AMD
TREATMENT:
New Hope in Personalized Medicine
MESSAGE FROM THE CHAIR:
A Storied Past Paves the Way to an Exciting Future

LEADERSHIP MILESTONE:
Randall J Olson’s 40th Anniversary

MAKING EYE SURGERY SAFER THAN EVER

PATIENT CARE: FROM THE CARIBBEAN TO MORAN

NEW EFFORTS EXPAND OUTREACH
Closer to Home
# JOHN A. MORAN EYE CENTER

## FOCUS

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The retinal vasculature of Moran researcher Bryan W. Jones, PhD, visualized by James Gilman, CRA, FOPS, using a new Zeiss high-definition optical coherence tomography model.
As I prepare to observe this milestone in 2019, it seems like only yesterday that I was convincing my colleagues we needed a strong ophthalmology program in our community. When I think about the next 40 years, the future can’t come fast enough. We’re on the verge of realizing a dream I had from the start: to create an eye center that would turn discoveries into treatments that could help millions of people. There’s no better example of this than the work of Greg Hageman, PhD.

When I first met Greg, I asked him what he wanted to do for the rest of his career. His answer was simple: cure age-related macular degeneration (AMD). I have no doubt Greg and the amazing team he’s put in place will do exactly that. They’ve made discoveries about the genetics of this sight-robbing disease that will change the world of ophthalmology, and we’re now advancing the first AMD therapy produced from their work into clinical trials.

Our physicians and researchers inspire me in so many ways. We’re looking forward to celebrating endowed chairs for Mary Elizabeth Hartnett, MD; Paul S. Bernstein, MD, PhD; and Alan S. Crandall, MD; as well as endowed professorships for researchers Alessandra Angelucci, MD, PhD; and David Krizaj, PhD.

This year, Nick Mamalis, MD, will serve as president of the American Society of Cataract and Refractive Surgery (ASCRS). His work with ASCRS and at Moran is improving the care provided by eye surgeons each day.

It’s my pleasure to report that for the second year in a row, Ophthalmology Times has ranked Moran among the top 10 best overall programs in the country. I’m also happy to share that our outreach program is helping more underserved Utahns than ever before with the support of our friends in the community.

Each year’s accomplishments build on the last, which is why I am always excited to say the best is yet to come.

Sincerely,

Randall J Olson, MD
Professor and Chair, Department of Ophthalmology and Visual Sciences
CEO, John A. Moran Eye Center, University of Utah
Gregory S. Hageman, PhD, executive director of the Sharon Eccles Steele Center for Translational Medicine, in his lab.
Gregory S. Hageman, PhD, and his talented team have developed the first therapy for age-related macular degeneration based on a better understanding of the genetics of the disease and a personalized medicine approach.

For too long, hopes of a cure for age-related macular degeneration (AMD) have been elusive.

After more than 130 clinical trials to test potential AMD drugs over the past decade, the chronic condition remains the leading cause of blindness for more than 20 million Americans age 55 and over.

All the while, Gregory S. Hageman, PhD, and his research team at the Moran Eye Center’s Sharon Eccles Steele Center for Translational Medicine (SCTM) have been quietly exploring the genetics behind AMD. Hageman refers to his team as “the most talented and enthusiastic group of people I’ve had the privilege to work with in my lifetime.” Their tireless efforts have translated a deeper genetic understanding into a new therapy that stands to change the outlook for AMD patients and their families.

A NEW HOPE
Doctors have long characterized AMD as a single disease with two stages. Individuals with the early stage develop drusen—small, yellow deposits of a fatty protein that form under the macula, the region of the retina that supports seeing fine detail. In the later stage, the macula degenerates with or without the growth of associated abnormal blood vessels under the retina.

Hageman started his analyses of AMD in the late-1980s. He first assessed what drusen were made of, identifying a host of proteins associated with the complement system—a component of the body’s immune system that attacks invading cells and prompts inflammation. A decade later, he discovered a genetic link to AMD in a gene called Complement Factor H that regulates the complement system. Most recently, SCTM research has produced a Galileo moment for ophthalmology:

AMD isn’t one biological disease. It’s at least two.

Complement system genes located on chromosome 1 cause one disease. An unrelated pair of genes found on chromosome 10 directs a second. Together, these two genetic regions account for more than 90 percent of genetic risk for developing AMD.

People with two copies of chromosome 1 risk genes, or homozygous carriers, are at significant risk for AMD. However, some people carry a form of the chromosome 1 gene that protects them from AMD. Those with one or two protective genes have a low risk.

“The crux of the matter is that this disease is really at least two distinct diseases,” said Hageman. “I believe recent clinical trials have failed because of a lack of this understanding. Sadly, companies may have had a drug that could have worked on patients with chromosome 1-directed AMD, but without excluding chromosome 10-directed AMD patients, they weren’t able to observe an effect.”
A PERSONALIZED APPROACH

From a practical standpoint, knowing AMD is at least two diseases makes a one-size-fits-all treatment impossible. Instead, Hageman has taken a personalized medicine approach to tailor treatment to each patient’s genetics. Using eye tissue from 350 donors representing seven genotype groups, the SCTM generated 9.2 billion points of data to deconstruct the complex molecular pathways involved in chromosome 1- and chromosome 10-directed AMD. The effort supported development of a new therapy designed to help people with the greatest genetic risk for chromosome 1 AMD—patients Hageman estimates represent a significant proportion of AMD patients in the U.S. alone.

The SCTM has partnered with newly funded startup Voyant Biotherapeutics to commercialize the new therapy, which will be delivered to the retina with the goal of slowing—even halting—disease progression. Pre-clinical testing exceeded expectations, and funding has been secured to move forward into clinical trials.

TIMELINE TO TREATMENT

1987

EYE REPOSITORY

Gregory S. Hageman, PhD, begins collecting human eye donations to examine the biology of AMD. Today, his repository includes over 8,500 pairs, the largest in the world dedicated to the study of normal and diseased retinal tissue.

2000

NEW OPPORTUNITY IN SALT LAKE CITY

Hageman establishes Moran’s Center for Translational Medicine (CTM) to quickly and cost-effectively turn scientific discoveries into diagnostics and therapies for blinding eye conditions, with a focus on AMD.

LANDMARK FINDING

Hageman discovers that abnormalities in the Complement Factor H (CFH) gene on chromosome 1, which regulates a part of the body’s immune system, are associated with an increased risk for, or protection from, developing AMD. He files numerous patent applications and publishes his work in 2005.

2006

GENETIC STUDY

The CTM begins recruiting participants for an ongoing genetic study of AMD. More than 4,800 people, with and without AMD or a family history of the disease, are enrolled so far. Study participants are screened and genotyped for future AMD treatment trials. The effort includes a partnership with the Utah Population Database, one of the world’s richest sources of genetic and other in-depth health information.

