Vision is more than the eye
Improving Patients' Lives

2017 Moran Advisory Council

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When I think of my dear colleague Richard Normann, PhD, I’m simply awed by the tremendous dedication and patience his research has required.

Dr. Normann has been an inspiration in his unrelenting quest to develop artificial sight. Guided by his desire to help people with vision loss live more independently, he created a truly landmark device—the Utah Electrode Array—some 30 years ago. Today, its potential for generating sight is about to be tested.

That’s right—it’s taken 30 years to perfect, license, and prepare the array for this moment. But it’s been time well spent. Aided by Alessandra Angelucci, MD, PhD, and other University of Utah and international collaborators, Dr. Normann will implant the array into the human brain for vision testing in 2017. It’s a momentous step forward and a key example of what interdisciplinary collaboration can achieve.

After all, the eye, in all its complexity, is simply the window through which the brain receives images. We know that once we have sight—and even when we lose it—the brain still wants to see. This edition of FOCUS examines the brain’s role in creating vision, highlighting the effort to create artificial sight and new research into the little-understood hallucinations of Charles Bonnet Syndrome.

Our hope for artificial vision is just one way the Moran Eye Center is working to improve our patients’ lives. As I have the privilege of working with our researchers, educators, and clinicians each day, I am humbled by their unwavering commitment to their individual roles in our collective mission to provide hope, understanding, and treatment to people with blinding conditions, eye disease, or visual impairment. This mission guides our efforts as we work to translate scientific discoveries into new therapies, and we are most excited about possible new treatments for age-related macular degeneration and glaucoma.

I believe we’ve never been stronger as an institution. Thanks to the hard work of many, we enjoy a top-ranked residency program and a recent rating as the nation’s No. 1 academic medical center for the quality of care we provide to our patients.

Of course, none of this would be possible without the support of so many people who believe in the importance of our mission and in the dedication of each and every member of the Moran team. I reflect on the encouragement I receive from our colleagues, donors, community, and university each day with gratitude, and I extend my sincere thanks to each of you.

Sincerely,

Randall J Olson, MD
Professor and Chair, Department of Ophthalmology and Visual Sciences; CEO, John A. Moran Eye Center, University of Utah
Three decades ago, University of Utah bioengineer Richard A. Normann, PhD, had a radical new idea he hoped might create artificial sight for people who had lost their vision due to disease. If the eyes couldn’t function anymore, why not let the brain do all the work?

His inspiration resulted in the creation of the Utah Electrode Array, a tiny device implanted into the brain that may soon bring artificial vision one step closer to reality.

Now, one of his collaborators, University of Utah neuroscientist Alessandra Angelucci, MD, PhD, is building on Normann’s groundbreaking research to develop a next generation array. It’s a technological leap akin to the shift from flip phone to iPhone, and the latest advance in the quest to understand the brain’s remarkable ability to create vision.
Finding the ‘Right Kind of Tool’
As a child, Richard A. Normann was a tinkerer. His father owned and installed pinball machines, and Normann’s own creations quickly emerged from their discarded parts. In college, his aptitude for engineering was clear, but Normann began to develop an interest in the inner workings of the body and took up physiology. He combined the two disciplines as a University of Utah professor of bioengineering and ophthalmology and visual sciences, and in the 1980s decided to investigate how to restore sight to those who had lost it to disease.

“People had been dreaming about restoring sight to the blind for quite a while, but they didn’t have the right kind of tool,” Normann said. “So we just decided to have a dinner party, inviting scientists and engineers from our campus and around the country. We talked about what was keeping us from actually making blind people see. After that night, it became clear to us what was really needed.”

Normann’s dinner party epiphany resulted in the creation of the Utah Electrode Array (UEA). Much smaller than a penny, the device uses a series of silicon microelectrodes implanted into the brain to record and replay the electrical activity of neurons. It’s this communication between neurons that creates vision, and countless other body functions.

Before the UEA, researchers had only tracked the electrical activity of just a few neurons in one location of the brain using a single electrode positioned on the organ’s surface or implanted in the brain. Using multiple electrodes has been a technological breakthrough, and successful testing of the device has been a bit like something straight out of a science fiction novel.

Normann and a colleague—University of Utah Bioengineering Associate Professor Gregory Clark, PhD—decided the safest and most practical way to initially evaluate the UEA would be with the help of forearm amputees. In these experiments, people were able to move a motorized prosthetic hand with their thoughts and experience a sense of touch. How did it work? A person thought about moving their hand. The UEA, implanted into the nerves of the arm, recorded those neural signals and sent them to the prosthetic. The success of those and many other experiments led to the commercial licensing of the UEA, used by scientists around the world.

Now, Normann hopes to realize his dream to restore useful vision with the UEA by bypassing the eyes and going straight to the brain. The idea: a person could wear glasses with a video camera attached to record real-world images. The UEA, receiving input from the video camera through an attached wire, could translate the images into a form of artificial vision the brain would recognize as sight. Although that vision would be pixelated, it should be just enough to allow a blind person to navigate through a doorway or around objects on the street without assistance, substantially improving their quality of life.

After decades of research and with an impressive list of collaborators, Normann plans to begin implanting the UEA, called the Moran/Cortivis Visual Prosthesis, in vision patients this year in Spain. “The name ‘Cortivis’ reflects the relationship between Moran and our Spanish collaborators,” said Normann. If successful, the testing should produce a blueprint for creating artificial sight.
University of Utah Professor of Ophthalmology and Visual Sciences, Alessandra Angelucci, MD, PhD

University of Utah Associate Professor of Mechanical Engineering, Brittany Coats, PhD

Miguel Hernández University of Elche, Spain, Cellular Biology Professor, Eduardo Fernandez, MD, PhD

University of Utah Adjunct Assistant Professor of Neurosurgery, Paul House, MD

University of Utah Emeritus Distinguished Professor of Bioengineering and Emeritus Professor of Ophthalmology and Visual Science, Richard A. Normann, PhD

University of Utah Assistant Professor of Neurosurgery, John D. Rolston, MD, PhD

COLLABORATORS TO IMPLANT THE UEA IN VISION PATIENTS IN 2017
Building on a Breakthrough

Professor of Ophthalmology and Visual Sciences Alessandra Angelucci, MD, PhD, is among Normann’s collaborators, sharing his hope for restoring sight. But committing her to the project took some coaxing.

“I resisted,” said Angelucci, a neuro-scientist who has devoted the past two decades of her research to understanding how the brain functions. “I thought if we didn’t know exactly how neurons in the visual cortex work, how can we know how to fix vision?”

Normann encouraged her to think big and be willing to take risks. The success of the UEA in controlling forearm prosthetics changed her mind.

“Today, we totally complement each other: the UEA is a great tool to understand how the brain works,” said Angelucci. “I use Dick’s technology to ask neuroscience questions, building on his innovation.”

Angelucci, part of the National Institute of Health’s (NIH) initiative to map the human brain, is using the UEA as the basis for a next generation of neuron interfacing array, called the Utah Optrode Array (UOA). She’s collaborating with University of Utah Department of Electrical and Computer Engineering Professors Steve Blair, PhD, and Loren Rieth, PhD, on an NIH BRAIN Initiative grant to adapt the UEA to use with optogenetics. Optogenetics, which activates neurons using light rather than electricity, will allow her to overcome one of the limitations of the UEA.

“Any neuron near an electrode in a UEA implanted in the brain will get ‘turned on’ by electrical currents injected into the brain via the UEA electrode, regardless of the direction they are going,” Angelucci explained. “But that’s not how the brain works. The brain gets activated in specific pathways depending on specific tasks.”

With optogenetics, Angelucci can fine-tune which neurons are turned on to provide an unprecedented level of control that represents the next step in artificial vision research. While the design of Angelucci and Normann’s devices are similar, the UOA uses 100 glass needles topped with light-emitting diodes (commonly known as LED lights) instead of metal electrodes.

Development of the UOA is still in the early phases. But it’s a step in the right direction to answer questions about how vision works.

“The more we understand how neurons in the brain communicate, the more we’ll be able to repeat those patterns to recreate visual function,” said Angelucci. “I’m inspired by Dick, and now, I’m directly involved in restoring vision.”
With good vision, most people can spy a tiny bug on a leaf or look up at the night sky and see a galaxy. But researchers still don’t fully understand how this complex process works—how the images the eyes collect travel through the optic nerve to be interpreted by the brain.

What is known: from the time humans first experience the wonder of vision, their brains are “wired” to see. So much so that even if a part of vision is lost, robbing the mind of the stimulation it’s used to, the brain fills the void by creating vivid, substantial hallucinations. This phenomenon is known as Charles Bonnet Syndrome (CBS), named for the eighteenth-century Swiss naturalist and philosopher who first described the condition in his visually impaired grandfather.

“CBS may not be well-known or documented, but it is extremely common,” said Lisa Ord, PhD, LCSW, director of Moran’s Patient Support Program. “I had a low-vision patient who saw the Grand Canyon opening up in front of her. Another patient said he saw scenery going by, as though he was in an airplane. Other people see patterns, people, or beautiful colorful flowers. We don’t know exactly how it works, but we see CBS all the time—especially in people with age-related vision loss.”

Ord, who is investigating CBS and writing a paper on the subject, has found prevalence rates vary widely from study to study—and numbers may be low as older patients hesitate to talk about hallucinations for fear of being diagnosed with mental illness or dementia.

“We want patients with partial or severe blindness—and their families and physicians—to know that CBS is perfectly harmless,” said Ord. “It’s just what the brain does. We talk about it in our support groups at Moran, and whenever one person dares to mention hallucinations, several others breathe a sigh of relief.”
Moran’s Patient Support Program offers a variety of professionally moderated support groups and vision rehabilitation services to help patients, families, and caregivers find ways to understand, accept, and move past the limitations of vision loss. Below are some of the CBS coping strategies they share.

Managing CBS

- **Blink rapidly or close your eyes for a few minutes.**
- **Change the level of light by opening the drapes or turning on lights.**
- **Take a nap since hallucinations tend to be more frequent when you’re tired.**
- **Use relaxation techniques such as deep breathing or thinking of a happy/safe place.**
- **Talk about what you are experiencing; interacting with others can help stop hallucinations.**
- **Walk away; physically moving to another location can eliminate hallucinations.**
- **Become familiar with “people” hallucinations so they don’t frighten you.**
- **Develop a new hobby, exercise, or become more socially engaged to increase your sensory stimulation.**

For more information about Patient Support services, please visit healthcare.utah.edu/moran/services/
JON AND KAREN HUNTSMAN

Envision a Future of Hope, Understanding, and Treatment for AMD Patients

Jon and Karen Huntsman are hoping to change the odds for millions who suffer from AMD.
Church of Jesus Christ of Latter-day Saints apostle David B. Haight was known and loved by members of his faith in his later years for his heartfelt, unscripted speeches. They were, in part, due to his difficulty seeing words on a teleprompter or a page in front of him. Haight publicly shared his battle with declining eyesight due to age-related macular generation (AMD), noting at the church’s 2000 general conference that, “As my eyesight decreases, I think my vision improves—my vision of what lies ahead.”

Now, his daughter and son-in-law are working to create a future they know he would have approved of—one that gives hope to people losing their vision to AMD. Jon and Karen Huntsman will generously gift $5 million to support AMD research at the Moran Eye Center.

“Moran is internationally recognized in this area, and they stand to impact so many people whose lives and families are drastically changed as this disease progresses,” said Karen Huntsman. “Now, more than ever, private funding is needed to support important medical research. We’re thankful we have the ability to do that.”

Characterized by a loss of central vision, AMD is the most prevalent cause of vision loss in adults over the age of 55 and is estimated to affect 196 million people by 2020. Yet, caring donors like the Huntsmans stand to change the odds.

“We are so fortunate and grateful to have extraordinary people like the Huntsmans who truly share in our mission that no person with a blinding condition, eye disease, or visual impairment should be without hope, understanding, or treatment,” said Moran Eye Center CEO Randall J Olson, MD. “The significance of this commitment cannot be overstated. We are very excited about the trajectory of our recent research, and the generosity of donors like the Huntsmans will get us closer to the finish line.”

A gift supporting AMD research will establish another remarkable legacy for health care at the University of Utah associated with the Huntsman name, already known in connection with the world-class Huntsman Cancer Institute. It will also support what Haight had once imagined.

After receiving care from Olson, Haight reflected on the institution’s future in 2004 by saying he imagined it might someday “be one of the world’s most precious gems.”

“We couldn’t agree more,” said Jon Huntsman.
Mother’s International Search for Answers to Son’s Illness LEADS HER TO MORAN

“I feel so blessed that I found Dr. Vitale.”
—Laura Whitton
As an experienced mom of three school-age boys, Laura Whitton wasn’t unusually concerned, at first, when her ten-year-old son, Avery, experienced what looked like ‘pink eye’ and flu-like symptoms. Illness had been going around his school, and the family had adjusted to life in China over the past two years as Whitton’s husband served as a U.S. diplomat. Knowing fevers are one way the body combats infection, Whitton took him to local doctors who treated him for his fever and pink eye.

But Avery grew sicker.

Over the course of six weeks, his headaches and body aches worsened and his fever continued to spike. When Avery woke at night crying from pain behind his eyes, Whitton became alarmed. For the next five months, she took him to specialists from China to Singapore. He endured several tests and rounds of topical steroids. But after each round, the painful eye inflammation returned, and no one knew why. Then, new symptoms appeared.

“When he began hobbling from excruciating back pain, I thought, where in the world can we find someone who has the answer,” said Whitton.

But Avery grew sicker.

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“Light at the End of the Tunnel

Desperate and frightened, Whitton did her own research using the internet. The name that kept popping up was Moran Eye Center uveitis specialist Albert T. Vitale, MD.

“I thought, if anyone can find the answer, he can,” said Whitton.

She cried during Avery’s first appointment with Vitale, when the doctor told her they would find an answer.

“After an extensive workup, we suspected Avery had tubulointerstitial nephritis with ocular uveitis syndrome (TINU),” said Vitale. “It’s an uncommon cause of intraocular inflammation in association with systemic disease with only 250 cases reported in the literature.”

In TINU, the body acts like it is rejecting a bad kidney transplant. Often, it is a short-term disorder. In rare cases, it may cause permanent kidney damage. Pediatric nephrology specialist Raoul Nelson, MD, PhD, at Primary Children’s, biopsied Avery’s kidney and confirmed TINU.

Getting Back to Normal

During treatment, Avery has been challenged by steroids that make him ‘wider,’ by medication schedules that sometimes rob him of dessert, and by not being able to play soccer. But his prognosis is hopeful.

Just days before his eleventh birthday, Avery heard good news: “There is no inflammation, and his vision function is excellent. He can be as active as he wants to be,” said Vitale.
“Saving a few seconds shooting has been a huge advantage. Overall, LASIK has made a big impact on my quality of life.”

—Oksana Masters
Strapped into a carbon fiber sit-ski custom molded to fit her body, Oksana Masters skis hard in the blistering cold to the rifle range.

