
The John A. Moran Eye Center is an integral part of University of Utah Health Care, which for six years running, has won the University Health System Consortium’s Quality Leadership Award and continues to rank among the nation’s top academic medical centers. This winning streak is matched by only one other health system in the US.

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OVER MY CAREER, I’VE SEEN OPHTHALMOLOGY EVOLVE beyond what anyone previously thought possible. In just a few decades, we’ve conquered cataracts, nearsightedness, and astigmatism. We can repair a detached retina, stop bleeding in the delicate tissues at the back of the eye, and replace a scarred cornea. Even when we can’t yet cure a disease, we can often provide useful, vision-preserving treatments. We talk so frequently about what we cannot yet do, but I think it is important to step back once in a while and marvel at what we can.
We’ve come this far because physicians and researchers never stop fighting to protect and restore sight. And I am immeasurably proud to say that here at the John A. Moran Eye Center, we are leading the charge.

This edition of Focus highlights some of Moran’s faculty members who are asking important questions and finding innovative and exciting ways to better prevent vision loss in glaucoma, to heal corneal wounds, prevent infection, prevent migraines, and keep patients safe under anesthesia.

We are turning discoveries into improved clinical treatments at a record-breaking pace and making a real difference in the care patients receive worldwide.

We are laying the groundwork for future breakthroughs in care by advancing our knowledge of the biology and genetics of major blinding diseases, including age-related macular degeneration, glaucoma, and diabetic retinopathy.

We are spreading our knowledge across the globe by developing models for sustainable care. Our education program, which is training the next generation of ophthalmology leaders, recently ranked in the Top 10 nationwide.

When I look at all that we are accomplishing, I know that the future of ophthalmology will be brighter because of the Moran Eye Center. To our visionary researchers and clinicians, our world-class staff, the patients who entrust their eye care to us, and the dedicated donors and community members who help keep us on the cutting edge, I want to say thank you.

Thank you for propelling us forward. For never accepting the status quo. And for sharing our ambition and our optimism for the future of eye care. I can only imagine where your support will take us next, and I can hardly wait.

Sincerely,

Randall J Olson, MD
Professor and Chair, Department of Ophthalmology and Visual Sciences; CEO, John A. Moran Eye Center, University of Utah
In everything we do at the John A. Moran Eye Center, we constantly ask, “How can we improve the care that we provide?” This spirit of service guides our research, and Moran has become a leader in pursuing better medical technologies and techniques. Our faculty are challenged and encouraged to be global change agents, redefining eye care across the spectrum. The stories that follow feature Moran entrepreneurs who have found groundbreaking solutions to challenging clinical puzzles.

INNOVATORS WHO CHANGE LIVES

Moran’s translational scientists work closely with Technology and Venture Commercialization (TVC) at the University of Utah, a national leader in commercialization and innovation. TVC assists University scientists in commercializing their products and getting them to market. “We want to move great technologies from the bench to a practical application,” says James E. Thompson, Interim Executive Director at TVC. “A successful technology venture is one that starts with people who want to develop a product that changes lives. When I think of highly successful departments, I think of Moran.”

“The unique factor at Moran is the spirit of entrepreneurship. There is support for being innovative and being commercially minded. Moran has amazing doctors and inventors, amazing scientists. If you have world class scientists, you are going to get world class inventions—that is really very exciting, and it starts from the top down—from Dr. Randall Olson.”
—James E. Thompson

“Moran certainly has a lot of startups compared to other departments; I think that is because the people there have a translational mindset.”
—Beth Drees, PhD, MBA, director of Health Sciences TVC team
Jade Therapeutics: Innovation in CORNEAL HEALING Disease and Injury

CMHA-S Hydrogel

PROBLEM
Corneal damage is the fourth most common cause of blindness in the world—after glaucoma, cataracts, and age-related macular degeneration. Up to 18 percent of all emergency room traumas are eye injuries, including occupational and facial burns and related corneal abrasions, inflammation, infections, and ulcers. Eye injury related to blast, burn, and chemical trauma has also increased significantly due to recent wars. Moran’s Barbara Wirostko, MD, found that for many ophthalmic healthcare practitioners, managing patients with corneal wounds can be difficult. “Right now, there are limited approved products, and some patients must apply topical ocular antibiotics every hour, which can be a struggle,” she says. In addition to the logistical difficulty of applying antibiotics every hour, there are significant risks. “If not administered properly, there is the possibility for ulcers, infection, scarring, pain, and corneal blindness.”

SOLUTION
Wirostko realized that a polymer—CMHA-S hydrogel— invented by Dr. Glenn Prestwich at the University of Utah and modified by Dr. Brenda Mann of SentrX Animal Care, can be used as a sustained-release multi-purpose drug delivery system for ocular infections, ulcers, inflammation, scarring, dry eye, and post-surgery recovery. “The polymer could possibly be used as a film to deliver ophthalmic antibiotics, or other drugs, when placed under the lower lid of a patient’s eye or under a bandage contact lens,” says Wirostko. In 2010, she co-founded Jade Therapeutics Inc., to continue developing the polymer.

This CMHA-S polymer, in gel form, has been used for several years in the veterinary medicine markets to promote the healing of corneal wounds in animals. One version of the polymer is manufactured by SentrX and sold globally as Remend by Bayer Animal Health. Dr. Wirostko realized that these products could be an important addition to the treatment of ophthalmic trauma in humans; she and her colleagues at Jade are working to facilitate this. Jade has been awarded Small Business Innovation Research grants from the National Science Foundation and the US Department of Defense to develop both the drug-releasing films and topical corneal treatment in humans.

Barbara M. Wirostko, MD, is adjunct associate professor of ophthalmology and co-founder and chief scientific officer of Jade Therapeutics Inc., 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.
Asha Vision: Glaucoma Treatment

BREAKTHROUGH

PROBLEM
Glaucoma gradually robs patients of their peripheral vision, often without warning. Increased pressure (IOP) within the eye damages healthy retinal ganglion cells (RGCs) and the optic nerve, leading to vision loss. Ideally, glaucoma treatment should combine IOP-lowering medications with treatments that protect damaged RGCs. No new glaucoma drugs have been launched over the past decade, in part because the mechanism that causes IOP to harm RGCs was unknown. David Krizaj, PhD, a vision scientist at the Moran Eye Center, and his team knew that pressure could be reduced with medication and surgery, but they didn’t know how or why pressure selectively kills RGCs, the cells that send visual signals from the retina into the brain. “So we researched how cells communicate with each other. We hypothesized that if we could identify the pressure-sensing mechanism that causes pressure to damage the eye, we could then target those cells by developing new pressure-reducing drugs,” notes Krizaj. “We found it—and we were able to successfully protect cells from dying.”

SOLUTION
Krizaj’s team discovered pressure sensors in two types of retinal cells—retinal ganglion neurons and glial cells (which provide nutrients to neurons). When subjected to major stress, such as intraocular or blast pressure, over-activated glial cells wreak havoc in the surrounding retinal tissue and exacerbate cell damage caused by the trauma. “The important part is not to let these over-active cells damage the retina while preserving their normal function, which is critical in developing and adult eyes,” says Krizaj. “Ideally, we want to control their activity—keep them quiet by controlling the stress and the excessive swelling, which is the most immediate problem after the blast.”

A grant from the Department of Defense allowed the team to develop drugs that can be administered in the field and that will immediately mitigate blast injury to soldiers by reducing pressure. These drugs dramatically lower IOP and are highly effective in protecting RGCs from stress and neural death. The new drugs have been patented, licensed to Krizaj’s company, Asha Vision LLC (Asha means hope or bringing of the light in Sanskrit), and are currently being tested in preclinical trials with positive outcomes. The next big step will be going to clinical trials to determine the safety and efficacy in humans. The potential advantages—simultaneous control of IOP, control of inflammation, and protection of neurons—would be game-changers for the treatment of glaucoma, traumatic eye and brain injury, and epilepsy.

David Krizaj, PhD, professor of ophthalmology and visual sciences, specializes in retinal neurobiology, calcium regulation, and glaucoma.
An expert in general anesthesia, bioengineering, and the anesthetic management of ophthalmic surgery patients, Derek J. Sakata, MD, knows that some patients do not tolerate anesthesia well, particularly patients who are vulnerable to malignant hyperthermia (MH)—an inherited disorder that affects one in twenty-five thousand people. “It’s triggered by the inhaled gases that we use to keep you asleep during eye surgery,” says Sakata. “The gases, which are absorbed by plastic parts in the anesthesia machine, can linger and may be slowly released when the machine is used for a new patient. In vulnerable patients, these lingering gases have the potential to cause the body’s temperature to heat up to the point where cells break down and may cause cardiac arrest.”

While rare, MH can have a 50 percent fatality rate if not treated immediately, so physicians cannot risk exposing vulnerable patients to ANY of the sleeping gases in the machine. Before surgery, anesthesiologists ask patients if they or one of their family members have ever had problems with anesthesia. “Historically, if the patient said yes, we had to flush the machine to get those gases lower than 5ppm (parts per million), and that delayed surgery by more than an hour,” Sakata notes.

Sakata and his partners Drs. Joseph Orr, Dwayne Westenskow, and Steve Blackwell formed Dynasthetics in 2011 to tackle the issue of anesthesia vapors. Their product, Vapor-Clean, is an FDA-approved system of medical grade charcoal filters that can reduce exposure of anesthetic vapor molecules to less than 5ppm in 90 seconds. “Before Vapor-Clean, we had a 10-year-old patient whom we suspected had an MH reaction. This can be prevented now,” says Sakata. Vapor-Clean is a single-patient-use device and has been evaluated and recommended by the Malignant Hyperthermia Association of the United States.

The idea to develop Vapor-Clean was sparked by Sakata and partners Drs. Joseph Orr and Dwayne Westenskow’s first invention, the ANEClear™—an anesthetic reversal device that allows patients to partially rebreathe their own exhaled carbon dioxide to clear inhaled anesthetics from the brain, reducing their time in the operating and recovery room. “We discovered that doctors at Cincinnati Children’s hospital were using the ANEClear to keep anesthetic vapors from coming out of the machine to protect MH-vulnerable patients,” says Sakata. “But ANEClear wasn’t designed to get the gases below the required 5ppm.”

Derek J. Sakata, MD, is medical director for Anesthesia Services, John A. Moran Eye Center; associate professor, University of Utah Department of Anesthesiology; and adjunct associate professor of ophthalmology and bio-engineering. He holds the Leland O. and Avanelle W. Learned Endowed Professorship in Anesthesiology.
PROBLEM

Proper safety procedures greatly reduce bacterial contamination, but patients receiving eye injections for various treatments can still get infections. The rate is about one in 2000—a number that’s not acceptable to Moran CEO, Randall J Olson, MD. While the infections are uncommon, the effects can be devastating, with some resulting in total vision loss.

“When a drug is injected into the eye, bacteria from the eye lodges inside the hollow part of the needle where it can cause infection,” says Olson. “Antiseptics simply do not kill all of the surface bacteria. For patients who require regular injections for diseases such as age-related macular degeneration, the benefits can outweigh the negatives, but their chances of infection increase. The problem is how to prevent bacteria getting into the injection site. I was surprised to find very little on the market or in development.”

SOLUTION

Olson developed an FDA-approved biodegradable anti-infective hypodermic needle that blocks bacteria. “The device is two needles, an outer and inner one. The outer dip-coated needle does not take skin-cores with it as it penetrates the eye,” said Olson. “Once inside the skin or conjunctiva covering the eye, the inner needle follows through, puncturing a protective membrane and delivering a bacteria-free drug—an innovation that promises to greatly reduce needle-caused contamination.”

In 2011, Olson established the company XEnd to commercialize this new medical device, bringing on entrepreneur Andy Raguskus to lead the company. XEnd’s “proof of concept” cadaver study was 100 percent successful, and they’ve been granted a patent.

Exciting, additional research shows that XEnd also reduces contamination in blood cultures. About three to five percent of the 18 million blood cultures performed annually in the US produce a false positive, causing these patients unnecessary and expensive treatments. Because true positives are often no more than five percent of all cultures, this can mean a positive culture has a 50 percent chance of being a mistake! According to the College of Pathologists Today, reducing false positives could save hospitals anywhere from $400,000 to $4.1 million per hospital annually. Next steps for the company are to conduct clinical trials in conjunction with Associated Regional and University Pathologists Laboratories and to obtain approval from the FDA.
PROBLEM

For years, neuro-ophthalmologist Brad Katz heard patients complain of painful light sensitivity and wondered why, exactly, light causes pain. “Oddly, it isn’t necessarily bright outdoor light that bothers some people, instead it’s artificial indoor light, such as nonincandescent and fluorescent—the kind you get in big box stores and from computer screens,” says Katz. “Some people get debilitating headaches—they can’t go out to shop, to work, or to church because of the light in the building. Migraines are the most common neurological condition. Almost all of them are light-sensitive, and there isn’t really a treatment out there yet.”

SOLUTION

Discussing the problem with colleagues, Katz found out about a rose-colored spectacle tint that had been developed in England for fluorescent light sensitivity. This tint, called FL-41, allowed some light-sensitive patients and migraine sufferers to resume normal activities. Katz was surprised by how effective it was, but no one was sure why it worked, until in 2000, research revealed a protective receptor cell in the eye specifically wired for light sensitivity. These cells serve a useful purpose by preventing a person from looking at a light that is too bright, but in some people, these cells are hypersensitive—especially to lights that are bluish green—exactly the same wavelength of light blocked by the rose-colored FL-41.

“I thought, now that I know how it works, I can make something better,” Katz says. Working with Steve Blair, an engineer from the University of Utah, Katz formed Axon Optics in 2010 and began producing FL-41-based glasses. They’ve since developed a new yellowish-tinted coating that does an even better job of blocking those wavelengths—and it won’t turn everything pink.

Their patent is pending, preliminary clinical trial results are about to be published in the Journal of Neuro-Clinical Science, and they are awaiting FDA approval to market the new coating for migraine and light sensitivity.
Virtual Reality Game Advances

STEM-CELL THERAPY
Research to Restore Vision

HOW RETINAL CELLS COMMUNICATE

As Part of President Obama’s BRAIN Initiative, Moran researcher Ning Tian, PhD, is studying how retinal ganglion cells (RGCs) communicate with other neurons in the retina and brain. An RGC is a type of neuron located near the inner surface of the retina. Collectively, RGCs are a key part of the visual system—they receive visual information in the retina and transmit it to many regions of the brain.

Tian’s investigations are a critical first step towards the ultimate goal of using stem-cell therapy to repair or regrow damaged cells. “Using stem-cell therapy to restore vision is a good idea,” says Tian. “But you can’t just replace damaged cells. You have to replace the right network of cells for a particular function—cells must talk to the right partner to work, or you get misinformation.”

More Neuronal Connections than Stars
There are 20 to 30 subtypes of RGCs, and each has a different visual function and set of synaptic connections. For example, unique subtypes are responsible for seeing color, reading, writing sentences, seeing moving targets, or finding direction. Like a computer chip, each RGC is prewired into a specific synaptic circuit to respond to environmental changes. “Our hope is to identify very specific mechanisms that will re-establish the right synaptic connections of neurons in disease,” says Tian. “Since there are more possible neuronal connections than stars in the universe, it’s a monumentally challenging project.”

Creative Approach
A challenge for Tian’s team has been quantifying and interpreting the cell subtypes impacted by blinding diseases. To do this, Tian’s third-year PhD neuroscience student, Brent Young, is conducting a game he calls the “Virtual Reality Visual Behavior Test” as a way for mice to communicate what they see.

A Mouse on a Mouse
A live mouse sits atop a Styrofoam ball that is connected to the runners of a computer mouse. When the live mouse runs along the Styrofoam ball, the rotation of the ball moves the computer mouse, which in turn moves a screen displaying twelve 6 x 6 inch different colored squares or bars moving in various directions. The mouse is trained to pick a certain color or moving direction and to run to that target. It gets half a drop of chocolate milk when it successfully completes a move.

Disease is then induced in the mouse, and its visual acuity is tested again. Researchers may find, for instance, that a disease causes the mouse to lose its ability to see a color, but not the ability to run in a specific direction or vice versa. This information allows Tian and his lab to determine what other visual functions are impaired when a disease destroys a subtype of RGC.

