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The power of going global

by Emily Y. Chew, MD, FARVO

To make team science work, we start by recognizing that everyone brings with them a piece of the puzzle. As our research funding becomes scarce, pooling our resources and data to conduct research together makes sense. Global connections become essential and totally feasible with the current technology for both the science and communication.

Good examples of such global connections include the International AMD Genetics Consortium, which consists of 26 clinics from 11 countries that shared resources and data from 43,566 subjects to identify novel, independently associated genetic common and rare variants.

The Consortium for Refractive Error and Myopia had a comparable worldwide reach in evaluating the effects of genes on refractive error in 40,036 adults from 25 studies of European ancestry and 10,315 adults from nine studies of Asian populations. Glaucoma researchers have also conducted similar studies through various consortia that have convened throughout the world.

The power of banding together is clearly demonstrated by the high productivity of these international working groups, which were largely supported by government funding in the countries they covered. Some investigators are fortunate enough to have access to private funding that brings together scientists from research centers across the world.

I personally have been involved with the Macular Telangiectasia Project, which was established in 2005 by the Lowy Medical Research Institute in California and is still going strong, supporting four basic science laboratories and 22 clinical sites across seven countries.

We have convened regular meaningful discussions between the basic scientists and clinicians who are participating and pooled our data, which has resulted in a much greater understanding of the natural history of this rare condition, as well as of the more refined clinical phenotyping required for genetic studies. Further collaboration with industry has resulted in translational research, which may potentially benefit patients affected with the condition. The study of the mechanisms of disease has benefited immensely from such collaborations.

The National Eye Institute (NEI) has set an example with the Audacious Goals Initiative (AGI), in which interdisciplinary investigators have collaborated to share ideas, technology and data. AGI is a unique opportunity to bring together outstanding investigators and to think more broadly about the goal to regenerate neurons and neural connections in the eye and the visual system.

NEI and the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) have also promoted collaboration among academic centers, community clinicians and industry in the Diabetic Retinopathy Clinical Research Network (known as DRCRnet).

The power of working together has brought truly game-changing results that affect how we treat eye disease and reduce blindness. For younger investigators who are looking for a role to play, find yourself a good mentor and participate in these national and global connections to make a difference.



Emily Y. Chew, MD, FARVO

“The power of working together has brought truly game-changing results that affect how we treat eye disease and reduce blindness.”



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Meet the new Trustees

Melinda K. Duncan, PhD, FARVO Lens Section

Professor, Department
of Biological Sciences
University of Delaware



What do you look forward to most about being on the Board?

I am particularly looking forward to seeing “behind the scenes” how an important and complex organization such as ARVO operates. Organizations like ARVO can make a big difference in building a positive public

perception of what we all do, both to the benefit of our profession and in fostering the health and well-being of people. I think the most exciting part is the opportunity to learn more about how scientists can advocate for science with both the general public and government officials in order to build support for funding the training of young scientists and the critical research that will impact human health.

Tell us about your research.

I entered the field of eye research in 1993 as a postdoctoral fellow in Joram Piatigorsky’s laboratory at NEI. Initially, my research focused on the transcriptional control of crystalline gene expression and lens development. Since starting my own lab at the University of Delaware, my work has branched out from there. While I still have ongoing projects on the role of transcription factors in eye development, most of my lab works on how the extracellular matrix (ECM) and ECM receptors control lens development, cataract formation and posterior capsular opacification — the major side effect of modern cataract surgery.

Your newly elected officers



Executive Vice President-elect

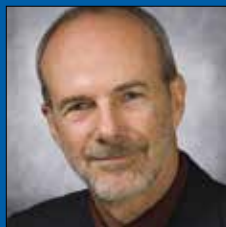
Justine Smith, MBBS, PhD, FARVO

The EVP five-year term will begin May 2017.



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Translational Vision Science and Technology (TVST)

The EICs five-year term will begin January 2018.

Irene Gottlob, MD, FARVO Eye Movements/Strabismus/Amblyopia/ Neuro-ophthalmology Section

Professor of
Ophthalmology,
Department of
Neuroscience,
Psychology and
Behaviour
University of Leicester



What do you look forward to most about being on the board?

I am looking forward to gaining further insight into the workings of ARVO and utilizing my expertise to promote ARVO. In particular, as a liaison to the Diversity Initiatives Committee, I aim to improve and enhance the involvement of women and minorities within the organization so that more are chosen for leading positions. I plan to use my international collaborative network to increase the international participation at ARVO.

From the scientific point of view, I aim to increase the visibility of EY within ARVO to encourage more research in this field and explore funding opportunities.

Tell us about your research.

I am a clinical-academic ophthalmologist specializing in neuro- and pediatric ophthalmology. My main areas of research are the regulation of eye movements and their disorders, in particular, nystagmus and amblyopia. Current areas of active research include understanding the genetics of neuro-ophthalmic diseases, improving diagnosis and treatment of nystagmus, amblyopia and pediatric neuro-ophthalmic diseases. Recently, my research has also included optical coherence tomography (OCT) in retinal dystrophies and nystagmus. Currently, one of the main aims of my group is establishing OCT for children including normal development as well as retinal and optic nerve disease.

**Stephen C. Pflugfelder, MD, FARVO
Cornea Section**

Professor and James and Margaret Elkins Chair in Ophthalmology/Director of the Ocular Surface Center, Department of Ophthalmology
Baylor College of Medicine



What do you look forward to most about being on the board?

Having been an ARVO member for over 30 years, I look forward to the opportunity to participate in formulating ARVO's future direction and impact on vision and biomedical research. Additionally, I appreciate the opportunity to interest young researchers in eye research and work toward improving funding of biomedical research, particularly for those starting in the field.

Tell us about your research.

I am a clinician-scientist with focus in ocular surface/cornea and tear disorders. I am particularly interested in natural immunoregulatory mechanisms for the ocular surface and how they are perturbed in dry eye. Our team has developed animal and culture models to study the pro-inflammatory effects of desiccation and hyperosmolar stress on the ocular surface and the innate and adaptive immune mediators/pathways that are involved in the ocular surface disease of dry eye. I'm fortunate to have a clinical practice and environment to confirm our laboratory findings in human patients and begin to translate discoveries into new and more targeted therapies.

CALL FOR NOMINATIONS

2017 Bressler Prize in Vision Science

Open to established mid-career vision clinicians or scientists whose leadership, research and service have led to important advancements in the understanding of vision loss, treatment of eye disease or the rehabilitation of people with vision loss. Nominees should be clinically and/or scientifically accomplished, yet under recognized in his/her respective fields.

Nominations must be made online. Please go to lighthouseguild.org/bressler. For additional information, call **212-769-7801** or email bressler@lighthouseguild.org

The prize of \$50,000 will be awarded at the Alfred W. Bressler Vision Science Symposium to be held in New York City in the fall of 2017.

2017 Pisart Award in Vision Science

Open to early-career vision clinicians or scientists, generally fewer than ten years following completion of last degree or training, whose noteworthy, innovative and scholarly contributions have the potential for substantial influence in the understanding of vision loss, treatment of eye disease or the rehabilitation of people with vision loss.

Nominations must be made online. Please go to lighthouseguild.org/pisart. For additional information, call **212-769-7801** or email pisart@lighthouseguild.org

The award of \$30,000 will be presented at the Alfred W. Bressler Vision Science Symposium to be held in New York City in the fall of 2017.



Closing date for nominations and receipt of all supporting documents is **December 31, 2016.**

Five members in five minutes

Collaborating on research projects: Members share what works best when communicating with researchers in other countries



Haiyan Gong, MD, PhD,
FARVO

Haiyan Gong, MD, PhD, FARVO

Professor of Ophthalmology, Anatomy and Neurobiology
Boston University School of Medicine
Boston, Mass., U.S.

“I’ve recently been involved in a collaboration with a researcher from a developing country funded by the ARVO Foundation. Communicating and networking through the ARVO Annual Meetings are good ways to find opportunities for collaborations. Two researchers do not need to be studying in the same research field to form a good collaboration. Junior researchers could benefit from the experience, expertise and lab resources of senior researchers. My suggestion is that researchers should not hesitate to reach out to other ARVO members for help and advice.”