Her heart feels as if it’s thudding out of her chest by the time she’s ready to shoot. Falling to her side, she lies on her belly—sit-ski up in the air—sights her rifle, and aims at one of five targets.

But, her contact lenses have fogged up. And then, one slips. Fixing it is frustrating and takes time: her hands are taped into her gloves so they don’t slip out.

Born with radiation-induced limb defects believed caused by the Chernobyl nuclear explosion, Masters is a double-leg amputee who has so far endured more than 20 surgeries in her 27 years—several of those to form thumbs and fingers from webbed hands.

Yet, even after overcoming monumental physical challenges to become one of the United States’ most elite Paralympic athletes, Masters found her efforts on the biathlon trials consistently stymied by her nearsightedness. “Shooting is about control,” said her U.S. Paralympic Nordic Skiing Coach, John Farra.

“For each missed shot, you have to ski an extra penalty loop of 100 meters while your competitors are skiing to the finish,” he said.

Hope in Sight
In 2016, the United States Olympic Committee selected University of Utah Health, which includes the Moran Eye Center, to join their National Medical Network. Masters, who trains in Utah, scheduled a vision screening at Moran to learn if sight-correcting surgery would eliminate the need for contacts altogether.

She met with Moran cornea specialist, Amy Lin, MD, who determined Masters was a good candidate for LASIK, a laser technique that precisely reshapes the cornea, treating nearsightedness, farsightedness, and astigmatism. Masters had surgery just days before heading to Sweden for a U.S. Paralympic Team training camp.

Making History
Four months later—minus the troublesome contacts—Masters took four world championship titles and five medals for the U.S. at the 2017 World Para-Nordic Skiing Championships. With the wins, she made history as the most successful U.S. woman at a world championship since International Paralympic Committee records were maintained in the sport.
RELATIONSHIPS AND RESEARCH:  
Global Outreach Division Opens Doors
While Moran’s Global Outreach Division has long focused on caring for people in need and educating providers, its unique relationships are fueling new opportunities for research.

“Research is very much in our wheelhouse at Moran, and now it’s part of our outreach efforts as well,” said Research and U.S. Programs Coordinator Margaret Rose. “We’re providing more opportunities for scientists, and those are possible since we can connect them to the relationships of trust and respect we’ve built with our patients and partners.”

Collaborations range from identifying projects on the Navajo Nation for graduate students to a recent surgical eye camp trip in Guatemala that led Department of Ophthalmology and Visual Sciences Adjunct Associate Professor Barbara Wirostko, MD, to investigate a notable discovery.

Wirostko studies a severe type of glaucoma associated with exfoliation syndrome (XFS), which causes a buildup of debris in the eye and affects other body systems. She’s been using the Utah Population Database, a rich source of in-depth genetic information, to determine whether XFS patients are at risk for other medical conditions.

Changes to the LOXL1 gene are known to cause XFS in people from Scandinavia, Eastern Europe, Turkey, Japan, and India. Wirostko was surprised when Moran cataract and glaucoma specialist Alan Crandall, MD, told her he noticed XFS debris in the eyes of several of his Guatemalan cataract surgery patients.

“There was a population in Guatemala where up to 30 percent of cataract surgery patients had XFS material in their eyes,” Wirostko explained. “We’ve partnered with Global Outreach to explore this in Guatemala, where this population has a much higher frequency of XFS.”

Members of Wirostko’s research team traveled with the global outreach team to Salamá, Guatemala in 2016, collecting 150 research samples.

“The whole purpose,” said Wirostko, “is to try to identify and understand this disease, which eventually might lead us to a cure.”
Christine and Fred Fairclough weren’t quite sure what to expect when they joined their first eye care mission with Moran Eye Center’s David W. Bernolfo Global Outreach Program to Salamá, Guatemala in 2015.

“We just knew we wanted to be involved in giving the amazing gift of sight,” said Christine. “We told the team to put us to work—but I don’t think either of us had any idea of the emotional impact that would have on us.”

The Salamá trip was the first of several the couple has underwritten—and have committed to underwrite—through a $1 million gift from the Christine and Fred Fairclough Charitable Trust. They have since traveled to Micronesia and Tanzania with the team and are eager to return to Micronesia again this year.

It never gets old, the couple explained.

“Each time we get to hold a hand, soothe a nervous patient before his cataract surgery, and see the huge smiles when the eye patches come off the next day, the tears just flow.”

The Fairclough’s history of giving to the University of Utah stretches back decades, as does their service beyond the University. Among many other contributions, Fred was Founding Director of the Ivory-Boyer Real Estate Center at the David Eccles School of Business and currently chairs the Primary Children’s Foundation Board. Christine serves on the board of the Kasiisi Project, which supports education in Uganda, and chairs Moran’s Global Vision Board.

“My hope in creating the Global Vision Board is to get everyone as enthused as we are,” said Christine. “Moran’s missions are supported solely by donors, and the technicians, nurses, and doctors all donate their time. After witnessing the way the teams work together, so tirelessly, so seamlessly, I think I have truly found my passion. Now, whenever I think about money, I think, how many eyes will that save?”
DAVID W. BERNOLFO

Global Vision Center Extends Moran’s Global Reach

The new David W. Bernolfo Global Vision Center opened in January 2017, providing Moran Eye Center’s outreach team with vital spaces and state-of-the-art equipment to improve eye care and education worldwide.

Focused on creating sustainable eye care in more than 25 countries, the outreach team works to train local ophthalmologists in their homelands and at Moran as part of its International Observer Program. A new telemedicine hub housed in the Bernolfo Center bolsters this mission by supporting a host of real-time educational opportunities.

“Now, our international partners can just use their smart phones to connect with Moran experts,” explained Outreach Division Manager, Michael Yei. “Our new telemedicine capabilities allow us to actually examine the eyes of patients in remote locations and share information. This is so helpful for the medical experts we’re training around the world.”

The center provides computer terminals where visiting physicians can access information and view surgical videos. It also includes dedicated lab space and a surgical simulator that enable residents and international observers to study eye anatomy and safely develop surgical skills.

With the outreach team conducting multiple local and international trips each month, the space was designed to promote efficiency. A dedicated storage room allows the team to easily organize and pack the thousands of pieces of equipment, medicines, and tools necessary to set up sight-restoring surgical camps in remote locations.

“We are already more productive,” said Yei, “and we are able now to plan additional trips that extend the impact of our work.”
The Road to SUSTAINABLE EYE CARE in Tanzania

Moran is Making a Difference
With its lush, forested mountains and the vast Serengeti Plain, there is no denying the beauty of Tanzania and its people.

Yet, this West African nation is also one of the fiscally poorest countries in the world, and it faces a daunting backlog of curable blindness. Half a million of its 52 million residents suffer from vision loss—mostly from cataracts.

"With only 37 ophthalmologists for the entire country, access to eye care is as profoundly lacking as anywhere in the world," according to Moran physician Jeff Pettey, MD.

The outreach team from Moran’s David W. Bernoflo Global Vision Center, along with key partners, is working to turn the tide.

Outreach and Training
As part of a long-range plan to train local physicians and staff while providing free eye surgeries to as many people as possible, the team and partners completed their second large-scale surgical outreach trip to the capital city of Dodoma in February 2017. That same month, they launched their first large-scale medical eye camp further north, in the villages of Chome, Same, and Makanya.

In all, the teams provided 761 sight-restoring surgeries, over 5,700 vision screenings, and distributed 800 pairs of prescription eyeglasses.

Twelve-year-old Ezeleda Julius was collecting firewood for her family when she was stabbed in the eye by a stick. Without treatment, she developed a traumatic cataract and nearly lost all sight in that eye. She showed strength and courage during her operation, and when her sight was returned, so was her smile.
“Each donated surgery and pair of glasses has the potential to change a life,” said Pettay, “but the ultimate goal is to help train enough providers so that Tanzanian doctors can start caring for their own population—and do it well.”

Since 2014, Pettay has partnered with Dr. Grace Sun of Weill Cornell Medicine’s Ophthalmology Department and Dr. Frank Sandi at the University of Dodoma College of Health’s Benjamin Mkapa Ultramodern Hospital to create the Tanzanian governments’ first ophthalmology residency program. This transformative effort to establish high-quality ophthalmology training in the heart of Tanzania could be up and running in as soon as one year.

Moving North
Craig Chaya, MD, joined the second half of the mission and led the outreach team’s 2017 eye camp further north in the Chome region, near Kilimanjaro. Local doctors Frank Sandi and Japhet Bright Boniface trained side-by-side with Moran ophthalmologists through the entire mission, and the team established an on-the-ground network that will help them better understand the exact needs for eye care in the region.
Randall J Olson, MD, and Jeff Pettey, MD, each received an American Association of Ophthalmology (AAO) Secretariat Award, Chicago, 2016. This award recognizes members and non-members for special contributions to AAO and ophthalmology outside the scope of the current Achievement Awards Program.

Iqbal “Ike” Ahmed, MD, Moran adjunct and former glaucoma fellow, received the John A. Moran Eye Center Distinguished Alumni Award and a Secretariat Award, AAO, Chicago, 2016.

Paul Bernstein, MD, PhD, received AAO’s 2016 Outstanding Humanitarian Service Award and the AAO Achievement Award for his “above and beyond” work for vitreoretinal services in the developing world, including training other specialists. He was also selected vice president of ARVO, 2016-2017, was recognized as an ARVO Gold Fellow for his exemplary individual accomplishments, leadership, and contributions to the association, and completed his fifth year of service on the ARVO Board of Trustees.

Gregory S. Hageman, PhD, was listed as one of the 100 most influential people in ophthalmology in The Ophthalmologist’s 2016 Power List.
Alan S. Crandall, MD, was the first Robert Ritch lecturer on pseudoexfoliation at Manhattan Eye and Ear Infirmary and the Monsur Armaly lecturer at the University of Iowa.

Also, Crandall was the first in Utah to implant the new, FDA-approved post-cataract surgery lens in the United States: Abbott’s Tecnis Symfony, on July 15, 2016, at the Moran Eye Center, University of Utah.

Robert Marc, PhD, received the 2016 Ephraim Friedman Award and lectured at the Fourth Biennial International Symposium on Age-Related Macular Degeneration at Harvard. There, Marc was lauded as building the first retinal connectome—the wiring diagram of the retina.

Leah Owen, MD, PhD, received a Primary Children’s Hospital Foundation Early Career Award for “Characterization of the molecular basis for retinopathy of prematurity protection in maternal preeclampsia.”
Researchers’ Photographs Make the Cover of Five Journals

Wolfgang Baehr, PhD, was featured on the cover of The FASEB Journal, October, 2016, for “Ciliopathy-associated IQCB1/NPHP5 protein is required for mouse photoreceptor outer segment formation.”

Liliana Werner, MD, PhD, and Nick Mamalis, MD, received multiple industry honors and sponsored awards during the past year, including two journal cover features:

Journal of Cataract and Refractive Surgery, March 2016, “Prevention of postoperative capsular bag opacification using intraocular lenses and endocapsular devices maintaining an open or expanded capsular bag.”

The Ophthalmologist, June 2016, “Localized calcification of a hydrophilic acrylic IOL.”

Also, Liliana Werner, MD, PhD, had a third journal cover feature: Journal of Cataract and Refractive Surgery, September 2016, “Late postoperative opacification of a hydrophilic-hydrophobic acrylic intraocular lens.”

In addition, Moran researchers David Krizaj, PhD; Bryan Jones, PhD; and Robert Marc, PhD, made the cover of Journal of Neuroscience, March 18, 2016, for their article image “Store-operated calcium entry in Müller glia is controlled by synergistic activation of TRPC and Orai channels.” Krizaj lab photo credit.
Moran’s Mary Elizabeth Hartnett, MD, hosted Harvard University Department of Ophthalmology Chair Joan Miller, MD, for a University of Utah H. A. and Edna Benning Presidential Endowment guest lecture. After touring Moran’s research labs and discussing recent breakthroughs at both Moran and Massachusetts Eye and Ear, Miller presented her latest research on age-related macular degeneration (AMD) and the direction of potential new cures. Miller is credited with co-developing the first FDA-approved treatment for AMD.
MORAN EYE CENTER 2016 PROFILE

MORAN NOTABLES

7th in National Institutes of Health Funding

Peer-Reviewed Publications

160

13th

Best Hospital for Ophthalmology
U.S. News & World Report

HIGH RANKING

Ophthalmology Specialty Award
U.S. News & World Report

PEOPLE OF MORAN

156 health staff

55 clinical volunteer adjuncts

38 clinical faculty

22 research faculty

13 residents

12 fellows

11 optometrists

11 research adjuncts
As part of University of Utah Health, Moran Eye Center was ranked **No. 1 in the nation** among academic medical centers for the quality of care it provides.

Vizient Inc. ranked more than 100 centers, examining excellence in quality and accountability. What does the nation’s best quality of care mean for patients at Moran?

### Better Access
Low average wait times: less than **one minute** to schedule appointments over the phone and less than **15 minutes** throughout your clinic visit.

### Better Care
High patient satisfaction: survey ratings have increased more than **200 percent** over the past five years.

### Better Safety
**Zero percent** infection rate for cataract surgeries and a .02 percent rate for eye injections.

**TOP QUALITY CARE**

**SURGERIES 6,754**

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**134,122 PATIENT VISITS**
Moran first made its mark in online education in 1994 with the introduction of Webvision—an ever-evolving, interactive textbook founded by Helga Kolb, PhD, now professor emerita of ophthalmology. The site has become an international clearing house for all things related to retina and vision science (webvision.med.utah). Now, Moran CORE, a new educational tool with global reach, stands to make a major impact on ophthalmology training and eye care, especially in the developing world.

**What:** The first free online multimedia ophthalmology education resource for residents, fellows, students, and ophthalmologists, Moran CORE offers access to an up-to-date, peer-reviewed curriculum to complement the American Academy of Ophthalmology Basic and Clinical Science Course.

**Why:** Numerous academic medical centers around the world lack training in specific areas. This situation is particularly dire in the developing world, where blindness and eye disease are overwhelming, but access to trained ophthalmologists is almost nonexistent.

“*Moran CORE will empower trainees who don’t have access to lectures and surgical videos. Because of its reach, the potential for global impact is unprecedented.*”

Moran Eye Center Director of Education, **JEFF PETTEY, MD**

“*Moran CORE has just started, yet we are gaining traction—adding content and increasing page views every day. It has the potential to propel the Moran Eye Center as a leader in online ophthalmic education in our country and the world. We are fortunate to have a stellar committee and editorial board, but I would like everyone to know that we could not have gotten off the ground without Nancy Lombardo and the teams at the Eccles Health Sciences Library.*”

Kathleen B. Digre, MD, Neuro-Ophthalmology Section Editor and a founder of NOVEL, the Neuro-Ophthalmology Virtual Education Library
Collaboration & Content Experts

The Moran Eye Center, Eccles Health Sciences Library, and e-channel collaborate to produce Moran Grand Rounds, Resident Lectures, and Ophthalmic Surgery Videos.

