorium
April 8, 2014, 6:00 pm: Norman C. Charles, MD, Professor of Ophthalmology, NYU Medical Center, presents "Diseases of the Orbit: Pathology of Orbital Disorders." Held in conjunction with the Boston University Department of Ophthalmology.
Course Directors: Frederick Jakobiec, MD, DSc and Rebecca Stacy, MD, PhD

Visiting Professor in Cataract Surgery

Mass. Eye and Ear, Meltzer Auditorium
April 23, 2014: Marie-Jose Tassignon, MD, PhD, FEBO, Chief and Head of the Department of Ophthalmology, Medical Director, University Hospital Antwerp, Belgium, presents "The Concept of the Bag-in-the-lens in Regular and Advanced Cases."

Cornea Visiting Professor Lecture Series

Mass. Eye and Ear, Meltzer Auditorium
May 29, 2014: Gerrit Melles, MD, PhD Director, Netherlands Institute of Innovative Ocular Surgery, Rotterdam, the Netherlands

Glaucoma Conference

Mass. Eye and Ear, Meltzer Auditorium
May 29, 2014: Douglas Rhee, MD, Chairman of the Department of Ophthalmology and Visual Sciences, University Hospitals Case Medical Center and Case Western Reserve University School of Medicine

Graduation for Residents and Clinical Fellows

Mass. Eye and Ear, Meltzer Auditorium
June 26, 2014, 4:00 pm

Vitrectomy Course for First-Year Retina Fellows

Mass. Eye and Ear
July 18-19, 2014: Designed for first-year retina fellows, this course is a comprehensive workshop covering the theory and practice of vitreoretinal surgery. Now in its fifth year, this course combines didactics, vitrectomy video, a simulation lab, and a wet lab under the direction of a group of eminent international faculty in a setting with a low student-to-teacher ratio. Each year, this popular workshop fills to capacity. Registration now open. Visit MassEyeAndEar.org/VRcourse

Course Directors: John Loewenstein, MD, Demetrios Vavvas, MD, PhD and Dean Elliott, MD

Awards, Grants & Other Honors

Awards

Dean Elliott, MD and Demetrios Vavvas, MD, PhD are among the 14 retinal specialists worldwide who were inducted into the Macula Society for 2014. Founded in 1977, the Macula Society is a forum for new research in retinal vascular

and macular diseases, and recognizes outstanding achievement by its members and others through awards and lectures.

Kathryn Colby, MD, PhD, Suzanne Freitag, MD and Patricia D'Amore, PhD, MBA, FARVO as well as HMS alumnus **Johanna Seddon, MD, ScM** were four of 11 recipients honored with the inaugural Women in Ophthalmology 2013 Mentorship award, which recognizes outstanding mentors in the ophthalmology community who have a sustained career commitment to mentoring. Awardees also were honored at the Women Physicians Section business meeting at the American Medical Association annual meeting, held November 16, 2013 in National Harbor, Maryland.

Neha Sangal, MD was selected as the 2013-2014 Richard J. Simmons and Ruthanne B. Simmons Glaucoma Fellow. This annual recognition was established in 2011 to honor the life and career of Dr. Ruthanne Simmons and the work of her father, Dr. Richard Simmons. Both were glaucoma physicians. The award will provide funding support for Dr. Sangal's fellowship training.

In October 2013, **Thomas Merrill**, Manager of Mass. Eye and Ear's Optical Shop, was appointed by Governor Deval Patrick to the Board of Registration of Dispensing Opticians, where he will serve until January 1, 2016. The Board is responsible for licensing dispensing opticians and ensuring compliance with state statutes and the Board's rules and regulations, as well as conducting hearings and facilitating resolutions to consumer complaints.

The **2013 Claes Dohlman Society Award** was presented to **Allen Eghrari, MD**, a fellow in the Division of Cornea, Cataract and External Diseases at the Wilmer Eye Institute. The award is given annually to a cornea fellow who demonstrates academic,

HMS Intensive Cataract Training Course

Mass. Eye and Ear, Meltzer Auditorium
June 7-8, 2014: Designed for second-year residents, this highly popular workshop offers a complete preparatory course covering all aspects of cataract surgery. The course draws an elite group of cataract surgical preceptors from the top training programs nationwide, and includes didactics, simulation lab and wet lab sessions.