William K. Stell, MD, PhD,
FARVO

William K. Stell, MD, PhD, FARVO

Professor, Departments of Cell Biology & Anatomy, Surgery
Cumming School of Medicine, University of Calgary
Calgary, AB, Canada

“Global collaboration is essential; disease knows no boundaries, and answers may be found anywhere. International collaborations are like others in some ways, but unique in other ways. Be aware that research teams may operate differently, and what constitutes ‘good’ research may be understood differently elsewhere. Make expectations explicit: who will do what; how will individuals be recognized; will collaboration extend beyond meeting immediate needs? Listen! Understand the collaborator’s needs — such as deadlines to publish, securing a position, being promoted or applying for research funding. Finally, expect to give more than you receive ... and relish every moment of it.”



Padmaja Sankaridurg,
BOptom, MIP, PhD

Padmaja Sankaridurg, BOptom, MIP, PhD

Associate Professor and Program Leader – Myopia;
Manager, Intellectual Property
Brien Holden Vision Institute, University of New South
Wales
Sydney, NSW, Australia

“When communicating with distant collaborators take care to a) create a positive image of yourself



Juana Gallar Martinez, MD,
PhD, FARVO

and your organization; b) engage in more thought and action than you would for usual on-site communications, as interactions are not typically face-to-face and affect your ability to convey emotion, urgency, business and cultural values; and c) ensure all parties work toward the ‘common goal.’

“Also, act quickly to organize teams at both ends, nominate spokespeople if necessary and establish multiple channels of communication to build relationships between individuals and groups. Other key elements are to have empathy for partners’ needs and create transparency to build trust.”

Juana Gallar Martinez, MD, PhD, FARVO

Assistant Professor of the Department of Physiology
Universidad Miguel Hernandez-CSIC
Alicante, Spain

“Active and effective communication is very important in collaborative research projects. It does not matter if the partners are across the hall or on the other side of Earth. Luckily, in our case, we have a common language, the technology communication tools, such as email (the core tool used as the official communication channel) and internet video conferencing (which is efficient when discussing many topics, although the time difference is an issue; more casual and pleasant than writing/reading profuse emails and tediously waiting for a reply). We also use instant communication apps for short updates and cloud storage systems to share files. Nevertheless, nothing substitutes the occasional face-to-face meetings where, besides discussing the project, we build healthy interpersonal relationships crucial for the eventual success of the team effort.”

Damian Dorfman, MD

Postdoctoral fellow
Pharmacological and Botanical Studies Center, The
National Scientific and Technical Research Council
Buenos Aires, Argentina

“Having the opportunity to attend the ARVO Annual Meeting and talk in person with one’s collaborators is especially useful. In the time between meetings, exchanging emails with ideas, methodology and results is my best practice to ensure open communication, building of relationships and achieving high quality research.”



Damian Dorfman, MD

Grants, contract work subsidize biotech startup

Oklahoma-based company developing AMD therapy got its start with SBIR funding

One of the greatest challenges facing a biotech startup is crossing the “valley of death,” the time between a company’s creation and the generation of revenue to cover costs. Charlesson LLC, an ophthalmic startup led by ARVO member Rafal Farjo, PhD, has been able to bypass the valley by forming the contract research organization EyeCRO. Here, Farjo, CEO of both companies, describes how Small Business Innovative Research (SBIR) grants from the National Eye Institute (NEI) helped get Charlesson off the ground, the relationship between Charlesson and EyeCRO, their products and their future.



third-party research organizations that could do some experiments for us. One thing we learned pretty quickly is that they gave us very expensive quotes. I was kind of expecting that. But what took me aback was when I asked for some preliminary data, I got a lot of hand waving about the difficulty in establishing a steady baseline in animal models. However, in my experience, if it’s a good model that you’ve taken the time to understand and validate, you should have steady baselines. Otherwise, why am I going to spend money on a study where I won’t even know what my negative control would look like?



Rafal Farjo, PhD

From these conversations, we got the idea to start EyeCRO, a CRO focused entirely on

ARVONews: Where did the idea for Charlesson originate?

Farjo: Charlesson was founded in 2005 by Dr. Jian-Xing Ma, the department chair of physiology at the University of Oklahoma, Oklahoma City. He had developed some novel concepts in his lab that he wanted to bring to the next level. I was a graduate student in an adjacent department, and after I defended my thesis, Dr. Ma approached me with the opportunity to stay in Oklahoma and help lift the company off the ground. I had a short contract with the goal of raising additional money through grants.

ARVONews: What role have SBIR grants played in supporting Charlesson?

Farjo: Charlesson wouldn’t be here today if it wasn’t for support from SBIR grants through NEI. Within my first six months, we got a Phase 1 SBIR grant for one drug program and a Phase 2 SBIR grant for another program, which gave us the resources to get up and running.

ARVONews: What was the biggest challenge in going from your initial contract to where you are now?

Farjo: We knew that we needed to work with contract research organizations (CROs) to generate some of the data we needed. These are

See **Charlesson LLC**, continued on page 8



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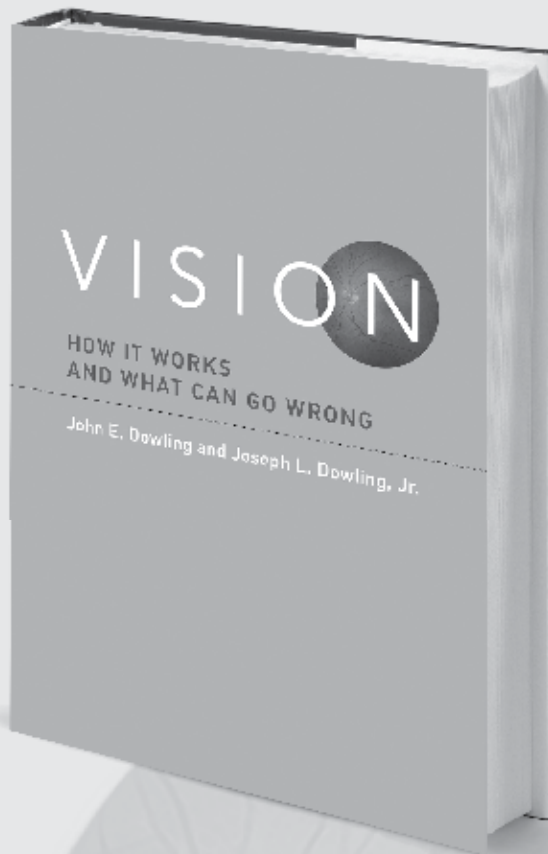
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 The MIT Press



"... a lucid overview of visual processing and clinical disorders of vision. Filled with personal anecdotes, it will be enjoyed by lay readers as well as scientists and clinicians. A fun read, accessible and fascinating."

—**John S. Werner**, Distinguished Professor of Ophthalmology and Neurobiology, University of California, Davis

mitpress.mit.edu/vision

Charlesson LLC, continued from page 7

ophthalmology and applying our vast experience with animal models to evaluate the activity of new therapeutic agents. EyeCRO has been a tremendous success for us. We were able to create a self-sufficient business with substantial revenues that we used to fund Charlesson's development programs.

ARVONews: EyeCRO has grown very quickly. To what would you attribute that success?

Farjo: All of our success is based on the fact that we offer the best science out there and generate data our clients can trust. More recently, we've seen a lot of interest in a new patented drug delivery platform we've developed, called Microemulsion Drug Ocular Penetration System (MiDROPS™). Microemulsions are different than regular emulsions in that they are thermodynamically stable — they won't separate or destabilize. They can also solubilize therapeutic agents that are too lipophilic to dissolve in normal eye drops, meaning that we can now deliver drugs directly and effectively to the front and back of the eye that previously either saw poor uptake via aqueous eye drops or had to be administered systemically. There are a lot of existing ophthalmic drugs that fit that description and we're working with numerous companies to develop new MiDROPS™ formulations of their drugs.

ARVONews: How has EyeCRO revenue supported Charlesson?

Farjo: Charlesson has two main projects. One is CLT-005, a small molecule inhibitor of the STAT3 transcription factor. We've been able to ameliorate neovascularization in the context of AMD. It appears to be an additive to anti-VEGF treatment in a synergistic way. Another project is an eye drop application of an existing systemic drug, fenofibrate, which we have formulated in MiDROPS™ to deliver the drug more efficiently and safely to the retina. Systemic/oral fenofibrate has been shown to be effective in large clinical studies of diabetic retinopathy and we anticipate our eye drop formulation can greatly improve on these results. Our goal in the next 12 - 18 months is to see some of our therapeutic candidates enter Phase I/II clinical trials.