Submissions are welcome from faculty, fellows, residents, and students in the US and abroad.

Posted material is approved by Moran's Editorial Board.

Sharing Worldwide

Moran CORE is reaching individuals domestically and internationally.

125 countries visited the site 39,374 page views 530 pages of new content 50 percent returning visitors

(as of February 2017)

Open Access to Specialized Knowledge

Ophthalmologists now have exceptional and unprecedented access to a multimedia repository that complements their specialized training wherever they live in the world.

CORE provides excellent preparation for challenging surgical cases, including an international curriculum for outreach and international partners, and incorporates best practices to combat preventable blindness worldwide.
Each year, the Achievement Rewards for College Scientists (ARCS) Foundation awards $15,000 to a first-year Moran Eye Center resident to seed promising research. Moran then matches the award for the following two years of residency, providing a total of $45,000 for a young researcher.

“Without the ARCS scholarship, residents have to put their research on hold,” explained Moran CEO Randall J Olson, MD, at the annual ARCS award luncheon. “We understand that hope in medicine lies in future innovation, in the passion of young researchers.”

Rebekah Gensure, MD, PhD, received the 2016 Utah ARCS Scholar in Ophthalmology Award. Gensure earned both her medical degree and a doctorate in biomedical engineering from Rutgers University. She joined Moran from Wills Eye Hospital, where she researched trans-corneal electrical stimulation for improvement of ocular dysfunction in patients with traumatic brain injury on a Department of Defense grant.
Moran Eye Center has provided the Intermountain West’s only uveitis specialists for more than a decade, offering hope to patients with this complex and sight-threatening disease.

Now, Moran is one of just 15 academic medical institutions nationwide to offer an Association of University Ophthalmology Professors-compliant uveitis fellowship. Moran uveitis experts Albert T. Vitale, MD, and Akbar Shakoor, MD, created the one-year program to immerse fellows in the full spectrum of uveitis pathology.

“Uveitis involves looking at every system in the body, and it goes well beyond what standard eye care involves,” said Shakoor. “Our fellows can expect intense training.”

Moran’s first uveitis fellow, Marissa Larochelle, MD, earned her medical degree from the University of Vermont and completed her ophthalmology residency at the University of Colorado. Larochelle has co-authored several published studies and presented at regional conferences, while her ongoing medical volunteer work in the Dominican Republic led her to found a women’s college scholarship fund there.
Moran Eye Center Education Training Program—A Superb Overall Experience
For over 35 years, the ophthalmology program has offered excellent didactic training and extensive surgical experience. From more than 400 applicants, four are selected each year to begin residency training, and from more than 175 fellowship applicants, seven are selected for five specialties. When we combine their potential with our education-focused culture and resources, the results are exceptional.

High Surgical Volumes
With 11 Moran locations, more than 35 ophthalmology specialists perform nearly 7,000 surgeries per year, ensuring residents and fellows participate in a full spectrum of clinical and surgical experiences. Nationally, ophthalmology residents must perform 86 cataract surgeries—the average is 140—but within three years, Moran chief residents each perform nearly 300 cataract surgeries and a range of 300 subspecialty surgeries, all supervised by board-certified attending faculty.

FELLOWSHIP PROGRAM 2016-2017

CORNEA

Brent Betts, MD
Severin Poul, MD

UVEITIS

Marissa Larochelle, MD

RETINA

Daniel Churgin, MD
James Zimmerman, MD

MORAN INTERNATIONAL

Eric Hansen, MD

GLAUCOMA

Adam Jorgensen, MD
David Phillips, MD

NEURO-OPHTHALMOLOGY

Anastasia Neufeld, MD

FIRST YEAR

Tara Hahn, MD
Nikko Ronquillo, MD, PhD
Christopher Ricks, MD
Lee Ferguson, MD, PhD

SECOND YEAR

Rene Choi, MD, PhD
Eileen Hwang, MD, PhD
Julia Byrd, MD
Rene Choi, MD, PhD
Eileen Hwang, MD, PhD

THIRD YEAR/CHIEF RESIDENTS

Julia Byrd, MD
Rene Choi, MD, PhD
Eileen Hwang, MD, PhD
**Dedicated Research Time**
Moran physicians and researchers collaborate daily in top-notch research labs producing clinical innovations. Residents receive protected research time one-half day each week. Funding is available through the Achievement Rewards for College Scientists (ARCS) Foundation, and Moran matches funds for second- and third-year awardees to continue their research.

**Global Outreach Opportunities**
Each year, Moran outreach physicians travel to 20 countries as remote as Micronesia and as close as Haiti. Our commitment to providing eye care to those unable to access or afford it gives residents and fellows extraordinary opportunities to participate in international electives.

**Room to Grow**
Residents raise their professional profiles at Moran: in 2016-2017, they authored 14 peer-reviewed publications and gave 56 local and national presentations. Residents also enjoy the personal benefits of Salt Lake, consistently ranked as one of the nation’s most livable cities at the base of the beautiful Wasatch Mountains.

Chief Resident Julia Byrd, MD, receives small incision cataract surgery instruction from Craig J. Chaya, MD, in Moran’s new wet lab.
Randall J Olson, MD, is the Chair of the Department of Ophthalmology and Visual Sciences and CEO of the John A. Moran Eye Center. He specializes in research dealing with intraocular lens and cataract surgery. Dr. Olson is the author of more than 300 professional publications and has given many named lectures all over the country and worldwide. He was selected to receive the 2016 Jan Worst Medal by the Intra-Ocular Implant Club, the 2015 Lifetime Achievement Award from AAO, the 2014 Rosenblatt Prize for Excellence by the University of Utah, the 2014 Kelman Award by AAO, and the 2012 Binkhorst Medal by ASCRS. Dr. Olson’s practice is limited to consultations and his long-term patients at this time.

SPECIALTY
• Cataract Services and External Eye Diseases

Paul S Bernstein, MD, PhD, specializes in AMD with special emphasis on the role of nutrition and environment in its treatment and prevention; inherited retinal and macular dystrophies; and surgical treatment of vitreoretinal disorders such as diabetic retinopathy and retinal detachments.

SPECIALTIES
• Vitreoretinal Diseases and Surgery
• Retinal Biochemistry
• Macular and Retinal Degeneration

Craig J Chaya, MD, practices comprehensive ophthalmology and specializes in the medical and surgical management of adult and pediatric cataracts, glaucoma, and anterior segment surgery. He is actively involved in Moran’s ophthalmology resident and glaucoma fellow training programs and Moran’s local and international outreach work, focusing on the advancement of eye care delivery. His research interests include the management of cataracts and glaucoma in the developing world and glaucoma surgical techniques and devices.

SPECIALTIES
• Comprehensive Ophthalmology
• Cataract Surgery
• Glaucoma

William Barlow, MD, is a comprehensive ophthalmologist and ocular surgeon with a specific interest in cataracts, complex cataract surgery, pterygium removal, and refractive eye surgery such as LASIK and PRK. He provides medical and surgical care for these conditions as well as general ophthalmic concerns.

SPECIALTIES
• Comprehensive Ophthalmology
• Cataract Services

James Beson, DO, specializes in comprehensive ophthalmology with a focus on the medical management of routine and complex glaucoma.

SPECIALTIES
• Comprehensive Ophthalmology
• Glaucoma

Susan Chortkoff, MD, focuses on the management and treatment of glaucoma, comprehensive ophthalmology, and has a special interest in the management of dry eye syndrome.

SPECIALTIES
• Comprehensive Ophthalmology
• Glaucoma

Alan S Crandall, MD, is the Senior Vice Chair of the Department of Ophthalmology and Visual Sciences, Director of Moran’s Glaucoma and Cataract Division, Co-director of Moran’s Global Outreach Division, the Val A. and Edith D. Green Presidential Endowed Chair in Ophthalmology, and past president of the American Society for Cataract and Refractive Surgery. He focuses on the medical and surgical management of glaucoma and cataracts. Dr. Crandall has experience with trabeculoplasty and laser cyclophotocoagulation. He is involved in numerous clinical research studies at Moran, lectures throughout the world, and was selected by Cataract and Refractive Surgery Today as one of 50 international opinion leaders. Dr. Crandall is the only physician to receive humanitarian awards from all three major ophthalmology organizations: the Senior Honor Award by AAO; the 2016 AGS Humanitarian Award; the 2014 AAO Humanitarian Award; and the 2013 ASCRS Humanitarian Award.

SPECIALTIES
• Cataract Services
• Glaucoma

Doctors in alphabetical order
<table>
<thead>
<tr>
<th>Ophthalmologists</th>
<th>Specialties</th>
</tr>
</thead>
</table>
| David C Dries, MD | • Pediatric Ophthalmology  
• Adult Strabismus |
| Joseph L Hatch, MD | • Comprehensive Ophthalmology |
| Kathleen B Digre, MD | • Pediatric Ophthalmology  
• Cataract Services |
| Mary Elizabeth Hartnett, MD | • Pediatric and Adult Retinal Diseases and Surgery |
| Robert O Hoffman, MD | • Pediatric Ophthalmology  
• Adult Strabismus |
| Rachael Jacoby, MD | • Retinal Diseases and Surgery  
• Macular and Retinal Degeneration |
| Griffin Jardine, MD | • Pediatric Ophthalmology  
• Adult Strabismus |
| Alison Crum, MD | • Neuro-Ophthalmology  
• Oculoplastics and Facial Plastic Surgery |
| Joseph L Hatch, MD | • Pediatric and Adult Retinal Diseases and Surgery |
| Mary Elizabeth Hartnett, MD | • Pediatric and Adult Retinal Diseases and Surgery |
| Robert O Hoffman, MD | • Pediatric Ophthalmology  
• Adult Strabismus |
| Rachael Jacoby, MD | • Retinal Diseases and Surgery  
• Macular and Retinal Degeneration |
| Griffin Jardine, MD | • Pediatric Ophthalmology  
• Adult Strabismus |

**Kathleen B Digre, MD**, is a past president of the North American Neuro-Ophthalmology Society and president-elect of the American Headache Society. She specializes in neuro-ophtalmology and evaluates and treats complex visual complaints, which can be due to optic nerve or brain disease. Her interests include gender differences in neuro-ophtalmic disorders, pseudotumor cerebri, ischemic optic neuropathy, temporal arteritis, papilledema, episodic vision loss, photophobia, headaches and eye pain. She worked with the North American Neuro-Ophthalmology Society and the University of Utah Eccles Library to develop a Neuro-Ophthalmology Virtual Educational Library (NOVEL) at novel.utah.edu. She received the Rosenblatt Prize for Excellence from the University of Utah in 2012.

**SPECIALTY**  
• Neuro-Ophthalmology

**Alison Crum, MD,** specializes in both oculoplastics and orbital surgery—the reconstruction of the bones around the eyes after traumas, correcting drooping eyelids, and aesthetic surgeries, such as eyelid lifts. She also practices neuro-ophtalmology and provides medical and surgical treatments for visual disorders. Her interests include treatment of Graves’ disease and of papilledema.

**SPECIALTIES**  
• Neuro-Ophthalmology  
• Oculoplastics and Facial Plastic Surgery

**David C Dries, MD,** provides medical and surgical care for eye diseases and visual impairments in children as well as the evaluation and management of strabismus in both children and adults. His special interests include amblyopia, esotropia, exotropia, retinopathy of prematurity, infant and childhood cataracts, and nasolacral duct obstruction.

**SPECIALTIES**  
• Pediatric Ophthalmology  
• Adult Strabismus

**Joseph L Hatch, MD,** provides expertise and experience in all areas of ophthalmology and has extensive experience in contact lens fitting. Since 2008, Dr. Hatch has served on the Church of Jesus Christ of Latter-day Saints Vision Initiative. This program sends eye care professionals to countries throughout the world.

**SPECIALTY**  
• Comprehensive Ophthalmology

**Mary Elizabeth Hartnett, MD,** is Director of Pediatric Retina. She specializes in vitreoretinal surgery and directs a pediatric retina center, managing both pediatric and adult retinal conditions at Moran. She performs surgery at Moran at the University of Utah and the Moran Eye Center at Primary Children’s Hospital.

**SPECIALTY**  
• Pediatric and Adult Retinal Diseases and Surgery

**Robert O Hoffman, MD,** is Chief of the Division of Pediatric Ophthalmology and Eye Muscle Disorders. He has special interests in retinopathy of prematurity, ocular genetics, craniofacial disorders, pediatric cataracts, and complicated strabismus.

**SPECIALTIES**  
• Pediatric Ophthalmology  
• Adult Strabismus

**Rachael Jacoby, MD,** specializes in medical and surgical diseases of the retina and vitreous. Her clinical and surgical interests include retinal detachments, diabetic retinopathy, and macular and retinal degeneration.

**SPECIALTIES**  
• Retinal Diseases and Surgery  
• Macular and Retinal Degeneration

**Griffin Jardine, MD,** specializes in pediatric eye diseases as well as adult strabismus. He offers medical and surgical treatment for amblyopia, strabismus, pediatric glaucoma, anterior segment disorders, pediatric cataracts, retinopathy of prematurity, and nasolacral duct obstruction.

**SPECIALTIES**  
• Pediatric Ophthalmology  
• Adult Strabismus

**Bradley J Katz, MD, PhD,** specializes in neuro-ophtalmology, cataract, and comprehensive ophthalmology. He evaluates patients with diseases that affect the optic nerve and diseases of the brain that affect vision and eye movements.

**SPECIALTIES**  
• Cataract Services  
• Neuro-Ophthalmology
Jeff Pettey, MD, is Director of Education at Moran; Chief of Ophthalmology at the Salt Lake City VA Medical Center; founder and Medical Director of Moran’s surgical outreach arm, Operation Sight; and one of the official Utah Jazz doctors. He is active in local and international ophthalmology outreach and education and works and lectures internationally on the topic. Dr. Pettey has an active interest in national health policy and holds committee positions for AAO.

**SPECIALTIES**
- Complex Cataract Surgery
- Complex Anterior Segment Surgery
- Post-Traumatic Eye Injury
- Sports Vision
Albert T Vitale, MD, is Director of Moran’s Uveitis Division. He specializes in patients with diseases of the retina and vitreous. He is one of the few ophthalmologists in the Mountain West specializing in the diagnosis and treatment of uveitis and other infections and inflammatory diseases of the eye. His research interests include ocular manifestations of systemic diseases, novel therapeutic agents, and new drug delivery systems in the treatment of ocular inflammatory disease, retinal vascular disease, and the pharmacotherapy of AMD. He is one of a few people in the country with dual training in ocular immunology and inflammatory disease and vitreoretinal surgery. Dr. Vitale is co-author of the definitive text on the subject, with Dr. C. Stephen Foster, entitled, *Diagnosis and Treatment of Uveitis*.