Course Directors: Sherleen Chen, MD, and Roberto Pineda II, MD



surgical and research excellence. Dr. Eghrari received the award on November 16, 2013 in New Orleans during the Claes Dohlman Society dinner at the American Academy of Ophthalmology's annual meeting.

The American Academy of Ophthalmology (AAO) presented **Donald Fletcher, MD** with one of its highest honors, the Secretariat Award, in recognition of his volunteer efforts helping individuals with severe vision loss in Manila, Philippines and organizing low vision programs in China, Brazil and Zimbabwe. Dr. Fletcher is Director of the Low Vision Rehabilitation Center at Retina Consultants of Southwest Florida as well as Adjunct Associate Clinical Scientist at Schepens/Mass. Eye and Ear.

Grants

Alex Bowers, PhD received \$30,000 from the William F. Milton Fund, a Harvard University Endowment Fund, in support of her project entitled, "Does Change Blindness Contribute to 'Looked but Failed to See' Accidents?"



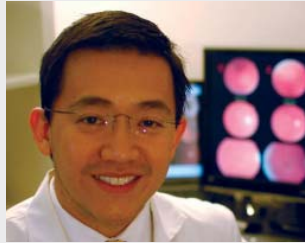
Jason Comander, MD was awarded a \$250,000 Research to Prevent Blindness Career Development Award over four years in support of his project entitled, "Inherited

Retinal Degenerations: From Molecular Diagnostics to Treatments."

The HMS Department of Ophthalmology was granted a \$30,000 Research to Prevent Blindness Medical Student Eye Research Fellowship for **Christina Grassi**, who is now in the middle of her year-long sabbatical from medical school and is working with **James Chodosh, MD, PhD** in the Howe Laboratory's Viral Pathogenesis Unit at Mass. Eye and Ear.

Pedram Hamrah, MD received \$328,000 from GlaxoSmithKline LLC for his project entitled, "To Study the Utility of *in vivo* Confocal Microscopy to Assess Cellular Response and Efficacy of Long-term Topical Steroid Treatment in Patients with Dry Eye Disease."

Dr. Hamrah also received \$275,000 from Allergan Inc. for his project entitled, "Ocular Surface Immune Response in Dry



Paolo Silva, MD was recognized by Philippine President Benigno S. Aquino III with the 2013 Outstanding Young Men (TOYM) Award for Medicine at the Rizal Hall of the Malacañan Palace. Established in 1959, this award is widely recognized as the Philippines' most prestigious award for young men and women who have excelled in their respective fields and have significantly contributed to the welfare of the Filipino people. Dr. Silva helps direct the Joslin Vision Network, Joslin's innovative telemedicine program developed at the Beetham Eye Institute. He also spearheads many of our overseas collaborations and initiatives, including the establishment of the first Teleophthalmology program for diabetic retinal disease in the Philippines at the Medical City.

Eye Disease: Analysis of Conjunctival and Peripheral Corneal Immune Cell Alterations by *in vivo* Confocal Microscopy and Clinical Correlation."

Eric Pierce, MD, PhD received a grant totaling \$713,000 from Foundation Fighting Blindness for his project entitled, "Finding Elusive RP Genes," which is being performed in collaboration with Dr. David Gamm of the University of Wisconsin-Madison.

Dr. Pierce also was awarded a total of \$315,000 from the Foundation for Retinal Research and Gavin R. Stevens Foundation in support of "Gene Therapy for *NMNAT 1* LCA."

The HMS Department of Ophthalmology received a Research to Prevent Blindness Innovative Ophthalmic Research Award on behalf of **Joshua Sanes, PhD** of Harvard University Department of Molecular and Cellular Biology. The \$100,000 award will support Dr. Sanes' research collaboration with **Demetrios Vavvas, MD, PhD**, "Molecular Basis of Age-related Synaptic Alterations in Outer Retina."

The American Glaucoma Society awarded **Brian Song, MD** \$10,000 for his project entitled, "Comparison of Alternative Visual Function Tests for Detection of Early Manifest Glaucoma."