ARVONews: Going from the lab to the business world can be daunting. What advice do you have for those thinking about starting their own company?

Farjo: Don't be scared; it's not as complicated as you think. ARVO provides a tremendous mechanism to get into the business world. At the Annual Meeting there are always seminars put on by the Commercial Relationship and Members-in-Training Committees on how to start a company, which is a great resource and typically filled with many friendly scientist/entrepreneurs who are happy to help.

Supporting the next breakthrough

"Hire the best people — then get out of their way."

— Arnold O. Beckman

It would appear that Johns Hopkins University shared the same philosophy as the founder of the Arnold and Mabel Beckman Foundation when they hired Jeremy Nathans, MD, PhD, 29 years ago. Through the years, Nathans has continuously distinguished himself with transformative breakthroughs in vision science, an achievement that earned him the Foundation's 2016 Beckman-Argyros Award in Vision Research.

Nathans, professor of molecular biology and genetics, neuroscience and ophthalmology at the university's School of Medicine, is only the third researcher to receive this prestigious award — which consists of a \$400,000 grant to the recipient's laboratory and a personal award of \$100,000. "I am honored to be included alongside David Williams and Krzysztof Palczewski," says Nathans.

The \$400,000 research award will be instrumental in continuing the work in his lab, where researchers are using molecular genetic approaches to study the development of the mammalian retina and embryo. The dual goals of their work are to understand the molecular and cellular mechanisms of pattern formation during development and the molecular and cellular basis of human disease. "In our most recent work, we have been studying a signaling pathway that creates and maintains the blood-retina barrier," says Nathans.

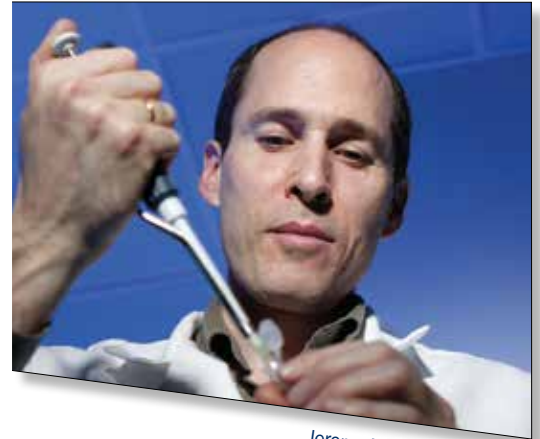
The Nathans laboratory discovered that the Norrin protein acts on the same receptor as the Wnt proteins, which is especially critical for the retina. "Norrin-Frizzled4 signaling plays a central role in maintaining the blood-brain and blood-retina barriers. This work defines a signaling system that controls central nervous system vascular development and homeostasis, and it connects a set of previously unrelated disorders of human retinal vascular development," he explains.

The remaining portion of the monetary award will also help sustain science research. Nathans is perpetuating the Beckman legacy of giving

back by donating all of his \$100,000 cash prize to the junior faculty at Johns Hopkins Medical Center. "Dr. Beckman set an incredibly high standard for socially responsible philanthropy," says Nathans. "The Beckman-Argyros Award exemplifies his philanthropic approach. It is perfectly in keeping with this standard that he set."

Nathans is delighted to give his portion away, believing that the best use of any award he receives is to fund new discoveries. "If you want to have the next breakthrough, you have to support the research."

To learn more about the Beckman-Argyros Award in Vision Research, visit beckman-foundation.org/beckman-argyros.



Jeremy Nathans, MD, PhD

ARVO Asia

Bridging disciplines and disparities:
Connecting eye research with health outcomes

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Nathans was one of two researchers to be awarded the 2008 António Champalimaud Vision Award, and was a 1992 recipient of ARVO's Cogan Award.

2016 Champalimaud Awardees recognized for novel findings linking eyes and brain

ARVO member Carol Mason, PhD (Columbia University), received the prestigious 2016 António Champalimaud Vision Award, along with three other researchers: John Flanagan, PhD (Harvard



From left to right: Christine Holt, PhD; ARVO member Carol Mason, PhD; and John Flanagan, PhD, receive their Champalimaud Vision Awards from the president of Portugal, Marcelo Rebelo de Sousa. Award recipient Carla Shatz, PhD, was unable to attend the ceremony in Lisbon.

Medical School), Christine Holt, PhD (University of Cambridge), and Carla Shatz, PhD (Stanford University). The foursome are being recognized for their groundbreaking findings in the relationship between the brain and the eyes — research that opens up the potential development of new therapies to combat vision disorders.

Their collective efforts show therapies targeting the brain and its capacity to accurately receive projections from the retina may be the key to curing certain vision disorders. Neurologic treatments may bring sight to those unable to see as a result of poorly established synaptic connections.

Celebrating 10 years

This year commemorates the 10th anniversary of the António Champalimaud Vision Award presentation. The award is given alternately for contributions to overall vision research (even numbered years) and contributions to the alleviation of visual problems, primarily in developing countries (odd numbered years).

2016

John Flanagan, PhD; Christine Holt, PhD; Carol Mason, PhD; and Carla Shatz, PhD

2015

The Kilimanjaro Centre for Community Ophthalmology, the Seva Foundation and Seva Canada

2014

Napoleone Ferrara, MD; Joan W. Miller, MD, FARVO; Evangelos S. Gragoudas, MD, FARVO; Patricia A. D'Amore, PhD, MBA, FARVO; Anthony P. Adamis, MD, PhD; George L. King, MD, FARVO; and Lloyd Paul Aiello, MD, PhD, FARVO

2013

Nepal Netra Jyoty Sangh, Eastern Regional Eye Care Programme, Lumbini Eye Institute and Tilganga Institute of Ophthalmology

2012

David Williams, PhD, FARVO; James Fujimoto, PhD; David Huang, MD, PhD, FARVO; Carmen Puliafito, MD; Joel Schuman, MD, FACS, FARVO; and Eric Swanson, MS

2011

African Programme for Onchocerciasis Control

2010

J. Anthony Movshon, PhD, FARVO, and William Newsome, PhD

2009

Helen Keller International

2008

Jeremy Nathans, MD, PhD, and King-Wai Yau, PhD

2007

Aravind Eye Care System

International Chapter Affiliate news

ARVO-Egypt: The young international chapter sets a high bar for success

This is part of a series of articles that highlight members and activities of ARVO's 13 International Chapter Affiliates (ICAs).

ARVO-Egypt was founded in January 2013 as a group of the National Eye Hospital (Al Watany) in Cairo, Egypt. The Chapter Affiliate's goal is to promote collaboration among ophthalmologists in clinical and epidemiological ophthalmological research. We recently talked with Mohamed El Bahrawy, MD, MSc, ARVO-Egypt Chapter Affiliate coordinator and director of the Watany Research and Development Center (WRDC) in Cairo. He shared different ways members promoted their chapter affiliate and their greatest successes.

ARVONews: What types of activities have you done to promote membership in ARVO-Egypt?

El Bahrawy: ARVO-Egypt's main focus is to implement the culture of research in the community of ophthalmologists in Egypt. We want to create a new generation of clinician-researchers in order to boost the volume of research and investigative production in the field of vision and ophthalmology in Egypt — both in public and private institutions.

In the past few years, we have directed our interests to training in the field of research, especially for young ophthalmologists and researchers. These have been in the form of highly successful workshops and training programs, including research methodology, publication, research ethics and many other topics of relevance. This focus on young ophthalmologists is also demonstrated through our sponsorship of nearly 10 researchers to attend and experience the outstanding aspects of the ARVO Annual Meeting. Additionally, we held three annual ARVO-Egypt meetings since 2013. The third congress included more than 25 world-class international guests. These included ARVO Fellows, who served as great motivators to the more than 150 attendees from all over Egypt to get involved in ARVO-related activities.

ARVONews: What can you tell us about your board structure?