**SPECIALTIES**
- Uveitis, Ocular Infections
- Retinal Diseases and Surgery

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Michael P Teske, MD, is Director of Vitreoretinal Diseases and Surgery. Dr. Teske specializes in medical and surgical diseases of the retina and vitreous. His primary surgical interests include retinal detachment, proliferative vitreoretinopathy, diabetic retinopathy, macular degeneration, epiretinal membranes, macular holes, and posterior segment trauma.

**SPECIALTY**
- Comprehensive Ophthalmology

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Jean Tabin, MD, provides general vision care and comprehensive ophthalmology services and works in Moran’s Triage Clinic treating patients and teaching medical students and residents who are interested in learning more about ophthalmology.

**SPECIALTY**
- Comprehensive Ophthalmology

---

Kim Taylor, MD, practices comprehensive ophthalmology and has extensive experience in fitting contact lenses. He has many years of experience in diagnosing and treating eye diseases of all kinds.

**SPECIALTY**
- Comprehensive Ophthalmology

---

Barbara M Wirosenko, MD, is Moran’s Resident Research Director and has specialized fellowship training in glaucoma. She treats glaucoma and comprehensive ophthalmology patients and specializes in clinical research and drug development for glaucoma pharmaceutical therapies. Her research interest is in sustained delivery of therapeutics for ocular pathologies and in better understanding the genetics and associated systemic diseases of exfoliative syndrome, a common cause of open-angle glaucoma.

**SPECIALTIES**
- Comprehensive Ophthalmology
- Glaucoma

---

Marielle Young, MD, provides medical and surgical care for children with eye disease as well as adults and children with strabismus. Her clinical expertise includes the evaluation and treatment of amblyopia, strabismus, infantile and developmental cataracts, and nasolacrimal duct obstruction.

**SPECIALTIES**
- Pediatric Ophthalmology
- Adult Strabismus

---

Judith E A Warner, MD, is Chief of Neuro-Ophthalmology. She evaluates complex visual complaints, which can be due to optic nerve or brain disease, and provides treatment for these disorders. Her interests include diplopia, giant cell arteritis, papilledema, optic neuritis, episodic vision loss, idiopathic intracranial hypertension, ischemic optic neuropathy, and unexplained vision loss.

**SPECIALTY**
- Neuro-Ophthalmology

---

Akbar Shakoor, MD, specializes in diseases of the retina and vitreous as well as the diagnosis and treatment of uveitis and other infectious and inflammatory diseases of the eye. His primary clinical and surgical interests include retinal detachments, diabetic retinopathy, epiretinal membranes and macular holes, macular and retinal degeneration, and the medical and surgical treatment of ocular inflammatory diseases such as uveitis.

**SPECIALTIES**
- Retinal Diseases and Surgery
- Uveitis and Ocular Immunology

---

Kim Taylor, MD, practices comprehensive ophthalmology and has extensive experience in fitting contact lenses. He has many years of experience in diagnosing and treating eye diseases of all kinds.

**SPECIALTY**
- Comprehensive Ophthalmology
Norm A Zabriskie, MD, is Vice Chair and Medical Director of Clinical Services and Director of Clinical Operations at Moran. He specializes in the medical and surgical treatment of glaucoma and cataract and has a research interest in the genetics of glaucoma.

**SPECIALTIES**
- Cataract Services
- Glaucoma

Brian E Zaugg, MD, specializes in the medical and surgical treatment of corneal and anterior segment eye diseases, including expertise in all types of corneal transplantation, routine and complex cataract surgery, anterior segment reconstruction, pterygium removal, and refractive surgery including LASIK, PRK, implantable contact lenses, and clear lens extraction. His research interests focus on improving efficiency and safety in cataract surgery as well as refractive surgery outcomes.

**SPECIALTIES**
- Cornea Transplant Surgery
- Ocular Surface Reconstruction (Pterygium Excision)
- Cataract Surgery (Premium Intraocular Lenses, Laser-Assisted Cataract Surgery, Monovision)
- Vision Correction Surgery (LASIK, PRK, Phakic Intraocular Lenses, Clear Lens Extraction)

Robert M Christiansen, MD, FACS, provides comprehensive vision rehabilitation services through Moran’s ophthalmology-based Patient Support Program. Nationally known in low-vision rehabilitation, he has been recognized by AAO with the Achievement Award and the Senior Achievement Award and by other organizations for his work with the partially sighted.

**SPECIALTY**
- Vision Rehabilitation

Lisa Ord, PhD, LCSW, is Director of the ophthalmology-based Patient Support Program for people with visual impairment and their families. Services include counseling, support and education groups, vision rehabilitation, occupational therapy, information and referral services, and the Orientation to Vision Loss Program.

**SPECIALTY**
- Counseling Related to Vision Loss

Roger P Harrie, MD, directs the Ophthalmic Ultrasound Department at Moran. He has been the senior instructor in the ocular ultrasound course at the annual AAO meetings and has published numerous articles, book chapters, and two textbooks. Dr. Harrie has made more than 50 humanitarian trips, mostly training doctors in developing countries in diagnostic and therapeutic techniques. He directs the outreach program in examining and giving glasses to residents of the Salt Lake Valley Youth Detention Center.

**SPECIALTY**
- Ophthalmic Ultrasound

Derek J Sakata, MD, is Medical Director of Anesthesia Services at Moran. Dr. Sakata provides and directs anesthesia care for ophthalmic patients before, during, and after surgery. He also has a background in engineering and has been involved in medical device design and subsequent company startups. He continues to be involved in research into new medical device designs and drug delivery.

**SPECIALTY**
- General Anesthesiology
Robert H Corry, OD, specializes in ocular pathology, pediatric and general optometry, and contact lenses.
Redwood Health Center
South Jordan Health Center

Timothy L Gibbons, OD, specializes in comprehensive eye care with special interest in contact lenses, pediatrics, and ocular disease.
Stansbury Health Center
Westridge Health Center

Mark A McKay, OD, specializes in full-scope optometric care, including adult and pediatric care, contact lenses, and job- or hobby-related visual needs.
John A. Moran Eye Center
Redwood Health Center
Westridge Health Center

David Meyer, OD, FAAO, is the Director of Contact Lens Services. He specializes in fitting contact lenses, primarily focusing on keratoconus, post-surgical corneas, pediatrics, irregular or high astigmatism, and fitting traumatized eyes. He also provides comprehensive eye care for glasses and soft contacts.
John A. Moran Eye Center
Midvalley Health Center

Alan Morgan, OD, practices comprehensive optometric eye care with special interest in contact lenses and dry eye management.
Farmington Health Center

Spencer D Mortensen, OD, FAAO, specializes in contact lenses, sports vision, and general optometry.
Westridge Health Center

Clair R Palmer, OD, practices general optometry and specializes in contact lenses.
Parkway Health Center
South Jordan Health Center

Dix H Pettey, OD, MS, specializes in fitting contact lenses for keratoconus, pediatrics, post-surgical, and eyes with severe or irregular astigmatism. He also provides comprehensive eye care for glasses and soft contacts.
Midvalley Health Center
John A. Moran Eye Center

Colleen S Schubach, OD, offers full-scope optometric eye care and contact lens services for all ages. She specializes in vision therapy with emphasis on children and sports vision.
Redstone Health Center

Craig M Smith, OD, specializes in children’s vision, sports vision, contact lenses, and general optometry.
Midvalley Health Center

Bryan H Vincent, OD, specializes in ocular pathology and contact lenses.
Midvalley Health Center
John A. Moran Eye Center
## Moran Eye Center Research Team 2016-2017

### Balamurali K Ambati, MD, PhD, MBA
**Professor, Ophthalmology and Visual Sciences and Adjunct Associate Professor of Neurobiology and Anatomy**
**Specialties**
- Ocular Angiogenesis and Corneal Research

### Alessandra Angelucci, MD, PhD
**Professor, Ophthalmology and Visual Sciences**
**Specialty**
- Visual Cortex Circuitry and Function

### Wolfgang B Baehr, PhD
**Professor and Director of Research; Ralph and Mary Tuck Professor of Ophthalmology and Visual Sciences**
**Specialties**
- Phototransduction, the Retinoid Cycle, and Membrane Protein Transport in Photoreceptors; Photoreceptor Biochemistry; Molecular and Cell Biology

### Paul S Bernstein, MD, PhD
**Director of Clinical Research and Associate Director of Research; Mary H. Boesche Professor of Ophthalmology and Visual Sciences**
**Specialties**
- Vitreoretinal Diseases and Surgery; Retinal Biochemistry; Macular and Retinal Degeneration

### Lara Carroll, PhD
**Research Assistant Professor, Ophthalmology and Visual Sciences**
**Specialties**
- Corneal and Retinal Neovascular Diseases

### Donnell J Creel, PhD
**Research Professor, Ophthalmology and Visual Sciences; Neurobiology and Anatomy; Neuroscience**
**Specialty**
- Electrophysiology

### Margaret DeAngelis, PhD
**Professor, Ophthalmology and Visual Sciences**
**Specialty**
- Multi-Omic and Systems Biology-Based Approaches to Pinpoint Disease Mechanism in AMD, Glaucoma, and Myopia, along with Co-Occurring/Co-Morbid Diseases

### Jeanne M Frederick, PhD
**Research Associate Professor, Ophthalmology and Visual Sciences**
**Specialty**
- Retinal Cell and Molecular Biology

### Gregory S Hageman, PhD
**John A. Moran Presidential Professor, Department of Ophthalmology and Visual Sciences; Executive Director, Sharon Eccles Steele Center for Translational Medicine**
**Specialties**
- The Genetics and Assessment of Pathways Involved in the Etiology of AMD; AMD Target Identification and Therapeutic Development

### Mary Elizabeth Hartnett, MD
**Professor, Ophthalmology and Visual Sciences**
**Specialty**
- Retinal Angiogenesis Relating to ROP and AMD
BUILDING BRIDGES FROM RESEARCH TO PATIENT CARE

Bryan W Jones, PhD
Research Associate Professor, Ophthalmology and Visual Sciences
SPECIALTIES Retinal Degeneration Disorders; Retinal Neurotransmission and Neurocircuitry; Metabolomics; Editor, Webmaster, webvision.med.utah.edu

Bradley J Katz, MD, PhD
Professor, Ophthalmology and Visual Sciences
SPECIALTIES Giant Cell Arteritis; Photophobia and Migraine; Optic Neuritis; Multiple Sclerosis

Helga ET Kolb, PhD
Professor (Emerita), Ophthalmology and Visual Sciences, University of Utah; Doctor Honoris Causa, Universidad Miguel Hernandez de Elche, Spain
SPECIALTIES Retinal Anatomy; Editor, webvision.med.utah.edu

David Križaj, PhD
Professor, Ophthalmology and Visual Sciences; Deputy Director of Research
SPECIALTIES Retinal Neurobiology; Calcium Regulation; Glaucoma

Binxing Li, PhD
Research Assistant Professor, Ophthalmology and Visual Sciences
SPECIALTIES Biochemistry and Biophysics of Macular Carotenoids; Mouse Models of Retinal Disease; Raman Imaging of Nutrients in the Retina

Nick Mamalis, MD
Professor, Ophthalmology and Visual Sciences; Co-Director, Intermountain Ocular Research Center
SPECIALTIES Ocular Pathology; Comprehensive Ophthalmology; Intraocular Lens Research; Postoperative Inflammation

Robert E Marc, PhD
Distinguished Professor of Ophthalmology; Cal and JeNeal Hatch Presidential Endowed Chair in Ophthalmology and Visual Sciences
SPECIALTIES Retinal Neurotransmission and Networks; Retinal Degenerations; Metabolomics

Richard A Normann, PhD
Professor (Emeritus), Ophthalmology and Visual Sciences; Distinguished Professor of Bioengineering, University of Utah; Doctor Honoris Causa, Universidad Miguel Hernandez de Elche, Spain
SPECIALTIES Artificial Vision/Neural Prosthetics

Leah Owen, MD, PhD
Assistant Professor, Ophthalmology and Visual Sciences
SPECIALTY Analysis of Genetic and Genomic Contribution to the Pathophysiology of Complex Pediatric Eye Disease Including Strabismus, Myopia, ROP, and Amblyopia
Laser confocal image of a mouse retina, showing the plane where the retinal ganglion cell axons exit the eye as the optic nerve. The tissue has been fluorescently immunostained to reveal the distribution of retinal ganglion cell axons (purple), glial cells (green), and cell nuclei (cyan).

—Photo Credit Alejandra Bosco, PhD, Research Assistant Professor, Department of Neurobiology and Anatomy, University of Utah
<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Affiliations</th>
<th>Specialties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monica Vetter, PhD</td>
<td>Adjunct Professor, Ophthalmology and Visual Sciences; George and Lorna Winder Professor of Neuroscience; Chair, Neurobiology and Anatomy</td>
<td>Retinal Development; Glaucoma</td>
</tr>
<tr>
<td>Barry Willardson, PhD</td>
<td>Adjunct Professor, Ophthalmology and Visual Sciences; Professor of Mathematics</td>
<td>Modeling of Visual Cortex</td>
</tr>
<tr>
<td>Werner Gellermann, PhD</td>
<td>Adjunct Professor, Ophthalmology and Visual Sciences; Research Professor, Physics</td>
<td>Spectroscopy of Living Human Tissue</td>
</tr>
<tr>
<td>Kristen Kwan, PhD</td>
<td>Assistant Professor, Human Genetics; Adjunct Assistant Professor, Ophthalmology and Visual Sciences</td>
<td>Ocular Development and Morphogenesis</td>
</tr>
<tr>
<td>Lloyd Williams, MD, PhD</td>
<td>Adjunct Research Assistant Professor, Ophthalmology and Visual Sciences</td>
<td>Genetics of Orphan Diseases; International Eye Disease and Population Studies; Cornea</td>
</tr>
<tr>
<td>Barbara M Wirostko, MD</td>
<td>Clinical Adjunct Associate Professor, Ophthalmology and Visual Sciences</td>
<td>Glaucoma; Corneal Wounds; Drug and Device Development</td>
</tr>
<tr>
<td>Paul Bressloff, PhD</td>
<td>Adjunct Professor, Ophthalmology and Visual Sciences</td>
<td>Genetic Epidemiology; AMD</td>
</tr>
<tr>
<td>Karen Curtin, PhD, MStat</td>
<td>Adjunct Professor, Ophthalmology and Visual Sciences, Moran Center for Translational Medicine</td>
<td>Sensory System Development; Retina and Inner Ear</td>
</tr>
<tr>
<td>Michael Deans, PhD</td>
<td>Assistant Professor, Otolaryngology; Adjunct Assistant Professor, Neurobiology and Anatomy</td>
<td>Sensory System Development; Retina and Inner Ear</td>
</tr>
<tr>
<td>Michael Feehan, PhD</td>
<td>Research Professor, Pharmacotherapy; Adjunct Professor, Ophthalmology and Visual Sciences</td>
<td>Psychosocial Impact of Blinding Disease</td>
</tr>
<tr>
<td>Jason Shepherd, PhD</td>
<td>Assistant Professor, Neurobiology and Anatomy; Adjunct Assistant Professor, Ophthalmology and Visual Sciences; Adjunct Assistant Professor, Biochemistry</td>
<td>Visual Cortex Function and Plasticity in vivo; Cellular and Molecular Mechanisms of Learning and Memory; Cell Biology of Synapse</td>
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<td>Research Professor, Pharmacotherapy; Adjunct Professor, Ophthalmology and Visual Sciences</td>
<td>Psychosocial Impact of Blinding Disease</td>
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<td>Werner Gellermann, PhD</td>
<td>Adjunct Professor, Ophthalmology and Visual Sciences; Research Professor, Physics</td>
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<td>Lloyd Williams, MD, PhD</td>
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<td>Clinical Adjunct Associate Professor, Ophthalmology and Visual Sciences</td>
<td>Glaucoma; Corneal Wounds; Drug and Device Development</td>
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H. Raymond and Eugenia H. Weeks
George P. and Adele W. Weiler
Bart L. and Marlene G. Wheelwright
Pauline Wiessner, PhD
Eileen and Terry Wilcox
Kent and Radean C. Wilcox
Robert L. and Deborah H. Wilke
Brandi Williams
Stephen P. and Nancy Z. Williams
David R. and Sharon Wilson
Georgia A. Wilson
Robert W. and Pamela Wing
Katherine Wolcott
Judy Wolfe
Hope H. and William A. Worner
Michael H. Yei and Jill A. Miller
Adam Young
Louise M. and Norman A. Zabriskie, MD