2007

The National Institutes of Health awards Hageman $23 million to study the role of CFH disease. The program includes colleagues from 12 national and international institutions.

2009

Hageman founds Optherion, Inc., which raises $45 million to develop therapies for AMD.

2010
In 2017, the FDA approved the first gene therapy for an inherited ocular disease. The SCTM treatment could be the next such therapy as physicians and researchers embrace personalized medicine.

“The dream for the future is to ultimately treat patients based solely on their genetics,” said Hageman. “If I am a patient, and I have one drusen but a 70 percent chance of developing AMD, I would want to be treated early. This is personalized medicine at its best. This is the world we’re going to live in.”

The SCTM will soon begin a rigorous new study aimed at fully understanding how AMD progresses in genetic subsets of patients. That’s where world-renowned clinician researchers and spouses Monika Fleckenstein, MD, and Steffen Schmitz-Valckenberg, MD, come in.

“I don’t think there’s anyone doing what Greg’s doing. There are people doing little individual elements. But there is no one else in the world with the same kind of vision and momentum, and team and resources.”

Tiarnan Keenan, Moran Adjunct Professor
THE DREAM STUDY

Fleckenstein is a longtime SCTM collaborator and will join Moran’s full-time faculty in 2019 as the former head of the University of Bonn Department of Ophthalmology Clinical Trial Center. She will oversee the DREAM1 study (named for Hageman’s dream to cure AMD and short for Drusen Endpoint Assessment Morphology Study in Chromosome 1-Directed AMD), which will determine exactly how homozygous chromosome 1-directed AMD progresses in patients and the appropriate stage in the disease to administer therapy.

Like Hageman, Fleckenstein believes treatment at an early disease stage is critical.

“We all fear that there is this point of no return where you simply cannot save the retina,” said Fleckenstein. “If you have a clinical trial that lasts for 12 months and the retina is already predetermined to die, treatment is not going to work. The timing of the therapy and the measures you choose to evaluate success need to fit together.”

The wide-reaching DREAM1 initiative, which will include centers across the U.S. and Europe, won’t stop at chromosome 1. The study will gather similar data to support a treatment in the works for homozygous chromosome 10 AMD patients and then move on to examine a host of other genetic combinations.

Armed with DREAM1 study data, Fleckenstein and Schmitz-Valckenberg will develop criteria for measuring changes in the retina and determine protocols used to evaluate the success of the chromosome 1-based therapy.

“Being involved in this is the chance of a lifetime. Greg is a pioneer in AMD research, and it’s a logical consequence that all of his research work from the past 30 years now ends in an interventional trial.”

MONIKA FLECKENSTEIN,
MORAN ADJUNCT PROFESSOR
“Moran is the best place in the world to be at the moment for AMD research. Many people are interested in AMD research, and many things are going on. But we really want to do profound research, and I believe what Greg is doing here is very well thought out.”

Steffen Schmitz-Valckenberg, Moran Adjunct Professor

FINDING THE RIGHT MEASURES

Internationally recognized for his ophthalmic imaging research as head of the Grading of Digital Fundus Examination (GRADE) Reading Center at the University of Bonn, Schmitz-Valckenberg will also join Moran as a full-time faculty member this year.

As a child, Schmitz-Valckenberg was drawn to photography as a hobby. Now he’s at the forefront of efforts to use a variety of imaging techniques to map the stages of retinal decline in AMD. He recently published imaging protocols for clinical studies in advanced AMD as part of an international panel.

Visual acuity is often used to evaluate success in ophthalmic clinical trials, but is a poor outcome measure for AMD. Imaging may show regions of atrophy in the retina where cells are dying, yet AMD patients will often have normal vision for some time before their sight slowly deteriorates. What’s more, rates of deterioration vary. Schmitz-Valckenberg will build a new reading center at Moran that will evaluate retinal images, measuring not only atrophy but also drusen and retinal sensitivity.

“The best case scenario is that you show statistics that the treatment is working against placebo, but you also have to demonstrate an effect for the patient—for example, that drusen regress or that patients are not developing atrophy,” he said.

As the therapy advances, institutions around the country and the world will be involved in clinical trials—all sending images to Moran’s reading center for a systematic, rigorous analysis.
AN IMPRESSIVE TEAM

In the past year, Hageman has recruited several other top researchers to join the SCTM team in full- and part-time roles.

When asked what’s kept him going for three decades, first through highs and lows of federal funding and then through years of methodical research as some scientists criticized him for not immediately publishing his findings, Hageman’s answer is this:

“One has to be stubborn, stick with dreams and surround themselves with talented individuals with similar thinking. It really takes a village to do the type of work we are engaged in, and we’ve built an incredible village to see this task through.”

To get this far, Hageman says, it’s taken the support of more than 4,800 patients enrolled in a SCTM genetics study, 8,500 organ donors who have left their eyes to science, generous philanthropists who have donated millions of dollars, and unique collaborations with private industry partners. Not to mention the leadership of Moran CEO Randall J Olson, MD, who has supported the SCTM’s unconventional approach to fast-track new therapies.

“Academia has to get to a place where they allow people to take this unique approach,” said Hageman. “If it hadn’t been for Randy Olson seeing that, no way would we have been able to do what we’ve done.”

SCTM research activities hold promise not only for AMD treatments, but also for numerous other diseases associated with the genetics of the complement system.

“The future will be taking the drugs we have designed for chromosome 1- and 10-directed AMD and using them to treat other systemic diseases,” he said with a smile. “But that won’t be my job. That we will save for the young folks.”

ABOUT AMD

AMD involves deterioration of the macula, which is the small central area of the retina responsible for seeing fine detail. Patients with AMD face a gradual loss of their central vision. Since no other organism has AMD, it’s essential for researchers to work with donated human tissue and study subjects.
The SCTM recently recruited nine international experts to help bring the first AMD treatment based on a patient’s genetic makeup to clinical trials:

**Catherine Bowes Rickman, PhD**, adjunct professor; Duke University Eye Center, an expert on preclinical drug testing and modeling, and the pathobiology of AMD.

**Eugene de Juan, MD**, adjunct professor; University of California, San Francisco, a renowned retinal specialist, inventor, and entrepreneur focusing on ocular medical and surgical therapeutics, including advances in drug delivery techniques for AMD.

**Monika Fleckenstein, MD**, currently adjunct professor; University of Bonn, Germany, an international authority on the design, conduct, and analysis of interventional clinical trials for retinal disease therapies.