Demetrios Vavvas, MD, PhD was the recipient of the 2013 Macula Society Research Grant and received \$30,000 in funding for his project entitled, "Role of RIP3 Kinase in Inflammation Photoreceptor Cell Loss."

David Wu, MD received a \$1.1 million K08 award over five years for his project entitled, "Molecular Profiling of Rods

to Identify New Therapies for Retinal Degenerations."

The Vision Rehabilitation Service at Mass. Eye and Ear was awarded \$25,000 from the Sara Elizabeth O'Brien Trust for a project that aims to reduce medication errors and falls of at-risk seniors by facilitating home visits from occupational therapists.

Other Honors



Lotfi Merabet, OD, PhD, MPH, was a featured speaker at the December 6, 2013 Challenges Workshop

at the Massachusetts Institute of Technology. Hosted by the Andrea Bocelli Foundation (ABF), the day-long event highlighted cutting-edge research that can produce innovative solutions to help visually impaired people increase their independence and social inclusion. World-renowned tenor and songwriter Andrea Bocelli, who lost his eyesight at the age of 12, established the ABF in 2011 and created the ABF Challenges Program to promote scientific and technological research.

Louis Pasquale, MD, FARVO was selected as the Massachusetts state spokesperson for World Glaucoma Week, which took place March 9-15, 2014. Dr. Pasquale is Director of the Mass. Eye and Ear Glaucoma Service as well as the Mass. Eye and Ear Ophthalmology Telemedicine program.

Personnel Updates

HMS Appointments:

- **Matthew Gardiner, MD, Mass.**
Eye and Ear, Assistant Professor of Ophthalmology
- **Lotfi Merabet, OD, PhD, MPH, Mass.**
Eye and Ear, Associate Professor of Ophthalmology
- **Shizuo Mukai, MD, Mass.** Eye and Ear, Associate Professor of Ophthalmology
- **Lucia Sobrin, MD, MPH, Mass.**
Eye and Ear, Associate Professor of Ophthalmology
- **Demetrios Vavvas, MD, PhD, Mass.**
Eye and Ear, Associate Professor of Ophthalmology

Promotions:



Carolyn Klock, MD was promoted to Program Director of the Harvard Medical School Department of Ophthalmology Residency Training Program and

Chief of the Division of Ophthalmology in the Department of Surgery at Brigham and Women's Hospital. *See page 12 for more details.*

New Recruits:



Xiaowu Gai, PhD joined Mass. Eye and Ear full-time in January 2014 as the new Director of Bioinformatics at Mass.

Eye and Ear and Director of Bioinformatics and Co-Director of the Ocular Genomics Institute. Dr. Gai received his MS in Genetics from the Institute of Genetics, Chinese Academy of Sciences, Beijing, P. R. China, and a PhD in Genetics from Iowa State. Most recently, he served as Director of Biomedical Informatics at Loyola University Chicago Stritch School of Medicine. His wife, **Rong Guo**, will be joining the Mass Eye and Ear research team as a biostatistician.

Vasiliki Poulaki, MD, PhD, a full-time vitreoretinal specialist at VA Boston Healthcare System and former Mass. Eye and Ear research and clinical fellow, began seeing patients and serving in a teaching capacity in the Mass Eye and Ear Emergency Department in October 2013. A 2012 ARVO/Alcon Early Career Clinician-Scientist Research Awardee, Dr. Poulaki has been invited to work in the

Mass. Eye and Ear, Longwood Now a Well-Integrated Community Resource



Patient visits to the new Mass. Eye and Ear, Longwood multi-specialty ambulatory care center at 800 Huntington Avenue have climbed steadily since the facility opened its doors to patients in December, 2012. During 10 months in FY13, the Longwood medical team and staff handled nearly 9,000 patient visits. Four additional clinicians joined the practice

this fall to keep pace with growth, bringing the number of Longwood practitioners to 13. Clinicians handle a full range of comprehensive and subspecialty services.