IN MEMORY OF
Those in whose memory gifts were made to the Moran Eye Center from January 1, 2016 through December 31, 2016
Martha Ahrens
Barbara Aikins
Peggy Lynn Aldrich
F. W. Allen
W. Deloy Archibald
Patrick Leland Benson
Kent Bishop
Gerry Blackham
P.D.G. Don Blackham
Rourke H. Bowman
Reed W. Brinton
My brother
Lyman Buhler
Donald W. Cissel
Howard Clements
Julee Orme Cook
Barbara E. Corbitt
Martha Daybell
Richard Candland Dibbee
Gerry Digrazia
Donna J. Dyer
Trent Gardner
Sue Goldsmith
Evadene Gray
Joan Eleanor Gustafson
Larry Hale
Jane Hamblen
Carroll Hansen
Lion Carroll M. Hansen
Lynn S. Haslam
JeNeal Hatch
Lois Horne
Kimberly Howes
Donald Hurst
Jean Hylton
Norman C. Jensen
Madelyn Leonard
Lucille Reid Peterson Lovewell
Jamie Lynn
Jay Macfarlane
Casey Marble
Lynell Martel
Margaret Weber Martinez
IN HONOR OF

Those in whose honor gifts were made to the Moran Eye Center from January 1, 2016 through December 31, 2016

N. Lee Anderson
Karen and David Bachman
William Barlow, MD
Paul S. Bernstein, MD, PhD
Richard Christiansen
Norris Cook
Anne Cowley
Alan Crandall, MD
Alison Crum, MD
LaVerne Diehl
Kathleen Digre, MD
Christine Fairclough
Roger C. Furlong, MD
Jason Groce
Donna Ann Hall
Jim and Gloria Hannon
M.E. Hartnett, MD
Curt and Billie Jo Jones
Gracie Lynn Jones
Bradley Katz, MD
Dr. David R. Lewis
Dr. Kim Corbin-Lewis
Amy Lin, MD
Kirsten Mallik
Mark Mifflin, MD
Moran Nurses and Staff
Randy and Linda Moseman
Valli Muthappan, MD, and
Brent Grover
Randall J Olson, MD
Mathew Parsons, MD
Jeff Petey, MD
Charlie Pieper
Edward Quigley
Marion E. Raish
Chris Reddish
Jonathan Reddish
Patrick Reddish
Heidi Reid
Londa Stout
Cathy Strazza
Peter Swartz, MD
Milo Taylor
Judith Warner, MD
Michael Yei
Norm Zabriskie, MD

PLANNED GIFTS

Those who have planned gifts in place to the Moran Eye Center from January 1, 2016 through December 31, 2016

Karen Bachman
Elmen D. Bloedel
Lyman R. and Jane Brothers
Ms. Laura D. Byrne
Richard A. and Carol M. Fay
Frank and Elaine Fox
Melvin Freeman
William B. Hale
Curtis and Lynne Kennedy
Thomas and Wendy Lacy
Ruth Lieder
Sylvia E. Prahl-Brodbeck
Linda Rankin
Don Reddish
Hazel M. Robertson
Janet Scahap
Daniel Soulia
Sharon Steele-McGee
Susan O. Taylor
Mary E. Thompson
Haru Toimoto

*Deceased

The Moran Eye Center is grateful for the contributions made to support our mission and goals. We have made every effort to ensure that this 2016 Donor Report is as accurate as possible. Should you find an error or wish to change your listing, please contact us at 801-585-9700.
Awards and Appointments

Blue Ridge Institute for Medical Funding ranks Moran Eye Center seventh out of 66 for NIH awards in 2016.

Research to Prevent Blindness Award: Moran Eye Center received a $115,000 Unrestricted Grant from RPB.

Randall J Olson, MD, was awarded the Jan Worst Medal Lecture by the Intra-Ocular Implant Club and delivered his lecture during the Jan Worst Medal Dinner at the annual ASCRS meeting in New Orleans, May 2016. The medal is one of the industry’s most prestigious awards. Olson also received the Humanitarian of the Year Award from the Utah Lions Foundation for greatly influencing the organization, which provides local, national, and international outreach.

Alessandra Angelucci, PhD, received a Brain U01 grant funded by the NIH for “Development of an integrated array for simultaneous optogenetic stimulation and electrical recording to study cortical circuit function in the non-human primate brain.”

Alessandra Angelucci, PhD, was awarded an NIH/NEI R01 competitive renewal “Parallel pathways in visual cortex: Functional connectivity of output pathways from area V1 to area V2.”

Wolfgang B. Baehr, PhD, received a one-year award, “Therapy in a mouse model of Joubert Syndrome,” from the Retina Research Foundation.

Paul S. Bernstein, MD, PhD, received a five-year renewal for a RO1 grant on “Biochemistry and pharmacology of the macular carotenoids.”

Margaret DeAngelis, PhD, received a four-year award, “Identifying epigenetic mechanisms in age-related macular degeneration (AMD),” from the Macular Degeneration Foundation, Inc. DeAngelis and Leah Owen, MD, PhD, received funding from the Carl Marshall Reeves & Mildred Almen Reeves Foundation, Inc. for a pilot study to identify AMD disease mechanisms in exquisitely phenotyped fresh donor eyes, and an NIH Clinical Loan Repayment Program Award.

Mary Elizabeth Hartnett, MD, was named the 2016 recipient of the Paul Henkind Memorial Lecture and Award by the Macula Society, one of the most elite, invitation-only groups in the international retinal field. She was also appointed to serve as a member of the Food and Drug Administration FDA’s Dermatologic and Ophthalmic Drugs Advisory Committee. And Hartnett was awarded a five-year RO1 renewal from NIH/NEI “Endothelial transmigration in neovascular age-related macular degeneration.”

Bryan W. Jones, PhD, received an award for “Aging retina and AMD” from the Carl Marshall Reeves & Mildred Almen Reeves Foundation, Inc.

Leah Owen, MD, PhD, was invited to participate in the University of Utah’s Vice President’s Clinical & Translational Research Scholars Program.

Jason Shepherd, PhD, was awarded the Young Investigator Award from the E. Matilda Ziegler Foundation for the Blind, a three-year grant, and became a Kavli Fellow from the Kavli Foundation, 2016.

Judith E. A. Warner, MD, (PI), Kathleen Digre, MD, and Meg DeAngelis, PhD, have formed an international collaborative network to study the genetic basis of idiopathic intracranial hypertension (IIH): The “Genetic initiative in neuro-ophthalmic conditions.”

Barbara M. Wirostko, MD, was selected to be a member of ARVO’s Members-in-Training Committee. She participated on a poster that received the MIT Outstanding ARVO Award and was selected to participate as a mentor in the ARVO Leadership Development Program for Women pilot program. Wirostko also received a grant from the Glaucoma Foundation for her research utilizing the Utah Population Database to evaluate the risk for major systemic diseases in patients with exfoliation syndrome (XFS) and how XFS impacts morbidity and mortality of those diseases.

Barbara M. Wirostko, MD, and Karen Curtin, PhD, MStat, received a $22,500 pilot award for the “Exfoliation Syndrome Project: Assessment of Associated Co-Morbidities and Identification of High-Risk Families in the UPDB,” from the University of Utah’s Program in Personalized Health and the Center for Clinical and Translational Science.

Jun Yang, PhD, received $50,000 from the Neuroscience Initiative Collaborative Pilot Project for “Understanding usherin, the major protein associated with inherited deaf-blindness,” a project “considered to be very promising and clearly demonstrates collaboration, innovation, and significance.”

ASCRS Awards

Liliana Werner, MD, PhD, and Nick Mamalis, MD, received ASCRS Best-Paper-of-Session Award May 8, 2016, New Orleans, for the “Assessment of a new hydrophilic acrylic supplementary IOL for sulcus fixation in pseudophakic cadaver eyes.” Authors: Nicholas Reiter, MD; Liliana Werner, MD, PhD; Jun Guan, MD; Jack Li, Nick Mamalis, MD, Sathish Srinivasan FRCSEd, FRCOphth, FACS.

Liliana Werner, MD, PhD, received the first prize in the category “Educational” at the Alcon Video Festival, XIV International Congress of Cataract and Refractive Surgery, São Paulo, SP, Brazil, with the video “Werner L, Stover J, Schwiegerling J, Das KK, – A Little Physics” on Intraocular Lens Opacification, 2016.
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Years</th>
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<tbody>
<tr>
<td>Alessandra Angelucci, MD, PhD</td>
<td>Co-chair, Departmental Hiring Committee, Department of Ophthalmology, University of Utah</td>
<td>2016-Present</td>
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<tr>
<td></td>
<td>Elected Standing Panel, NIH Center for Scientific Review Study Section, Mechanisms of Sensory, Perceptual, and Cognitive Processes</td>
<td>2014-Present</td>
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<tr>
<td></td>
<td>Review Editor, <em>Frontiers in Neuroanatomy</em></td>
<td>2008-Present</td>
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<tr>
<td>Wolfgang B Baehr, PhD</td>
<td>Associate Editor, <em>Frontiers in Molecular Neuroscience</em></td>
<td>2015-Present</td>
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<td></td>
<td>Editor, <em>Journal of Ocular Biology, Diseases, and Informatics</em></td>
<td>2013-Present</td>
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<tr>
<td></td>
<td>Senior Editor, <em>Vision Research, Elsevier Science</em></td>
<td>2004-Present</td>
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<tr>
<td>Paul S Bernstein, MD, PhD</td>
<td>Vice President-Elect, Vice President, ARVO</td>
<td>2015-2017</td>
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<td>Guest Editor, <em>Proceedings of the National Academy of Sciences</em></td>
<td>2016-Present</td>
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<td></td>
<td>Board of Trustees, ARVO</td>
<td>2012-Present</td>
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<td></td>
<td>Council Board, International Carotenoid Society</td>
<td>2011-Present</td>
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<td></td>
<td>Scientific Advisory Board, Foundation Fighting Blindness</td>
<td>2005-Present</td>
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<tr>
<td>Alan S Crandall, MD</td>
<td>Chairperson, European Society of Cataract and Refractive Surgery</td>
<td>2015</td>
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<tr>
<td>Karen Curtin, PhD, MStat</td>
<td>Chair, Utah Population Database Development Committee</td>
<td>2015-Present</td>
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<tr>
<td></td>
<td>Associate Editor, <em>BMC Gastroenterology</em>; Editorial Board, <em>Frontiers in Applied Genetic Epidemiology</em></td>
<td>2011-Present</td>
</tr>
<tr>
<td>Margaret DeAngelis, PhD</td>
<td>Editor, <em>Journal of Community Medicine and Health Care; Journal of Ophthalmology and Optometry; Journal of Medicine and Public Health; Journal of Retinal Disorders and Transplantation</em></td>
<td>2016-Present</td>
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<tr>
<td></td>
<td>Reviewing Editor, <em>Frontiers in Molecular Neuroscience</em></td>
<td>2015-Present</td>
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<td></td>
<td>Editor, <em>Journal of Clinical Medicine; Journal of Human Transcriptome; Advances and Applications in Bioinformatics and Chemistry</em></td>
<td>2014-Present</td>
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<tr>
<td></td>
<td>Guest Editor, <em>Journal of Clinical Medicine-Special Issue,</em> “Age-Related Macular Degeneration”</td>
<td>2013-Present</td>
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<td></td>
<td>Editorial Board, <em>BioMed Central Genetics</em></td>
<td>2012-Present</td>
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<tr>
<td>Kathleen B Digre, MD</td>
<td>President-Elect, American Headache Society</td>
<td>2016-2018</td>
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<td></td>
<td>Chair, Moran CORE Committee</td>
<td>2015-Present</td>
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<td></td>
<td>Director, Center of Excellence in Women’s Health; Chair, Neuro-Ophthalmology Virtual Education Library (NOVEL) Oversight Committee</td>
<td>2005-Present</td>
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<tr>
<td>Gregory S Hageman, PhD</td>
<td>Advisory Board, Applied Genetic Technologies Corporation</td>
<td>2013-Present</td>
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<td></td>
<td>Chief Scientific Officer, Co-Founder, Voyant Biotherapeutics LLC; Clinical Advisory Board, Sequenom, Inc.</td>
<td>2012-Present</td>
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<td></td>
<td>Board of Directors, AMD Alliance International; John A. Moran Presidential Professor, Department of Ophthalmology and Visual Sciences, University of Utah School of Medicine</td>
<td>2009-Present</td>
</tr>
</tbody>
</table>
Mary Elizabeth Hartnett, MD

2015-Present  Co-Director, University of Utah, MD-PhD Program
2014-Present  Representative, The University of Utah Promotion and Tenure Advisory Committee, School of Medicine
2012-Present  Editor, American Academy of Pediatric Ophthalmology and Strabismus; Telehealth Steering Committee, University of Utah
2011-Present  Editor, Molecular Vision, Scientific Review
2009-Present  Honorary Editorial Board, Patient Related Outcome Measures, Dove Press; Honorary Editorial Board, Eye and Brain; Editorial Board, Clinical Ophthalmology
2002-Present  Executive Committee and Advisory Board, Women’s Eye Health

Robert O Hoffman, MD

2011-Present  Medical Executive Committee, Primary Children’s Medical Center
2007-Present  Legislative Committee, American Association for Pediatric Ophthalmology and Strabismus
2003-Present  Alumni Board and Executive Committee, Ophthalmology and Visual Sciences, School of Medicine

Rachael S Jacoby, MD

2012-Present  Institutional Review Board, University of Utah

Bryan W Jones, PhD

2015-Present  Editor, Experimental Eye Research; Communications Advisory Board Committee, ISER
2002-Present  Editor/Webmaster, webvision.med.utah.edu