Ning Tian, PhD, specializes in retinal neurobiology. He is a professor of ophthalmology and visual sciences, an adjunct professor of neurobiology and anatomy, and an adjunct professor of bioengineering.
A retinal ganglion cell (RGC) in green communicates with an amacrine cell in red, a subtype of an RGC. Credit: Bryan W. Jones, PhD.
THE DATA DETECTIVES

Gregory Hageman, PhD, spent the first few decades of his career building the world’s largest collection of donated eye tissue and extracting from it key discoveries about age-related macular degeneration (AMD)—including that AMD is at least two distinct diseases. In 2011, he joined the Moran Eye Center as the executive director of the Sharon Eccles Steele Center for Translational Medicine (SCTM). Hageman came to Moran with a bold idea—create synergistic partnerships between scientific departments, international academic collaborators, and private industry to more quickly and affordably develop new therapies for AMD, the most common cause of irreversible blindness in people over 65. Five years in, that idea seems to be working, and one critical aspect of that success is a fruitful partnership with a unique local resource: the Utah Population Database (UPDB).

Using Utah’s one-of-a-kind resources to solve the puzzle of AMD

The UPDB at the University of Utah is a priceless source of in-depth genealogical, genetic, and medical information. Karen Curtin, PhD, associate director for the UPDB and a member of the SCTM team, is collaborating with Hageman to identify biological connections between AMD and cardiovascular disease. For some time, AMD has been known to correlate with certain heart diseases. Understanding this relationship at a genetic level will help pinpoint the most promising targets for AMD therapy and will likely have far-reaching implications for patients with cardiovascular disease and other conditions.

Only in Utah

For nearly 40 years, the UPDB has made it possible for researchers to study genetics, epidemiology, demography, and public health. Utah’s large families, genealogical records kept by The Church of Jesus Christ of Latter-day Saints Family History Library, and Utah State Vital Records have made it possible for the UPDB to create a resource with approximately 25 million records representing 8 million individuals.
The third collaborator is the Intermountain Health Care Heart Study. Tissue samples from Intermountain patients are being tested by the SCTM to determine if they also have genetic markers for AMD. Using the UPDB’s resources, Curtin can then delve into these patients’ family histories and learn whether heart disease or AMD run in their families. By combining these patients with those who have entered Dr. Hageman’s studies at the Moran Eye Center, Curtin’s team can look for disease “clusters”—Utah families suffering both from heart disease and AMD.

“No other similar resource in the world rivals the UPDB,” says Hageman. “When we combine it with the SCTM’s patient and donor eye resources and robust knowledge of the biology of AMD, we have an absolutely unique and unprecedented opportunity to identify diseases that co-segregate with specific genetic forms of AMD.”

The SCTM team is looking for targets where drug intervention will prevent AMD from developing or progressing. “A target could be something like a protein or a biomarker,” explains Curtin. “There’s a gene running amok and overexpressing a protein that causes the disease. We’ll look to inhibit that gene so it doesn’t overexpress the protein.”

They’ve found a number of specific cardiovascular diseases that appear to share a genetic susceptibility with AMD. The findings are so promising that Intermountain has agreed to provide an additional 12,000 DNA samples, on top of their original 4,400. The SCTM is currently analyzing these samples and will begin moving forward on the most promising targets in summer 2016.

Impacting Clinical Care Today

Understanding the connections between diseases can lead to better clinical practices now, even before new treatments are developed. For example, SCTM researchers are finding that if conditions like preeclampsia, coronary artery disease, or heart attacks run in your family, you may be at higher risk for AMD. “If you establish a link between having preeclampsia in pregnancy and having AMD later in life—for women who have had preeclampsia, you can recommend an eye exam by a certain age or even test for AMD genes,” explains Curtin.

While beneficial, this early testing is just a side benefit of the work Curtin is doing with the SCTM. “The ultimate goal is to diagnose and to find effective treatments for the different forms of AMD—because it’s not just one disease.”

The Johnson Foundation Graciously Donates to AMD Research

A TREASURED SWEDISH CONNECTION

We are honored that the Johnson Foundation of Jamestown, New York, recently made a generous gift of $100,000 to the John A. Moran Eye Center to help find new treatments for age-related macular degeneration. The gift will advance AMD research being done by Dr. Gregory Hageman at the Moran Eye Center. Created by the late John Alfred Johnson, the Johnson Foundation was administered by Jamestown attorney John L. Sellstrom, co-trustee, and Carole Sellstrom, executive director. Brothers John Alfred and Oscar Johnson were born in Sweden around the turn of the twentieth century and came to America as young men. Neither married nor had children, and both lived simply and invested their earnings well. John developed AMD. By the end of his life, he was almost completely blind.
A beloved friend of the John A. Moran Eye Center, Sharon Steele-McGee has seen firsthand how research improves patient care. Comparing her own simple cataract surgery with her father’s cumbersome procedure and recovery decades ago, she determined her best philanthropic investment would be to advance eye research. As she watched friends adjust to life with age-related macular degeneration (AMD) and learned that more and more baby boomers would be diagnosed with the disease, Sharon took action. In 2009, she contributed significant funds to help recruit Dr. Gregory S. Hageman to Utah and establish a center for translational medicine (CTM) to accelerate the development of new AMD therapies. Since then, her support has been unwavering—she has committed more than $9 million to this critical cause. To honor her tremendous commitment, the CTM has been renamed The Sharon Eccles Steele Center for Translational Medicine (SCTM).
**Philanthropic Ambassador**
Warm and compassionate, Sharon’s interest in giving back extends to friends far and wide, including her friends at Moran. The connection began with the philanthropic legacy of her parents, Harold and Eleanore Steele, for whom the Harold and Eleanore Steele Corneal and Refractive Clinic at Moran is named. It has continued through her experiences as a patient and as an extraordinary ambassador for the center. A Salt Lake City native and granddaughter of philanthropist Mariner S. Eccles, Sharon spends her summers in her home city. For the remainder of the year, she resides in Indian Wells, California, where she savors the other three seasons in the desert. Over the years, she has shared her experiences and passion for the Moran Eye Center with prospective donors, hosted events on Moran’s behalf, and become a cherished member of the Moran family. “My own experiences have given me a deeper understanding of what vision means to people, and my family’s legacies instilled the philosophy that you give back—and you give back to the people and places that you truly care about and were good to you. Moran is that place for me,” she says.

**Game-Changer**
“We are absolutely thrilled that the center now bears Sharon’s name,” says Dr. Hageman. “This gift makes all of us proud of what we are doing and encourages us to work even harder. I have been passionate about finding a cure for AMD for most of my career. Early on, I came to the realization that although I might direct an overall effort to find such a cure, one does not do this in a vacuum. The people who surround you—scientists, clinicians, bosses, friends, study patients, eye donors, volunteers, philanthropists, and many others—are the real game-changers who make it possible to turn dreams and goals into reality.”

“Shortly after I met Sharon, she called me to say she wanted to take a few hours to introduce me to Salt Lake City and a few of her favorite neighborhoods. I was incredibly touched by her kindness in reaching out to me. We had such a fun afternoon looking around and beginning what has become a special friendship. Whenever I think of Sharon, F-U-N pops into my mind. She’s the friend you can be serious with one minute and laugh hysterically with the next minute. It is truly never a dull moment; she speaks her mind, and I love her for that. Her genuine interest in our research really keeps me pushing the limits to do all I can to recruit patients to our research study and to keep us humming toward our goals for AMD. I am deeply indebted to Sharon for all she has done for me personally and of course for her tremendous support of the SCTM. She is one in a million!” —Jill Hageman

“Even before I met Sharon, she funded my move from Iowa to the Moran Eye Center. But I only learned about this gift recently—and that is a true testament to Sharon’s personality. Over the years, she has become a genuine friend—to me, to my wife Jill, and to many of the faculty and staff members at Moran. She has engaged herself in our scientific efforts, always eager to learn more about them. It is an absolute delight to spend time with her and witness her sincere enthusiasm. She is kind, respectful, and takes a deep interest in the well-being of others—I am proud to call her my friend.”

—Gregory S. Hageman, PhD, John A. Moran Presidential Professor, Department of Ophthalmology and Visual Sciences; Executive Director, Sharon Eccles Steele Center for Translational Medicine.

Sharon’s Salt Lake City home perfectly reflects her discerning taste and generous spirit. Surrounded by lush gardens, it is filled with natural light—and everywhere you look, pieces by local sculptors, painters, and her favorite floral artist express her love of beauty and her support for the people who create it. She is also a lover of all creatures, great and small, and makes sure every bird and squirrel who visits the tree-covered sanctuary just outside her kitchen door is well fed.
On the Utah strip of the Navajo Nation, eye care is almost impossible to access: remote dirt roads make transportation a challenge, and specialized health care is limited.

In September 2013, a team of Moran Eye Center medical volunteers visited the isolated region and saw Navajo patients for the first time. Since then, Moran, in partnership with Utah Navajo Health System, Inc. and Blue Mountain Hospital, has been providing sight-restoring surgeries, diagnostic screenings, eyeglasses, and more to approximately 120 patients every month.

The dirt roads connecting Key and Frances Parrish to the rest of the world are steep and bumpy. When dense cataracts began clouding their vision, they stopped driving to the nearest town—and their closest source of fresh drinking water. Instead, they drank groundwater from a pump intended for animals in an area with high levels of arsenic. Following bilateral cataract surgery, both are more independent and able to drive and access clean water again.

Anna Black is the primary caregiver for her husband, Sam, who suffered a stroke. Since Moran Eye Center physicians removed cataracts from both of her eyes, she is able to weave traditional baskets with quickness and precision and better provide money for her family.

Did You Know?

A pterygium is a non-cancerous, slightly raised growth that starts in the clear, thin tissue of the white part of the eye and can grow onto the cornea. It can cause burning, irritation, or a feeling like there’s something foreign in the eye.
EYE CARE FOR NATIVE AMERICAN CHILDREN

A medical mission to Monument Valley Elementary School in September 2015 revealed that 35 percent of the students had some form of uncorrected visual impairment—a major impediment to learning. Moran pediatric ophthalmologist Robert Hoffman, MD, says that high rates of astigmatism are common among Native Americans in the Southwest.

Moran’s Outreach Division dispensed more than 300 pairs of free, custom-fit glasses to children and teenagers in 2015. Many were funded by a generous gift from the Larry H. and Gail Miller Family Foundation.
A long relationship with the Moran Eye Center and Dr. Alan Crandall has resulted in a $3 million personal gift from David Bernolfo. His gift will be used to expand the global and Utah efforts of Moran’s Outreach Division.

The Utah effort will focus on eye care for underserved Native American populations. Moran has provided care to thousands of residents of the Navajo Nation, but there is much more work to be done. High rates of diabetes, refractive error, and sun exposure—combined with a lack of access to care—have created a perfect storm of need among Utah’s native communities.

“We have a duty and obligation to our fellow Utahns to make sure they have access to the care they need. Mr. Bernolfo’s gift allows us to provide ongoing ophthalmologic services to a population that has for too long been overlooked,” says Michael Yei, manager of Moran’s Global Outreach Division. This gift will be used for the following:

- Develop a program to provide vision services to all seven Native American tribes in Utah.
- Purchase needed surgical equipment, including retinal lasers, for use on the Navajo Nation. Currently, patients in need of retinal care must be brought to Salt Lake, which is expensive, time-consuming, and limiting in the number of patients who can be treated.
- Construct a dedicated office suite within the Moran Eye Center for the Outreach Program.
- Continue global outreach missions to countries like Haiti, Tanzania, Guatemala, and Micronesia, where Moran physicians provide sight-restoring surgeries and train promising local ophthalmologists.

“I’m truly touched and humbled by David’s remarkable generosity. He is a big part of why we’ve been able to help so many people.”
—Alan S. Crandall, MD, Co-director of Moran’s Global Outreach Division

“Moran has given me the opportunity to make a meaningful gift to their ongoing challenge against blindness. I know my contribution will be used wisely, ensuring so many will regain their sight—and their lives.”
—David Bernolfo
Thank you to our Night for Sight committee

Special thanks to our Honorary Chair, Claudia Skaggs Luttrell; Event Chair, Kelly Belden Fisher; and the volunteer committee: Vicki Bennion, Ann Bernstein, Whit Cluff, Julie Crandall, Susan and Kevin Deesing, Rachel and Cameron Diehl, Gayle Everest, Carol W. Firmage, Carolyn Hoffman, Marilee Latta, Mercy Mamalis, Patrick Reddish, Lincoln Shurtz, Mimi Sinclair, Liz Slager, and Lisa and Dan Williamson, who worked tirelessly to create such a special evening.

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Presenting Sponsors
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OUTREACH
CHALLENGES WORLDWIDE

According to the World Health Organization, 39 million people worldwide are blind. The incidence of vision loss in developing countries is sky-high, and eye care can be impossible to access. It affects families, communities, and entire economies. When breadwinners can't work or get around, kids leave school to care for them. When kids who are in school can't see because they need glasses, their education suffers. Unless something changes, the cycle continues.

CHALLENGES IN HAITI

• 1 million people and only 5 ophthalmologists in Cap-Haïtien
• Strong tropical sun contributes to an extremely high rate of cataracts
• Almost 1/3 of the population is afflicted with glaucoma
• Minimum government wage: $5/day

Moran’s Outreach Sustainability Model in Action in Haiti

Being able to see again changed 85-year-old Marguerite’s life—and the lives of the grandchildren she is raising by herself in Cap-Haïtien, Haiti. Several of them had to quit school to run her small store when she could no longer work because of blindness from cataracts. As soon as one cataract was removed in August, 2015, she sent her grandchildren back to their classes, and she went back to running her store. Not being able to work was devastating for her. As she says, “I do not like to rely on others.” The Moran team removed her second cataract on a recent visit. Marguerite’s life obstacles are just one example of the staggering challenge of worldwide blindness.

MORAN’S Sustainable Model

Moran’s Global Outreach Division’s model aims to change lives as it empowers local partners in some of the most neglected corners of the world to develop sustainable eye care. Here’s what Moran does:

Provide volunteers and donations. Medical teams volunteer their time, and generous donors—including those who provide equipment, supplies, and medications—keep the program going.

Establish local partnerships, use local resources, train local caregivers.

Train young ophthalmologists from all over the world in advanced specialties and train their staffs in clinic management and surgical support.

How MORAN’S Model is Working in Haiti

Our partnership with Vision Plus Clinique (VPC) in the north shore town of Cap-Haïtien, Haiti, and its outlying area is one example of Moran’s model at work:

Since 2013, Moran’s Global Outreach team, led by Craig Chaya, MD, along with a consortium from Wills Eye Hospital and Truhlsen Eye Institute-University of Nebraska, has conducted 5 volunteer missions in Haiti.

We’ve performed hundreds of cataract and glaucoma surgeries while VPC staff have observed and learned. We also performed the first corneal transplant and micro-invasive glaucoma surgeries in this region, all the while transferring surgical skills to local ophthalmologists.

The team has taken subspecialty training and care to new levels in Cap-Haïtien and is providing training for all levels of clinical and support staff.

Starting in January 2017, Moran will sponsor a fellowship for a graduate of Haiti’s only current ophthalmology program. This will allow a Haitian ophthalmologist to receive further training at VPC in cataract and glaucoma surgery and basic cornea work.
Community Leaders Champion Moran’s Outreach Program

Christine Fairclough will serve as Chair of Moran’s newly formed Global Outreach Advisory Council, which will promote Moran’s outreach work within the local community and raise funds to help restore sight and train physicians and staff in underserved areas around the world.

“The advocacy and support of this council will help Moran expand its effort to make vision care accessible to some of the most underserved communities in Utah and to implement a sustainable model of eye care in some of the neediest areas of the world. Christine is fully engaged in our mission, and we are so lucky to have her as a leader,” said Michael Yei, Global Outreach Program Manager. “She and her husband, Fred, are highly respected Utah philanthropists and community leaders, and they have helped many local organizations grow and expand their good works.”

The Faircloughs underwrote and participated in a Moran outreach mission to Guatemala in 2015, which made a lasting impression. “I will never, ever look at things the same way because of this experience. Meeting these wonderful patients and seeing their lives changed in a matter of 24 hours—we are blessed by this experience,” said Christine. Fred added, “These doctors perform surgery, and the next morning when patients open their eyes, they have vision. It’s magic; it really is.”