El Bahrawy: Currently, we have an active board of 15 members, and we are officially declared as an Egyptian scientific community by the Egyptian Organizations

Ministry, giving us the ability to approach academic institutions and universities in Egypt about collaborating. Our goal is to expand to include countries in the Middle East and Africa regions, by encouraging membership in and collaboration with ARVO-Egypt. We are currently in communication with South Africa, United Arab Emirates and Tunisia.



ARVO-Egypt board members welcome attendees to their third chapter meeting in Cairo last December.

ARVONews: What do you consider the greatest successes of ARVO-Egypt?

El Bahrawy: We believe that our greatest success is that ARVO-Egypt is currently a well-known entity among all academic bodies and ophthalmologists in Egypt. This is a major step in the introduction of ARVO to these institutions. Also, we are proud of the involvement of our board members in the activities and the working groups of the ARVO International Chapter Affiliate Committee (ICAC), which serves as an outstanding method of exchange of experience and ideas. As one of the youngest ARVO chapter affiliates, this involvement has given us access to the more seasoned chapters with more advanced tools for vision research. Together, we [ICAC representatives] are creating a database of research projects and fundraising efforts as a resource for collaboration.

ARVONews: What are some next steps for ARVO-Egypt?

El Bahrawy: Our next main project is the launch of the EgyResearch Online database system, which will be a national databasing channel for ophthalmology and vision-related investigative projects all over Egypt. We believe this will fulfill, in part, our goal of standardizing this kind of research in Egypt and facilitating collaboration between Egyptian and international researchers.

Innovation in Ireland

New industry-university partnership uses multimedia to educate public about vision research

An invited guest lecture by two pharmacology alumni at the University College Dublin (UCD), Ireland has grown into a multi-year, government-supported public outreach initiative benefitting vision researchers, clinicians and patients.



Breandán Kennedy, PhD, of the University College Dublin encourages students to use multimedia in research.

Listening to the lecture about the alumni's work at ICON-Firecrest, a company with expertise in applying multimedia to enhance clinical trials, ARVO member Breandán Kennedy, PhD, Associate Professor at UCD, and others recognized the opportunity to create a joint industry-academia

placement project for UCD,

MSc Biotechnology students. "This partnership forces students to think about problems from a different perspective, instilling valuable research and communication skills," says Kennedy.

"At ICON-Firecrest we are keen to strengthen our links with academic institutions, as these types of synergistic collaborations will allow in-house expertise and knowledge to be widely shared," says Rosemarie Carew,

PhD, pharmacologist manager at ICON-Firecrest.

Sean Kirwan, a recent pharmacology graduate from Kennedy's group, was the first to be funded by the new partnership. The initial goal was to create a concise, engaging and accessible 3-D animation to educate the public and patients about age-related macular degeneration (AMD). "We engaged with a lot of patient advocates, ophthalmologists and vision researchers to ensure the accuracy and accessibility of our animations," says Kirwan.

The AMD animation was compelling enough to receive follow-on funding from the Irish Health Research Board to produce three additional animations on diabetes, diabetic retinopathy and inherited retinal degeneration. In addition to being freely available online, the videos have been used to educate local students about diabetes-related blindness, pre-university students about vision research and in ARVO's public outreach campaign to educate the public about optical coherence tomography (see story on page 14).

"This is a great example of what can be delivered through creative engagement between university and industry partners," says Orla Feely, PhD, UCD vice-president for research, innovation and impact.

"What started as an unforeseen detour into public outreach has been very rewarding," says Kennedy. "It has enhanced our subject knowledge, creativity and use of multimedia, as well as our engagement with a network of key stakeholders in vision research."

ARVO booth at science festival draws crowds



For the second time, ARVO hosted a booth at the USA Science and Engineering Festival in Washington, D.C., with the help of local ARVO member volunteers. This year's focus was on explaining 3D vision to the Festival's 365,000 attendees — K-12 students from area schools.

Five eye-catching anaglyphs and a 3D cartoon video were displayed at the booth, attracting the attention of the younger attendees. Over the three-day event, four thousand red-cyan glasses were given away, along with a booklet developed by ARVO, *Seeing in Stereo*, to help those who stopped by to share the fun at home and with their friends.

Every step is a learning process

Lisa Ostrin, OD, PhD, is an assistant research professor at the University of Houston focusing on myopia and glaucoma. Ostrin, an ARVO member since 2001, is a participant in the pilot Leadership Development Program for Women, and currently serves on the Annual Meeting Program Committee and the Members-in-Training Committee. She is a fellow of the American Academy of Optometry, a recipient of the American Optometric Foundation Ezell Fellowship and was recently selected by the Alliance for Eye and Vision Research to be one of its Emerging Vision Scientists for the coming year.

ARVONews: What was your inspiration for becoming a researcher in the field of ophthalmology?

Ostrin: After graduating college, where I studied art, I worked for Prevent Blindness Texas, and I became interested in photorefractive for children's vision screenings. Dr. Dennis Levi recruited me as the first student in the combined OD/PhD program at the University of Houston, where I worked in the lab of Dr. Adrian Glasser on accommodative physiology. I really appreciated how the graduate program complemented my clinical studies, teaching me how to think critically and translate research-based discoveries to the clinic. I was inspired by Adrian's scientific rigor in the lab and patience in teaching me proper techniques. At the first ARVO Annual Meeting I attended, I found myself at a Ft. Lauderdale oyster bar discussing vision science with legends in the field. That type of camaraderie and enthusiasm has kept me inspired and moving forward.

ARVONews: What can you tell us about the research project you are working on now?

Ostrin: I am studying the effects of light on eye growth and circadian rhythms. I am completing a two-year study using objective techniques to correlate light exposure and behavioral patterns with eye growth in children. This work has led me to investigate the role of light in other diurnal processes in the body, such as ipRGC function, choroidal thickness and melatonin release. In an age of artificial light and electronic technology,

we are becoming more aware of the impact that the environment has on our bodies and the importance of maintaining a healthy lifestyle, including spending time outdoors and getting adequate sleep.

ARVONews: What has been some of the best advice you received as a young woman scientist?

Ostrin: From a mentor — be patient, persevere and do what you love. From an editor — accept criticism and adversity as a tool to become a better scientist. Research and academics can be an intense and often arduous journey. Every step is a learning process. In addition to success in the lab, finding a balance between work and family life is challenging, but with determination and passion, it can be achieved. Involving my kids at work, bringing them to the lab and getting them excited about science and the eye has helped me to maintain balance.

ARVONews: What advice would you give women who are looking to get more involved in leadership?

Ostrin: Network, talk to your colleagues and mentors about their successes and challenges, and don't be shy about standing up, share your ideas and contribute to your community. Make use of the vast resources ARVO has to offer its members and seize opportunities to become involved in leadership roles. It is an honor and a privilege to serve ARVO through committee positions, where you can learn more about how ARVO functions and contribute to the continued success and growth of the vision science community.

ARVONews: What's next for you professionally?

Ostrin: I have recently entered tenure-track, so I am focusing on writing manuscripts and applying for grants as I continue to hone my research goals and form collaborations. I am so fortunate to be in a position where I can continuously learn, experiment and discover, hopefully contributing to what is known about the eye. I enjoy mentoring students to help them formulate and carry out scientific ideas. My goal is to establish an innovative and productive environment that is scientifically nurturing to students and advances the field of vision research.



Lisa Ostrin, OD, PhD



With your pledge of \$10,000 or more to the ARVO Foundation, you can join an elite group of individuals within the ARVO community who share Dr. John Dowling's passion for vision research.

Contact Amanda Johnson at ajohnson@arvo.org for information.

Celebrating 25 years of OCT and its promising future

Vision researchers are responsible for a number of sight-saving breakthroughs that have taken place over the past 25 years. But one of the bigger success stories during that time frame first started in the labs of curiosity-driven electrical engineers.

Overlapping with work from Japan and the lab of Adolf Fercher, PhD, (Medical University of Vienna), the first use of the phrase “optical coherence tomography” was published in *Science* in 1991 by the lab of James Fujimoto, PhD, (Massachusetts Institute of Technology).

The new imaging technology used low-coherence interferometry to acquire one-dimensional scans (A-scans) of the retina and 1 – 2 mm below its surface. Taking several A-scans adjacent to one another — known as a B-scan — allowed for the creation of the two

dimensional (2D) images for which optical coherence tomography (OCT) is known.