Bradley J Katz, MD, PhD

2007-Present  Medical Director, Utah Eye Care Initiative, University of Utah
2006-Present  Chair, Department of Ophthalmology Committee for Indigent Care

David Krizaj, PhD


Kristen Kwan, PhD

2015-2017  Editorial Board, Developmental Dynamics

Amy Lin, MD

2015-2017  Director-at-Large, Board, Contact Lens Association of Ophthalmologists

Nick Mamalis, MD

2016  Scientific Advisory Board, VisiDome Ltd, Israel
2015-Present  Secretary-Elect, Secretary, Executive Committee and Governing Board, ASCRS; Medical Advisory Board, Ocumetics Technology Corp, Canada
2013-Present  Chairman, Cataract Knowledge Base Panel, AAO
2008-Present  Co-Director, Intermountain Ocular Research Center
2007-Present  Editor, Journal of Cataract and Refractive Surgery
1998-Present  Editorial Board, Review of Ophthalmology

Robert E Marc, PhD

2013-Present  Editorial Board, Journal of Comparative Neurology, Society for Neuroscience

Mark D Mifflin, MD

2015-Present  President-Elect, Utah Ophthalmology Society
2005-Present  Faculty Executive Committee, Ophthalmology and Visual Sciences

Randall J Olson, MD

2015-2016  Advisory Committee, AAO, Preferred Practice Pattern Committee
2014-Present  Advisory Board, AAO; Editorial Advisory Board, EyeNet
2012-Present  Executive Editor, American Journal of Ophthalmology; Editorial Board, Ophthalmologica