“Moran is committed to protecting future generations in Haiti from unnecessary blindness. But this work would not be possible without the close collaboration we have fostered with industry leaders. Alcon, Allergan, Glaukos, Ivantis, MST, Katena, New World Medical, and many others have proven to be generous and invaluable partners. However, what really distinguishes Moran is our sustainable approach—our commitment to educating, training, and empowering local ophthalmic leaders.” —Craig Chaya, MD

**MORAN’S Sustainable Model**

- **Teach surgeons to train others in their own countries.**
  - Moran worked with donors to purchase an Alcon Ophthalmic Surgical Operating Microscope for VPC. This teaching tool with advanced optics, HD video display, and recording capabilities allows teams to view surgeries as they happen and to study them afterwards.

- **Help small hospitals offer high-quality care that will make them financially self-sufficient.**
  - Local physician, Dr. Luc-Dupuy, is receiving ongoing advanced training. Moran’s team is working to secure corneal tissue so that he can continue to provide corneal transplants.

- **Make long-term commitments to return.**
  - We are developing a glaucoma awareness program, providing much-needed basic education about treatment options and getting the word out to the population.

- **VPC uses fees from paying patients to subsidize charitable care for patients in need. By training VPC’s physicians to provide better and more advanced care, we are helping them attract more customers who are able to pay and who would otherwise leave the country for their care.**

- **Moran or our US partners will make four trips to Cap-Haïtien in 2016.**
Moran Specialists Discover a New Neurologic Disease in the Remote Highlands of Papua New Guinea

In July 2015, Drs. Alison Crum and Anya Gushchin trained local doctors and brought oculoplastic vision care for the first time to villagers suffering from a never-before-seen form of droopy eyelid (ptosis), as well as other eye-related afflictions, in the remote eastern highlands of Papua New Guinea (PNG).

Very Different Droopy Eyelids
“Droopy eyelids all over the world are just droopy eyelids,” says Crum. “Basically, the muscles that raise the eyelid don’t work, so the eyelid sags over the eye and blocks vision. But we found PNG patients with droopy eyelids who are also losing the ability to talk, swallow, and walk. It is very different than what we expected. This is a whole new neurologic disease that progresses throughout the entire body. It’s very surprising—localized only to this region of PNG, and we don’t know why it happens.”

Silicone Sling
At Mingende Rural Hospital, in the Simbu Province, Drs. Crum, Gushchin, Edward Quigley, and oculoplastics specialist Dr. Ben Limbu, former Moran observer, saw over 110 patients with drooping lids and 30 to 40 with other problems such as eye and facial tumors and trauma. They repaired 73 droopy eyelids by implanting a silicone sling to allow the patient to use his or her forehead muscle to lift the drooping lid enough to see.

Life-changing Surgery
Eighty-year-old Yawia, who hadn’t gone outside for the last 20 years because he could not open his eyes, was led into the clinic by his son. Because of an unusual in-turning of his upper lids, called trachoma, his eyelashes scratched and hurt his corneas so badly that he could not blink, and he couldn’t eat or do anything on his own. He was functionally blind. After surgery to turn his lashes outward, Yawia’s son said, “opim eye bloyu” or “open your eyes.” Yawia looked around with a huge grin on his face. He could see! He walked home leading his son—with his eyes open.

Papua New Guinea’s “Dream Team” of Ophthalmologists and Surgeons Made the Trip a Success
Anya Gushchin, MD, international fellow, oculoplastics, and Alison Crum, MD, oculoplastics, orbital surgery, neuro-ophthalmology specialist, Moran Eye Center; Edward Quigley, MD, PhD, Neuroradiology specialist, University of Utah; Michael Seward, MD, cornea/comprehensive specialist, Great Lakes Eye Care, Michigan.

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“Ptosis Crutches”
Droopy-lid patients who were not candidates for eyelid surgery were fit with “ptosis crutches”—custom glasses made on the spot from donated reading glasses. The lenses are cut out of the bottom of the frame, heated to make them flexible, and then bent up and inward toward the face. When worn like glasses, the in-turned lenses lift the drooping eyelid, allowing the patient to see through the empty frame. Much better than the alternative eyelid crutches locals create with sticks from trees, which could cause infection.

Training is Key
The only two local doctors at Mingende, Drs. Gabriel Yohang and Maggie Taune, do everything: administer anesthesia, deliver babies, remove appendixes, and handle trauma, but neither had ever worked on eyelids. Drs. Crum, Gushchin, and Limbu made training the local physicians a priority during the mission. “It is hard to teach everything in a week. We need to try to identify local PNG medical students who want to be ophthalmologists and to continue training,” says Crum. “But the training went well, and I’m really looking forward to going back. I’m honored and really proud that I get to do this work every day.”

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PATIENT CARE

Dreams Come True
Eighteen-year-old Joseph Sesay was born with congenital cataracts and has been blind his whole life, only able to see distant shadows and some bright colors. Growing up in Sierra Leone, he never dreamed that one day he would find himself on the other side of the world—and able to see.

But Joseph likes challenges. In junior high, he moved to a school for sighted students. In 2013, he was named Young Disabled Academic Student of the Year for all of Sierra Leone. Urged to compete in an academic competition for hundreds of students from developing countries sponsored by the American Field Services-USA, Joseph won—along with seven others—despite being the only student with a disability. Winning made him eligible for a US student exchange program and landed him in Boise, Idaho, at the home of host father, Anthony Boatman, in 2015.

Complicated Yet Treatable
One of Boatman’s first priorities was to get Joseph to an eye doctor. The ophthalmologist in Boise determined that life-long cataracts had led to nystagmus, a condition that causes Joseph’s eyes to flitter back and forth. While cataract surgery could give Joseph sight, it would be complicated and require general anesthesia. Joseph’s doctor referred him to the Moran Eye Center and internationally renowned cataract specialist, Alan S. Crandall, MD. After examining both eyes, Dr. Crandall confirmed he would be able to safely remove Joseph’s cataracts.

Well-Loved
Joseph’s parents are farmers in a small village in Africa and would never be able to afford the surgery Joseph needed. So in a show of remarkable support, his friends in Boise created a GoFundMe campaign to offset Joseph’s medical costs. They raised over $9,000. “He is very well loved,” says teacher-advisor, Natalie Lutes. “When Joseph sits down for lunch, kids and adults can’t wait to be with him.”

While waiting for surgery, Joseph said he was “only 10 percent scared” that it would not work or that he would lose his remaining vision. The risk, he decided, was worth it. “If I’m ever to get my sight, to see my parents would be the best achievement for me. Right now, I am sleeping; when I get my sight, I’ll say I’m awake.”

Post-surgery—Moran’s Ongoing Care
Joseph’s concept of the world has been through touch, not sight,” says Boatman. “Every day, he learns that things he imagined in his ‘mind’s eye’ all these years look quite different in reality.” Joseph continues to see Dr. Crandall every two months, who advises, “While we have restored Joseph’s sight, he now has to learn new skills like depth perception, facial expressions, eye-hand coordination, reading, and writing. Because Joseph is very bright, people may think he should be able to do things immediately, but keep in mind, he is just now learning skills that sighted children learn in the first five years of life—so it will take some patience.” And Joseph’s dream did come true—he “saw” his family for the first time via photos that a friend sent from Sierra Leone.

“I want to thank all of the people who have helped me. I cannot pay them—I can only say thank you for being so altruistic.” —Joseph Sesay

Alan S. Crandall, MD, is the Val A. and Edith D. Green Presidential Endowed Chair in Ophthalmology; Senior Vice Chair, Department of Ophthalmology and Visual Sciences; Director, Glaucoma and Cataract Division; and Co-director, Global Outreach Division.

A Global Community Comes Together to GIVE THE GIFT OF SIGHT

Dr. Crandall, Joseph, Tony Boatman

Joseph, still blind before surgery, learned to ride a bike with the help of his Brazilian exchange brother, Andre.
Since joining the Moran Eye Center in 1996, Norm A. Zabriskie, MD, has treated tens of thousands of glaucoma patients. He has seen the treatment of glaucoma progress from a time when the benefits of lowering eye pressure were still being debated, to the present—when that treatment is now standard procedure for a disease that he says, “continues to be chronic and relentless.”

Zabriskie describes his patient care philosophy as trying to “bring the magic every day—to offer my patients the best information, skills, and knowledge that I can.” And in terms of making treatment decisions with patients, “I always ask myself, if I were making this decision for me, what would I do? It’s an ongoing process, fighting a disease that never gives up. Honestly, I live and die with how my patients are doing. When things are going well, either because of surgery or treatment, it’s fantastic. By the same token, if you have patients who are not doing well, it can be devastating. Dealing with that is the hardest part.”

“Almost 3 million people ages 40 and older have glaucoma, yet only half know they have it. Even more alarming is that the number of people with glaucoma is projected to increase to more than 4 million by 2030 and more than 6 million by 2050.”
—National Eye Institute
Kim Murray: Glaucoma Patient

Kim Murray has been Zabriskie’s patient for the past 20 years. They first met when Kim was diagnosed at the relatively young age of 49. He had no family history of glaucoma, but he knew his eyes were changing. It was hard to read the small print, especially in his work as an air conditioning mechanic with the Tooele Army Depot. “You need good vision for nameplates and technical manuals, among other things,” he says. “When I had my eyes checked, I found out my pressure was 45 in both eyes. That’s when I was referred to Dr. Zabriskie.”

Over the years, the two have been through several regimens of eye drops and numerous laser surgeries. Murray has had a trabeculectomy (surgery to lower pressure inside the eye by draining fluid from the eye) in both eyes. “At one point, they didn’t know if they could save my right eye,” he says. “But after 18 years, I am now off drops and my visual field has been stable. I read everything, I drive, and I love to garden and hike. I’m able to spend time with my 15 grandchildren, and life is good. Of course, I didn’t always feel this way. At first, I felt sorry for myself, but I soon got over that. I had a lot of confidence in Moran and Dr. Zabriskie. I did everything he asked me to do—following all directions for drops, not lifting (after surgery), all kinds of things. He’s always there for me—always a caring, thorough, encouraging, and compassionate fellow. I tell my friends who are diagnosed to just listen, be patient, and trust. You can learn and adapt.”

Eye pressure is measured in millimeters of mercury (mm Hg). Normal eye pressure ranges from 10-22 mm Hg, and eye pressure of greater than 22 mm Hg is considered higher than normal. High eye pressure alone does not cause glaucoma. However, it is a significant risk factor. Anyone diagnosed with high eye pressure or who has a family history of glaucoma or is over the age of 50, should have regular comprehensive eye examinations to check for signs of the onset of glaucoma.

Glaucoma is a group of diseases that damage the eye’s optic nerve and can result in vision loss and blindness. However, with early detection and treatment, you can often protect your eyes against serious vision loss.

Learn more at healthcare.utah.edu/moran/ophthalmology/glaucoma/
It’s a terrifying yet real scenario: parents celebrate the birth of their child but then face the worrisome realization that something is critically wrong with their infant’s eyes. Their tiny baby, still learning to breathe on her own, needs urgent retinal surgery—specialized care that isn’t available at most home hospitals. With little time to spare, many turn to the Moran Eye Center’s Pediatric Retina Center for help.
Providing Answers to Families in Distress
Few ophthalmologists are trained to diagnose and treat pediatric retina disorders, which disrupt the healthy development of the light-sensitive tissue at the back of the eye. There are dozens of conditions that cause retinal blindness in infants and children, but most of them are rare. Moran’s Pediatric Retina Center was created by Moran’s Mary Elizabeth Hartnett, MD, and is one of only a handful in the country offering complete care for these challenging conditions.

Hartnett treats infants and children throughout the Intermountain West. Her mission: to deliver the best possible care and education, while conducting critical research to make future advances in pediatric retina care possible.

Clinical Care
Pediatric ophthalmologists from the Moran Eye Center staff the only children’s hospital in the region. It is equipped with state-of-the-art microsurgical equipment, enabling Hartnett to perform delicate surgery on the smallest premature infants on up. Retinal conditions often are complicated, so after surgery, Hartnett refers patients and their families to other specialists at Moran who help achieve the best possible outcomes:

- Pediatric ophthalmologists provide visual rehab to maximize visual potential after treatment.
- The Patient Support Program works with families struggling with blinding conditions and facilitates referrals for those with special education needs. As many patients come from out of state, the program also connects them with resources closer to home.
- Moran’s genetic counselor advises families with inherited retinal conditions.
- Imaging staff carefully monitor the retina and provide critical diagnostic information.

Research
Hartnett’s clinical and basic research is enriched by the larger-than-average number of pediatric retina patients seen at Moran, and she is working with students across the University of Utah campus to advance eye care in innovative ways. Here are some current research initiatives:

- Understanding and preventing retinopathy of prematurity (ROP), testing the safety and effectiveness of current therapies, and regulating the processes that cause abnormal blood vessel growth.
- Untangling the genetics of Coats’ disease, a rare pediatric retina disorder.
- Creating eye-strengthening video games and diagnostic apps to help parents test whether young children have vision issues.
- Developing better protective eyewear, as sports-related trauma is a relatively common source of retinal injury in children.

Education
Many pediatric retinal conditions are so rare that little public information is available. Hartnett’s long-term goal is to create a website that will serve as a hub for pediatric retina disease information, and she is currently working with students to develop educational resources for parents.
“What doesn’t vision loss impact?” That question, posed by Amy Henderson, MSW, CSW, of Moran’s Patient Support Group, goes to the very core of the group’s mission and the difference they make in the lives of patients and their families. As part of one of the country’s only comprehensive programs dedicated to helping patients understand and cope with vision loss, Henderson and her colleagues offer everything from compassion and counsel to tools and advice—as well as guided cultural adventures. “On top of dealing with the practical issues associated with vision loss, patients can experience grief and loneliness,” says Henderson. “Some feel like there’s a stigma attached to depending on others, and then there are the inevitable changes in family dynamics, so we have a lot to talk about in our support gatherings. We try to address all of these issues in a safe, trusting environment, and that really makes a difference.”

Program Director, Lisa Ord, PhD, LCSW, and Henderson also conduct long-term, private counseling. “We’ve helped patients who are dealing with PTSD from traumatic eye injuries and parents who are coping with feelings of guilt because they have unknowingly passed on a genetic mutation that has resulted in a serious eye condition or vision loss,” Ord explains. They also reach out to individual clients through TruClinic, a telemedicine system that gives access to services to those in rural or out-of-state locations. “It’s almost like a house call,” says Ord. “It allows people who are unable to come to us to take advantage of one-on-one counseling. All they need is a computer and an internet connection.” Future plans include conducting Patient Support Groups via TruClinic as well.

“Overall,” says Ord, “our entire team is here to help people make it through and to learn about all the practical resources and tools available to help them keep exploring life and moving forward.”

Here’s what some of our Patient Support clients have to say about the difference the program has made in their lives.

“Because of the Maintaining Independence class, I walk a little taller, knowing there are others out there who understand.”

“I don’t think you realize the magnitude of what you do. I finally felt like I wasn’t the only one. I was so isolated, and now I know I’m not alone.”

“Because of what we talked about in your Maintaining Independence class, I called ahead for a shopper at a department store. They were so nice about it. Thank you!”

Patricia Beaman; Larry Castleton; Iris Moulton, docent; Dr. Lisa Ord; Dorothy Nathan.
“When anybody—staff, tech, or doctor—sees a patient and/or family with any kind of issue, whether emotional or having to do with resources such as transportation, they can make a referral to us, and we are able to work together—bringing in specialists as needed.”

Patient Support Services Program Director, Lisa M. Ord, PhD, LCSW

Ongoing groups at Moran include “Orientation to Vision Loss,” “Maintaining Independence,” “Adults with Vision Loss,” and a “VIP” (Visually Impaired Persons) group for retirement-age patients with vision impairment. For more information, call 801-585-2213.

Vision Rehab & Occupational Therapy

Robert Christiansen, MD, FACS, a nationally recognized expert in low-vision rehabilitation, helps patients who still have some vision make the most of their remaining sight. He works on-site with Moran patients who benefit from a variety of aids, including magnifying tools and special lights. His first step is to make sure patients have the best refraction possible. “Sometimes, when a patient has low vision, it takes a while to tweak their eyeglass prescription, especially if they need to use their glasses with another device,” he notes. “We look at different lighting conditions, working with contrast sensitivity and other factors that can affect the ability to read, cook, or just to get around.”

Occupational Therapist Kasey D. Mitchell, MOT, OTR/L, CLVT, is available to help low vision and blind patients adapt to various equipment in their homes. They can even “try before buying.”