At the time, this laser-based technique was primarily employed in optical communication via fiber optical networking and inter-satellite communications. “In the early days, we were supported by the United States Air Force,” says Fujimoto. “They were very interested in advanced optical and photonics technology.”

“That money was actually part of Star Wars [the 1980s missile defense program initiated by U.S. President Ronald Reagan],” said David Huang, MD, PhD, of Oregon Health and Science University, who is first author of the original OCT paper. “No one ever thinks of Ronald Reagan and Star Wars as having anything to do with OCT, but it indirectly did.”



Educating the public on OCT

OCT has revolutionized the ability of eye care providers to monitor and treat diseases such as glaucoma, diabetic retinopathy and age-related macular degeneration (AMD). Yet patients, let alone the general public, are completely unaware of the hope OCT offers toward preserving their sight in the face of these blinding conditions.

Working with the pioneers who developed OCT technology and its application to the clinic, ARVO is pursuing its first public outreach campaign to highlight the impact OCT has had on public health. The primary output is a series of five-minute videos aimed at the general public. The videos tell stories of OCT touching real people: patients ranging from the elderly with AMD to preterm babies in neonatal units; health care providers in the eye clinic and operating room; and the researchers in basic and applied labs around the world.

Other activities include a publication calculating the OCT-enabled savings Medicare has enjoyed from the reduced injection frequency of anti-VEGF biologics in the treatment of AMD, a future TED-style talk on the complex ecosystem necessary for the evolution of OCT, and educational materials and advocacy events in Washington, D.C. Look for these events and videos in the coming months.



In the video on diabetic retinopathy and OCT, an ophthalmologist from the Bascom-Palmer Eye Institute discusses the results of a scan with his patient.

As the field of ophthalmology recognized the value of OCT, the demand for faster images at higher resolution drove the technology forward. The first generation time-domain (TD) OCT instruments were capable of 160 – 400 A-scans per second that produced images with limited clinical utility. In the early 2000s, spectral-domain OCT (SD-OCT) was demonstrated by a number of groups, including the labs of Maciej Wojtkowski, PhD, (Copernicus University) and Joseph Izatt, PhD, (Duke University). SD-OCT instruments are capable of tens of thousands of A-scans per second, allowing researchers and clinicians to combine adjacent 2D B-scans into 3D visualizations of the retina and underlying structures known as en face images. Because of its high-quality imaging and relative affordability, SD-OCTs are the most commonly found OCT instrument in eye care clinics worldwide.

The future of OCT

But even with all these accomplishments, the recent *IOVS* special issue on OCT (iovs.arvojournals.org/ss/octissue.aspx) suggests that the most exciting discoveries may still be in OCT's future. One research area is focusing on swept-source OCT (SS-OCT), which can offer hundreds of thousands of A-scans per second to generate high resolution en face images. Another active area of research is dedicated to OCT angiography — a technology able to track blood flow in vessels as small as capillaries, creating 4D images that provide a wealth of data for clinicians. “We could never see those blood vessels,” says Philip Rosenfeld, MD, PhD, of Bascom Palmer Eye Institute. “But with the new generation of OCT angiography instruments, we can see when those blood vessels start to disappear, and we can come up with treatments to preserve them.”

Potential insights into neurological disorders, such as Alzheimer's and Parkinson's disease, are also being explored with OCT. “There are studies underway to determine whether, in addition to brain tissue, these conditions can show up in the structures of the retina,” says Paul Sieving, PhD, director of the National Eye Institute. Neurology is just one field in a long list that includes cardiology, dermatology and gastroenterology in which OCT is being used to offer new perspectives on well-studied tissues.

With the wealth of clinical data that have been produced by the use of OCT for 10-plus years, researchers are training machines to interpret the

images in the absence of an eye care provider. “Digital image analysis will allow an eye doctor to come to conclusions faster and in a more standardized way for many more patients,” says Ursula Schmidt-Erfurth, MD, of the Medical University of Vienna, Austria.

OCT is even moving into the operating room. Cynthia Toth, MD, (Duke University), in conjunction with Izatt and local OCT instrument manufacturer Bioptigen Inc., has been developing OCT systems that could be used during surgery. Having OCT incorporated into a surgical microscope “is kind of like Google Earth,” says Toth. “I'm looking down at the retina, but then I can come down and do ‘street view’ and literally be standing on the retinal surface. I can walk around and look under and behind the membrane to get different views before, during and after I'm finishing a maneuver.”

Twenty five years after the first publication of optical coherence tomography, the technology has evolved from a slow, room-sized curiosity behind the high walls of the ivory tower to a sleek, valuable and routine test used every second in eye clinics around the world. But as Eric Swanson, MSEE, (Massachusetts Institute of Technology) who is a coauthor of the original OCT paper points out, “The opportunity for future impact by OCT is still incredibly promising.”

OCT Advisory Panel

Co-chairs

David Huang, MD, PhD
Oregon Health & Science University
Portland, Ore.

Joseph A. Izatt, PhD
Duke University
Durham, N.C.

Eric Swanson, MSEE
Massachusetts Institute of Technology
Cambridge, Mass.

Philip J. Rosenfeld, MD, PhD
Bascom Palmer Eye Institute
Miami, Fla.

Ursula Schmidt-Erfurth, MD
Medical University of Vienna
Vienna, Austria

Members

Wolfgang Drexler, PhD
Medical University of Vienna
Vienna, Austria

Joel S. Schuman, MD
New York University
New York, N.Y.

Jay S. Duker, MD
New England Eye Center
Boston, Mass.

Cynthia A. Toth, MD
Duke University
Durham, N.C.

James G. Fujimoto, PhD
Massachusetts Institute of Technology
Cambridge, Mass.

Yoshiaki Yasuno, PhD
University of Tsukuba
Tsukuba, Japan

What's there to like about Baltimore?

Members share some of the ARVO 2017 host city's best kept secrets

Laura Asnaghi, MSc, PhD

Johns Hopkins University School of Medicine

Asnaghi has been living in Baltimore since 2009. She works in the field of ocular oncology at Johns Hopkins University School of Medicine where she focuses on basic and translational research in uveal melanoma, conjunctival squamous cell carcinoma and retinoblastoma.

What surprised me most about the city ... is that people are very friendly and inclined to chat, and in the most characteristic neighborhoods, like Hampden, you can have a real taste of the typical charm of the city. Baltimore is an intellectually active and interesting city. I would say that the best words that describe this city are "never boring."

What I like best about Baltimore ... is the Inner Harbor area, with the waterfront. It's always filled with people and different types of entertainment. From the Harbor, the water taxi brings you to the most historical and characteristic parts of the city. Moreover, from the top of the Baltimore World Trade Center Tower you have a 360-degree view of the city and the Harbor, which is pretty spectacular on a sunny day. I also enjoy several museums in the city, including the Baltimore Museum of Art, which is located near the Hopkins Homewood campus area and has the largest collection of works by Matisse in the world.



Baltimore Museum of Art

Haoxing Chen, MD

Recent graduate,
University of Maryland School of Medicine

Chen lived in Baltimore for four years as a student at the University of Maryland School of Medicine (UMSOM) prior to leaving in June to start his residency. His research project at UMSOM was focused on constructing a protocol to systematically

quantify structures in the anterior segment of pediatric patients using ultrasound biomicroscopy.

What surprised me most about the city ... is the contrast it presented from all the rumors you hear about Baltimore. Despite the dramatization of the riots and the unsafe streets, the patients are respectful individuals with a lot of fascinating pathology and complicated social situations.

What I miss most about living in Baltimore ... is the surrounding neighborhoods where you can find authentic food and novelty stores. From Federal Hill and Little Italy, to Mount Vernon and Fells Point, there was a large variety of ethnic food to keep me satisfied.



Benvenuti! Welcome to Little Italy, Baltimore.

Fernando Arevalo, FACS, MD

Wilmer Eye Institute, Johns Hopkins University

Arevalo moved to Baltimore a year ago after accepting a position as chairman of the Department of Ophthalmology at Johns Hopkins Bayview Medical Center. In his new role, he is working to grow the department and develop a strong referral practice for the faculty, with cutting edge technology — all with the goal of benefiting patients. At the Retina Division of Wilmer Eye Institute, he is both building his clinical practice and working on clinical research.