Leah Owen, MD, PhD


Bhupendra C K Patel, MD, FRCS

2007-Present  Chief Section Editor, Plastic Surgery, British Journal of Ophthalmology
2006-Present  Chief Section Editor, Plastic Surgery, EYE
<table>
<thead>
<tr>
<th>Name</th>
<th>Academic Position</th>
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<tbody>
<tr>
<td>Jeff Pettey, MD</td>
<td>Chief Coeditor, ORBIT, 2005-Present; Editorial Board, Evidence Based Eye Care, 2002-Present; Editor, USA ORBIT, 2000-Present; Editorial Board, Aesthetique, 1999-Present; Editorial Board, Journal of Cranio-Maxillofacial Trauma, 1996-Present; Medical Advisory Board, American Society of Ocularists, 1991-Present; Editorial Board, Abstracts from the Literature for Ophthalmic, Plastic, and Reconstructive Surgery, 1990-Present</td>
</tr>
<tr>
<td>Jason D Shepherd, PhD</td>
<td>Chief of Ophthalmology, Salt Lake City Veterans Affairs Hospital; Associate Editor, AAO, 2014-Present; Associate Editor, AAO Global Ophthalmology Guide, 2013-Present</td>
</tr>
<tr>
<td>Geoffrey Tabin, MD</td>
<td>Chair, Executive Board, University of Utah Neuroscience Initiative; National Eye Advisory Council, National Eye Institute, National Institutes of Health; Board of Directors and Scientific Advisory Board, Glaucoma Research Foundation, 2014-Present; Chair, Neuroscience Strategic Planning Committee, University of Utah, 2013-Present; Scientific Advisory Board, “Catalyst for a Cure 2,” Glaucoma Research Foundation, 2011-Present</td>
</tr>
<tr>
<td>Monica Vetter, PhD</td>
<td>Chair, Executive Board, University of Utah Neuroscience Initiative; National Eye Advisory Council, National Eye Institute, National Institutes of Health; Board of Directors and Scientific Advisory Board, Glaucoma Research Foundation, 2014-Present; Chair, Neuroscience Strategic Planning Committee, University of Utah, 2013-Present; Scientific Advisory Board, “Catalyst for a Cure 2,” Glaucoma Research Foundation, 2011-Present</td>
</tr>
<tr>
<td>Albert T Vitale, MD</td>
<td>President-Elect, American Uveitis Society, 2015-Present; Co-Director, AAO, Uveitis Sub-Specialty Day, AAO Annual Meeting, 2014-Present; Chairman, Education of Utah Ophthalmology Society, 2012-Present; Faculty Executive Committee, Ophthalmology and Visual Sciences; Editorial Board, Editorial and Writing Committee for Practicing Ophthalmologists, AAO; Editor, Basic Science Course: Intraocular Inflammation, Uveitis, and Tumors for Focal Points, AAO, 2006-Present; Advisory Boards, Genentech, Inc. and Lucentis; Uveitis Advisory Board, Aciont Inc., 2004-Present; Uveitis Advisory Board, Bausch &amp; Lomb, 2003-Present</td>
</tr>
<tr>
<td>Judith E A Warner, MD</td>
<td>Past President-Elect, President, Board of Directors, University of Utah Faculty Club, 2015-2016; Editorial Board, Neuro-Ophthalmology, 2004-Present</td>
</tr>
<tr>
<td>Liliana Werner, MD, PhD</td>
<td>Coeditor, Quarterly Column, “Cataract/IOL Complications: Moran CPC Reports,” EyeWorld International; Editorial Board, Brazilian Journal of Ophthalmology, 2013-Present; Institutional Review Board, University of Utah, 2012-Present; Chair, Continuing Medical Education Advisory Committee, ASCRS, 2011-Present; Scientific Advisory Board, Powervision Inc., USA, 2009-Present; Co-Director, Intermountain Ocular Research Center, John A. Moran Eye Center, University of Utah, 2008-Present; Editorial Board, Journal of Cataract and Refractive Surgery; Editorial Board, EyeWorld Magazine, 2004-Present</td>
</tr>
<tr>
<td>Lloyd Williams, MD, PhD</td>
<td>Director, Himalayan Cataract Project, Zambia; Director, Editorial Board, Global Sight Alliance, 2013-Present; Board Chair and Founder, HelpMercy International, Inc., 2004-Present</td>
</tr>
<tr>
<td>Barbara M Wirostko, MD</td>
<td>Scientific Advisory Board, Glaucoma Foundation, 2015-Present; Chief Medical Officer Retained Consultant, Altheos, Inc.; Executive Team, Lead Clinical Development Program and Glaucoma Strategy, Novel Rho Kinase Inhibitor, Currently in Phase 2; Medical Advisory Board, Ophthalmology Consultant, Premier Research LTD, 2011-Present; Editorial Board, Acta Ophthalmologica, 2010-Present; Associate Editor, Acta Ophthalmologica, 2007-Present</td>
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<td>DATE</td>
<td>PRESENTER</td>
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<tr>
<td>January 6</td>
<td>Rene Choi, MD, PhD, Resident</td>
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<td></td>
<td>Gurjeet Singh, MD, Neurology Resident</td>
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<tr>
<td>January 13</td>
<td>John Welling, MD, International Fellow</td>
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<tr>
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<td>Gurjeet Singh, MD, Neurology Resident</td>
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<tr>
<td>January 20</td>
<td>Julia Byrd, MD, Resident</td>
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<tr>
<td>January 27</td>
<td>Bhupendra C. K. Patel, MD, FRCS, Faculty</td>
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<tr>
<td>February 11</td>
<td>Eileen Hwang, MD, PhD, Resident</td>
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<td>Daniel Abenroth, MD</td>
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<tr>
<td>February 17</td>
<td>Laura Hanson, MD</td>
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<td>February 24</td>
<td>Marielle Young, MD, Faculty</td>
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<tr>
<td>March 2</td>
<td>Kristen Chapman, MD, Glaucoma Fellow</td>
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<tr>
<td>March 9</td>
<td>Russell Swan, MD, Chief Resident</td>
</tr>
<tr>
<td>March 16</td>
<td>Steven Tsang, PhD, Laslo A. Bito, Associate Professor of Ophthalmology, Professor of Pathology and Cell Biology, Columbia University</td>
</tr>
<tr>
<td>March 23</td>
<td>Albert T. Vitale, MD, Faculty</td>
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<tr>
<td>April 6</td>
<td>David Copenhagen, PhD, Professor, Department of Ophthalmology and Physiology, Center for Integrated Neuroscience, University of California San Francisco</td>
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<tr>
<td>April 13</td>
<td>Neuro-Ophthalmology Team</td>
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<tr>
<td>April 20</td>
<td>Brittanay Coats, PhD, Assistant Professor, Department of Mechanical Engineering, University of Utah</td>
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<tr>
<td>April 27</td>
<td>Jeff R. Botkin, MD, MPH, Professor of Pediatric and Medical Ethics, University of Utah; Barbara M. Wirostko, MD, Faculty</td>
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<tr>
<td>May 11</td>
<td>Vladimir Kefalov, PhD, Professor of Ophthalmology and Visual Sciences, Washington University in St. Louis</td>
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<tr>
<td>May 18</td>
<td>Chris Conrady, MD, Resident</td>
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<td>Ricky Chen, MD, Neurology Resident</td>
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<tr>
<td>May 25</td>
<td>Reece Feist, MD, Resident</td>
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<td>Hreem Patel, MD, Glaucoma Fellow</td>
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<tr>
<td>June 1</td>
<td>Ninel Gregori, MD, Associate Professor of Clinical Ophthalmology Vitreoretinal Diseases and Surgery, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine; Chief of Eye Care Section, Miami VA Medical Center</td>
</tr>
<tr>
<td>June 8</td>
<td>Christine A. Curcio, PhD, Professor, University of Alabama at Birmingham</td>
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<tr>
<td>June 15</td>
<td>Paul S. Bernstein, MD, PhD, Faculty</td>
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<td>PRESENTER</td>
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<tr>
<td>July 20</td>
<td>Cole Gross, MSIV, University of Nevada</td>
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<td>Jeffery Kartchner, MSIV, University of Nevada</td>
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<td>Tyler Quist, MSIV, University of Utah</td>
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<td>July 27</td>
<td>Michael Simmons, MSIV, University of Arizona</td>
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<td>Jed Assam, MSIV, University of North Dakota</td>
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<td>Chris Bair, MSIV, University of Utah</td>
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<td>July 29</td>
<td>Amy Lin, MD, Faculty</td>
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<td>August 10</td>
<td>Kenneth Price, MSIV, New York University</td>
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<td>Jamie Odden, MSIV, University of North Dakota</td>
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<td>Eric Weldy, MSIV, University of Tennessee</td>
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<td>Sherief Raouf, MSIV, Stony Brook University</td>
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<td>August 17</td>
<td>Jeff Pettey, MD, Faculty</td>
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<td>Jennifer Hranilovich, PGY4, Pediatric Neurology, PCMC</td>
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<td>Kathleen B. Digre, MD, Faculty</td>
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<td>August 31</td>
<td>Mark D. Mifflin, MD, Faculty; Brent Betts, MD, Cornea Fellow</td>
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<td>Severin Pouly, MD, Cornea Fellow</td>
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<tr>
<td>September 7</td>
<td>Joseph Cotto, MD, PhD, Associate Professor of Pathology and Immunology, Washington University School of Medicine, St. Louis</td>
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<td>September 14</td>
<td>Daniel Agraz, MSIV, University of Nebraska</td>
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<td>Eliza Barnwell, MSIV, University of South Carolina</td>
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<td>Brent Kramer, MSIV, University of Iowa</td>
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<td>Don McCorquodale, PGY4, Neuro</td>
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<td>September 16</td>
<td>Tyler Anderson, MSIV, Virginia Commonwealth University</td>
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<td>Gaytri Elera, MSIV, Penn State University</td>
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<td>Blake Williams, MSIV, University of Chicago</td>
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<td>Sai Bhuvangiri, MSIV, St. George University</td>
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<td>Presenter</td>
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<tr>
<td>September 21</td>
<td>Jason Nguyen, MD, Ocular Pathology and Research Fellow</td>
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<td>Joah Aliancy, MD, Ocular Pathology and Research Fellow</td>
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<td>Jack Li, MSIV, Texas A&amp;M</td>
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<td></td>
<td>Andrea Blitzer, MD, Postdoctoral Research Fellow</td>
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<tr>
<td>September 28</td>
<td>Charles Weber, MD</td>
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<td>Joah Aliancy, MD, Ocular Pathology and Research Fellow</td>
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<tr>
<td>October 5</td>
<td>Rob Davies, PhD, Licensed Psychologist, Graduate Medical Education Wellness Director, University of Utah</td>
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<tr>
<td>October 12</td>
<td>Brent Betts, MD, Cornea Fellow</td>
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<tr>
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<td>Reese Feist, MD, Resident</td>
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<td>Michael Burrow, MD, PGY1</td>
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<tr>
<td>October 19</td>
<td>Rando Allikmets, PhD, William and Donna Acquavella Professor of Ophthalmic Sciences Research Director, Edward S. Harkness Eye Institute</td>
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<tr>
<td>October 26</td>
<td>Laura Hanson, MD</td>
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<td>Nikko Ronquillo, MD, PhD, Resident</td>
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<td></td>
<td>Anastasia Neufeld, MD, Neuro-Ophthalmology Fellow</td>
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<tr>
<td>November 9</td>
<td>Ron Pelton, MD, PhD, AAO</td>
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<tr>
<td>November 16</td>
<td>Claude F. Burgoyne, MD, Senior Scientist and Research Director, Legacy Research Institute, Devers Eye Institute</td>
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<tr>
<td>November 30</td>
<td>Bhupendra C. K. Patel, MD, FRCS, Faculty</td>
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<tr>
<td>December 7</td>
<td>Evan Joyce, MD, MS, Neurosurgery Resident</td>
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<td>Aatman Shah, MD, Neurosurgery Resident</td>
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<td>Kristin Mitrovich, MD, Neurology Resident</td>
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<tr>
<td>December 14</td>
<td>Severin Pouly, MD, Cornea Fellow</td>
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<td>Brent Betts, MD, Cornea Fellow</td>
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<td>Julia Byrd, MD, Chief Resident</td>
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<td>Brian E. Zaugg, MD, Faculty</td>
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<tr>
<td>National and International Presentations 2016</td>
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<tr>
<td><strong>Alessandra Angelucci, MD, PhD</strong></td>
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<tr>
<td>Distinguished Seminar Series, Department of Biological Sciences.</td>
<td>Suny, NY</td>
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<tr>
<td>Distinguished Seminar Series, Department of Ophthalmology, University of Pittsburgh.</td>
<td>Pittsburgh, PA</td>
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<tr>
<td><strong>Wolfgang B Baehr, PhD</strong></td>
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<tr>
<td>Paper Presentation, Trafficking of Transducin-a by UNC119A/B and ARL3GTP Dependent Diffusion. Wolfgang Baehr, Cecilia D. Gerstner, Christin Hanke-Gogokha, Guoxun Ying, Jeanne M. Frederick.</td>
<td>Seattle, WA</td>
</tr>
<tr>
<td>Arf-like Protein 3 (ARL3) and ARL3-GEF, ARL3b, Regulate Assembly of the Mouse Photoreceptor Transition Zone. Christin Hanke-Gogokha, Jeanne M. Frederick, Houbin Zhang, Wolfgang Baehr.</td>
<td>Kyoto, Japan</td>
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<tr>
<td>Invited Speaker, Membrane Protein Transport in Photoreceptors: Peripheral Proteins. Jules Stein Eye Institute.</td>
<td>Los Angeles, CA</td>
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<tr>
<td>Poster Presentation, Christin Hanke-Gogokha and Wolfgang Baehr. The Function of ARL3, Pro Retina Meeting. Christin Hanke-Gogokha, Thesis Defense, University of Potsdam, Germany.</td>
<td>Potsdam, Germany</td>
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<tr>
<td><strong>Paul S Bernstein, MD, PhD</strong></td>
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<tr>
<td><strong>Poster Session, Scholl HP, Shah SM, Kay CN, Tsang, Stepen KE, Bernstein PS, Lam BL, Gorin MTEASE: A Phase 2 Clinical Trial Assessing the Tolerability and Effects of Oral Once-a-Day ALK-001 on Stargardt Disease, ARVO.</strong></td>
<td>Denver, CO</td>
</tr>
<tr>
<td><strong>Lutein, Zeaxanthin, and Meso-Zeaxanthin: Retina International World Congress. Lutein, Zeaxanthin, and Meso-Zeaxanthin: The Basic and Clinical Science Underlying Carotenoid-Based Nutritional Interventions against Ocular Disease. Retina International World Congress.</strong></td>
<td>Taipei, Taiwan</td>
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<tr>
<td><strong>Lara Carroll, PhD</strong></td>
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<td><strong>Craig J Chaya, MD</strong></td>
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<tr>
<td>Malpositioned Lenses - Techniques of Surgical Management. Course: IC-14 Management of Co-existing Cataract and Glaucoma: Surgical Challenges. The Future of Cataract Surgery: Experience and Results, ESCR.</td>
<td>Vienna, Austria</td>
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<tr>
<td>The ABCs of CTRs. Hard Lenses with Loose Zonules in PKE Case Presentation. ASCRS. 2010 Winter Update.</td>
<td>Playa del Carmen, Mexico</td>
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<td>Name</td>
<td>Title and Details</td>
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<tr>
<td>Margaret DeAngelis, PhD</td>
<td>Genetics of AMD in Genesics of Multifactorial Diseases. Moderator, The Aging Transcriptome in Health and Disease of the Retina in Mouse to Human: Modeling AMD. ISER.</td>
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<tr>
<td>Boston, MA</td>
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<tr>
<td>Michael Deans, PhD</td>
<td>Genome-wide Analysis of Allele-Specific Expression in Human Donor Eyes. Faculty, Medical Retina Diseases and Epidemiology. Medical Retina and Epidemiology Seminar, 50th Zhongshan Ophthalmic Center Hospital Anniversary.</td>
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<tr>
<td>Guangzhou, China</td>
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<tr>
<td>Kathleen B Digre, MD</td>
<td>The Retina Society Annual Meeting.</td>
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<td>Austin, TX</td>
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<td>New Orleans, LA</td>
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<tr>
<td>Michael Feehan, PhD</td>
<td>Invited Speaker, Toward a Refined Understanding of AMD-associated Pathways: Diagnostic and Therapeutic Implications. Syncona and MeiraGTx.</td>
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<tr>
<td>Baltimore, MD</td>
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<tr>
<td>Mary Elizabeth Hartnett, MD</td>
<td>Studying Effects of Intrauterine Growth Restriction on ROP with Rodent Models. ISER.</td>
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<tr>
<td>Tokyo, Japan</td>
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<tr>
<td>Donnell J Creel, PhD</td>
<td>Retinal Electrophysiology, International Retina Conference.</td>
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<tr>
<td>Guangzhou, China</td>
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<tr>
<td>Margaret DeAngelis, PhD</td>
<td>Epigenetics and Human Disease in Epigenetic and miRNA Regulation in Normal and Diseased Retina. Moderator and Faculty. ARVO.</td>
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<tr>
<td>Seattle, WA</td>
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<td>Event</td>
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<td>Hickum's Dictum. AUS Uveitis Sub-Specialty Day, AAO. Chicago, IL</td>
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<tr>
<td>Ocular TB. 22nd Annual Corners TB and HIV Conference. Flagstaff, AZ</td>
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<td>Akbar Shakoor, MD</td>
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<td>Oculoplastic Association of India Meeting.</td>
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<td>The Fat Nose Syndrome. Recognition of a New Syndrome, Diagnosis and Management. A New Grading System for the Bell’s Phenomenon. 47th Annual Fall Symposium, American Society of Ophthalmic Plastic Surgeons.</td>
<td>Chicago, IL</td>
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<td>Jeff Petey, MD</td>
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<td>Femto Basics. AAO/ASCME Summit.</td>
<td>India</td>
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<td>Graduation Commencement. MD Camp. Ohio State University.</td>
<td>Columbus, OH</td>
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<tr>
<td>Cataract Surgery in the Developing World. CORE Central.</td>
<td>Chicago, IL</td>
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<tr>
<td>Role of Outreach in Medical Education. Grand Rounds. Henry Ford Hospital.</td>
<td>Detroit, MI</td>
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<td>Leah Owen, MD, PhD</td>
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<tr>
<td>Owen LA, Morrison MA, Yoder B, DeAngelis MM. A Predictive Model of Retinopathy of Prematurity Risk and Severity. ARVO.</td>
<td>Seattle, WA</td>
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<tr>
<td>Bhupendra C K Patel, MD, FRCS</td>
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<td>The Fat Nose Syndrome. Recognition of a New Syndrome, Diagnosis and Management. A New Grading System for the Bell’s Phenomenon. 47th Annual Fall Symposium, American Society of Ophthalmic Plastic Surgeons.</td>
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<tr>
<td>Jason Shepherd, PhD</td>
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<tr>
<td>Seminar Series, Department of Pharmacology, University of Colorado Medical School.</td>
<td>Denver, CO</td>
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<tr>
<td>Center for the Neurobiology of Learning and Memory, University of California – Irvine.</td>
<td>Orange County, CA</td>
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<tr>
<td>Kavil Frontiers in Science Symposium, National Academy of Sciences.</td>
<td>Newport, CA</td>
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<tr>
<td>Department of Molecular and Cellular Physiology, Stanford University.</td>
<td>Stanford, CA</td>
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<td>Michael P Teske, MD</td>
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<td>Monica Vetter, PhD</td>
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<tr>
<td>Invited Speaker, Transcriptional Control of Retinal Identity. ISER.</td>
<td>Tokyo, Japan</td>
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<td>Albert T Vitale, MD</td>
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<tr>
<td>General Principles, Epidemiology, Classification, Diagnostic Approach, and Treatment of Uveits Learning Objectives. University of Ottawa annual Ophthalmology and Optometry Dinner.</td>
<td>Ottawa, Ontario, Canada</td>
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<tr>
<td>Medical and Surgical Therapy and the Diagnosis of Uveits. AAO.</td>
<td>Chicago, IL</td>
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<tr>
<td>Diagnostic and Therapeutic Vitreoretinal Surgery in the Management of Uveits. New England Eye Center, Tufts Medical Center.</td>
<td>Boston, MA</td>
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<td>Liliana Werner, MD, PhD</td>
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<tr>
<td>Annual Meeting of the Italian Association of Cataract and Refractive Surgery, AICCCER.</td>
<td>Rome, Italy</td>
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<td>XXXIV Congress of ESCRS.</td>
<td>Copenhagen, Denmark</td>
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<td>Crystalline Lens. Basic and Clinical Aspects.</td>
<td>Wakayama, Japan</td>
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<td>120th Annual Meeting of the Japanese Ophthalmological Society.</td>
<td>Sendai, Japan</td>
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<tr>
<td>XIV International Congress of Cataract and Refractive Surgery.</td>
<td>Sao Paulo, Brazil</td>
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<td>ASCRS.</td>
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<td>Barbara M Wirostko, MD</td>
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<td>Insights into Associated Systemic Diseases Using the Utah Population Database. 23 Annual Think Tank, The Glaucoma Foundation.</td>
<td>New York, NY</td>
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<tr>
<td>Cataract</td>
<td>Glaucoma</td>
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| Accuracy of the Holladay Two Formula Using Lenstar Biometry  
*Pl: William Barlow, MD*  
Assessment of the Patient Experience during Sequential Bilateral Cataract Surgery  
*Pl: Craig J Chaya, MD*  
Clinical Study of the ARTISAN® Aphakia Lens for the Correction of Aphakia in Adults  
*Pl: Alan S Crandall, MD*  
Clinical Study of the ARTISAN® Aphakia Lens for the Correction of Aphakia in Children  
*Pl: Alan S Crandall, MD*  
Tear Film Osmolarity and Matrix Metalloproteinase-9 (MMP-9) Levels after Cataract Surgery  
*Pl: Amy Lin, MD*  
Pediatric Cataract Surgery Outcomes Registry  
*Pl: Marielle Young, MD*  |
| Multi-Center Retrospective Review of Gonioscopy-Assisted Transluminal Trabeculotomy  
*Pl: Craig J Chaya, MD*  
The Safety and Effectiveness of the Hydrus Aqueous Implant for Lowering Intraocular Pressure in Glaucoma Patients Undergoing Cataract Surgery, a Prospective, Multicenter, Randomized, Controlled Clinical Trial: Hydrus Four Study  
*Pl: Alan S Crandall, MD*  
Pseudoexfoliation and Co-Morbidities  
*Pl: Barbara M Wirostko, MD*  |
| Effect of Corneal Preservation Time on Long-Term Graft Success (CPTS)  
*Pl: Mark D Mifflin, MD*  
Biomechanical Changes in the Cornea after Laser-Assisted in situ Keratomileusis and Photorefractive Keratectomy  
*Pl: Mark D Mifflin, MD*  
Comparison of Corneal Biomechanical and Nerve Properties between Eyes of Patients Who Have Undergone Unilateral Refractive Surgery  
*Pl: Mark D Mifflin, MD*  
70 Versus 110 Degrees Side-Cut Angles in Femtosecond Laser-Assisted in situ Keratomileusis  
*Pl: Mark D Mifflin, MD*  
Efficacy and Safety of Loteprednol 0.5% Gel for Routine Prophylaxis after Photorefractive Keratectomy Compared to Prednisolone Acetate 1% Suspension and Fluorometholone 0.1% Suspension  
*Pl: Mark D Mifflin, MD*  
Survey of Post-Operative Pain in Photorefractive Keratectomy when Using Topical Versus Oral Non-Steroidal Anti-Inflammatory Drugs  
*Pl: Mark D Mifflin, MD*  |
| Prospective Assessment of Photophobia in Moran Eye Center Patients  
*Pl: Kathleen B Digre, MD*  
Evaluation of Optic Neuropathies with Imaging  
*Pl: Kathleen B Digre, MD*  
Retrospective Review of Primary and Secondary Causes of Pseudotumor Cerebri  
*Pl: Kathleen B Digre, MD*  
Visual Quality-of-Life Migraine Study  
*Pl: Kathleen B Digre, MD*  |
| Causes of Eye Pain  
*Pl: Kathleen B Digre, MD*  
Proteomics and Genomics of Giant Cell Arteritis: The Role of Hepcidin in the Pathogenesis of Giant Cell Arteritis; the Function of Hepcidin in Giant Cell Arteritis  
*Pl: Bradley J Katz, MD, PhD*  
Predictive Value of Optic Nerve MRI Measurements at Onset of Optic Neuritis for Two-Year MS Outcomes: “Form & Function”  
*Pl: Bradley J Katz, MD, PhD*  
Thin Film Spectacle Coatings to Reduce Light Sensitivity and Headaches in Patients with Migraine  
*Pl: Bradley J Katz, MD, PhD*  |
| National Ophthalmic Genotyping Network, Stage 1 - Creation of Repository for Inherited Ophthalmic Diseases  
*Pl: Paul S Bernstein, MD, PhD*  
Rapid Assessment of Avoidable Blindness  
*Pl: Craig J Chaya, MD*  |
| Genetic Initiative in Neuro-Ophthalmic Conditions - Idiopathic Intracranial Hypertension  
*Pl: Judith E A Warner, MD*  |
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<tr>
<th>PEDIATRIC OPHTHALMOLOGY</th>
<th>RETINA</th>
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<tbody>
<tr>
<td>Genetic Associations in Preterm Infants at Risk of ROP</td>
<td>Clinical Interventions against Stargardt Macular Dystrophy: DHA Supplementation in Patients with STGD3</td>
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<tr>
<td>PI: Mary Elizabeth Hartnett, MD</td>
<td>PI: Paul S Bernstein, MD, PhD</td>
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<tr>
<td>Preeclampsia and ROP</td>
<td>Natural History Observation and Registry Study of Macular Telangiectasia Type Two: The MacTel Study</td>
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<tr>
<td>PI: Mary Elizabeth Hartnett, MD</td>
<td>PI: Paul S Bernstein, MD, PhD</td>
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<tr>
<td>Growth and ROP Registry</td>
<td>Value of Genetic Counseling and Testing for Patients Who Would Like to Know More about Their Personal Risk of AMD</td>
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<td>PI: Robert O Hoffman, MD</td>
<td>PI: Paul S Bernstein, MD, PhD</td>
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<tr>
<td>Analysis of Genetic Variant and Treatment-Based Variations in Infants at Risk for ROP</td>
<td>The Natural History of the Progression of Atrophy Secondary to Stargardt Disease: A Retrospective Longitudinal Observational Study: the PROGSTAR Study</td>
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<tr>
<td>PI: Leah Owen, MD, PhD</td>
<td>PI: Paul S Bernstein, MD, PhD</td>
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<tr>
<td>Clinical and Molecular Relationship between Maternal Preeclampsia and ROP</td>
<td>Utah Center for MacTel Genetics: A Sub-Study of Subjects Enrolled in “The Macular Telangiectasia Project” at the University of Utah</td>
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<tr>
<td>PI: Leah Owen, MD, PhD</td>
<td>PI: Paul S Bernstein, MD, PhD</td>
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<td>RETINA</td>
<td>A Phase Three Randomized, Double-Masked, Controlled Trial to Establish the Safety and Efficacy of Intravitreous Administration of Fovistatm (Anti PDGF-B Pegylated Aptamer) in Combination with Lucentis® Compared to Lucentis® Monotherapy in Subjects with Neovascular AMD</td>
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<td>Macular Pigment Measurements in Eye and Other Tissues</td>
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<td>PI: Paul S Bernstein, MD, PhD</td>
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<td>Growth Factors in Vitreoretinal Diseases</td>
<td>A Phase Two Multicenter, Double-Masked, Randomized, Placebo-Controlled Study to Investigate the Long-Term Safety, Tolerability, Pharmacokinetics, and Effects of ALK-001 on the Progression of Stargardt Disease</td>
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<td>Safety and Efficacy of Abicipar Pegol (AGN-150998) in Patients with Neovascular AMD</td>
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<td>Growth and ROP Registry</td>
<td>A Phase Two Multicenter, Double-Masked, Randomized, Single-Masked, Sham-Controlled Study of Safety, Tolerability, and Evidence of Activity of Intravitreal APL-2 Therapy in Patients with Geographic Atrophy</td>
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**New Enrollment Post-Approval Study of the Argus® II Retinal Prosthesis System**