Moran’s Patient Support Program provides integrated services to patients with vision loss.
FULL SPECTRUM OF VISION CARE

Specialists at the Moran Eye Center receive referrals from physicians throughout the Intermountain West daily; and whether patients come to us with eye trauma or an inherited condition, we have the ability to deal with the most complex cases.

IMAGING

Imaging identifies the presence of fluid in the retina, retinal nerve fiber density, and thickness of the retina and optic nerve. Images document changes from one visit to the next.

ECHOGRAPHY

Echography uses ultrasound to produce detailed images of the eye and eye socket, helping to identify tumors, abnormal growths, foreign substances, and detached retinas. Moran’s Roger P. Harrie, MD, wrote a definitive book on this form of diagnosis, more commonly known as “ocular ultrasound.”

NEURO-OPHTHALMOLOGY

Neuro-ophthalmology is the study of the eye as it relates to the brain. Moran’s neuro-ophthalmologists Kathleen B. Digre, MD; Judith E. A. Warner, MD; Bradley J. Katz, MD, PhD; and Alison Crum, MD, evaluate and treat some of the most complex and enigmatic visual complaints, including visual loss, double vision, light sensitivity, and disorders of visual processing.

OCULOPLASTIC AND FACIAL PLASTIC SURGERY

Oculoplastic and Facial Plastic Surgery physicians Alison Crum, MD, and Bhupendra C. K. Patel, MD, FRCS, specialize in treatment of the eyelids, brows, cheeks, tissues around the eye, facial bones, and the tear drainage system. They address issues ranging from simple cancers to complex facial reconstruction. They also perform cosmetic facial procedures. Drs. Crum and Patel regularly see patients from all over the United States who are seeking second and third opinions.

TRIAGE

Triage is a specialty clinic for patients with emergent eye problems. Whether they have pain and/or inflammation, visual disturbances, or traumatic eye injuries, Jean Tabin, MD, and her staff offer comprehensive diagnosis and treatment, as well as referrals to specialists when needed.
MORAN EYE CENTER COMMUNITY CLINICS 2016

Temporary Address: 750 North Central Avenue

Park City
Redstone Health Center
1743 West Redstone Center Drive Suite 115

Orem
Tooele
West Valley City
Midvale
Murray
Salt Lake City
South Salt Lake
West Jordan
South Jordan
Riverton
Farmington
Layton

Moran’s NEW Farmington Health Center OPENS FALL 2016
Temporary Address: 750 North Central Avenue

Primary Children’s Hospital
University of Utah Hospital
Moran Eye Center
65 Mario Capecchi Drive

Stansbury Health Center
220 Millpond Road Suite 100

Westridge Health Center
3730 West 4700 South

West Jordan Health Center
5126 West Daybreak Parkway 5200 West 11400 South

South Jordan Health Center
5126 West Daybreak Parkway 5200 West 11400 South

South Jordan Health Center Clinic at Intermountain Riverton Hospital 3773 West 12600 South Suite 301

Moran Eye Center Clinic at Intermountain Riverton Hospital 3773 West 12600 South Suite 301

Parkway Health Center
145 West University Parkway

*New Farmington Health Center Opens Fall 2016
165 North University Avenue
Farmington, Utah

*New Farmington Health Center
Temporary Address: 750 North Central Avenue

165 North University Avenue
Farmington, Utah
AWARDS AND HONORS

Jan Worst Medal Lecture
Randall J Olson, MD, Professor and Chair, Department of Ophthalmology and Visual Sciences; CEO, John A. Moran Eye Center, 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.

American Academy of Ophthalmology (AAO) Life Achievement Honor Award Goes to Two Moran Physicians
Randall J Olson, MD, and Nick Mamalis, MD, both received Life Achievement Honor Awards from AAO at the largest gathering of ophthalmologists in the United States, November, 2015. This award honors their contributions to the academy, its scientific and education programs, and to ophthalmology.

Paul Henkind Memorial Lecture
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, the Macula Society is focused on new research in retinal and macular diseases. The majority of its members are involved in cutting-edge research and/or are investigators in major clinical trials.

Serious Games Showcase & Challenge Winners
Marielle Young, MD, and Mary Elizabeth Hartnett, MD, teamed up with video game developers from the University of Utah’s Entertainment Arts and Engineering program and won “Best Student Game” in the Serious Games Showcase & Challenge in Orlando, Florida, December 2015. The game helps combat lazy eye in children. Fully controlled by eye movement, the game forces the lazy eye to move around the screen, which can strengthen and help find the right balance between the eyes.
Albert T. Vitale, MD, was honored with the Utah Ophthalmology Society’s 2015 Lewis A. Petersen, MD, Humanitarian Award at the society’s annual meeting, March, 2016. The award recognizes a Utah ophthalmologist who has performed “exemplary service to the local, national, and/or international community.” Director of Moran’s Uveitis Division, Vitale is recognized for his long-standing dedication to improving and expanding access to retinal care in the developing world and for his focus on teaching and training the next generation of retinal specialists to perform charitable care and outreach work.

HUMANITARIAN LEADERS

Alan S. Crandall, MD, received the American Glaucoma Society 2016 AGS Humanitarian Award in recognition of his “humanitarian efforts for the preservation of vision and to improve the quality of life for those in need.” Crandall, who has been a part of the University of Utah’s Department of Ophthalmology for over 30 years, is the Val A. and Edith D. Green Presidential Endowed Chair in Ophthalmology, Senior Vice-chair of Ophthalmology and Visual Sciences, Director of Glaucoma and Cataract, and Co-director of Moran’s Global Outreach Division. He also served as past president of the American Society for Cataract and Refractive Surgery.

Geoff Tabin, MD, co-director of the John A. Moran Eye Center Global Outreach Division and co-founder of the Himalayan Cataract Project, received the 2016 Biosyntrx Thornton Humanitarian Award. Tabin’s mission and core values mirror the Humanitarian committee’s commitment to making a sustainable, positive impact in global quality of life by encouraging lifestyle choices that lower the risk and financial burdens associated with mostly preventable, chronic degenerative disease.
Dr. Bruce Parsons Shares a Unique Heritage with Moran

Bruce Parsons, OD, real estate investor, medical missionary, lifetime Rotarian member and leader, world traveler, hiker, philanthropist, numismatist, and esteemed citizen of Murray City, Utah, made a generous donation of irreplaceable historical ophthalmology equipment, some of it over 100 years old, to the Moran Eye Center. His gift reminds us that our shared medical history connects us in tangible ways with past patients and doctors like Parsons and provides context for the vital role that the Moran Eye Center continues to play in improving patient care for generations to come.
New Pediatric Ophthalmology Clinic
Moran’s Pediatric Ophthalmology Clinic relocated to a spacious new area on the fourth floor of the Primary Children’s Medical Center, directly across the bridge from the Moran Eye Center. The beautiful new facility has 10 exam rooms and welcomes families to a large waiting area with a flat-screen TV, a play area, and a collection of colorful, child-friendly artwork.

VISIONS ART EXHIBIT
Salt Lake City’s Art Access Gallery and the John A. Moran Eye Center collaborated to produce Visions, an exhibit bridging the worlds of art and science. Presented in April 2015, the show featured a range of eye imagery derived from scientific analysis as well as art created by the low-vision or vision-impaired community. “It was exciting to see other scientists and some grad students experience their first gallery showing and to see people from outside science appreciate scientific visualization of something that many people hold near and dear—their vision,” said Moran researcher and photographer, Bryan W. Jones, PhD. Exhibit participants included James Anderson, Michele Banks, Nico Cuenca, Jim Gilman, Bryan W. Jones, Helga Kolb, Gabe Luna, Paula Morris, Hope Morrison, Scott Peterson, Rebecca Pfeiffer, Stuart Stanbury, and Peter Westenskow.

Moran’s Ophthalmology Residency Program at the University of Utah ranks 10th in the nation for reputation by Doximity, the leading medical professional network and the source for rankings used by U.S. News and World Report. Moran also ranks in the top 20 ophthalmology departments in the 2015-2016 survey.
Once Moran residents and fellows complete their education and training, they have a world of options. So it’s always a tribute to our educational programs when they choose to come back and join our team as physicians and faculty. Most recently, we welcomed former resident, Leah Owen, MD, PhD, and former fellow, Akbar Shakoor, MD.

**Akbar Shakoor, MD: In it for the Long Haul**

Only about 100 physicians in the US are trained in ocular immunology, the study of uveitis, and Dr. Shakoor is one of them. He joins Albert T. Vitale, MD, Director of Moran’s Uveitis Division. Both are passionate about teaching, and together they plan to launch Moran’s first uveitis fellowship in 2016.

“Uveitis involves looking at every system in the body—it goes well beyond what standard eye care involves,” Shakoor emphasizes. “Most of our patients have chronic issues, so sometimes we see them every week, then every month, for years. I am so impressed with their resiliency, and I really learn from them—both the kids and adults. With chronic disease, you are in it for the long haul, so I work very hard on managing patients’ expectations.”

**Leah Owen MD, PhD: Pediatric Champion**

Dr. Owen screens newborns for a range of eye diseases associated with premature birth, such as retinopathy of prematurity, and she specializes in medical and surgical treatments for pediatric eye disease and eye misalignment as well as surgery for adult eye misalignment.

“No one exam is identical to another,” she notes, “and working with kids is truly an art. You have to take time, play with them, listen, and gain their trust. Adults are equally challenging, as their eye misalignment can be more complex and debilitating. Overall, it is a privilege to have the trust of patients and of parents and to be able to contribute in this way.”

Owen is also leading a new research lab at Moran. Her research goals are varied, but, “All my questions are directed toward improving our care of pediatric eye disease and increasing our understanding of how visual development occurs.”

**Did You Know?**

**Uveitis** is a general term covering a group of inflammatory, autoimmune, or infectious diseases that can cause significant damage to the tissues of the eye. It is among the most common causes of severe vision loss or blindness in the world.
Moran Residents Receive High-volume Surgical Training

Within three years, one Moran resident will see hundreds of patients and perform a variety of surgeries. Nationally, ophthalmology residents are required to perform 87 cataract surgeries—the average is 140—but a Moran resident performs over 350 cataract surgeries as well as a range of subspecialty surgeries. In addition, they become experienced using the latest equipment and techniques, including the Centurion phaco machine, LenSx laser, and an invaluable training tool called the Eyesi Simulator that trains residents to do parts of cataract surgery and tremor control in a very safe environment.

“I knew Moran had a great residency program, but didn’t fully appreciate this until I finished. I realized that the advanced and innovative surgical techniques Moran residents are taught by Dr. Crandall and others are largely not incorporated into other residency curriculums. I further gained appreciation for the breadth of training and the privilege of learning from experts in all major areas of ophthalmology available at Moran.”—Leah Owen, MD, PhD

“The Moran Eye Center is known for teaching residents, both medically and surgically. All cases of resident surgery are videoed. We review cases with the residents to help them understand all the steps of surgery. We can walk through any complication and explain why it happened and how to avoid it in the future. These reviews help build a strong foundation for residents to become excellent surgeons.”

—Alan S. Crandall, MD, is the Val A. and Edith D. Green Presidential Endowed Chair in Ophthalmology; Senior Vice Chair, Department of Ophthalmology and Visual Sciences; Director, Glaucoma and Cataract Division; and Co-director, Global Outreach Division

402%
One Moran resident performs 402% more cataract surgeries than the national requirement

NATIONAL REQUIREMENT
87
NATIONAL AVERAGE
140
MORAN RESIDENTS
350+

Average Number of Surgical Procedures Performed by a Moran Resident

Cataract
More than 350

Glaucoma
5-10 primary trabeculectomies and tube shunts; 10-20 lasers including SLT (selective laser trabeculoplasty) and LPI (laser peripheral iridotomy)

Refractive Surgery
2-6 LASIK/PRK

Emergency Care
10-15 open globes

Retina
500+ intravitreal injections; 30-50 retinal lasers, including PRP (panretinal laser photocoagulation), focal, laser retinopexy

Pediatrics
40 strabismus; 15-20 nasolacrimal duct obstruction probing and dilations

Pterygium
5-10 surgeries

Comprehensive Ophthalmology
20-40 Nd:YAG capsulotomies

Plastic Surgery
50 eyelid laceration repair, ptosis repair, and blepharoplasty

Cornea Transplants
1-4 primary with more as assistant
Consistently Ranked as One of the Top 10 Ophthalmology Education Programs in the Nation

For over 30 years, the ophthalmology program at the University of Utah School of Medicine has offered excellent didactic training and extensive surgical experience. Each year, faculty from the Moran Eye Center provide ophthalmology training to approximately 70-80 medical students and visiting residents as well as three interns, nine residents, eight to 10 fellows, and many international observers. As the only medical school in the Intermountain area, the University of Utah plays an important role in training the region’s next generation of physicians and ophthalmologists. As of the 2016-2017 academic year, Moran will add a fourth resident each year.

FELLOWSHIP PROGRAM 2015-2016

CORNEA

Paul “Adam” Frederick, MD
Brian Zaugg, MD
Zachary Joos, MD

GLAUCOMA

Kristin Chapman, MD
Hreem Patel, MD
Laura Hanson, MD

MORAN INTERNATIONAL

Jim Bell, MD
James Zimmerman, MD
John Welling, MD

RETINA

Ashlie Bernhisel, MD
Christopher Conrady, MD, PhD
Richard “Reese” Feist, Jr., MD

SECOND YEAR

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

FIRST YEAR

CORNEA

Adam Jorgensen, MD
Russell Swan, MD
Brian Stagg, MD

ACADEMIC & ANTERIOR SEGMENT

RESIDENCY PROGRAM 2015-2016

FELLOWSHIP PROGRAM 2015-2016

NEURO-OPTHALMOLOGY

Zachary Joos, MD

RETINA

Jim Bell, MD
James Zimmerman, MD
John Welling, MD

SECOND YEAR

Julia Byrd, MD
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Russell Swan, MD
Brian Stagg, MD

ACADEMIC & ANTERIOR SEGMENT

RESIDENCY PROGRAM 2015-2016
Nikko Ronquillo, MD, PhD, Moran intern, received the 2016 Achievement Awards for College Scientists (ARCS) Foundation’s Randall J Olson Scholar Award in October, 2015. The award includes $15,000 from ARCS and a matching award from Moran to enable Ronquillo to continue his research into Senior-Loken Syndrome during his residency.

A superb overall experience

With 11 locations and four state-of-the-art ophthalmic surgery suites, over 35 ophthalmology specialists carry out more than 6,500 surgeries per year at the Moran Eye Center. This ensures that residents and fellows have ample opportunity to participate in a full spectrum of clinical and surgical experiences.

Located at the base of the spectacular Wasatch Mountains, the University of Utah is the flagship institution of higher education in Utah. Within reach of seven major ski resorts, gorgeous desert country, and a population known for its friendliness, Salt Lake continues to rank among the top cities in which to live.

Moran chief resident Brian Stagg, MD, was one of just 20 applicants accepted into the National Clinician Scholars Program—a two-year fellowship that offers interdisciplinary training for clinicians to become change agents who will drive policy-relevant research and partnerships to improve health and health care in the US. Stagg began his fellowship on July 1, 2016 at the University of Michigan’s training site.
CEO of the John A. Moran Eye Center

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 Lecture 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 the American Academy of Ophthalmology, and the 2012 Binkhorst Medal by the American Society of Cataract and Refractive Surgery.

Specialties

- Cataract Services and External Eye Diseases

Doctors in Alphabetical Order

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

Paul S Bernstein, MD, PhD, specializes in age-related macular degeneration 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 in Haiti, Guam, Micronesia, Ghana, and the Navajo Nation in southern Utah. 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

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 the Moran Eye Center, 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 ASCRS Humanitarian Award; and the 2013 ASCRS Humanitarian Award.

Specialties

- Cataract Services
- Glaucoma

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 as well as comprehensive ophthalmology. Dr. Chortkoff also has a special interest in the management of dry eye syndrome.

Specialties

- Comprehensive Ophthalmology
- Glaucoma
David C Dries, MD, provides medical and surgical care for a wide range of 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, retinoblastoma, infant and childhood cataracts, and nasolacrimal 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. In 2008, Dr. Hatch was asked to serve 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 the Moran Eye Center. She performs surgery at both the Moran Eye Center 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 primary clinical and surgical interests include retinal detachments, diabetic retinopathy, and macular and retinal degeneration.