Mass. Eye and Ear, Longwood is well integrated into the community and is a ready resource for nearby medical practices whose clinicians are operating in the facility's new surgical suite and utilizing its ophthalmic imaging and testing resources. The expansion has broadened collaborations among HMS Ophthalmology affiliates, neighborhood institutions and the community in general. Joslin Diabetes Center has co-located clinical offices there and Joslin physicians are now providing a full array of high quality, comprehensive and subspecialty eye care to ophthalmology patients who are at-risk for diabetes-related eye complications. Additionally, Mass. Eye and Ear, Longwood's closer proximity to Brigham and Women's (BWH) Hospital is facilitating communication with BWH physicians and streamlining care for patients.

Angiogenesis Laboratory where she will focus on exploring treatment modalities for uveal melanoma.



Long-time colleague **Michael Pinnolis, MD**, is joining the Retina Service and Mass. Eye and Ear Retina Consultants in Stoneham on a part-time basis. Michael has been

with Harvard Vanguard Medical Associates through several corporate name changes dating back to 1982, where he has practiced and served in several leadership roles including Executive Vice President for the Clinical Practice, Chief of Healthcare Improvement, and Director of Central Surgical Specialties. He attended Tulane University Medical School, and completed his residency at Stanford University, followed by his retina fellowship at Mass. Eye and Ear.

Service

Twenty students from **Year Up Boston**, a jobs preparation program, attended a community benefits clinic that was held November 22, 2013 at Mass. Eye and

Ear, Longwood. In addition to identifying those who needed eyeglasses, participating doctors referred students for further examination for possible pathology, including glaucoma, lattice degeneration and amblyopia. Participating staff included **Mark Bernardo, OD**; resident **Catherine Choi, MD**; technicians **Do Lee** and **Alexander Lascko**; apprentice optician **John Vaillancourt**; and Longwood Lead Optician **Joseph Erickson**. Mass. Eye and Ear partnered with Vision Coalition who provided free eyeglasses.

Selected Publications

(Additional recent publications are included in Eyes on Research on pages 14-15.)

Third-year resident **Yoshihiro Yonekawa, MD** and colleagues' paper entitled "Intra-arterial Chemotherapy for Group C Retinoblastoma with Adjacent High-flow Infantile Hemangioma" was selected for the cover of the September/October 2013 issue of *Ophthalmic Surgery Lasers and Imaging Retina*.

Louis Pasquale, MD, FARVO published his American Ophthalmological Society thesis, entitled "The Blue Arc Entoptic Phenomenon in Glaucoma (An American

Ophthalmological Thesis)" in *Transactions of the American Ophthalmological Society* (2013).

Yang Liu, MD, Wendy Kam, MS, Juan Ding, PhD, and David Sullivan, PhD of Mass. Eye and Ear/Schepens published an article entitled, "Effect of Azithromycin on Lipid Accumulation in Immortalized Human Meibomian Gland Epithelial Cells" in December 2013. According to an interview with Drs. Liu and Sullivan, "The ability of AZM to stimulate the differentiation, and apparently secretion, of human meibomian gland epithelial cells is clinically very significant. This action could explain why the off-label use of topical AZM is the most commonly used pharmaceutical treatment for MGD in the United States."

Mary Lou Jackson, MD, Peter Bex, PhD and colleagues published "Feasibility of a Web-Based Survey of Hallucinations and Assessment of Visual Function in Patients with Parkinson's Disease" in the *Interactive Journal of Medical Research* January 2014. Research participants were drawn from the online patient community, PatientsLikeMe, which is a group based in Cambridge, MA that provides web support for patients and aims to "change the way industry conducts research and improve patient care." This health data-sharing platform now has over 220,000 members and has information relating to more than 2,000 health conditions.

Peter Bex, PhD and collaborators have challenged the existing theory that deprivation of vision during critical periods of childhood development results in irreversible vision loss. They showed that the human visual system can retain plasticity beyond critical periods, even after early and extended blindness. Their findings were published in the *Proceedings of the National Academy of Sciences* (PNAS) Early Edition and discussed in "Children Born Blind Can Learn to See as Teenagers," published January 29, 2014 in *Nature.com's* news section.