What surprised me most about the city ... is that Baltimore is the capital city of crabs. I was also surprised by the beauty of the Inner Harbor, which offers shops, upscale crab shacks and attractions like the Civil War-era warship, the *USS Constellation*, as well as the National Aquarium.

What I like most about Baltimore ... is that I have the opportunity to work in one of the best institutions in the world with amazing colleagues. In addition, I like the variety of great restaurants, many of which should for sure be recommended to ARVO attendees.

Janet Sunness, MD, FARVO

Greater Baltimore Medical Center

Sunness, who has lived in Baltimore for 33 years, conducts clinical research on the impact of advanced dry AMD on the quality of life and on visual function. Medical director at Greater Baltimore Medical Center, she serves as the principal investigator of one of the nine clinical sites for the ProgStar study, a prospective natural hx study of Stargardt disease.

Baltimore's best kept secret ... is the wonderful and safe communities, which tend to be overshadowed by the news media.

What I like best about living and working in Baltimore ... is the wonderful sense of community and the 13-minute drive to work.



Hampden neighborhood, Baltimore

Richard Thompson, PhD

University of Maryland School of Medicine

Thompson has lived and worked in Baltimore for 25 years. His team's work is focused on developing novel fluorescence imaging methods for early screening for AMD and other diseases.

Baltimore's best kept secrets ... are some of the less widely known places to visit, such as Sherwood Gardens, Hampden (a neighborhood with funky shops and restaurants, like Café Hon) and Harbor East (younger and trendier than Harborplace itself, but a little farther from downtown). Fort McHenry, the site

that served as the inspiration for "The Star Spangled Banner," is actually a lovely spot as well as fascinating. And the *USS Constellation* in the Inner Harbor is one of the few late 18th-century sailing warships still afloat anywhere.

Some of the things I like best about living and working in Baltimore ... are proximity to the Chesapeake Bay for sailing and seafood (if you're a fan of farm-to-table and locally sourced food you'll enjoy Woodberry Kitchen), Orioles Park for baseball (one of the best places to watch baseball, and three blocks from the Baltimore Convention Center), the fact that getting to and from the airport isn't a hassle (15 minutes from downtown by taxi or light rail), and that Washington, D.C., and the Smithsonian Museums are an hour's drive or train ride away.



Sheila West, PhD, FARVO

Wilmer Eye Institute, Johns Hopkins Hospital

West moved to Baltimore from California in 1971 and, except for a four-year sojourn in the Philippines, she has lived in the city ever since. She serves as the vice chair for research at Wilmer Eye Institute. Her research projects in Baltimore have included working on diabetic retinopathy with the local Latino community, and internationally, on trachoma in Tanzania, Nepal and elsewhere.

Baltimore's best kept secret ... is the city itself with superb restaurants (check out Cinghale, Woodberry Kitchen or Sobo Café), lovely distinct neighborhoods that are affordable and diverse cultures. And we just smile at those on the East Coast who consider it a train stop on the way from New York to Washington, D.C.



Camden Yards, home of the Baltimore Orioles

What I like about living and working in Baltimore ... is that the expertise and collegiality at Johns Hopkins has made it an exceptional place to do interdisciplinary research. We live in the city and, as with any place one lives, the enduring friendships of colleagues and neighbors is especially meaningful. And how about them "Os"?

First matching funds campaign raises the bar

David R. Williams, PhD, FARVO, heard the phrase “I’m going to make you pay!” many times over during the ARVO 2016 Annual Meeting. The good-natured chiding from his colleagues came in response to the \$10,000 matching gift Williams and his wife, Inger Williams, PhD, put forward with a goal of raising \$20,000 for the ARVO Foundation at the Annual Meeting.

Generous attendees did indeed push Williams to make good on the match. In total, the ARVO Foundation raised over \$21,000 during the five-day meeting. “I was thrilled to see the leveraging power of the matching gift,” says Williams.

The matching funds campaign was a first-time endeavor for the ARVO Foundation. “We are delighted by David’s generosity and the big-hearted response of ARVO 2016 attendees to our first matching funds effort,” said ARVO Foundation Chair Mark Petrash, PhD, FARVO. “The campaign not only raised money for more travel grants, but it elevated the visibility of the Foundation’s work in supporting vision and eye researchers worldwide.”

Supporting travel grants is significant to Williams, who himself received a travel grant to attend the ARVO Annual Meeting in 1977. “It was one of the first things I put on my CV as I tried to build my career,” he says.

Today, almost 40 years later, Williams is eager to invest in the next generation of vision scientists with his gift to the ARVO Foundation. As the research environment becomes more challenging, he believes travel grants create a path for early-career “dabblers” and give them a sense of belonging, encouraging them to stay in the field. “It’s a field ripe for intellectual investment. We need the young intellectual capital to preserve the future of the field.”

ARVO has also played another significant role in Williams’ life. He met his wife at an ARVO Annual Meeting in the early 1980s in Sarasota, Fla. “She was attending the Annual Meeting from Stockholm on an ARVO travel grant, and I bumped into her at a shuttle bus stop. We struck up a conversation, and I was immediately obsessed.”

They stayed in touch and eventually married in 1985. “It’s just one of the many ways ARVO transforms lives,” he jokes.

Looking ahead to the ARVO 2017 Annual Meeting in Baltimore, Williams hopes others will take up the charge to support the ARVO Foundation by offering a matching gift. “I’d be thrilled if this became an annual tradition,” he says.

If you’d like to lead a matching gift campaign at the 2017 Annual Meeting, please contact Amanda Johnson, ARVO Foundation Manager, at ajohnson@arvo.org.



David Williams, PhD, FARVO, and Inger Williams, PhD, matched donations given at the ARVO 2016 Annual Meeting up to \$10,000.

Everyone needs mentors

Eugene Appenteng Osae, OD, an optometrist and research assistant in the Department of Optometry and Vision Science at the Kwame Nkrumah University of Science and Technology in Ghana, started his journey to a career in eye science when his grandmother was diagnosed with glaucoma. “Everyone has a need to see,” he says. “I wanted to get a skill to help people like my grandma so others didn’t have to experience what she did.”

While he was in optometry school, he worked closely with his local supervisor and mentor, David Ben Kumah, MSc, OD, who once asked him to present a paper at a conference on his behalf. That experience helped spark Osae’s interest in eye research, particularly in dry eye disease, and for the first time, he could see himself as an academic optometrist. He had an opportunity to be mentored in dry eye research by Philipp Steven, MD, at the Ocular Surface Group, Department of Ophthalmology at the University of Cologne, Germany. Seeking addition mentorship and guidance beyond Ghana, he connected with an eye researcher on LinkedIn who, in turn, connected him to Martine Jager, MD, PhD, FARVO. She encouraged his research pursuits, introduced him to other eye scientists and recommended that he apply for ARVO’s Developing Country Eye Researcher Travel Fellowship (DCERF) to attend the Annual Meeting.

Osae was selected as a DCERF recipient to attend the ARVO 2015 Annual Meeting in Denver, but he wasn't able to secure a visa. "I was very disappointed I couldn't attend," he says, "but it was ultimately a good thing. In the interim year, I was able to work with my mentor, Dr. Steven, and his group in Cologne on a dry eye project in Ghana, out of which I prepared an abstract to strengthen my visa application."

His plan worked, and Osae attended the ARVO 2016 Annual Meeting in Seattle. The DCERF program matched him with two mentors to help him navigate the meeting and make the most of the scientific program. One of his mentors was Jager, whom he finally met in person after exchanging dozens of emails across continents.

Osae, who had never been to a big scientific meeting before, called his Annual Meeting experience exciting, engaging and a bit overwhelming. "At one point, I wished I could cut myself into two or three people so I could attend multiple sessions," he recalled. "I really enjoyed the scientific sessions, and the social aspect, too. Every scientist there was very focused on their work, but all were very helpful and relaxed in taking time to talk to me."

He presented his poster, "Assessment of Meibomian Glands Using a Custom-made Meibograph in Dry Eye Patients in Ghana," and happily accepted the feedback and offers of assistance he received from other attendees. Since the Annual Meeting, he has stayed in touch with several new mentors who have encouraged him to publish his work and offered suggestions to modify his custom-made meibograph, a device donated by his collaborators in Cologne for assessing dry eye patients in Ghana.