**Tiarnan Keenan, MD, PhD**, adjunct professor; National Institutes of Health National Eye Institute, a specialist in the pathogenesis of AMD who worked with Hageman as a U.K./U.S. Fulbright scholar and will now assist with SCTM research.

**Anat Loewenstein, MD**, adjunct professor; Tel Aviv University, Israel, chair of the Department of Ophthalmology and vice dean of the Sackler Faculty of Medicine, an expert in early detection of AMD, retinal toxicity of drugs, and vitreoretinal surgery.

**Philip Luthert, MBBS, FRCP, FRCPath, FRCOphth**, adjunct professor; former director of University College London Institute of Ophthalmology, a leading ophthalmic pathologist studying AMD at the tissue level who will analyze large-scale genetic, clinical, and other datasets.

**Steffen Schmitz-Valckenberg, MD**, currently adjunct professor; University of Bonn, Germany, an acclaimed expert in high-resolution retinal imaging who will inform clinical trial design and develop protocols for assessing patient data.

**Larry A. Wheeler, PhD**, research professor; University of Utah, a specialist in AMD drug discovery and development and former senior vice president of biological sciences at Allergan, which collaborated with Hageman’s team on a robust gene expression study.

**Moussa Zouache, PhD**, research assistant professor, University of Utah Department of Ophthalmology & Visual Sciences, an expert in mathematical modeling from France who will assess sets of histological, clinical and genomic data, screen drug data, and identify responders to treatment.

The group joins SCTM adjunct professors Karen Curtin, PhD, MStat; and Debra A. Schaumberg, OD, MPH, ScD.

Clinical and research team leaders supporting the SCTM are Jill Hageman, RN; Burt Richards, PhD; Brandi Williams, PhD; and Lisa Nichols.
Building a World-Class Institution

At a young age, Olson quickly understood the difference vision makes in a person’s life. He got his first pair of glasses as a first-grader and has a string of stories about dropping and searching for his glasses in the Utah snowbanks, rivers, and mountains he loves to explore. Following a two-week elective at the end of medical school, Olson knew ophthalmology would be his career. Even before he had officially started his position at the U, Olson recruited retina specialist Mano Swartz, MD, to join him. There was just one hitch.

“I had nothing to promise,” said Olson. “We agreed on a salary, and I said I didn’t know if we could necessarily pay it or not. But he accepted on those terms.”

Working out of a few exam rooms in the School of Medicine, Olson barely made his budget the first year. Swartz recalls it as a time of putting in hard work to achieve a dream as the pair drove throughout the Mountain West in a 1973 Chevrolet, introducing themselves to other ophthalmologists who might refer patients.

“Great institutions start with taking an opportunity,” said Swartz. “We had an opportunity, we saw the potential, and neither of us was afraid to work to build it. We started getting a few referrals, hoping that good results would sell themselves, and they did. We started to grow.”
MORAN MILESTONES

1979
Randall J Olson, MD, becomes the sole physician in the University of Utah’s Division of Ophthalmology in the Department of Surgery. He first recruits retina specialist Mano Swartz, MD, followed by neuro-ophthalmologist George Sanborn, MD.

1981
The Division of Ophthalmology grows to include glaucoma specialist Alan S. Crandall, MD; pediatric ophthalmologist Jane Kivlin, MD; pathologist David J. Apple, MD; and electrophysiologist Donnell J. Creel, PhD. Research professors Richard A. Normann, PhD, and Helga Kolb, PhD, take second appointments in Ophthalmology.

1982
Olson earns the division departmental status after a bit of maneuvering. “I committed that as a department we would take no more support than we already had,” said Olson. “I got the chair of surgery to say, ‘I won’t support you, but I won’t fight you,’ and the dean said the same thing: if I thought I could pull it off, I should go for it.”

Olson co-founds the Center for Intraocular Lens Research with Apple to study the new technology of intraocular lenses (IOLs), which replace the eye’s natural lens during cataract surgery. Their groundbreaking research results in improved quality and design of IOLs and new surgical techniques now used by most surgeons. The research also spurs the withdrawal of poorly designed IOLs from the marketplace.

1983
Moran continues a period of growth with new clinical and research hires that include Eric Lasater, PhD; retinal specialist Michael P. Teske, MD; and neuro-ophthalmologist Kathleen B. Digre, MD.

1984
Olson is named department chair, a position he still holds. The team works in cramped quarters. “We were working out of the old emergency room and literally turned the elevator shaft into two exam rooms,” recalled Olson.

Oculoplastic surgery is added as a subspecialty.

1987
Olson becomes medical director of the King Khaled Eye Specialist Hospital in Riyadh, Saudi Arabia. There he meets Wayne Imbrescia, who later joins Moran and becomes its executive director.

Moran continues a period of growth with new clinical and research hires that include Eric Lasater, PhD; retinal specialist Michael P. Teske, MD; and neuro-ophthalmologist Kathleen B. Digre, MD.

1989
Moran’s growing faculty in 1989.

1991
Crandall creates Moran’s earliest donor-funded outreach program with the goal to eliminate preventable blindness around the world. The program is now the largest of its kind at any U.S. academic institution and has worked in 25 countries.

1992
Moran establishes its Patient Support Program for people experiencing vision loss.
After raising $54 million, including additional funding from John A. Moran, a new 210,000-square-foot eye center opens to house research labs and provide clinical and surgical care. The building includes five bridges that literally and symbolically connect research laboratories to patient care areas.

The original 85,000-square-foot John A. Moran Eye Center opens thanks to a $3.5 million donation from University of Utah alumnus John A. Moran and gifts from patients, friends, donors, and organizations. The center houses operating rooms, triage, a pharmacy, and the Utah Lions Eye Bank, but is short on space for researchers scattered around campus.

Researcher Robert E. Marc, PhD, joins Moran among a wave of research recruits in the 1990s that include researcher Wolfgang Baehr, PhD.

Patient services expand with a new retina clinic and refractive surgery laser suite.

After raising $64 million, including additional funding from John A. Moran, a new 210,000-square-foot eye center opens to house research labs and provide clinical and surgical care. The building includes five bridges that literally and symbolically connect research laboratories to patient care areas.

Gregory S. Hageman, PhD, is recruited to Moran to head its first Center for Translational Medicine. The center, which works to find new therapies for blinding eye conditions, is later renamed the Sharon Eccles Steele Center for Translational Medicine in honor of the $9 million pledged by Sharon Eccles Steele.

Moran announces the formation of The Vision Institute, a new University status that broadens its mission beyond ophthalmology to include other campus departments working in coordination to translate research discoveries into new therapies and medical devices.

Moran opens its first community clinic.

Moran adds uveitis as a subspecialty.

Moran adds a pediatric retina subspecialty.