Alumni News

Joan O'Brien, MD, class of '92, received the prestigious Suzanne Veronneau Troutman Award from Women in Ophthalmology. Dr. O'Brien is the George E. de Schweinitz and William F. Norris

Professor of Ophthalmology, chair of the Department of Ophthalmology and director of the Scheie Eye Institute at the Perelman School of Medicine. She specializes in the treatment of ocular tumors, and her research focuses on the genetics of eye disease, including retinoblastoma, melanoma and glaucoma. Dr. O'Brien completed her residency training in ophthalmology at Harvard Medical School, and research fellowships in immunology and molecular ophthalmic pathology at Mass. Eye and Ear.

Advanced Cell Technology, Inc. appointed **Eddy Anglade, MD**, Resident class of '93, to the newly created position of Executive Vice President of Clinical Development. Dr. Anglade joins ACT after co-founding Lux Pharmaceuticals and serving as its Chief Medical Officer, where he guided the development of orphan designated and fast-track products as well as early phase development of a novel therapeutic agent for dry eye disease.

Corneal surgeon **James Aquavella, MD**, class of '62, recently committed more than \$4 million to the University of Rochester in memory of his late wife, Kay, who was a nurse, educator, and administrator. The gift will support two endowed professorships at the School of Medicine and Dentistry: the Catherine E. Aquavella Distinguished Professorship in Ophthalmology and the James V. Aquavella, MD, Professorship in Ophthalmology. Dr. Aquavella was a cornea fellow at Schepens/Mass Eye and Ear with Claes H. Dohlman, MD, PhD.

David Guyer, MD, class of '92, was appointed to the Board of Directors for ThromboGenics, an integrated

biopharmaceutical company focused on developing and commercializing innovative ophthalmic medicines. He now serves as the Co-Founder, Chief Executive Officer, and Chairman of the Board of Directors for Ophthotech Corporation. Previously, he co-founded and served as CEO for Eyetech Pharmaceuticals, Inc. Dr. Guyer completed his retina fellowship at Mass. Eye and Ear.

PremNandhini Satgunam, BSopt, MS, PhD was selected as a 2014 Centennial Notable Alumna of the Ohio State College of Optometry. Dr. Satgunam earned her PhD at Ohio State before joining the laboratory of Eli Peli, OD, MSc at Schepens for a post-doctoral fellowship and is now back in India conducting research at L V Prasad Eye Institute. The Centennial Gala will be held September 5, 2014 in Ohio.

In Memorium

One of the most influential glaucoma leaders in the world, **David Epstein, MD, MMM** passed away on March 4, 2014. Dr. Epstein completed his ophthalmology residency at Harvard Medical School and a clinical research fellowship in glaucoma at Mass. Eye and Ear. In 1976, he joined the ranks at Mass. Eye and Ear and served as Director of the Glaucoma Service from 1982 to 1991. For the last 22 years, he was the Joseph A. C. Wadsworth Clinical Professor of Ophthalmology and Chair of the Department of Ophthalmology at Duke University School of Medicine. A tribute to Dr. Epstein will be published in the June issue of *EyeWitness*. ■

More than a million Americans suffer from hemianopia, and can frequently bump into walls, trip over objects or walk into people on the side where the visual field is missing.

Prism glasses, invented by **Eli Peli, MSc, OD**, expand the

upper and lower visual fields of patients with hemianopia by as much as 30 degrees and alert people with this condition to objects and obstacles that are otherwise not visible to them. **Alex Bowers, PhD** was lead author in a study recently published in *JAMA Ophthalmology*, which compared "real" to "sham" prism glasses. The researchers found that after six months, 41 percent of patients were still wearing the real peripheral prism glasses and reported that the glasses were more helpful in terms of obstacle avoidance.



EyeWitness

Newsletter of the Harvard Medical School
Department of Ophthalmology



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SAVE THE DATES



HMS Department of Ophthalmology 2014 Annual Meeting & Alumni Reunion Weekend

June 20-22, 2014

Celebrating the 10 graduating classes of 1964, 1969, 1974, 1979, 1984, 1989, 1994, 1999, 2004, and 2009, the annual meeting and alumni reunion weekend is an event not to be missed! (*details on page 13*)



**Age-related Macular
Degeneration**
CENTER OF EXCELLENCE

Third International Biennial Symposium on Age-Related Macular Degeneration

October 24-25, 2014

The event kicks off with a cocktail reception on
Thursday, followed by panel discussions on
Friday and Saturday morning.

Please visit
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