Back in Ghana, Osae is sharing what he learned at the ARVO Annual Meeting with his students and colleagues, and encouraging them to join ARVO. "Everyone needs mentors to help advance their careers and build confidence," he says. "After my experience with the DCERF program and attending the ARVO Annual Meeting, I'm an ARVOnian for life."

To apply and for more information about DCERFs, visit arvofoundation.org/DCERF.



Ghanaian DCERF recipient Eugene Appenteng Osae, OD, with his mentor Martine Jager, MD, PhD, FARVO.

A place for young mentors

Anna Ablamowicz, OD, a clinical assistant professor of optometry and PhD trainee at the University of Alabama, volunteered as a first-time mentor with the Developing Country Eye Researcher Travel Fellowship (DCERF) program at the ARVO 2016 Annual Meeting. Each of the young DCERF recipients, most of whom have never attended a large scientific meeting before, are assigned two or three mentors to help them navigate the meeting and make new contacts. Ablamowicz served as a mentor to Amra Vodencarevic, MD, from Bosnia and Herzegovina. In addition to helping her plan her agenda, they attended poster sessions together.

While Ablamowicz herself is a trainee, she sees value in pairing early-career mentors with other trainees from developing countries. "A later-career mentor can certainly provide more help with connections and scientific guidance, but there's a place for younger mentors, too," she says.

Mentees who are relatively close to their

mentor's career stage can find more common ground and may be more comfortable talking about some of their challenges than they would with later-career mentors. "We're still going through some of the same things together like starting up research or building our confidence in our abilities to conduct research," she says.

Ablamowicz's desire to serve as a DCERF mentor stemmed from her parents' experience as young scientists in Poland. With little infrastructure in their home country to support their research, they came to the U.S. to pursue their PhDs. Ablamowicz said, "I know it's important to give young scientists encouragement to keep striving to achieve their goals despite the resource limitations they might face in their own country."



DCERF mentors Anna Ablamowicz, OD (left), and Miller Ogidigben, PhD (right), with their mentee Amra Vodencarevic, MD, from Bosnia and Herzegovina.

Message from the chair

Building on our past to prepare for the future



J. Mark Petrash, PhD, FARVO

Over its first 15 years of existence, the ARVO Foundation has grown from a concept shared by visionary leaders into an organization that administers over \$900,000 in programs annually to benefit ARVO members. These include over 130 travel grants, eight research fellowships and seven monetary awards recognizing advances in eye and vision research.

The ARVO Foundation has developed this strong — but small — portfolio of programs with a core group of generous donors. Today, the ARVO Foundation stands poised to take the next big step forward in its evolution. We're ready to think beyond travel grants by supporting bigger, more ambitious ARVO programs that will foster the next generation of eye and vision scientists.

For the past several months, the Foundation has gathered input from the ARVO community regarding key challenges and opportunities for our future. The findings of this study, which are being reviewed by the Board of Governors, will help the Foundation establish funding priorities for programs that will better serve ARVO

members, and particularly, the young researchers who represent the future of our field.

Along with this bigger picture thinking about programs comes broader thinking about funding. The Foundation is expanding efforts to ensure the long-term financial security of our programs. We will be introducing more opportunities to partner with us, including expanded corporate support, as well as major and planned gifts from individual donors like you.

The Foundation is privileged to have the benefit of a visionary Board of Governors who look boldly to the future while keeping a close eye on delivering — at the highest level — our current set of programs.

I hope you will follow our progress and consider ways you can join in the effort to do something that helps ARVO continue to evolve as the world's most important community of eye and vision researchers and the world's most effective organization for training of our next generation of vision scientists.

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2015 by the numbers

122

Young researchers supported by a travel grant to attend the Annual Meeting

10

Research fellows from developing countries funded to attend the Annual Meeting

\$212,000

Dollars invested in research fellowships

\$48,500

Cash awards recognizing significant contributions to research

9

New Dowling Society members who committed \$10,000 or more to the ARVO Foundation

100%

ARVO Board of Trustees supporting the ARVO Foundation

Time with an “expert” yields stimulating connections

The silent auction benefiting the ARVO Foundation at the ARVO 2016 Annual Meeting featured a special new item this year, “Time with an Expert,” where bidders had the chance to win a personal meeting with ophthalmology icons John E. Dowling, PhD, FARVO, and Sir Peng Khaw, MD, PhD, FARVO.

Linking a young researcher to John Dowling

The winning bid for time with Dowling was purchased by an anonymous donor who earlier in the week had met and was impressed by a young researcher, Robert Tripon, MD, from Romania. The donor gifted the prize to Tripon to encourage his professional development. Tripon first attended an ARVO Annual Meeting in 2015 as a Developing Country Eye Researcher Fellow (DCERF), a program supported by the ARVO Foundation. He returned in 2016 and planned to stay in the U.S. after the meeting to continue his research with the mentor he was assigned from the DCERF program last year, Haiyan Gong, MD, PhD, FARVO, at Boston University.

“Dr. Dowling provided me with insights in both methodology and the scientific field of my research area right before starting my laboratory work with Dr. Gong,” says Tripon. “Thanks to my conversation with Dr. Dowling, I was prepared to start my experiments with a more relevant research plan and greater probability of finding new results than I could have ever imagined.” As a result of their meeting, Dr. Dowling invited Tripon to meet again later in the summer and helped him analyze his results.

Dowling called their conversation “delightful,” saying Robert is “bright, enthusiastic and a real go-getter.” He adds, “I suspect he will make a real difference in Romania, and his time here in Boston will provide excellent training for him.”

Khaw “groupie” meets her mentor

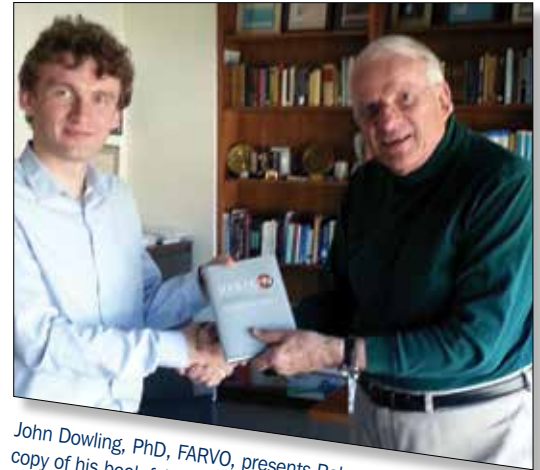
Gisela Velez, MD, MPH, a clinician-researcher now in private practice in the Boston area, is a self-described Peng Khaw groupie. When she learned at ARVO 2016 that she could win a 30-minute meeting with him, she knew she had to bid.

“I had never met him before, but I knew his group was doing research with Müller cells. His group had developed the MIO-M1 cell line which I had used for some of my work.

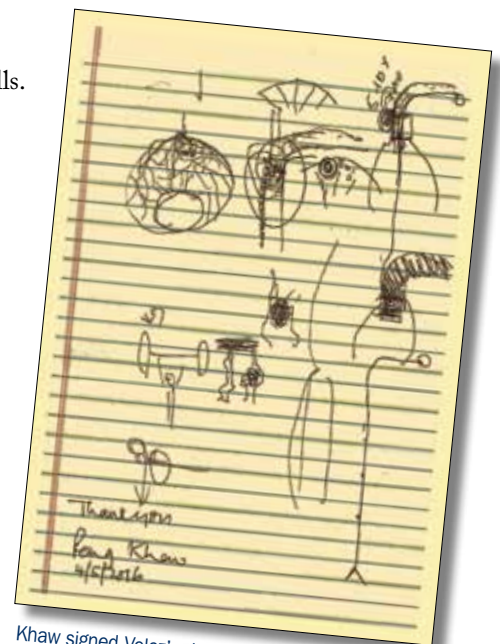
“As a researcher and a clinician, Khaw has a cohesive vision for the big picture of how basic science and practice come together. Any scientist’s goal should be to focus on that.”

The two were able to meet in person the last day of the Annual Meeting for a “stimulating” conversation centered around Khaw’s new work on anti-scarring and regenerative therapy. Khaw says “We were able to discuss particularly the role of Müller cells, which she has worked on before, and also our new hypothesis on Müller cells and energy production and their role in the energetics and the health of the retinal ganglion cells and axonal layer.”