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

Bradley J Katz, MD, PhD, specializes in neuro-ophthalmology, 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

Amy Lin, MD, specializes in the medical and surgical treatment of corneal and anterior segment diseases. Her interests include corneal transplantation, anterior segment reconstruction, cataract surgery, refractive surgery, and teaching residents and fellows.

**SPECIALTIES**
- Corneal Transplantation
- Cataract Surgery (Advanced Technology Intraocular Lenses and Laser-assisted Cataract Surgery)
- Vision Correction Surgery (LASIK, PRK, Phakic Intraocular Lenses)
Jeff Pettey, MD, is the John Moran Eye Center Director of Education; Assistant Professor at the University of Utah Department of Ophthalmology and Visual Sciences; 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 Utah Jazz Moran 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 the American Academy of Ophthalmology.

SPECIALTIES
• Pediatric Ophthalmology
• Adult Strabismus

Bhupendra C K Patel, MD, FRCS, is an expert in the management of disorders involving eyelids, periorbital tissues, the lacrimal system, and facial bones, including fractures. His clinical research interests include thyroid disease, optic nerve disorders, orbital and eyelid tumors, blepharospasm, lacrimal surgery, and facial cosmetic surgery.

SPECIALTIES
• Oculoplastic and Facial Plastic Surgery

Nick Mamalis, MD, is Director of the Ophthalmic Pathology Laboratory and evaluates all specimens submitted to the laboratory. He focuses his clinical practice on comprehensive ophthalmology including cataract and other anterior ocular surgeries. Dr. Mamalis is the editor of the Journal of Cataract and Refractive Surgery and is the author of over 200 peer-reviewed publications, one textbook, and 44 book chapters. He is also Co-director of the Intermountain Ocular Research Center and is performing research in the area of intraocular lenses and postoperative inflammation. Dr. Mamalis lectures throughout the world and was selected by Cataract and Refractive Surgery Today as one of 50 international opinion leaders. He received the 2015 Life Achievement Honor Award from AAO and the 2013 Binkhorst Medal from ASCRS.

SPECIALTIES
• Cataract Services
• Ophthalmic Pathology
• Comprehensive Ophthalmology

Mark D Mifflin, MD, is the Director of Cornea and Refractive Division, Chief of Surgical Services, Moran Eye Center, and Medical Director of the Utah Lions Eye Bank. He specializes in the medical and surgical treatment of corneal and anterior segment eye diseases, including expertise in all types of corneal transplantation, cataract surgery, and vision correction using lasers, intra-ocular lenses, and conductive keratoplasty.

SPECIALTIES
• Cornea Transplant Surgery (Penetrating Keratoplasty, Lamellar Keratoplasty, Stem Cell Transplantation, and Eye Banking)
• Cataract Surgery (Premium Intraocular Lenses, Monovision)
• Vision Correction Surgery (LASIK, PRK, Phakic Intraocular Lenses)

Leah Owen, MD, PhD, specializes in the medical and surgical treatment of pediatric eye disease, including cataract, nasolacrimal duct obstruction, amblyopia, retinopathy of prematurity, and strabismus. She also specializes in the surgical treatment of adult strabismus.

SPECIALTIES
• Pediatric Ophthalmology
• Adult Strabismus

Geoffrey Tabin, MD, is the John E. and Marva M. Warnock Presidential Endowed Chair in Ophthalmology and Co-director of Moran’s Global Outreach Division. Dr. Tabin is working to develop eye care delivery in developing countries, including improving cataract and corneal surgery.

SPECIALTIES
• Complex Cataract Surgery
• Complex Anterior Segment Surgery
• Post-Traumatic Eye Injury
• Sports Vision

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
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 Intermountain 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 age-related macular degeneration. 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
- Comprehensive Ophthalmology
- Uveitis, Ocular Infections
- Retinal Diseases and Surgery

Barbara M Wirostko, MD, is the Resident Research Director and has specialized fellowship training in glaucoma, 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

Kim Taylor, MD, provides general vision care and 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

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
- Retinal Disease and Surgery

Norm A Zabriskie, MD, is Vice Chair and Medical Director of Clinical Services and Director of Clinical Operations at the John A. Moran Eye Center. He specializes in the medical and surgical treatment of glaucoma and cataracts. He 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)
Derek J Sakata, MD,
is Medical Director of Anesthesia Services at the John A. Moran Eye Center. 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

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

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

SPECIALTY
• Vision Rehabilitation

Donnell J Creel, PhD, is Director of the Electrophysiology Service at the John A. Moran Eye Center. The Electrophysiology Service provides examinations including visually evoked potentials, full-field electroretinograms, auditory brainstem responses, electrooculograms, multifocal electroretinograms, and multifocal visually evoked potentials. These tests quantitate retinal, optic pathway, visual cortical, and brainstem auditory pathway function. Dr. Creel has written some of the most-read online chapters on these tests.

SPECIALTY
• Electrophysiology

Roger P Harrie, MD, directs the Ophthalmic Ultrasound Department at the Moran Eye Center. He has been the senior instructor in the ocular ultrasound course at the annual American Academy of Ophthalmology meeting 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
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*

David Meyer, OD, FAAO, is the Director of Contact Lens Services. He specializes in fitting contact lenses, primarily focusing on keratoconus, post-surgical corneas, pediatric, irregular or high astigmatism, and fitting traumatized eyes. He also provides primary eye care for those who do not wear contact lenses.
*John A. Moran Eye Center*  
*Midvalley 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.
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*Redwood Health Center*  
*Westridge Health Center*
Balamurali K Ambati, MD, PhD, MBA
Professor of 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

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 Age-related Macular Degeneration, 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 Age-related Macular Degeneration; AMD Target Identification and Therapeutic Development

Mary Elizabeth Hartnett, MD
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SPECIALTY
Retinal Angiogenesis Relating to Retinopathy of Prematurity and Age-related Macular Degeneration

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Research Associate Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Retinal Degeneration Disorders; Retinal Neurotransmission and Neurocircuity; Metabolomics; Editor, Webmaster, webvision.med.utah.edu

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SPECIALTIES
Giant Cell Arteritis; Photophobia and Migraine; Optic Neuritis; Multiple Sclerosis
BUILDING BRIDGES FROM RESEARCH TO PATIENT CARE

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Biochemistry and Biophysics of Macular Carotenoids; Mouse Models of Retinal Disease; Raman Imaging of Nutrients in the Retina

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SPECIALTIES
Ocular Pathology; Comprehensive Ophthalmology; Intraocular Lens Research; Postoperative Inflammation

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SPECIALTIES
Retinal Neurotransmission and Networks; Retinal Degenerations; Metabolomics

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SPECIALTY
Analysis of Genetic and Genomic Contribution to the Pathophysiology of Complex Pediatric Eye Disease Including Strabismus, Myopia, Retinopathy of Prematurity, and Amblyopia

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Molecular and Cell Biology; Corneal and Retinal Diseases

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Vascular Biology: abnormal vessel growth implicated in pathological neovascularization in age-related macular degeneration, retinopathy of prematurity, and diabetic retinopathy

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Epidemiology and the Joint Influences of Genetic, Molecular, and Lifestyle Risk Factors in Causing Eye Disease; Age-related Macular Degeneration; and Dry Eye Disease

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Shirley Petersen Dunbar
Wayne E. Egan
Robert John Epperson
Joe and Phyllis Everton
Marie Ferre
Jeanne Frank
Trent Gardner
Suzanne Goldsmith
Jane E. Hamblen
Clark Hardy
Lynn Haslam
Anne C. Hoffman
Robert H. Hoffman
Lois F. Horne
Kim A. Howes
Norman C. Jensen
Ann Marie Johnston
Ada Keddington
Sylvia Kirkland
Madelyn Leonard
Derek W. Leyde
Elise Madsen
Casey and Lloyd Marble
Margaret W. Martinez
Wilma McCullough
Jean H. Miller
Storey Mills
Wesley B. Morgan
David W. Mumford
Steve Nichols
John A. Nicolaysen
Frank Louis Nilsen
Dalene Nilson
Gladys Hanson Patterick
Pete Paulos
Lynda Rae Peterson
Darlene M. Phillips
George C. Pingree
Gene E. Pinkerman
Cheyenne Prather

Jeanne M. Rainey
George Sabol
Emily Sanderson
Helen Ward Shryock
Bridget Singleton
Mark H. Smith
Patricia Snapp
Carolyn Ann Spurrier
Cherie Stewart
George B. Swick
Norm Tanner
Fullmer Tebbs
Afton R. Van Kampen
Jeffro Varner
Michael Weiner
Barbara D. Wilcken
Edith Williams
Carl Woolsey Sr.
George Andrew Workman
Peg Wueling
Paul Zablotney
Kevin A. Zenger
Ronald M. Zenger

IN HONOR OF
Those in whose honor gifts were made
to the Moran Eye Center from January 1,
2015 through December 31, 2015

Jaden Albrecht
Balamurali K. Ambati, MD, PhD
Daniel M. Anderson, MD
Paul Bernstein, MD, PhD
Burt Cassity
Craig J. Chaya, MD
Richard O. Christiansen
Alan Crandall, MD
LaVerne Diehl
F. Jane Durcan, MD
David Feil, MD
Stan Feil, MD
Jean Geiss
Clark and Nancy Giles
Roger Harrie, MD
Alan Huish
Curt and Billie Jo Jones
Gracie Lynn Jones
Brad Katz, MD, PhD
Amy Lin, MD
Susan MacDonald, MD
Kirsten T. Mallik
Nick and Mercy Mamalis and Family
Merrill Matzinger
Bonnie Messerly
Mark D. Milfin, MD
Majid Moshirfar, MD

Harald Olafsson
Randall J Olson, MD
Matthew Parsons, MD
Senator Rand Paul
Charlie Pieper
Esther Pomeroy and
Bala Ambati, MD, PhD
Marion Raish
Chris Reddish
Jon Reddish
Patrick and Gwen Reddish
Rose Park Lions Club
Abigail Schmidtlein
Abbey Schwab
Stan Spurrier, DDS
Thomas Starkovich
Lawrence Templin, MD
Michael Teske, MD
Darcy and Brandon Wolsey
Michael Yei
Norm Zabriskie, MD

*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 2015
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

Research to Prevent Blindness ranked Moran as number two in peer-reviewed publications for organizations they fund.

Balamurali K Ambati, MD, PhD, MBA, was listed #1 in the Ophthalmologist Power List Top 40 Under 40 2015.

Alessandra Angelucci, MD, PhD, collaborated on a breakthrough process with Dr. Valerio Pascucci of the University of Utah’s Scientific Computing and Imaging Institute on developing software to map the connections in the large primate brain and more easily create a three-dimensional model of the brain. Their process was announced at a press conference at the annual Society for Neuroscience meeting in Chicago in October 2015.

Paul Bernstein, MD, PhD, has been recognized as an ARVO Gold Fellow for his exemplary individual accomplishments, leadership, and contributions to the association.

Wolfgang Baehr, PhD, received a renewal of The Retina Research Foundation grant which provides critical general funding for a variety of research at Moran, and he received renewal of 1R01 EY08123-28, Photoreceptor Ciliopathies: UNC119 paralogs and NPHP5/10, National Eye Institute.

Mary Elizabeth Hartnett, MD, has been recognized as an ARVO Gold Fellow for her exemplary individual accomplishments, leadership, and contributions to the association.

Robert Marc, PhD, was awarded a five-year University of Utah Core Vision Research Grant by National Institutes of Health, National Eye Institute. All five modules were awarded at full funding. The core grant provides over $500,000 research support annually to Moran research.

Randall J Olson, MD, received the 2015 Philip M. Corboy, MD, Memorial Award, Hawaiian Eye Foundation, for distinguished service in ophthalmology and delivered a keynote lecture at the second largest conference in ophthalmology—the Royal Hawaiian Eye Meeting.

Nikko Ronquillo, Jr., MD, PhD, received the ARCS Foundation Randall J Olson Scholar Award. The award was presented on October 22, 2015 at the ARCS Scholar luncheon.

Brian Stagg, MD, was accepted into the National Clinician Scholars Program. Only 20 scholars are accepted each year. Dr. Stagg also received the Heed Fellowship Award, an unrestricted merit award for post-graduate studies from the Heed Ophthalmic Foundation.

Haibo Wang, MD, PhD, was awarded a one-year Knights Templar Eye Foundation award for The Role of UCP2 on ROP.

Barbara Wirostko, MD, received Moran’s Clinical Faculty of the Year Award in June 2015.

Liliana Werner, MD, PhD, and Nick Mamalis, MD, received multiple industry honors and sponsored awards during the past year, including their article, “Pathologic evidence of pseudoexfoliation in cases of in-the-bag intraocular lens subluxation or dislocation,” which was featured on the cover of Journal of Cataract and Refractive Surgery (JCRS), April 30, 2015.

Liliana Werner, MD, PhD, was selected to join an elite group of eight world experts invited to share their perspectives in a series of workshops created by Alcon Laboratories to define and develop the “best-in-class” next generation intraocular lens.

ASCRS Awards, 2015
BEST PAPER OF SESSIONS AWARDS


MacLean K, Werner L, Kramer GD, Farukhi MA, Gardiner GL, Mamalis N. Evaluation of stability and capsular bag opacification of new foldable adjustable IOL.


Mamalis N, Werner L, Farukhi MA, Kramer GD, MacLean K, won first prize in the category “Cataract Complications,” with the video, Fun with Femtosecond Lasers.

AAO Awards, 2015
Melissa Chandler, CRA, OCT-C, COA, ophthalmic imager, won two awards at the Ophthalmic Photographers Society Scientific Exhibit at AAO 2015 in Las Vegas: Second place Fluorescein Angiogram/Central Serous Retinopathy, and third place OCT/Best’s Vitelliform Dystrophy.
<table>
<thead>
<tr>
<th>Name</th>
<th>Positions and Contributions</th>
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</table>
| Alessandra Angelucci, MD, PhD | 2015 Lead Guest Editor, Special Issue, *Visual Neuroscience* on “Controversies in Extrastriate Cortex Mapping”  
2014-Present Elected Standing Panel, NIH Center for Scientific Review, Study Section, Mechanisms of Sensory, Perceptual, and Cognitive Processes  
2008-Present Review Editor, *Frontiers in Neuroanatomy*  
| Wolfgang B Baehr, PhD     | 2015-Present Associate Editor, *Frontiers in Molecular Neuroscience*  
2013-Present Editor, *Journal of Ocular Biology, Diseases, and Informatics*  
2004-Present Senior Editor, *Vision Research, Elsevier Science* |
| Paul S Bernstein, MD, PhD  | 2015-2017 Vice President-elect, Vice President, ARVO  
2014-2015 Editor, Special Issue, “Carotenoids,” *Archives of Biochemistry and Biophysics*  
2011-Present Council Board, International Carotenoid Society  
2005-Present Scientific Advisory Board, Foundation Fighting Blindness |
| Alan S Crandall, MD       | 2015 Chairperson, European Society of Cataract and Refractive Surgery |
| Karen Curtin, PhD, MStat  | 2011-Present Associate Editor, *BMC Gastroenterology*; Editorial Board, *Frontiers in Applied Genetic Epidemiology* |
| Margaret DeAngelis, PhD   | 2014-Present Guest Editor, *Journal of Clinical Medicine*-Special Issue, “Age-related Macular Degeneration”; Chair, Seminar Series Committee, Moran Eye Center, Department of Ophthalmology, School of Medicine  
2011-Present Board of Trustees, Fourth Street Clinic; Senior Executive Steering Committee, Age-related Macular Degeneration Gene Consortium, NEI/NIH  
2010-Present Director, Ocular Genomics and Systems Biology Laboratory, Moran Eye Center, University of Utah School of Medicine |
| Kathleen B Digre, MD      | 2015-Present Chair, Moran CORE Committee  
2005-Present Director, Center of Excellence in Women’s Health; Chair, Neuro-ophthalmology Virtual Education Library (NOVEL) Oversight Committee  
1995-Present Editorial Board, *Journal of Neuro-Ophthalmology* |
| Michael Feehan, PhD       | 2015-Present Editorial Board, *Inside Patient Care* |
| Gregory S Hageman, PhD    | 2013-Present Advisory Board, Merck Sharp and Dohme Corporation; Scientific Advisory Board, Applied Genetic Technologies Corporation  
2012-Present Chief Scientific Officer, Co-founder, Voyant Biotherapeutics LLC; Clinical Advisory Board, Sequenom, Inc.  
2009-Present Board of Directors, AMD Alliance International |
Mary Elizabeth Hartnett, MD
2015-Present  Co-director, University of Utah, MD-PhD
2015  Chair, ARVO, Ethics Committee; Chair, ARVO, Retinal-Biology Scientific Section
2014-Present  Representative, The University of Utah Promotion and Tenure Advisory Committee, School of Medicine
2013-2015  Chair, NIH Center for Scientific Review, Study Section on Diseases and Pathophysiology of the Visual System
2012-Present  Editor, *American Academy of Pediatric Ophthalmology and Strabismus* Telehealth Steering Committee, University of Utah
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  Board, Institutional Review Board, University of Utah