Moran serves as the largest ophthalmology clinical care and research facility in the Mountain West with more than 60 faculty members, 500 employees, and 10 satellite clinics. Physicians provide comprehensive care in nearly all ophthalmic subspecialties. Moran supports 15 laboratories and its faculty are training 12 fellows, 11 residents, and four interns.
A wave of recruitments followed that included Moran’s senior vice chair and director of glaucoma and cataract, Alan S. Crandall, MD. From the beginning, Crandall said, Olson built Moran by seeking to hire the best in the field. “To me, he’s the ultimate chairman because he does what’s best for ophthalmology, for Moran,” said Crandall.

Olson allowed his physicians to do what they were best at. For example, he supported Crandall in establishing an international outreach program at Moran and in taking prominent roles in industry organizations that ate into his clinical care time. Perhaps most important, said Crandall, Olson encouraged innovation. “We were one of the first academic programs to do phacoemulsification and to use intraocular lens implants (IOLs), which are now the standard for cataract surgery,” said Crandall. “That put us in the cataract spotlight 10 to 15 years earlier than most universities.”

As the age of IOLs dawned, Olson pioneered the field of IOL and cataract surgery research—inventing new devices along the way.

As Olson hired talented researchers and clinicians as fast as he could, space constraints for the growing department made collaboration difficult. Relying on the help of friends and donors, including longtime university supporter John A. Moran, Olson opened the first Moran Eye Center building in 1993 and later improved upon it with the construction of today’s center. Neither project used state or federal funds.

Moran Executive Director Wayne Imbrescia helped Olson build both centers and has worked with him for more than 30 years. “Randy has an amazing ability to make people feel comfortable and valued,” said Imbrescia. “I would say that’s the most endearing part of his personality that gets everything else to fall into place. It’s kind of the secret sauce.”

Olson is a particularly successful leader, said Imbrescia, because he has a strong will to achieve, paired with the humility to focus first and foremost on the institution.

Randall J Olson, MD, is a world-renowned expert in cataract and intraocular lens surgery and a researcher who has authored more than 300 professional publications. He has received many of the field’s top recognitions, including:

- 2012 American Society of Cataract and Refractive Surgery Binkhorst Medal
- 2014 University of Utah Rosenblatt Prize for Excellence
- 2014 American Association of Ophthalmology (AAO) Kelman Award
- 2015 AAO Lifetime Achievement Award
- 2016 International Intra-Ocular Implant Club Jan Worst Medal
Those are qualities management author and researcher Jim Collins has described as inherent in the most successful organizational leaders, notes Imbrescia.

“I asked him once, ‘Randy, do you ever have a bad day? I’ve never seen you have a bad day in the 36 years I’ve known you,’ ” said Imbrescia. “And he said, ‘I have bad days. I just don’t wear them on my sleeve. I don’t bring it to work. I don’t let it influence the positive beat of the organization and the positive culture.’ ”

The attitude has carried Olson to a notable achievement: he is believed to be the longest-serving chair of any academic ophthalmology department in the country.

**WHAT THE FUTURE HOLDS**

When Olson thinks about the future of an institution now employing more than 500 people, he thinks about personalized medicine—the ability to deliver therapies based on a patient’s genetic makeup. He cites Moran’s current approach to developing genetic-based therapies for age-related macular degeneration (AMD).

“My vision as we move along is that we expand where we are and try to use the same overall approach in other important diseases,” said Olson. “Some patients have had long-standing diabetes and don’t ever seem to get diabetic retinopathy. Why? We have a unique resource for this type of research in the Utah Population Database [UPD].”

The UPD provides researchers with more than 22 million public health and clinical records, linked with family histories—and researchers have a responsibility to tap it, said Olson. He also sees Moran as a leader in embracing new technologies.

“I see us, with our strength in bioengineering, really being leaders in looking at new technology approaches,” he said. “We want to be a leader in understanding how teleophthalmology and apps are going to be providing more and more care, and we should embrace that and not be afraid of it.”

He’s confident the best is yet to come.
Nick Mamalis, MD, has spent more than a decade helping hospitals around the country protect eye surgery patients from a rare but potentially sight-threatening inflammatory syndrome known as TASS.

Toxic Anterior Segment Syndrome (TASS) can be caused by a wide variety of non-infectious agents introduced into the eye, including small traces of cleaning agent residue left on surgical instruments. But that wasn’t widely known in 2006 when the American Society of Cataract and Refractive Surgery called on Mamalis to find the causes of a mysterious and widespread outbreak of TASS. He identified poor instrument sterilization techniques among the culprits.

Now, a task force co-chaired by Mamalis has issued new, evidence-based guidelines for the cleaning and sterilization of intraocular surgical instruments. The guidelines address all aspects of cleaning and sterilization, including the use of short-cycle steam sterilization on instruments that will be reused on the same day and the use of enzymatic detergent.

Manufacturers’ directions for use had required the use of enzymatic detergent to clean many instruments. But Mamalis discovered minute amounts of detergent residue on instruments that underwent sterilization and thorough rinsing.

“We were able to provide research proving that, first of all, you can’t get rid of all the enzymatic detergent that’s left on an instrument, and secondly, that it causes TASS,” said Mamalis. “That led us to recommend enzymatic detergents not be used.”

His research also demonstrated the efficacy of short-cycle steam sterilization, which cuts down on drying time and allows instruments to be quickly reused. The method protects patients and can lower health care costs by reducing the number of instruments and packaging needed.

“The task force used research to determine how we can provide optimal safety for our patients in the most efficient manner,” said Mamalis, “and that’s why I think these guidelines are really important.”
When Neil and Maleena Sookram made their first journey from Trinidad and Tobago to the Moran Eye Center with their son Aidan, they felt hope and trepidation. It was 2015, and Aidan was just a year old. Born at 28 weeks, weighing barely over two pounds, he had spent 48 days in a neonatal intensive care unit. At four months, his parents noticed he was not following moving objects or reaching for things as an infant with normal vision should. A local doctor confirmed that Aidan had retinopathy of prematurity (ROP)—a potentially blinding disorder involving abnormal blood vessel growth that affects premature infants.

Aidan’s ROP was becoming more severe, but the delicate surgical and laser treatments that could possibly save his vision weren’t available in Trinidad and Tobago. Physicians referred the family to Moran’s pediatric retinal specialist, Mary Elizabeth Hartnett, MD.

“As two people going from a tiny Caribbean island to Utah with our new baby, it was hard,” recalled Aidan’s dad. “But through it all, everyone at Moran went out of their way to help us.”

Aidan had late-stage ROP in both eyes, with partial retinal detachments.