Velez also managed to secure a unique souvenir from their meeting. As they talked, Khaw sketched his theory on a piece of paper for her as he explained. “I asked him to sign it,” Velez says. “I’m planning to frame it and hang it in my office!”



John Dowling, PhD, FARVO, presents Robert Tripon, MD, with a copy of his book following their meeting in Boston



Khaw signed Velez’s doodle representing how Müller cells may interact with ganglion cells, playing an important role in metabolic support and function.

What's new with key initiatives?

As the Obama era comes to a close, we look to the horizon for clues about the future of medical research funding. While change brings uncertainty, it is worth remembering that historically NEI and NIH have maintained strong bipartisan support. Below are updates on key initiatives born during the Obama Administration.



Paul A. Sieving, MD, PhD, FARVO
Director, National Eye Institute,
National Institutes of Health

BRAIN Initiative

Projects funded by President Obama's Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative (braininitiative.nih.gov/) are bearing fruit. John Spudich, University of Texas, and collaborators discovered four new channelrhodopsins in algae.¹ The discovery expands the toolkit for optogenetics — techniques that enable selective neuronal activation or inhibition using light. Hongkui Zeng, Allen Institute for Brain Science, and colleagues classified more than 1,600 neurons in primary visual cortex using single-cell RNA sequencing, identifying 49 cell types.² And Thomas Euler, University of Tubingen, used 2-photon imaging to assess the functional diversity of retinal ganglion cells in mice.³

An announcement of additional BRAIN projects and new funding concepts have gained approval for 2017. Investigators will meet Dec. 12 – 14 in Bethesda, Md., at the third annual BRAIN Investigators Meeting.

Precision Medicine Initiative

President Obama's Precision Medicine Initiative (PMI) (nih.gov/precision-medicine-initiative-cohort-program) is preparing to start enrollment of the million-strong PMI cohort later this year. The ultimate goal of the PMI is to develop personalized disease prevention and treatment strategies. For researchers, it promises a trove of human data, the likes of which we've never seen.

In July, NIH announced \$55 million in awards to build partnerships and infrastructure to support the PMI cohort. Participants will be asked to share biological samples and information on diet and lifestyle. These data will be linked to clinical data entered in an electronic health records system. The awards fund a data and research center to acquire, organize and provide secure access for researchers; a participant technologies center that will test mobile applications for enrolling, consenting and collecting data; and a network of initial health provider organizations, strategically selected to recruit participants reflecting U.S. diversity. Funds for building a PMI Cohort biobank was awarded to the Mayo Clinic in May 2016.

NEI Audacious Goals Initiative (AGI)

This month, the NEI funded six new projects in support of AGI — a sustained effort to restore vision through regeneration of retinal neurons and their connections in the visual system. These “-omics” projects are using discovery-based approaches to identify factors that affect key aspects of neural regeneration, such as outgrowth, axonal guidance and synaptogenesis. These projects will lay the groundwork for subsequent AGI research. Combined funding for the projects is about \$4 million per year for four years.

At the ARVO 2016 Annual Meeting in May, NEI hosted a workshop on the topic of replacing retinal ganglion cells from endogenous sources, chaired by Monica Vetter, PhD, (University of Utah) and Peter Hitchcock, PhD, (University of Michigan). Leonard Levin, MD, PhD, FARVO, (McGill University) moderated an AGI town hall forum to identify diseases that might be good targets for testing new regenerative therapies. The events were summarized during the June 2016 National Advisory Eye Council meeting. Video of the presentations are available at nei.nih.gov/audacious/.

NEI Retina Organoid Challenge

In response to congressional interest, NEI is spurring development of a retina organoid through a challenge competition, scheduled for launch in late 2016. Yoshiaki Sasai, MD, PhD, astonished the vision research community in 2011 when he created an eye cup with organized retinal neural tissue from stem cells.⁴ Scientists immediately recognized the potential of self-organizing 3D cultures for disease and drug modeling, organ replacement and developmental studies. Several other organoids have since emerged: liver, prostate and pancreas to name a few. We are still fleshing out the details of the NEI retina challenge competition. In April 2016, we hosted a technical planning meeting at NIH in Bethesda to sketch out a conceptual retinal organoid and discuss how to make it a reality. Stay tuned to the NEI website (nei.nih.gov) for updates.

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Expanding our reach: Impact Factors and special issues

Investigative Ophthalmology & Visual Science

by Thomas Yorio, PhD, FARVO,
Editor-in-chief

Investigative Ophthalmology & Visual Science (IOVS) released special issues: One celebrates the 25th anniversary of optical coherence tomography with guest editors James Fujimoto, PhD, and David Huang, MD, PhD. Another from the Ocular Research Symposia Foundation workshop focused on “Sight Restoration Through Stem Cell Therapy” and was edited by Gerald Chader, PhD. *IOVS* is pleased to offer these special, focused editions and we plan to publish additional special issues in the coming year.

In addition, *IOVS* continues to work on providing a rapid time to first decision. While our goal is to be under 30 days; we are currently averaging 36. This year also saw the introduction of our Reviewer in Training program, which provides new investigators the opportunity to gain experience in the peer review process through an online training program. We are excited that a number of new investigators have signed up for training.

In other news, the most recent impact factor results show that *IOVS* has moved up to sixth in the ophthalmology cohort ranking. Finally, we want to thank the reviewers, editorial board members and associate editors who spent countless hours making sure the best quality papers are being published in *IOVS*. We look forward to working with all of you this coming year.

Journal of Vision

by Dennis M. Levi, OD, PhD,
Editor-in-Chief

The *Journal of Vision (JOV)* began accepting submissions (closed effective Oct. 1) this year for a special issue, A Dress Rehearsal for Vision Science. The concept of the issue is based on an image of a dress widely circulated on the internet in 2015. Different people saw very different color combination in the dress; white-gold, blue-black, and blue-brown were

among the most commonly reported. Some reported that the colors changed from time to time with continued viewing. The dress image triggered enthusiastic but informal discussion in the vision community concerning the reported marked individual differences and bi-stability. We look forward to publishing papers covering this topic in 2017.

Another *JOV* special issue, Scene Perception from Central to Peripheral Vision, was released this year and articles continue to be published upon acceptance. A key issue in real-world scene perception is the roles played by central and peripheral vision. While central vision has the highest visual acuity, peripheral vision covers the vast majority of our visual field. Yet, the nature of peripheral vision is mysterious, in that our common intuitions about it are often wrong. To read already published papers in this special issue, visit Volume 16, No. 2 at jov.arvojournals.org.

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ARVO IMAGING IN THE EYE
CONFERENCE

Where imaging is going

May 6, 2017
Baltimore Convention Center
Baltimore, Md.
arvo.org/imaging

Journals, continued from page 23

Translational Vision Science and Technology

by Marco Zarbin, MD, PhD, FARVO,
Editor-in-chief

Translational Vision Science and Technology (TVST) has been accepted for coverage in the Science Citation Index Expanded (SCIE), one of Thomson Reuters' Impact Factor databases. It will be cross-indexed in their Biological Abstracts and BIOSIS Previews products as well. We thank all of the scientists who have contributed their work to *TVST* and to the associate editors, editorial board members and reviewers who have enabled us to achieve this milestone.

As most ARVO members know, *TVST* emphasizes multidisciplinary research that bridges the gap between basic research and clinical care. Because of its translational emphasis, *TVST* publishes manuscripts by scientists and clinicians with very diverse backgrounds — from

basic chemistry to physics to epidemiology to ophthalmic surgery — in order to bring together research that has a high probability of advancing the way we understand and/or treat vision-threatening diseases. In addition, in 2017, we are planning to publish quarterly mini-reviews on the following topics: Use of CRISPR to Modify Human Genes, Reversal of Cone Dormancy in Retinitis Pigmentosa, Bench to Bedside Research to Develop a Treatment for Leber Hereditary Optic Neuropathy and Experimental Animal Models of Retinal Dystrophies and Functional Assessments.

Submissions to *TVST* continue to increase rapidly (the annualized submission rate in 2016 has increased by 38% over 2015) and the acceptance rate currently is about 50%. Indexing in the SCIE is the newest benefit to authors, and we anticipate additional index coverage in 2017.

Thank you all again for your support of *TVST*. We will continue to strive to serve you and to enable you to share the results of your work with the scientific community.

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