Bryan W Jones, PhD
2015-Present  Editor, *Experimental Eye Research*
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
2009-Present  Editorial Board, *Journal of Open Access Animal Physiology*

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
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*

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
2014-2015  Advisory Board, AAO; Editorial Advisory Board, *EyeNet*
2002-Present  Advisory Boards, Advanced Medical Optics, Inc.; Surgical Global; and Healon V
2001-Present  Chair, Advisory Board, Calhoun Vision
1983-Present  Executive Committee, Department Chairs’ Collateral Group and Sciences Council, School of Medicine
<table>
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<tr>
<th>Name</th>
<th>Position</th>
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<tr>
<td>Leah Owen, MD, PhD</td>
<td>2015-Present Editorial Board, <em>Journal of Ophthalmology and Visual Sciences</em></td>
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<td></td>
<td>2005-Present Chief Coeditor, <em>ORBIT</em></td>
<td>2003-Present Editorial Board, <em>Evidence Based Eye Care</em></td>
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<td>2002-Present Editor, USA <em>ORBIT</em></td>
<td>2000-Present Editorial Board, <em>Aesthetique</em></td>
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<td>1999-Present Editorial Board, <em>Journal of Cranio-Maxillofacial Trauma</em></td>
<td>1996-Present Medical Advisory Board, American Society of Oculists</td>
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<td>1991-Present Editorial Board, <em>Abstracts from the Literature for Ophthalmic, Plastic, and Reconstructive Surgery</em></td>
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<tr>
<td>Jeff Pettey, MD</td>
<td>2014-Present Chief of Ophthalmology, Salt Lake City Veterans Affairs Hospital; Associate Editor, AAO</td>
<td>2013-Present Associate Editor, AAO <em>Global Ophthalmology Guide</em></td>
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<td>Jason D Shepherd, PhD</td>
<td>2014-Present Editorial Board, <em>Frontiers in Molecular Neuroscience</em></td>
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<td>Geoffrey Tabin, MD</td>
<td>2006-Present Editor, <em>Stedman’s Medical Dictionary</em></td>
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<tr>
<td>Monica Vetter, PhD</td>
<td>2014-Present Chair, Executive Board, University of Utah Neuroscience Initiative</td>
<td>2013-Present Chair, Neuroscience Strategic Planning Committee, University of Utah</td>
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<td>2011-Present Scientific Advisory Board, “Catalyst for a Cure 2,” Glaucoma Research Foundation</td>
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<td>Albert T Vitale, MD</td>
<td>2015-Present President-elect, American Uveitis Society</td>
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<td>2014-Present Co-director, AAO, Uveitis Sub-specialty Day, AAO Annual Meeting</td>
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<td></td>
<td>2012-Present Chairman, Education of Utah Ophthalmology Society</td>
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<td></td>
<td>2006-Present Faculty Executive Committee, Ophthalmology and Visual Sciences; Editorial Board, Editorial and Writing Committee for Practicing Ophthalmologists, AAO; Editor, Basic Science Course: <em>Intraocular Inflammation, Uveitis, and Tumors for Focal Points, AAO</em></td>
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<td>2004-Present Advisory Boards, Genentech, Inc. and Lucentis; Uveitis Advisory Board, Aciont Inc.</td>
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<td>2003-Present Uveitis Advisory Board, Bausch &amp; Lomb</td>
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<tr>
<td>Judith E A Warner, MD</td>
<td>2015-2016 Past President-elect, President, Board of Directors, University of Utah Faculty Club</td>
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<td>2012-Present Institutional Review Board, University of Utah</td>
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<td>2011-Present Chair, Continuing Medical Education Advisory Committee, ASCRS</td>
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<td>2009-Present Scientific Advisory Board, Powervision Inc., USA</td>
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<td>2008-Present Co-director, Intermountain Ocular Research Center, John A. Moran Eye Center, University of Utah</td>
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<td>Barbara M Wirostko, MD</td>
<td>2015-Present Scientific Advisory Board, Glaucoma Foundation</td>
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<td>2011-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</td>
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<td>2010-Present Editorial Board, <em>Acta Ophthalmologica</em></td>
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<td>2007-Present Associate Editor, <em>Acta Ophthalmologica</em></td>
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<td>January 7</td>
<td>Adam Jorgensen, MD, Resident</td>
<td>Hemianopia with Normal Imaging</td>
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<td>René Choi, MD, PhD, Resident</td>
<td>A Short Neuro Case Presentation on Vision Loss</td>
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<td>January 14</td>
<td>Ashlie Bernhisel, MD, Intern</td>
<td>When Clinical Suspicion Prevails</td>
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<td>January 21</td>
<td>Visvanathan Ramamurty, PhD,</td>
<td>AIPL1-LCA, from Bench to Bedside?</td>
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<td>Center for Neuroscience, West</td>
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<td>Virginia University</td>
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<td>January 28</td>
<td>Alison Crum, MD, Faculty</td>
<td>Plastics</td>
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<td>February 11</td>
<td>Ilyas Washington, PhD,</td>
<td>How Inhibiting the Dimerization of Vitamin A May Prevent Retinal Degeneration</td>
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<td>Assistant Professor,</td>
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<td>Columbia University Medical</td>
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<td>February 18</td>
<td>Klara Landau, MD, FEBO,</td>
<td>Trochlear-Nerve-Palsy: “Tricks and Tipps”</td>
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<td>Professor and Chair,</td>
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<td>Department of Ophthalmology,</td>
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<td>University Hospital Zurich</td>
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<td>February 25</td>
<td>Albert T Vitale, MD, Faculty</td>
<td>Uveitis</td>
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<td>March 4</td>
<td>Reuben Valenzuela, MD</td>
<td>Neuro-ophthalmic Manifestations of Sarcoidosis</td>
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<td>Neuro-ophthalmology Fellow</td>
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<td>March 11</td>
<td>Lars G Fritsche, University</td>
<td>Lessons from the Largest Case-control Study of Age-related Macular Degeneration</td>
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<td>March 18</td>
<td>Liliana Werner, MD, PhD,</td>
<td>Localized Calcification of Hydrophilic Acrylic IOLs after Procedures Using</td>
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<td>Faculty</td>
<td>Intracameral Injections of Air/Gas</td>
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<td>March 25</td>
<td>Marielle Young, MD, Faculty</td>
<td>Pediatrics</td>
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<td>April 1</td>
<td>Mani Nambi, PhD, Graduate</td>
<td>Robot Assisted Retina Surgery</td>
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<td>Research Assistant,</td>
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<td>April 8</td>
<td>Sabine Fuhrmann, PhD, Faculty</td>
<td>In Search for a Therapy for Lipofuscin-induced Blinding Disease</td>
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<td>Enrique Rodriguez-Boulan, MD</td>
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<td>Weill Cornell Medical College</td>
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<td>April 15</td>
<td>Reuben Valenzuela, MD</td>
<td>Neuro-ophthalmology</td>
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<td>Neuro-ophthalmology Fellow;</td>
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<td>Zachary Joos, MD, Chief</td>
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<td>Resident; Brian Zaugg, MD,</td>
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<td>Chief Resident</td>
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<td>April 22</td>
<td>Balamurali K Ambati, MD, PhD,</td>
<td>Femto Musings: Evidence and Perspectives</td>
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<td>MBA, Faculty</td>
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<td>April 29</td>
<td>Jay Jacobson, MD, Professor</td>
<td>Advertising in Ophthalmology</td>
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<td>Emeritus, Medical Ethics,</td>
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<td>May 13</td>
<td>Trent Richards, MD, Chief</td>
<td>A Chemotic and Injected Eye</td>
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<td>Resident; Jeremy Valentine, MD</td>
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<td>May 20</td>
<td>Russell Swan, MD, Resident</td>
<td>Choroidal Melanoma: Case and Clinical Review</td>
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<tr>
<td>May 27</td>
<td>Aparna Ramasubramanian, MD,</td>
<td>Paradigm Shift in the Management of Retinoblastoma in the Last Decade</td>
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<td>Polly Moore, PhD, Medical</td>
<td>Non-24 Disorder</td>
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<td>Science, Vanda Pharmaceuticals</td>
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<td>June 3</td>
<td>Brian Zaugg, MD, Chief</td>
<td>Visual Snow and Midyear Forum Academy Update</td>
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<td>June 10</td>
<td>Jason Feuerman, MD, Cornea</td>
<td>DMEK Pros, Cons, and Lessons Learned from Our First Case</td>
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<td>June 17</td>
<td>Reece Feist, MD, Intern</td>
<td>Leukemic Retinopathy</td>
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<td>June 24</td>
<td>Rachael Jacoby, MD, Faculty</td>
<td>Retina</td>
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<td>Julia Byrd, MD, Resident</td>
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<td>July 8</td>
<td>Alan Morris, MD, Internal Medicine, University of Utah</td>
<td>Clinical Quality and Value: Business Processes, Clinical Research, and Computer Protocols—Roles for 6-Sigma and Closed-loop Control</td>
</tr>
<tr>
<td>July 15</td>
<td>Judd Cahoon, MSIV, University of Utah</td>
<td>COMP-Ang1-Induces Vascular Normalization in Murine Type 1 Diabetic Retinopathy</td>
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<td>Rebekah Gensure, MSIV, Rutgers University</td>
<td>Transcorneal Electrical Stimulation</td>
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<td>Nate Lambert, MSIV, University of Utah</td>
<td>Iris Nevi and the Transition to Melanoma</td>
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<td>Sravanthi Vegunta, MSIV, University of Arizona COM</td>
<td>Intense Pulsed-light Therapy for Dry Eye Disease</td>
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<td>July 22</td>
<td>Bennett Hong, MSIV, Stonybrook University</td>
<td>Plaquenil Maculopathy</td>
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<td>David Griffin, MSIV, University of Central Florida</td>
<td>A Case of Ocular Cicatricial Pemphigoid</td>
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<td>Brad Jacobsen, MSIV, University of California, Irvine</td>
<td>Orbital Recurrence following Aggressive Laser Treatment for Recurrent Retinoblastoma</td>
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<td>Jason Jensen, MSIV, University of Utah</td>
<td>Objective Phacoemulsification Efficiency and Chatter</td>
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<tr>
<td>July 29</td>
<td>Amy Lin, MD, Faculty</td>
<td>Not Just a Hyphema</td>
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<td>August 12</td>
<td>Michael Ellis, MSIV, University of Kansas SOM</td>
<td>Conjunctival Intraepithelial Neoplasia</td>
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<td>Martin de la Presa Pothier, MSIV, University of Utah</td>
<td>Patient Perceived Pain during Second Eye Cataract Surgery</td>
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<td>David Massop, MSIV, Creighton University</td>
<td>Subretinal Mass in an Immunocompromised Patient</td>
</tr>
<tr>
<td>August 19</td>
<td>Taylor Fields, MSIV, Medical College of Georgia</td>
<td>Pseudoexfoliation Syndrome and Atrial Fibrillation</td>
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<td>Amith Subhash, MSIV, University of Utah</td>
<td>Autoimmune Retinopathy</td>
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<tr>
<td>August 26</td>
<td>Alan S Crandal, MD, Faculty</td>
<td>Cataract</td>
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<tr>
<td>September 2</td>
<td>Bradley J Katz, MD, PhD, Faculty</td>
<td>Thin-film Optical Notch Filters for the Treatment of Migraine and Photophobia</td>
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<td>Donraphael Wynn, MD, Neuro-ophthalmology, University of Utah SOM</td>
<td>Skewed Diagnosis</td>
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<tr>
<td>September 9</td>
<td>Huy Ly, MSIV, Texas Tech University, Paul L. Foster SOM</td>
<td>Optic Nerve Aplasia</td>
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<td>Ryan O. Meilia, MSIV, University of Oklahoma COM</td>
<td>Down and Out Again (Ophthalmoplegic Migraine)</td>
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<td>Anthony Leonard, MSIV, University of South Carolina COM</td>
<td>Forward Light Scattering for the Staging and Management of Keratoconus</td>
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<td>Samuel Thomas, MSIV, University of Utah</td>
<td>Corneal Transplant: The Global Need and an Innovation Solution</td>
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<tr>
<td>September 16</td>
<td>Tyler Anderson, MSIV, Virginia Commonwealth University</td>
<td>Implications of Popular Eye Remedies: Past and Present</td>
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<td>Gaytri Elera, MSIV, Penn State University</td>
<td>Optic Nerve Drusen: Purely Benign Condition</td>
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<td>Blake Williams, MSIV, University of Chicago</td>
<td>A Case of Parinaud’s Syndrome</td>
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<td>Sai Bhuvangiri, MSIV, St. George University</td>
<td>Punctate Inner Choroid</td>
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<tr>
<td>September 23</td>
<td>Tara Hahn, MD, Intern</td>
<td>Torsional Diplopia following Inferior Rectus Recession in Thyroid Eye Disease</td>
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<td>Andy Zhou, MD, Research Fellow</td>
<td>Gene Therapy for the Eye</td>
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<td>Sailaja Bondalapati, MSIV, University of Utah</td>
<td>Cystoid Macular Edema in Retinopathy of Prematurity</td>
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<td>September 30</td>
<td>Tina Mamalis, MSIV, <em>University of Utah</em></td>
<td>The Reduction of Serum Soluble Flt-1 in AMD</td>
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<td>Jun Guan, MD, Ocular Pathology Research Fellow</td>
<td>Residual Refractive Error after Cataract Surgery and a Novel Modular Intraocular Lens</td>
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<td>Nick Reiter, MD, Ocular Pathology Research Fellow</td>
<td>Assessment of a New Hydrophilic Acrylic Supplementary IOL for Sulcus Fixation in Pseudophakic Cadaver Eyes</td>
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<td></td>
<td>Jack Li, BA, MSIII, Ocular Pathology Research Fellow</td>
<td>Evaluation of Biocompatibility and Capsular Bag Opacification with the CORD LLC, SC9 Accommodating Intraocular Lens in the Rabbit Model</td>
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<tr>
<td>October 7</td>
<td>Shizuya Saika, MD, PhD, Professor and Chair, Department of Ophthalmology, <em>Wakayama Medical University</em>, SOM, Wakayama, Japan</td>
<td>Epithelial-mesenchymal Transition: The Key Phenomenon in Ocular Fibrotic Disease</td>
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<tr>
<td>October 14</td>
<td>Jay Jacobson, MD, Professor Emeritus, Medical Ethics, <em>University of Utah</em></td>
<td>Ethics Conference</td>
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<td>Adam Jorgensen, MD, Chief Resident; Eileen Hwang, MD, PhD, Resident</td>
<td>When Should an Ophthalmologist Retire</td>
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<tr>
<td>October 21</td>
<td>Russell Swan, MD, Retina Fellow</td>
<td>When Carrots Start Looking Like Cones</td>
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<td>Al-Wala Awad, MD, Department of Neurosurgery, <em>University of Utah</em></td>
<td>Diagnosis and Management of Pituitary Adenomas</td>
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<td>Bornali Kundu, MSTP, <em>University of Wisconsin</em>, Madison</td>
<td>Management of Vision Threatening Papilledema</td>
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<tr>
<td>October 28</td>
<td>Michael Yei, Moran Global Outreach Division Manager</td>
<td>International</td>
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<td>Juan Carlos Negrette, Director of Global Health, <em>University of Utah</em></td>
<td>Global Outreach</td>
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<td>Brian Stagg, MD, Chief Resident</td>
<td>Charity Surgery Day</td>
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<tr>
<td>November 11</td>
<td>Mark D Mifflin, MD, Faculty; Brian Zaugg, MD, Cornea Fellow, Adam Frederick, Cornea Fellow</td>
<td>Refractive Surgery</td>
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<tr>
<td>November 18</td>
<td>Brian Stagg, MD, Chief Resident</td>
<td>Sixteen-year-old Boy with Headaches and Vision Loss</td>
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<tr>
<td>December 2</td>
<td>Adam Jorgensen, MD, Chief Resident</td>
<td>NTG and Mimickers</td>
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<td>Christopher Wilkerson, MD, Neurology Resident, <em>University of Utah</em></td>
<td>Diplopia in a Patient with Downbeat Nystagmus</td>
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<tr>
<td>December 9</td>
<td>Norm A Zabriskie, MD, Faculty</td>
<td>Glaucoma</td>
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<tr>
<td>Balamurali K Ambati, MD, PhD, MBA</td>
<td>A Unifying Mechanism for RAP and CNV. Macula of Paris.</td>
<td>Paris, France</td>
</tr>
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<td></td>
<td>Cataract/IOLs - Advances in Techniques and Technology to Improve Patient Outcomes. Hawaiian Eye CME Seminar 2015.</td>
<td>Maui, HI</td>
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<tr>
<td>Alessandra Angelucci, MD, PhD</td>
<td>Plenary Speaker, UC Berkeley Workshop on Theory of Neural Computation.</td>
<td>Berkeley, CA</td>
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<tr>
<td>Wolfgang B Baehr, PhD</td>
<td>Invited Speaker, Rab8 and Rab11 are Dispensable for Photoreceptor Ciliary Trafficking. Rab28 is Required for Cone Survival in Mouse Retina. The Biology and Chemistry of Vision. FASEB Meeting.</td>
<td>Big Sky, MT</td>
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<td>Invited Speaker, The Role of ARL3 in Trafficking of Lipidated Proteins to Photoreceptor Sensory Cilia. The Biology of Cilia and Flagella. FASEB Meeting.</td>
<td>Snowmass Village, CO</td>
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<td></td>
<td>Invited Presentation, The Role of ARL3 in Trafficking of Lipidated Proteins to Photoreceptor Sensory Cilia. The Sichuan Provincial Key Laboratory for Human Disease Gene Study. The Institute of Laboratory Medicine, Hospital of University of Electronic Science and Technology of China and Sichuan Provincial People’s Hospital.</td>
<td>Chengdu, China</td>
</tr>
<tr>
<td>William Barlow, MD</td>
<td>Toric IOLs. Effect of Increased Vacuum and Aspiration Rates on Phacoemulsification Efficiency. Radiused Phacoemulsification Tip. Cataract Surgery Symposium on Reducing Operative Complications. ASCRS.</td>
<td>San Diego, CA</td>
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<td></td>
<td>Beyond EPA and DHA: The Role of Very Long Chain Polyunsaturated Fatty Acids (VLC-PUFAs) in AMD. Macular ART.</td>
<td>Paris, France</td>
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<td>Scientific Poster 490: A Clinical Trial of Zeaxanthin Supplementation in Patients with Macular Telangiectasia. AAO.</td>
<td>Las Vegas, NV</td>
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<td>Invited Speaker, Washington University. Plenary Lecturer, Ocular Nutrition Symposium, University of Missouri, St. Louis School of Optometry.</td>
<td>St. Louis, MO</td>
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<td>Invited Speaker, Department of Nutrition, Texas A&amp;M University.</td>
<td>College Station, TX</td>
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<tr>
<td>Alan S Crandall, MD</td>
<td>Cataract Surgery in the Realm of Glaucoma and Use of Surgical Management Including MIGS. 38th Annual Alumni Meeting.</td>
<td>Detroit, MI</td>
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<td></td>
<td>How to Avoid Surgical Plateau and Continue Growing as a Surgeon after Training. Panel Participant. AAO.</td>
<td>Las Vegas, NV</td>
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<td>Breakfast Roundtable Discussions. AGS.</td>
<td>Coronado, CA</td>
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<td>Funding New Horizon: Venture Capital Panel Discussion. 19th AGS.</td>
<td>San Francisco, CA</td>
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<td>Complication: Anterior Segment Complication. Innovative Technology to Optimize Outcomes.</td>
<td>West Point, IL</td>
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<td>Title</td>
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<td>the Dislocated Cataract: Use of the CTR, CTS, and Capsule Retractors. Stretch, Snip, Sculpt, or Replace? Master Course in Complex Iris Repair and Prosthesis Cases. Imaging for Cutting-edge Procedures. What is the Best IOL for My Glaucoma Patients? ASCRS.</td>
<td>Barcelona, Spain</td>
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<tr>
<td>Glaucoma Surgery for the Cataract Surgeon: Ways to Improve Your Outcomes and to Catch up with the Latest: A Video-based Course. Management of Cataract Lens Challenging Cases. Surgical Management of Malpositioned Lenses. XXXIII Congress of the ESCRS.</td>
<td>Chennai, India</td>
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<tr>
<td>Incidence of Idiopathic Intracranial Hypertension (IIH) among Users of Tetracycline Antibiotics. Metastasis or Metamorphosis? Exploratory Study of the Relationship between the Levonorgestrel-releasing Intrauterine System and Idiopathic Intracranial Hypertension. NANOS.</td>
<td>San Diego, CA</td>
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<tr>
<td>Poster Session, NOVEL Update: It is More than a Library. Intracranial Hypertension: Causes, and Can it Occur Without Papilledema? EUNOS.</td>
<td>Ljubljana, Slovenia</td>
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<tr>
<td>Plenary Session, Quality of Life in IIH. NANOS.</td>
<td>San Diego, CA</td>
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<tr>
<td>Challenging Headache Cases. Scottsdale Headache Symposium.</td>
<td>Scottsdale, AZ</td>
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<tr>
<td>Neuro-ophthalmological Disorders in Pregnancy. Braley Lecture, University of Iowa.</td>
<td>Iowa City, IA</td>
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<td>Transforming Pharmacy Services: New Models of Primary Health Care Delivery. BD (Becton, Dickinson and Company), Worldwide Diabetes Care Leadership Team.</td>
<td>Franklin Lakes, NJ</td>
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<td>Pharmacists’ Occupational Satisfaction and Coping with Stress. APhA.</td>
<td>San Diego, CA</td>
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<tr>
<td>Gregory S Hageman, PhD Invited Speaker, Toward the Identification of Pathways and Targets in Diabetic Retinopathy: Lessons Learned from Studies of Age-related Macular Degeneration. Novo Nordisk.</td>
<td>Malov, Denmark</td>
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<td>Presented, CTM/Voyant Pathway Discovery. Allergan, Inc.</td>
<td>Irvine, CA</td>
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<td>Invited Speaker, Toward a Refined Understanding of the Biology and Genetics of AMD: Diagnostic and Therapeutic Implications. FORSIGHT Labs LLC and VISION4.</td>
<td>Menlo Park, CA</td>
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<td>Invited Speaker, Toward a Refined Understanding of AMD-associated Pathways: Diagnostic and Therapeutic Implications. NIBR.</td>
<td>Washington, DC</td>
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<tr>
<td>Keynote Speaker, Game Changers in Vision. Innovative Approaches to Research to Care. 2015 Focus on Eye Health National Summit, Prevent Blindness.</td>
<td>Tarrytown, NY</td>
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<tr>
<td>Invited Speaker, Toward a Refined Understanding of AMD-associated Pathways: Diagnostic and Therapeutic Implications. The Role of Complement Biology and Genetics in Age-related Macular Degeneration. Regeneron.</td>
<td>Gainesville, FL</td>
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<td>Invited Speaker, Toward a Refined Understanding of AMD-associated Pathways: Diagnostic and Therapeutic Implications. Applied Genetic Technologies, Corp.</td>
<td>San Francisco, CA</td>
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<td>Invited Speaker, Toward a Refined Understanding of AMD-associated Pathways: Diagnostic &amp; Therapeutic Implications. Alexion Pharmaceuticals.</td>
<td>Newport, RI</td>
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<tr>
<td>Mary Elizabeth Hartnett, MD Moderator, The small GTPase Rap1 Regulates Intracellular ROS Generation in RPE. Personal and Historical Insights into the Henrietta Lacks Story. Author Block: Roland and Patricia Pattillo, Morehouse School of Medicine, Atlanta, Georgia. National MD-PhD Association Meeting.</td>
<td>Keystone, CO</td>
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<td>TNFa-Induced CNV Inhibited by Active Rap 1. AOS.</td>
<td>Newport, RI</td>
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<tr>
<td><strong>Mary Elizabeth Hartnett, MD</strong></td>
<td><strong>Sensory Integration in the Eye.</strong> University of Ljubljana, Department of Biology.</td>
<td>Ljubljana, Slovenia</td>
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<td>Moderator for Session 5 Basis Sciences, VEGF Activates EPOP and causes Pathological Angiogenesis. Macula Society Annual Meeting.</td>
<td>TRP Channel-mediated Integration of Temperature, Mechanical Stress, and Glutamatergic Stimuli in Retinal Ganglion Cells. TRPV4 Channels Regulate the Inflow Pathway in the Anterior Eye. ARVO.</td>
<td>Denver, CO</td>
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<tr>
<td>Distinguished Speaker, VEGF in Retinal Development and Pathology. Research Lecture Series, SUNY Downstate</td>
<td>A Novel Approach to Pressure Lowering with Neuroprotection. Alcon/Novartis.</td>
<td>Ft. Worth, TX</td>
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<tr>
<td>Rationale, Evidence, and Safety for Anti-VEGF in Proliferative Angiogenesis, 12. International Conference in Advanced Retinal Teaching, Medical University Vienna.</td>
<td>The Role of Multisensory Integration in Retinal Disease. University of California, Los Angeles, Jules Stein Distinguished Lecture Series.</td>
<td>Los Angeles, CA</td>
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<tr>
<td>Mechanisms of Anti-VEGF and Prospects for Future Treatments of ROP. Retina Subspecialty Day. AAO.</td>
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<td>Discovery Institute Distinguished Seminar Series.</td>
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<td>Bradley J Katz, MD, PhD</td>
<td>Kristen Kwan, PhD</td>
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<td>The Relationship between the Levonorgestrel-releasing Intrauterine System and IIH. Poster Session, ARVO.</td>
<td>Hedgehog Signaling Constrains Cell Migration During Early Eye Morphogenesis. Southwest Regional Meeting of the Society for Developmental Biology.</td>
<td>Dallas, TX</td>
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<td>Cellular and Molecular Dynamics Shaping the Vertebrate Eye. Department of Cell Biology and Human Anatomy, UC Davis.</td>
<td>Davis, CA</td>
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<tr>
<td>Nick Mamalis, MD</td>
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<td>Pathologic Evidence of Pseudoxefalliation in Cases of IOL Subluxation/ Dislocation within the Capsular Bag. ASCRS/ESCRS Survey on Foldable IOLs Requiring Implantation or Secondary Intervention: 2014 Update. Localized Opacification of Hydrophilic Acrylic IOLs after Multiple Surgical Procedures. AAO.</td>
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<td>Jeff Pettey, MD</td>
<td>Global Burden of Blindness. University of Dodoma Medical School.</td>
<td>Dodoma, Tanzania</td>
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<td>Cataract Outreach Quality Eye Surgery in Challenging Environments. ASCRS.</td>
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<td>Medical and Surgical Therapy in the Diagnosis of Uveitis. How to Interpret Fundus Fluorescein Angiography in the Treatment and Diagnosis of Uveitis. AAO.</td>
<td>Las Vegas, NV</td>
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<td>Infectious Posterior Uveitis: Ocular Syphilis, The Great Masquerader. IOIS.</td>
<td>San Francisco, CA</td>
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<td>Denver, CO</td>
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<tr>
<td>Liliana Werner, MD, PhD</td>
<td>British Society for Refractive Surgery 22nd Annual Scientific Congress.</td>
<td>Birmingham, England</td>
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<td>VIII Congresso Brasileiro de Catarata e Cirurgia Refrativa, Costa do Sauípe.</td>
<td>Bahia, Brazil</td>
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<tr>
<td>Jun Yang, PhD</td>
<td>Whirlin Different Regions Have Unique Functions in the Inner Ear and Retina. Association for Research in Otolaryngology Mid-winter Meeting.</td>
<td>Baltimore, MD</td>
</tr>
<tr>
<td>Norm A Zabriskie, MD</td>
<td>Cataract Surgery Alone: An Underutilized Glaucoma Solution? ASCRS.</td>
<td>San Diego, CA</td>
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<td>Trabeculectomy: Intraoperative and Postoperative Considerations. Nebraska Ophthalmologic Society.</td>
<td>Lincoln, NE</td>
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Currently, more than 60 clinical research trials are being carried out at the Moran Eye Center