“The right eye was worse, and I needed to perform surgery,” said Hartnett, not only a talented surgeon but also a leading ROP researcher funded by the National Institutes of Health. “My concern was for his future vision, so I was glad the Sookrams were willing to come back for follow-up.”

Aidan has returned to Moran three times. In 2016, his vision was holding steady; but in 2017, he had a major retinal detachment in his right eye and underwent more sight-saving surgery. When he came back in March 2018, he saw his very first snow and Hartnett saw a marked improvement.

Today, Aidan wears glasses for myopia (so he can focus close up). His dad reports he’s in school, learning his ABCs, drawing, and riding his bike.

“We always hope that children with ROP get care in time,” said Hartnett. “They may not get 20/20 vision, but the vision we are able to save is priceless.”

Mary Elizabeth Hartnett, MD, holds a favorite photo of Aidan and his family.

FROM TRINIDAD AND TOBAGO TO MORAN

JUST IN TIME
The Moran Eye Center’s Global Outreach Division has long worked to meet a growing need for eye care among underserved Utahns. It recently partnered with community organizations to expand outreach for the state’s homeless and resettled refugee populations through two new efforts: Project Homeless Connect and the Hope in Sight Refugee Eye Care Clinic.

PROJECT HOMELESS CONNECT

Take one look at Sherman’s glasses, and it’s clear how hard he’s worked to keep them going. The lenses are scratched but intact. The metal frame is held together by duct tape, and a faded green twist tie strengthens a failing connection.

They’re the only pair Sherman has had for at least a decade, through hard times and most recently homelessness. But thanks to Moran Eye Center Global Outreach Division volunteer physicians and medical personnel, he’s looking forward to a modern new pair of bifocals.

Moran provided Sherman with a comprehensive eye exam and a new prescription in October 2018 during Salt Lake City’s Project Homeless Connect, which offers a variety of local services as part of a larger initiative sponsored by the U.S. Interagency Council on Homelessness. Moran supplied eye care and surgical referrals at the city’s inaugural 2017 event and most recently worked with Friends for Sight to provide 164 free eye exams, 114 prescription glasses, and more than 100 pairs each of reading and sunglasses.

Glasses were the overwhelming need, according to Moran’s Craig J. Chaya, MD, division co-medical director and one of the event’s volunteer physicians. “It’s amazing how many people can’t see, can’t fully function, simply because they don’t have the proper prescription, or because they’ve lost or broken their only pair of glasses,” he said.

Jessica was among those eager to get new glasses after running out of disposable contact lenses: she couldn’t afford a $50 Medicaid co-pay for refills. “It’s been really bad,” she said. “I can hardly see anything.”

People in need of updated prescriptions, like Sherman, later picked up their new glasses at the Fourth Street Clinic in Salt Lake City, where Moran physicians regularly provide no-cost eye care.
Aaiti Maya Rai, right, received free cataract surgery as part of Operation Sight Day.

Moran’s Rebekah Gensure, MD, PhD, and Dale at Project Homeless Connect.

Craig J. Chaya, MD, provides free medical care at the Hope in Sight Refugee Eye Care Clinic.

BY THE NUMBERS: 2018 LOCAL OUTREACH

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<tr>
<th>Comprehensive Eye Exams for Adults and Children</th>
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<th>Volunteer Hours by 188 People</th>
<th>Eye Surgeries</th>
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Through November 2018, including refugee clinics; Operation Sight Day; Project Homeless Connect; Navajo Nation clinics; and Maliheh, Fourth Street, and People’s Health clinics.

HOPE IN SIGHT REFUGEE EYE CARE CLINIC

When Aaiti Maya Rai of Salt Lake City was a baby, she lost sight in her left eye following an injury. She made do with her right eye until, as an older adult, vision in that eye started to blur. Little by little, she began to lose most of her sight—along with her independence.

For years, she had little hope of getting her sight back. As one of tens of thousands of Nepali Bhutanese who fled the country decades ago because of political repression, Rai had been living in a refugee camp in Nepal. Two years ago, a resettlement agency relocated her to Utah.

In April 2018, volunteer doctors evaluated her sight as part of the Moran Eye Center Global Outreach Division’s inaugural Hope in Sight Refugee Eye Care Clinic. An ophthalmologist confirmed Rai’s failing vision was due to a cataract—a clouding of the eye’s natural lens that causes blindness. The good news was that a simple operation could restore her vision.

Physicians identified Rai and 18 other former refugees for free cataract surgery through Moran’s twice-yearly Operation Sight events, sponsored by Bank of American Fork. Following her June 2018 surgery, Rai was thrilled.

“She says she can’t wait to read again,” said Kalpana Singh, MD, a Nepalese doctor training at Moran who served as her interpreter.

Moran partnered with the Refugee and Immigrant Center – Asian Association of Utah, the International Rescue Committee, and the Utah Refugee Services Office to organize the event, made possible by funding sponsor Grandeur Peak Global Advisors of Salt Lake City.

“It’s important that we, as a community working together, take the opportunity to step up and meet the need for eye care right here at home,” said Jeff Pettey, MD, outreach division co-medical director. “When we assist Utahns who are chronically underserved, we’re transforming families and supporting our state economy by getting people back to work and school.”
Moran Eye Center Global Outreach Division physicians work to create self-sustaining eye care systems in developing countries, looking forward to the day their services are no longer needed.

Now, after years of providing sight-saving surgeries and ophthalmic training in the Federated States of Micronesia (FSM), the division has taken an important step toward sustainability. Moran created a strategic National Eye Care Plan for the FSM—and forged a government alliance to make it happen.

A first between Moran and a government entity, the plan outlines how the FSM will work with Moran over the next three years: contributing financial support for nurse training, skills transfer, equipment, and hiring a national eye care coordinator.

While providing quality eye care to underserved patients presents unique challenges worldwide, few regions are as challenging as the FSM. The remote nation of more than 100,000 people spans over 1 million square miles of islands and ocean. Geography alone limits access to treatment, and the backlog of curable blindness is staggering.

Since 2013, Moran outreach teams have been making the 6,200-mile journey to treat patients suffering from treatable forms of blindness. To date, they have conducted over 2,500 vision screenings, distributed more than 2,500 pairs of eyeglasses, and performed some 800 surgeries.

In 2016, Craig J. Chaya, MD, and other physicians began to train Micronesian physician Padwick Gallen in advanced cataract and oculoplastic surgery. Gallen had completed his ophthalmic training in Fiji and returned to his home in Pohnpei to practice. Today, he is the only ophthalmologist in the FSM and travels among the major islands.

In December 2018, Moran conducted an Ophthalmic Nurse Education Symposium, training 12 FSM nurses. The Errol EerNisse Family Foundation funded this initial nurse-training trip—one of several planned over the next three years.