**PI: Paul S Bernstein, MD, PhD**

**Growth Factors in Vitreoretinal Diseases**

**PI: Mary Elizabeth Hartnett, MD**

**ROP1 - Phase One Trial of Bevacizumab Treatment for Severe ROP**

**PI: Mary Elizabeth Hartnett, MD**

**RAINBOW Study: A Randomized, Controlled Study Evaluating the Efficacy and Safety of Ranibizumab Compared with Laser Therapy for the Treatment of Infants Born Prematurely with ROP**

**PI: Mary Elizabeth Hartnett, MD**

**Genetics of Pediatric Retinal Disorders**

**PI: Mary Elizabeth Hartnett, MD**

**Spectral Domain Optical Coherence Tomography Imaging of Eyes: A Practical Diagnostic Tool and Methodology**

**PI: Mary Elizabeth Hartnett, MD**

**A Phase Three, Double-Masked, Randomized Study of the Efficacy and Safety of Intravitreal Aflibercept Injection in Patients with Moderately Severe to Severe Nonproliferative Diabetic Retinopathy**

**PI: Rachael Jacoby, MD**

**A Prospective Multicenter Post-Approval Study of VisionCare’s Implantable Miniature Telescope (by Dr. Isaac Lipshitz) in Patients with Bilateral Severe to Profound Central Vision Impairment Associated with End-Stage AMD**

**PI: Mark D Mifflin, MD**

**Phase Four Safety Study of IOP Signals in Patients Treated with ILU-VIEN (Fluocinolone Acetonide Intravitreal Implant)**

**PI: Akbar Shakoor, MD**

**Regeneron 1417A Phase Two, Double-Masked, Randomized, Controlled, Multiple-Dose, Regimen-Ranging Study of the Efficacy and Safety of Intravitreal REGN2176-3 in Patients with Neovascular AMD**

**PI: Michael P Teske, MD**

**UVEITIS**

**A Multicenter Open-Label Study of the Long-Term Safety and Efficacy of the Human Anti-TNF Monoclonal Antibody Adalimumab in Subjects with Non-Infectious Intermediate-, Posterior-, or Pan-Uveitis**

**PI: Albert T Vitale, MD**

**Standardization of Uveitis Nomenclature Working Group**

**PI: Albert T Vitale, MD**

**Long-Term Follow-Up of Patients Participating in the Multicenter Uveitis Steroid Treatment Trial: MUST Trial Follow-Up Study**

**PI: Albert T Vitale, MD**

**Periocular and Intravitreal Corticosteroids for Uveitic Macular Edema: POINT Trial**

**PI: Albert T Vitale, MD**

**Macular Edema Ranibizumab v. Intravitreal Anti-Inflammatory Therapy: MERIT Trial**

**PI: Albert T Vitale, MD**
<table>
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<tr>
<th>Gregory S Hageman, PhD, is the John A. Moran Presidential Professor, Department of Ophthalmology and Visual Sciences; executive director, Sharon Eccles Steele Center for Translational Medicine, specializing in the genetics and assessment of pathways involved in the etiology of age-related macular degeneration and retinal cell biology.</th>
<th>Variants in Complement Regulatory Genes Predict AMD (Factor B), Allikmets RA, Hageman GS, Dean MC, and Gold AM. United States 9,063,139 (issued 23-June-2105) (2421US); Europe 07750527.9 (allowed; not yet published) (2420EP).</th>
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<tr>
<td>Methods for Determining a Human Subject’s Propensity to Develop an Abdominal Aortic Aneurysm, Hageman GS. Israel 196319 (granted 29-March-2016; not yet issued) (2120IL).</td>
<td>Bradley J Katz, MD, PhD, founder and CEO of Axon Optics, axonoptics.com, joined with Tecport Optics to develop a ground-breaking optical interference filter coating process for plastic spectacle lenses. The process blocks the specific wavelengths of light that have been implicated as the cause of photophobic symptoms, particularly those associated with triggering and exacerbating debilitating migraine headaches. The University of Utah has registered the existing proprietary property.</td>
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<tr>
<td>Predicting AMD with SNPs within or near C2, FACTOR B, PLEAKHA1, HETRA1, PRELP, or LOC387715, Hageman GS. Canada 2,704,447 (condition for allowance; not yet issued) (2220CA).</td>
<td>David Krizaj, PhD, is an inventor of a novel method for treatment of glaucoma and other ocular diseases associated with abnormal mechanical environment within the eye. The method has been validated in animal models and has the potential for a wide impact on clinical care, as there are currently no treatments that regulate intraocular pressure and protect retinal ganglion neurons in glaucoma.</td>
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<td>Asha Vision, LLC, Founder and CEO. Sharon Eccles Steele Center for Translational Medicine, University of Utah, member.</td>
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Salcantay Vision Solutions, LLC, CEO.  
Entrepreneurial Faculty Scholars, University of Utah, member.  

Epilepsy Treatment Using Novel Ion Channel Targets. **Hold For More Data from Inventor.**

Compounds with TRPV4 Activity, Compositions and Associated Methods Thereof. **Patent Filed.**

Role of TRPV4 Antagonists in Ocular Disease. **Patent Pending:** 00846-US501, Krizaj D, Ryskamp DA, Barabas P.

Mechanosensory Channel Antagonists in Glaucomatous Neuroprotection. **Patent Pending:** 00846-US01, D Krizaj, P Barabas, Y Xu, G Prestwich, DA Ryskamp.

**Randall J Olson, MD,**
is the chair of the Department of Ophthalmology and Visual Sciences and CEO of the John A. Moran Eye Center. He specializes in research dealing with intraocular lens and cataract surgery.

A Safer Knife Blade. **Patent Licensed, Exclusive.**


A Vision Correction System to Minimize Intraocular Lens Rotation. **Patent Pending.**


**Derek J Sakata, MD,**
is medical director for Anesthesia Services at Moran. He provides and directs anesthesia care for ophthalmic patients before, during, and after surgery. He is also involved in research into new medical device designs and drug delivery and is involved in subsequent company startups.


**Imag1 Eyes Magnetics.** **Patent: United States** 20130231520, Cherian G, Sakata D.

**Ning Tian, PhD,**
specializes in retinal neurobiology.

**Dual Imaging Chamber.** **Patent Released to Inventor:** Ning Tian, PhD, and Brent Young.

**Larry Wheeler, PhD,**
specializes in ophthalmic drug discovery and development, age-related macular degeneration, pharmacology of glaucoma, and dry eye and neuroprotection.


Sustained Release Intracocular Implants and Methods for Preventing Retinal Dysfunction. **Patent Issued:** **United States** 9,144,543. Huang GT, Burke JA, Hughes PM, Zhang KM, Lin T, Wheeler LA.

Sustained Release Intracocular Implants and Methods for Treating Ocular Vasculopathies. **Patent Issued:** **United States** No 9,161,938. Huang GT, Jackson B, Burke JA, Lin T, Hughes PM, Wheeler LA, Donn RS.

**Barbara M Wirostko, MD,**
is co-founder and chief scientific officer of Jade Therapeutics Inc.—a drug development company focusing on developing sustained delivery drugs and products via a novel propriety cross-linked hyaluronic acid polymer for ophthalmic areas of high unmet need—now a wholly owned subsidiary of EyeGate Pharmaceuticals, Inc. (NASDAQ:EYEG). Dr. Wirostko has taken on the role of chief medical officer of EyeGate, and the lab will remain in Salt Lake City.


<table>
<thead>
<tr>
<th>PUBLISHED RESEARCH</th>
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<tr>
<td>A sample of more than 100 published and presented materials by Moran faculty members between January 1 and December 31, 2016</td>
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<th>Acta Crystallographica. Section F Structural Biology Communications</th>
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<th>BJM Case Reports</th>
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<tr>
<td>Li HJ, Tsaoouidis KT, Tabin GC. Scleral fixation of a posterior chamber intraocular lens combined with penetrating keratoplasty in an aphakic patient with microcornea and microphthalmia. BMJ Case Rep.</td>
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| Olson RJ. Has the time come for all to routinely use intracameral antibiotic prophylaxis at the time of cataract surgery? Am J Ophthalmol. Jun;166:xii-xiv. |


| Li HJ, Tsaoouidis KT, Tabin GC. Scleral fixation of a posterior chamber intraocular lens combined with penetrating keratoplasty in an aphakic patient with microcornea and microphthalmia. BMJ Case Rep. |
Brain


British Journal of Ophthalmology


Canadian Journal of Ophthalmology


Case Reports in Ophthalmology


Channels


Child’s Nervous System


Clinical and Experimental Ophthalmology


Clinical and Experimental Optometry


Current Eye Research


Developmental Biology

Bryan CD, Chien CB, Kwan KM. Loss of laminin alpha 1 results in multiple structural defects and divergent effects on adhesion during vertebrate optic cup morphogenesis. Dev Biol. 416(2), 324-37.

European Journal of Ophthalmology


Experimental Eye Research


Merriman DK, Sajdak BS, Li HJ, Jones BW. Seasonal and post-trauma remodeling in cone-dominant ground squirrel retina. Exp Eye Res. Sep;150:90-105.


Eye and Brain


Eye and Vision (London)


Eye (London)


EyeNet

Crandall AS. A sinking feeling about multifocal IOLs. EyeNet. 20(2), 63.

The FASEB Journal


Frontiers in Cellular Neuroscience


Frontiers in Neuroscience


Generations

### Healthcare Technology Letters


### Health Communication


### Human Molecular Genetics


### Internal Journal of Pharmacy Practice


### International Ophthalmology


### Intraocular Lens Surgery

Mamalis N, MacLean KD. IOL dysphotopsias. *Intraocular Lens Surgery.* 107-111.

### Investigative Ophthalmology and Visual Sciences


### JAMA Ophthalmology


### The Journal of Biological Chemistry


### Journal of Cataract and Refractive Surgery


Journal of Clinical and Experimental Ophthalmology


Journal of Clinical Medicine


Journal of Clinical Neuroscience


Journal of Clinical Rheumatology


Journal of Comparative Neurology


Journal of Experimental Neuroscience


Journal of Glaucoma


The Journal of Headache and Pain


Journal of Healthcare Risk Management


The Journal of Lipid Research


Journal of Neurological Sciences


Journal of Neuro-Ophthalmology


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Yarch J, Federer F, Angelucci A. Local circuits of V1 layer 4b neurons projecting to V2 thick stripes define distinct cell classes and avoid cytochrome oxidase blobs. J Neurosci. 37:422-436.


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Journal of Ophthalmology


Journal of Patient Safety


Journal of Pediatric Ophthalmology and Strabismus

Journal of Reliable Intelligent Environments

Maternal and Child Health Journal
Mehta-Lee SS, Palma A, Bernstein PS, Lounsbury D, Schlecht NF. A preconception nomogram to predict preterm delivery. Matern Child Health J.

Molecular Therapy - Methods and Clinical Development

Molecular Vision


Nature Communications

Nature Genetics

Neurology

New York Scientific Data Summit, IEEE Xplore

Ocular Immunology and Inflammation


Ocular Surgery News

Optic Pathic Genomics

Ophthalmology


Ophthalmology and Eye Diseases

Ophthalmic Genetics

Ophthalmic Plastic and Reconstructive Surgery


Optometry and Vision Science
Patient Education and Counseling

PLoS One


Proceedings of the National Academy of Sciences U.S.A.

Jo AO, Lak M, Frye AM, Phuong TT, Redmon SN, Roberts R, Berkowitz BA, Yarishkin O, Krizaj D. Differential volume regulation and calcium signaling in two ciliary body cell types is subserved by TRPV4 channels. Proc Natl Acad Sci U S A. Apr 5;113(14):3885-90.

Proceedings of the VI International Symposium on Human Health Effects of Fruits and Vegetables

Progress in Retinal and Eye Research


The Protein Journal


Retina

Retinal Cases and Brief Reports

Retinopathy of Prematurity
ME Hartnett. Pathophysiology of ROP. β. Retinopathy of Prematurity.

The Science of Free Radical Biology and Disease
ME Hartnett. The effects of hypoxia, hyperoxia, and oxygen fluctuations on oxidative signaling in the preterm infant and ROP. Oxidative stress and antioxidant protection. The Science of Free Radical Biology and Disease.

Scientific Reports
## Research Grants and Contracts

<table>
<thead>
<tr>
<th>Grant Title</th>
<th>Award Amount</th>
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<td><strong>Balamurali K Ambati, MD, PhD</strong></td>
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<td>The Role of Soluable Flt-1 and Raver2 in Ocular Vascular Demarcations</td>
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<td><strong>Intraceptor Interference of VEGF in Ocular Angiogenesis</strong></td>
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<td><strong>Comp-Ang 1: Vascular Normalization and Neuroprotection for Diabetic Retinopathy</strong></td>
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<td><strong>Avoiding Apoptosis after Retinal Stroke with a Novel Class of KCNQ2-5</strong></td>
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<td>Pilot Grant, Towards the Non-Human Primate Connectome: Computational Approaches and Software Development</td>
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<td><strong>Parallel Pathways in Visual Cortex: Functional Connectivity of Output Pathways from Area V1 to Area V2</strong></td>
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<td><strong>Photoreceptor Ciliopathies: UNC119 PARALOGS and NPHP10/NPHP5</strong></td>
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<td><strong>Anatomical and Functional Organization of Inter-Areal Feedback Circuits in the Visual Cortex, and Their Impact on Neuronal Res</strong></td>
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<td><strong>Development of an Integrated Array for Simultaneous Optical Stimulation and Electrical Recording for the Study of Cortical Circuits</strong></td>
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<td><strong>Computational Infrastructure for Brain Research: EAGER: A Scalable Solution for Processing High-Resolution Brain Connectomics Data</strong></td>
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<td><strong>Functional Specialization of V1 Output Pathways to V2: A 2-Photon Imaging Study of the Non-Human Primate Visual Cortex</strong></td>
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<td><em>Biochemistry &amp; Pharmacology of Macular Carotenoids</em></td>
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<td><em>Program of Research to Understand the Genetic Epidemiology of Glaucoma and Co-Occurring Diseases</em></td>
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<td>LJ Skaggs &amp; Mary C Skaggs Foundation&lt;br&gt;8/1/14 - 3/31/17</td>
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VILLAGERS FROM MPUNGUZI VILLAGE WAIT TO HAVE THEIR EYES CHECKED.

In February, 2017, Moran’s outreach team and partners provided 761 sight-restoring surgeries, over 5,700 vision screenings, and distributed 800 pairs of prescription eyeglasses to residents of Tanzania. See page 22.
What was your favorite story?
What would you like to hear more about?
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