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<tr>
<th>CATARACT</th>
<th>Principal Investigator</th>
<th>Details</th>
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</table>
| Safety and Effectiveness of Intracameral Moxifloxacin in Cataract Surgery | Balamurali K Ambati, MD, PhD, MBA | Accuracy of the Holladay 2 Formula Using Lenstar Biometry Principal Investigator: William Barlow, MD  
Clinical Study of the ARTISAN Aphakia Lens for the Correction of Aphakia in Adults Principal Investigator: Alan S Crandall, MD  
Clinical Study of the ARTISAN Aphakia Lens for the Correction of Aphakia in Children Principal Investigator: Alan S Crandall, MD  
Tear Film Osmolarity and Matrix Metalloproteinase-9 (MMP-9) Levels after Cataract Surgery Principal Investigator: Amy Lin, MD  
Driving with Pseudophakia Principal Investigator: Randall J Olson, MD |
| CORNEA                                                                   | Principal Investigator | Details                                                                                     |
| Subconjunctival Aflibercept Injection for Corneal Neovascularization      | Balamurali Ambati, MD, PhD, MBA | Subconjunctival IVIg (Gamunex-C) Injection for Corneal Neovascularization and Inflammatory Conditions Principal Investigator: Balamurali Ambati, MD, PhD, MBA  
Effect of Corneal Preservation Time on Long-term Graft Success (CPTS) Principal Investigator: Mark D Mifflin, MD  
Retrospective Study of Descemet’s Stripping Automated Endothelial Keratoplasty Outcomes Principal Investigator: Mark D Mifflin, MD  
Evaluation of the Safety and Efficacy of Corneal Collagen Crosslinking in Eye with Keratoconus or Corneal Ectasia after Refractive Surgery Principal Investigator: Mark D Mifflin, MD  
Biomechanical Changes in the Cornea after Laser Assisted in situ Keratomileusis (LASIK) and Photorefractive Keratectomy (PRK) Principal Investigator: Mark D Mifflin, MD  
70 versus 110 Degrees Side-cut Angles in Femtosecond Laser-assisted in situ Keratomileusis (LASIK) Principal Investigator: 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 Principal Investigator: Mark D Mifflin, MD |
| GENERAL                                                                   | Principal Investigator | Details                                                                                     |
| Call Variation Between Ophthalmology Programs                              | James Bell, MD         | Conjunctional Forniceal Depth across a Normalized Pediatric and Young Adult Population Principal Investigator: Alison Crum, MD  
Time and Experience Required for Ophthalmological Surgical Training Principal Investigator: Jeff Petey, MD |
| GLAUCOMA                                                                  | Principal Investigator | Details                                                                                     |
| 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 4 Study) Principal Investigator: Alan S Crandall, MD  
Observational Study Assessing Various Novel Vascular and Diagnostic Parameters and their Relationship to Glaucoma Principal Investigator: Barbara M Wirostko, MD  
Pseudoexfoliation and Co-morbidities Principal Investigator: Barbara M Wirostko, MD |
| NEURO-OPHTHALMOLOGY                                                       | Principal Investigator | Details                                                                                     |
| Prospective Assessment of Photophobia in Moran Eye Center Patients        | Kathleen B Digre, MD   | Evaluation of Optic Neuropathies with Imaging Principal Investigator: Kathleen B Digre, MD  
Retrospective Review of Primary and Secondary Causes of Pseudotumor Cerebri Principal Investigator: Kathleen B Digre, MD  
Visual Quality of Life Migraine Study Principal Investigator: Kathleen B Digre, MD  
Causes of Eye Pain Principal Investigator: Kathleen B Digre, MD  
Proteomics and Genomics of Giant Cell Arteritis Principal Investigator: Bradley J Katz, MD, PhD  
Prospective Study to Evaluate the Possible Association Between the Use of PDE5 Inhibitors and the Risk of Acute Nonarteritic Anterior Ischemic Optic Neuropathy Principal Investigator: Bradley J Katz, MD, PhD  
Predictive Value of Optic Nerve MRI Measurements at Onset of Optic Neuritis for Two-year MS Outcomes Principal Investigator: Bradley J Katz, MD, PhD  
Thin Film Spectacle Coatings to Reduce Light Sensitivity and Headaches in Patients with Migraine Principal Investigator: Bradley J Katz, MD, PhD  
Functional Vision Loss and Childhood Trauma Principal Investigator: Bradley J Katz, MD, PhD |
<table>
<thead>
<tr>
<th>Study Title</th>
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<tr>
<td>Posterior Cortical Atrophy</td>
<td>Judith E A Warner, MD</td>
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<td>Pediatric Ophthalmology</td>
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<td>Genetics of Pediatric Retinal Disorders</td>
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<tr>
<td>Preeclampsia and Retinopathy of Prematurity</td>
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<td>Genetic Associations in Preterm Infants at Risk of Retinopathy of Prematurity</td>
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<td>Spectral Domain OCT Imaging of Eyes: a Practical Diagnostic Tool and Methodology</td>
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<td>Postnatal Growth and Retinopathy of Prematurity Study (G-ROP)</td>
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<td>Prevalence of Autism Spectrum Disorders in Patients with Oculocutaneous Albinism</td>
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<td>Retina</td>
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<td>Subretinal Versus Intravitreal TPA for Subretinal Hemorrhage</td>
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<td>Macular Pigment Measurements in Eye and Other Tissues</td>
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<td>Utah Center for the Collaborative Study of the Role of Macular Pigment Carotenoids in the Pathogenesis and Treatment of MacTel</td>
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<td>Phase 2 Multiple-site, Randomized, Placebo-controlled Trial of Oral Valproic Acid for Retinitis Pigmentosa</td>
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<td>Natural History and Observation and Registry Study of Macular Telangiectasia Type 2: the MacTel Study</td>
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<tr>
<td>Utah Center for MacTel Genetics</td>
<td>Paul S Bernstein, MD</td>
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<tr>
<td>Efficacy and Safety of Emixustat Hydrochloride (ACU-4429) with Placebo for the Treatment of Geographic Atrophy Associated with Dry Age-related Macular Degeneration</td>
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<td>Natural History of the Progression of Atrophy Secondary to Stargardt Disease: a Prospective Longitudinal Study (ProgSTAR)</td>
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<td>Natural History of the Progression of Atrophy Secondary to Stargardt Disease: a Retrospective Longitudinal Study (ProgSTAR)</td>
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<td>Phase 3 Randomized, Double-masked, Controlled Trial to Establish the Safety and Efficacy of Intravitreous Administration of FovistaTM (anti PDGF-B pegylated aptamer) Administered in Combination with Lucentis® Compared to Lucentis® Monotherapy in Subjects with Neovascular Age-related Macular Degeneration</td>
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<td>Phase 2, Multi-center, 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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</tbody>
</table>
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.