“Training a ‘front line’ of nurses to pre-screen patients across the islands is a huge step that will free Dr. Gallen to concentrate on surgeries,” said Chaya. “Along with new equipment and hopes of a future infrastructure that could help support telemedicine, we are working with the FSM to set the stage for real sustainability.”
Adobe Systems Inc. founder and mathematician John E. Warnock, PhD, is no stranger to solving tough problems. He’s known around the world for creating a way for people to exchange documents electronically—the now ubiquitous PDF, or portable document format. Even as an undergraduate at the University of Utah, Warnock developed a breakthrough algorithm that tells a computer how to render a complex image.

Now he and his wife, Marva, are joining efforts to find solutions to an even larger challenge: blinding diseases afflicting millions of people. The couple recently gifted $5 million to support ongoing research at the Moran Eye Center.

“It’s especially important to support research at its most fundamental scientific level, where discovery and understanding can build upon themselves until we are able to create solutions for some of the toughest eye diseases out there,” said Warnock. “I believe it’s possible, but only with support from those dedicated to advancing science.”

Marva Warnock, a former partner and graphic designer at Marsh Design in Palo Alto, California, is known not only for creating the iconic Adobe logo, but also as a designer for nonprofit organizations. She is a longtime supporter of civic engagement, human rights with a passionate interest in the rights of all people, the arts, and technology.

“Advances in technology, and science, have changed the way we live and the way we work,” she said. “Now I believe they will change health care, and the researchers at Moran are as close as anyone in the country to major breakthroughs. I can’t wait to see what happens in the coming years.”

Moran Eye Center CEO Randall J Olson, MD, shares the couple’s dedication to finding cures for diseases that ravage sight.

“Regardless of whether you’re in medicine or technology, discoveries are about persistence, about knowing that you’ve got a revolutionary idea and pursuing it,” said Olson. “No one understands that better than John and Marva, and we can’t thank them enough for their support.”

The Warnock gift represents the latest in a generous history at their alma mater.

In 2003, the pair secured the future of the John E. and Marva M. Warnock Engineering Building. Completed in 2007, it represents one of the most sophisticated engineering school facilities in the country. Across campus, the Warnocks have endowed chairs for faculty members in mathematics, computer science, and art.
Mary Elizabeth Hartnett, MD, is founder and director of Moran’s Pediatric Retina Center and Principal Investigator of a retinal and choroidal angiogenesis laboratory funded by the National Institutes of Health (NIH). She is a sought-after research collaborator and a care innovator who has expanded pediatric retina services at Moran and Primary Children’s Medical Center. Her latest research focuses on retinopathy of prematurity, a blinding disorder affecting premature infants.

She recently garnered several awards and honors for her research and clinical achievements.

MACULA SOCIETY AWARD
Hartnett is receiving the Macula Society’s Arnall Patz Medal in 2019 for outstanding contributions in the study of retinal vascular diseases. She will receive the award during the annual Macula Society meeting in February and will deliver the Arnall Patz Lecture at the 2019 American Academy of Ophthalmology annual meeting in October.

The Macula Society is a prestigious invitation-only group focused on new research in retinal and macular diseases.

ENDORDED CHAIR
University of Utah President Ruth V. Watkins recently appointed Hartnett the Calvin S. and JeNeal N. Hatch Endowed Chair in Ophthalmology. Cal Hatch retired as chairman and CEO of Clorox Company, and the University of Utah recognized him with a Distinguished Alumni Award in 1994 for his business, civic, and philanthropic achievements. He and his wife, JeNeal, were active members of the university’s Health Sciences Council.

NATIONAL AND INTERNATIONAL RECOGNITION
Hartnett is a new member of the National Eye Institute’s (NEI) advisory council. The preeminent government organization solely dedicated to research on visual diseases and disorders, the NEI supports research through grants and training awards.

She also is joining the editorial board of the American Journal of Ophthalmology, a monthly peer-reviewed publication, and was elected to serve as a Vice-President (Americas) of the International Society for Eye Research.
Paul S. Bernstein, MD, PhD, is Moran’s director of clinical research and associate director of research. He specializes in age-related macular degeneration (AMD), with special emphasis on the role of nutrition and environment in its treatment and prevention; inherited retinal and macular dystrophies; and surgical treatment of vitreoretinal disorders.

Bernstein’s latest research from his National Institutes of Health-funded laboratory focuses on the genetics and imaging of macular telangiectasia type II (MacTel)—a notoriously difficult-to-diagnose hereditary disease that causes central vision loss.

Two recent honors recognize his research and clinical achievements.

### MACULA SOCIETY AWARD
Bernstein was invited to deliver the Macula Society’s 2019 W. Richard Green Lecture in honor of work that has helped explain the pathogenesis of retinal diseases. He will deliver the lecture at the 42nd annual meeting of the Macula Society in February in Bonita Springs, Florida.

One of the most prestigious invitation-only groups in the international retinal field, the Macula Society is focused on new research in retinal and macular diseases.

### ENDOWed CHAIR
University of Utah President Ruth V. Watkins has appointed Bernstein the Val A. and Edith D. Green Presidential Endowed Chair in Ophthalmology. The late couple established the chair in honor of the excellent care provided to Val by Mano Swartz, MD, as well as the outstanding work of Julia Kleinschmidt, PhD, and Alan S. Crandall, MD. Val Green retired from Coca-Cola, where he coordinated advertising for 14 states.
Kathleen B. Digre, MD, a renowned neuro-ophthalmologist, has been appointed to the rank of distinguished professor. The University of Utah honor is reserved for individuals whose achievements exemplify the highest goals of scholarship, demonstrated by recognition accorded to them by peers with national and international stature and whose record includes evidence of a high dedication to teaching as demonstrated by recognition from students and colleagues. Digre founded Moran’s neuro-ophthalmology service and directs the Division of Headache & Neuro-Ophthalmology at the University of Utah.

Alessandra Angelucci, MD, PhD, now holds the Mary H. Boesche Endowed Professorship in Ophthalmology, established in honor of Maureen K. Lundergan, MD, and Mano Swartz, MD, and to support eye disease research. Angelucci is a National Institutes of Health BRAIN Initiative grantee whose research focuses on visual cortex circuitry and function—key knowledge in understanding exactly how vision occurs in the brain and how it might be reproduced using a prosthesis.

David Krizaj, PhD, has been appointed the John Frederick Carter Endowed Professor of Ophthalmology. The late George William and Beatrice Brain Carter established the Carter professorship in memory of their late son, who passed away at age 9. George Carter, a U graduate, taught mechanical engineering at the school for 13 years and was a member of the Health Sciences Council. Krizaj’s research is uncovering how cells in the eye sense and interpret mechanical signals such as pressure. High pressure is associated with debilitating and potentially blinding diseases such as glaucoma and diabetic retinopathy. He was recently appointed as director of the Neuroscience Program at the University of Utah.

MOST INFLUENTIAL

The Ophthalmologist magazine named Moran’s Liliana Werner, MD, PhD, as one of the top 100 most influential people in the world of ophthalmology on its Power List 2018. She is co-director of the Intermountain Ocular Research Center, a nonprofit, independent laboratory that performs basic, in-depth scientific research on intraocular lenses.
Each year, the Achievement Rewards for College Scientists (ARCS) Foundation awards $15,000 to an incoming first-year Moran Eye Center resident, allowing promising young researchers to move forward with their work. Moran matches the award for the next two years, providing a total of $45,000.

The 2018 ARCS Scholar brings a strong history of research and service to the role.

Ariana M. Levin, MD, completed her Bachelor of Science in biology at Stony Brook University, where she was a Ward Melville Valedictorian. She earned her medical degree from Weill Cornell Medicine with honors in service and distinctions in ophthalmology and geriatric medicine. During medical school, she completed an Area of Concentration—a six-month research block integrated into the medical school curriculum—at Memorial Sloan Kettering Cancer Center. There, she focused on treatments for retinoblastoma, a type of eye cancer that usually develops in early childhood. Levin’s research has provided a better understanding of the long-term effects of modern chemotherapy approaches for retinoblastoma.

At Moran, Levin is predicting visual outcomes after retinoblastoma treatment and studying travel-related burdens for surgery patients. The Mark and Kathie Miller Foundation funded Levin’s first-year award in honor of Moran CEO Randall J Olson, MD.

The Department of Ophthalmology and Visual Sciences has named surgeon Jeff Petey, MD, its first vice chair of education, enhancing the prominence of its teaching mission. Petey, who has served as director of education since 2012, has ushered in a new era of innovative ophthalmic education. Under his direction, the residency program has been acknowledged as a model and ranked among the nation’s Top 10 programs. Petey was also recently elected to the Association of University Professors of Ophthalmology Program Directors Council.

Vice Chair of Education Jeff Petey, MD, center, confers with first-year resident Bradley Jacobsen, MD, left, and a patient.
Moran offers one of the nation’s top educational programs, providing excellent didactic training and extensive surgical experience. A 2018 survey by physician website Doximity placed Moran’s residency program at No. 10 in the country and No. 3 in the Intermountain West and West Coast. Why?

A Unique Approach
At Moran, our residents are exceptionally prepared. We require they complete their internship in a combined ophthalmology and internal medicine program. They spend four months in ophthalmology, including one half-day a week at Moran’s Continuity Clinic where they follow a patient’s care throughout their ophthalmology rotation, and four and a half days at the VA Salt Lake City hospital.

Moran goes beyond traditional curriculum to teach residents and fellows how to provide patients with the best outcomes at the lowest cost. Each resident undertakes a quality improvement project, and a chief resident is involved in curriculum development.
Program Growth
The program has grown—resident applications increased to 501 for four spots in 2018. We’ve gone from six residents to 12, and one fellow to up to 11 for cornea and refractive surgery, glaucoma, neuro-ophthalmology, pediatric and strabismus, retina and vitreous surgery, uveitis, and international outreach.

High Surgical Volumes
Our 26 surgeons perform over 7,000 surgeries per year and see more than 142,000 patients, ensuring residents and fellows have a full range of clinical and surgical experiences. Nationally, residents are required to perform 86 cataract surgeries—the average is 140—but Moran residents perform over 345 cataract and 300 subspecialty surgeries, all supervised by board-certified attending faculty. A wet lab center gives residents additional opportunity for hands-on experience.

Dedicated Research Time
Moran residents receive protected research time one-half day each week, and we provide funding opportunities such as the Achievement Rewards for College Scientists (ARCS) Foundation. Each year, a resident is awarded $15,000, and Moran matches funds for his or her second and third year.

Outreach Opportunities
Moran’s Global Outreach Division travels to 20 countries as remote as Micronesia and as close as Haiti providing eye care, which gives residents and fellows extraordinary opportunities to participate in international electives.

MEET MORAN’S FIRST PEDIATRIC FELLOW
As a young woman and daughter of Vietnamese refugees, Sophia Y. Fang, MD, MAS, was drawn to humanitarian work. As a student, she pursued the intersection of engineering and medicine. Later, she realized her chosen fields had the potential to change the trajectory of a child’s life when it comes to curable blinding conditions.

Now, as the Moran Eye Center’s inaugural pediatric ophthalmology fellow, Fang says the rewards of helping children and a deep commitment to global health and community outreach have landed her in the perfect setting.

Fang earned her bachelor’s degree in biomedical engineering at the University of Southern California and a master’s and medical degree at the University of California, Davis. She completed her ophthalmology residency at UC Davis Medical Center.
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 by the Intra-Ocular Implant Club, the 2015 Lifetime Achievement Award from AAO, the 2014 Rosenblatt Prize for Excellence by the University of Utah, the 2014 Kelman Award by AAO, and the 2012 Binkhorst Medal by ASCRS. Dr. Olson’s practice is limited to consultations and his long-term patients at this time.

SPECIALTY
• Cataract Services and External Eye Diseases

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

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

Craig J Chaya, MD, is Co-Medical Director, Moran Global Outreach Division. He specializes in the medical and surgical management of adult and pediatric cataracts, glaucoma, and anterior segment surgery. He is actively involved in Moran’s resident and glaucoma fellow training programs and local and international outreach work. His research interests include the management of cataracts and glaucoma in the developing world and glaucoma surgical techniques and devices.

SPECIALTIES
• Cataract Surgery
• Glaucoma
• Anterior Segment Surgery

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, and on comprehensive ophthalmology, and has a special interest in the management of dry eye syndrome.

SPECIALTIES
• Comprehensive Ophthalmology
• Glaucoma

Alan S Crandall, MD, is the John E. and Marva M. Warnock Presidential Endowed Chair; Senior Vice Chair; Director of Glaucoma & Cataract; Senior Medical Director, Moran Global Outreach Division; and past president of the American Society of Cataract and Refractive Surgery. He focuses on the medical and surgical management of glaucoma and cataracts. Dr. Crandall has experience with trabeculectomy and laser cyclophotocoagulation. He is involved in numerous clinical research studies at Moran, lectures throughout the world, and was named by Cataract and Refractive Surgery Today as one of 50 international opinion leaders. Dr. Crandall was selected to receive the ASCRS Foundation’s inaugural 2018 Chang Humanitarian Award. He is the only physician to receive humanitarian awards from all three major ophthalmology organizations: the 2016 AGS Humanitarian Award; the 2014 AAO Humanitarian Award; and the 2013 ASCRS Humanitarian Award.