Methods and Reagents for Treatment and Diagnosis of Age-Related Macular Degeneration, Hageman GS. New Zealand 608860 (issued 03-June-2015) (1223NZ); Hong Kong HK1154634 (issued 21-Aug-2015) (1221HK); Europe application 10185982.5 (allowed-15-July-2015) (1224EP).

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).


RCA Locus Analysis to Assess Susceptibility to AMD and MPGNII, Hageman GS. Australia 2008318316 (issued 19-Nov-2015) (2210AU).

Predicting AMD with SNPs within or near C2, FACTOR B, PLEAKHA1, HETRA1, PRELP, or LOC387715, Hageman GS. Canada application 2,704,447 (condition for allowance; not yet issued) (2220CA).

Variants in Complement Regulatory Genes Predict Age-Related Macular Degeneration (Factor B), Allikmets RA, Hageman GS, Dean MC, and Gold AM. United States 9,063,139 (issued 23-June-2105) (2421US); Europe application 07750527.9 (allowed; not yet published) (2420EP).


Bryan W Jones, PhD, and Robert E Marc, PhD, specialize in retinal degeneration disorders, retinal neurotransmission and neurocircuitry, and metabolomics.


Bradley J Katz, MD, PhD, founder and CEO of Axon Optics, www.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.


Nanoparticle Light Filtering Method and Apparatus, Steven M Blair, Pradeep Kasinadhuni, Steve McDaniel, Bradley J Katz, United States 14542478.

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.

Asha Vision, LLC, Founder and CEO.

Sharon Eccles Steele Center for Translational Medicine, University of Utah, member.
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.


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.


Derek J Sakata, MD, is medical director for Anesthesia Services at the John A. Moran Eye Center. 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.


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.


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.

Ocular Drug Delivery System. Patent Published: PCT/US2013/036807, WO/2013/158661, United States and foreign applications pending. An ocular drug delivery system including a composition in which a formulation having an active agent (e.g., HGH, rHGH or an HGH mimic) that increases insulin growth factor (IGF) or that alters insulin growth factor binding protein (IGFBP) in a subject is dispersed in a pharmaceutical carrier. The composition is configured for placement in, around, or on an eye of the subject, and the composition provides controlled release of an amount of the active agent to the eye effective to promote ocular surface and corneal neural regeneration and wound healing.


# Published Research

A sample of more than 100 published and presented materials by Moran faculty members between January 1 and December 31, 2015

<table>
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<tr>
<th>Advanced Ocular Care</th>
<th>British Journal of Ophthalmology</th>
<th>Clinical Ophthalmology</th>
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<tr>
<td>American Journal of Ophthalmology</td>
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<td>American Journal of Pathology</td>
<td>Chinese Medical Journal</td>
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<td>Clinical and Experimental Ophthalmology</td>
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<td>Disease Models and Mechanisms</td>
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Journal of Clinical Medicine


Journal of Glaucoma


Journal of Neuro-Ophthalmology


Journal of Neurophysiology


The Journal of Neuroscience


Journal of Ocular Pharmacology and Therapeutics


Journal of Pediatrics


Journal of Visual Experiments


Laryngoscope


Molecular Basis of Disease


Molecular Therapy


Neurology


Ocular Immunology and Inflammation


The Ocular Surface


Ophthalmic Plastic and Reconstructive Surgery


Optometry and Vision Science Journal


Optometry and Vision Science Journal


Patient Education and Counseling


PLoS ONE


Proceedings of the National Academy of Sciences of the United States of America


Retinal Physician


Survey of Ophthalmology


Visual Neuroscience


Water Science Technology

### RESEARCH GRANTS

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Funding Agency</th>
<th>Amount</th>
<th>Start Date</th>
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<tr>
<td>Intraceptor Interference of Vegf Pa</td>
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<td>Alessandra Angelucci, MD, PhD</td>
<td>Eyelea for Corneal Neo</td>
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<td>Computation of Visual Cortex Information in the Primary Visual Cortex</td>
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<td>Parallel Pathways in Visual Cortex: Functional Connectivity of Output Pathways from AreaV1 to Area V2</td>
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<td>To Continue to Build a Repository of Human Eyes from the Utah Lions Eye Bank of Tissue for Studies of Age-related Macular Degeneration for the Purpose of Gene Expression Assays and Functional Studies</td>
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<td>A Multicenter, Double-blind, Randomized, Placebo-controlled Study of Weight-reduction and/or Low-sodium Diet plus Acetazolamide vs Diet plus Placebo in Subjects with Idiopathic Intracranial Hypertension with Mild Visual Loss (IIHTT)</td>
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<td>Nanosized Carotenoid Complexes</td>
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<td>Biochemistry and Pharmacology of the Macular Carotenoids</td>
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<td>A Phase 2, Multi-center, Randomized, Double-masked, Placebo-controlled, Parallel Study to Investigate the Safety, Tolerability, Efficacy, Pharmacokinetics, and Pharmacodynamics of GSK933776 in Adult Patients with Geographic Atrophy (GA) Secondary to Age-related Macular Degeneration (AMD)</td>
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<td>Alan S Crandall, MD</td>
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David C Dries, MD

Telemedicine Approaches to Evaluating Acute-phase Retinopathy of Prematurity—eROP

NA

National Eye Institute
07/01/10-06/30/15

Michael Feehan, PhD

Research to Optimize the Delivery of Primary Care In Pharmacies: A Linked Discrete Model of Consumer, Pharmacist, and Payer Demand

$76,452

The SKAGGS Institute for Research
1/15-3/15

Research to Optimize the Delivery of Primary Care In Pharmacies: A Linked Discrete Model of Consumer, Pharmacist, and Payer Demand

$493,227

The SKAGGS Foundation for Research
4/15-12/16

Patient Journeys in Venous Thromboembolism (VTE): A Comprehensive Model of the Drivers of Self-reported Patient Risks and Harms as They Transition from Hospital to Home

$499,786

Pfizer Independent Grants for Learning and Change
10/15-9/17

Gregory S Hageman, PhD

Pathway and Target Identification for Chromosome 1- and Chromosome 10-driven Age-related Macular Degeneration

$8,500,000

Voyant Biotherapeutics LLC/Allergan
12/15-12/31/17

Drug Targets for AMD Treatment

$29,000

Voyant Biotherapeutics LLC
12/15-12/31/17

Genetic Susceptibility to Age-related Macular Degeneration: R01EY013435 Subaward

$36,182

Pl: Rando Allikmets;
Pl Subaward: Greg Hageman
National Institutes of Health
07/01/10-06/30/15

Hyperspectral Imaging of the Macula in Health and Disease Subaward

$118,560

Pl: R. Theodore Smith;
Pl Subaward: Greg Hageman
National Institutes of Health
12/01/10-11/30/15

Mary Elizabeth Hartnett, MD

Mechanism of Angiogenesis in ROP

$373,026

National Eye Institute
9/1/14-8/31/19

Endothelial Transmigration in Neovascular Age-related Macular Degeneration

$365,050

National Eye Institute
4/1/12-2/31/17

Studies on Angiogenic Mechanisms and Safety Regarding Erythropoietin in Retinopathy of Prematurity: Seeking a Safe Treatment

$90,000

March of Dimes
6/1/13-5/31/16

Medical Student Research Program in Eye Health and Disease

$29,460

National Eye Institute
5/1/16-4/30/21

Bryan W Jones, PhD

Young Ophthalmologist Retina Grant

$1,000

Juliette RP Vision Foundation
04/15-15/04/14/16

RPB Glaucoma Grant

NA

Research to Prevent Blindness, Inc.
02/01/15-02/01/16

BIDAC Software Development Grant

$50,000

Scientific Computing and Imaging Institute/USTAR
05/01/14-05/01/15

Zachary P Joos, MD

Ophthalmic Surgical Video Project, International Division of Ophthalmology

NA

Moran Eye Center
01/01/14-Present

Bradley J Katz, MD, PhD

Blast Ocular Injury

$718,099

US Army Medical Research Acquisition Activity
09/01/12–08/31/16

David Krizaj, PhD

Ocular Blast Mechanisms

$661,051

US Army Medical Research Acquisition Activity
08/15/12-08/14/16

Glaucoma Drugs2

$40,000

Glaucoma Research Foundation
03/01/14-02/28/15

The Role of Mechanosensation in Retina Function and Dysfunction

$247,691

National Eye Institute
12/01/15-11/30/16
<table>
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<tr>
<th>Project Title</th>
<th>Funding</th>
<th>Institution/Grant</th>
<th>Start/End Dates</th>
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<td>Development of TRPV4 Channel Antagonists to Treat Glaucoma</td>
<td>$50,000</td>
<td>Neuroscience Initiative Collaborative Pilot Project, U of U</td>
<td>2015-2016</td>
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<td>Development of Translational Approaches to Treating Glaucoma</td>
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<td>Willard L. Eccles Foundation</td>
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<td>New Strategies for Neuroprotection and Edema Mitigation in Diabetic Retinopathy</td>
<td>$25,000</td>
<td>Diabetes and Metabolism Center Pilot Grant, U of U</td>
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<td>Kristen Kwan, PhD: Hedgehog Signaling and Cilia in Choroid Fissure Morphogenesis and Coloboma</td>
<td>$1,150,000</td>
<td>National Eye Institute</td>
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<td>Stepwise Coordination of Eye Morphogenesis by Extracellular Matrix</td>
<td>$800,000</td>
<td>National Institutes of Health</td>
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<td>The Role of Cell Adhesion in Zebrafish Choroid Fissure Formation Competitive Renewal</td>
<td>$60,000</td>
<td>Knights Templar Eye Foundation Career-Starter Research Grant</td>
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<td>Hedgehog Signaling and Morphogenesis in the Etiology of Coloboma</td>
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<td>March of Dimes Birth Defects Foundation</td>
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<td>Nick Mamalis, MD, and Liliana Werner, MD, PhD</td>
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<td>Evaluation of Stability and Capsular Bag Opacification with a New Foldable IOL (SP2 Yellow) in a Research Eye Model</td>
<td>NA</td>
<td>Hoya Medical Singapore PTE. LT</td>
<td>07/01/14-Present</td>
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<td>Evaluation of Stability and Capsular Bag Opacification with a New Foldable IOL (SP2 Clear) in a Research Eye Model</td>
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<td>Evaluation of Stability and Capsular Bag Opacification with a Foldable IOL Coupled with a Patterned Protective Membrane in a Research Eye Model</td>
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<td>Sharklet Technologies, Inc.</td>
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<td>Evaluation of FluidVision Accommodating IOL in a Research Eye Model</td>
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<td>PowerVision, Inc.</td>
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<td>Evaluation of Biocompatibility of a Silicone Fluid in a Research Eye Model</td>
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<td>Evaluation of an Automated Capsulorhexis Technique for Phacoemulsification and IOL Implantation in a Research Eye Model</td>
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<td>Power Adjustment and Biocompatibility</td>
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<td>Evaluation of Biocompatibility and Capsular Bag Opacification with a New Foldable IOL in the Research Model</td>
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<td>University of Tennessee</td>
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<td>Core Vision Research Grant</td>
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<td>Mark D Mifflin, MD: Cornea Preservation Time Study</td>
<td>$109,350</td>
<td>Jaeb Center for Health Research</td>
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<td>Evaluation of Topical Antibiotics/Risk of Endophthalmitis with Intravitreal Injection</td>
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<td><strong>Paladin Study</strong></td>
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<td>Alimera Sciences, Inc.</td>
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<td>Michael P Teske, MD</td>
<td><strong>The Natural History of Geographic Atrophy Progression (GAP) Study</strong></td>
<td>$75,900</td>
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<td>PI, Michael Teske; Co-I, Paul S Bernstein</td>
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<td><strong>Ning Tian, PhD</strong></td>
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<td><strong>Ipa Wang-Immune Responses</strong></td>
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<td><strong>Must Follow-Up Study</strong></td>
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<td><strong>Double-mass, Placebo-controlled, Multi-centered, Dose-ranging Study to Assess the Efficacy and Safety of LX211 as Therapy Clinically Quiescent Sight Threatening, Noninfectious Uveitis</strong></td>
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<td><strong>A Phase III Study of the Efficacy and Safety of RhufabV2 (Ranibizumab) in Subjects with Minimally Classic or Occult Subfoveal Neovascular Age-related Macular Degeneration (MARINA)</strong></td>
<td>NA</td>
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<td><strong>A Multicenter Open-label Study of the Long-term Safety and Efficacy of the Human TNF Monoclonal Antibody Adalimumab in Subjects with Non-infectious Intermediate Posterior-or Pan-uveitis (M11-327)</strong></td>
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<td><strong>A Multicenter Study of the Efficacy and Safety of the Human Anti-TNF Monoclonal Antibody Adalimumab as Maintenance Therapy in Subjects Requiring High-dose Corticosteroids for Active Non-infectious Intermediate- Posterior-or Pan-uveitis (M10-877)</strong></td>
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<td><strong>A Multicenter Study of the Efficacy and Safety of the Human Anti-TNF-Monoclonal Antibody Adalimumab in Subjects with Inactive Non-infectious- Posterior-or Pan (M10-880)</strong></td>
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<td><strong>Multicenter Uveitis Steroid Treatment (MUST) Trial</strong></td>
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By the time Moran Eye Center’s Global Outreach surgeons landed in the East African country of Tanzania in February 2016, the advance team had already screened over 1,000 patients. Hundreds more arrived every day, many of them walking with wooden sticks to help find their way. By the end of the camp, many left their walking sticks behind.

#SeeTheNeedBeTheChange

The John A. Moran Eye Center is an integral part of University of Utah Health Care, which for six years running, has won the University Health System Consortium’s Quality Leadership Award and continues to rank among the nation’s top academic medical centers. This winning streak is matched by only one other health system in the US.

Visit our website moraneyecenter.org