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

SPECIALTIES
- Neuro-ophthalmology
- Oculoplastics and Facial Plastic Surgery

Kathleen B Digre, MD, is president of the American Headache Society and a past president of the North American Neuro-Ophthalmology Society. She specializes in neuro-ophthalmology and evaluates and treats complex visual complaints, which can be due to optic nerve or brain disease. Her interests include gender differences in neuro-ophthalmic disorders, pseudotumor cerebri, ischemic optic neuropathy, temporal arteritis, papilledema, episodic vision loss, photophobia, headaches, and eye pain. She worked with the North American Neuro-Ophthalmology Society and the University of Utah Eccles Library to develop the Neuro-Ophthalmology Virtual Educational Library (NOVEL), novel.utah.edu. She chairs Moran’s CORE and library committees. Honors include the Rosenblatt Prize, an honorary degree from the University of Zurich, and appointment of Distinguished Professor at the University of Utah.

SPECIALTY
- Neuro-ophthalmology

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

SPECIALTIES
- Pediatric Ophthalmology
- Adult Strabismus
- Complicated Adult, Child Strabismus
- Craniofacial Disorders

Mary Elizabeth Hartnett, MD, holds the Calvin S. and JeNeal N. Hatch Endowed Chair in Ophthalmology and Visual Sciences. She is Director of Moran’s Pediatric Retina Center and one of few retina specialists internationally trained to diagnose and treat pediatric retina disorders. As PI of an NIH-funded laboratory, she studies conditions including retinopathy of prematurity and AMD. Dr. Hartnett has authored over 36 book chapters, and created the first academic textbook on the subject, Pediatric Retina. She has delivered numerous national and international invited lectures. Her awards include Physician Scientist Merit Award from Research to Prevent Blindness, the Honorary Lecture Award and Scientific Contribution Award from Women in Ophthalmology, the Macula Society’s Paul Henkind Award, and ARVO’s Weisenfeld Award. She is an ARVO Gold Fellow.

SPECIALTY
- Pediatric and Adult Retinal Diseases and Surgery

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

SPECIALTY
- Comprehensive Ophthalmology

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

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

SPECIALTIES
- Pediatric Ophthalmology
- Adult Strabismus

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

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

SPECIALTIES
- Retinal Diseases and Surgery
- Macular and Retinal Degeneration
**SPECIALTIES**
- Uveitis and Ocular Immunology
- Comprehensive Ophthalmology
- Cataract Surgery

**SPECIALTIES**
- Cataract Services
- Ophthalmic Pathology
- Comprehensive Ophthalmology

**SPECIALTIES**
- Cornea Transplant Surgery
- Lamellar Keratoplasty
- Stem Cell Transplantation, and Eye Banking

**SPECIALTIES**
- Pediatric Ophthalmology
- Adult Strabismus

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

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

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.

**SPECIALTIES**
- Retinal Disease and Surgery

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

**SPECIALTY**
- Comprehensive Ophthalmology

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

**SPECIALTY**
- Neuro-ophthalmology

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

**SPECIALTIES**
- Comprehensive Ophthalmology
- Glaucoma

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

**SPECIALTIES**
- Pediatric Ophthalmology
- Adult Strabismus

Meagan Seay, DO, specializes in neuro-ophthalmology and treats patients with optic nerve and eye movement conditions as well as neurologic diseases that affect vision.

**SPECIALTY**
- Neuro-ophthalmology

Akbar Shakoor, MD, specializes in diseases of the retina and vitreous as well as uveitis and other infectious and inflammatory eye conditions. His 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. He is Director of the Uveitis Fellowship Program.

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

Rachel G Simpson, MD, specializes in the medical and surgical treatment of glaucoma, cataracts and advanced anterior segment surgeries.

**SPECIALTIES**
- Glaucoma
- Cataract Surgery
- Anterior Segment Surgery

Jean Tabin, MD, provides urgent vision care and comprehensive ophthalmology services at Moran’s Triage Clinic. There, she treats patients for any emergency or urgent concerns regarding their vision or eyes while often teaching medical students and residents interested in learning more about ophthalmology.

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**SPECIALTY**
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**SPECIALTIES**
- Pediatric Ophthalmology
- Adult Strabismus
Norm A Zabriskie, MD, is Professor, Vice Chair, Medical Director of Clinical Service, and Executive Director of Clinical Operations. He specializes in the medical and surgical treatment of glaucoma and cataracts and has a research interest in the genetics of glaucoma.

Specialties
- Glaucoma Services
- Cataract Services

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 AAO with the Achievement Award and the Senior Achievement Award and by other organizations for his work with the partially sighted.

Specialty
- Vision Rehabilitation

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

Specialty
- Counseling Related to Vision Loss

Derek J Sakata, MD, is Medical Director of Anesthesia Services at Moran and Executive Medical Director for the University of Utah Ambulatory Southern Service Area. 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 novel ways to deliver high-quality, efficient and cost-effective health care, medical devices, and drug delivery. He serves as Chair of the Faculty Innovation Research and Entrepreneur (FIRE) Scholars in the Center for Medical Innovation.

Specialty
- General Anesthesiology

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)

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

Specialty
- Ophthalmic Ultrasound

Ophthalmologists continued
Bryan H Vincent, OD, specializes in ocular pathology and contact lenses. Midvalley Health Center

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

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

Brandon J Dahl, OD, FAAO, specializes in comprehensive optometry, pediatrics, disease management with special emphasis on anterior segment disease, and contact lenses. Parkway Health Center Westridge Health Center

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

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

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

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

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

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

Colleen S Schubach, OD, specializes in children’s vision, sports vision, contact lenses, and general optometry. Midvalley Health Center

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

Bryan H Vincent, OD, specializes in ocular pathology and contact lenses. Midvalley Health Center John A. Moran Eye Center

OPTOMETRISTS

2018-2019
Balamurali K Ambati, MD, PhD, MBA
Professor, Ophthalmology and Visual Sciences; Adjunct Associate Professor, Neurobiology and Anatomy
SPECIALTIES
Ocular Angiogenesis and Corneal Research

Alessandra Angelucci, MD, PhD
Professor, Ophthalmology and Visual Sciences; Mary H. Boesche Professor of Ophthalmology
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
Professor and Director of Clinical Research and Associate Director of Research; Val A. and Edith D. Green Presidential Endowed Chair in Ophthalmology
SPECIALTIES
Vitreoretinal Diseases and Surgery; Retinal Biochemistry; Macular and Retinal Degeneration

Lara Carroll, PhD
Research Assistant Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Corneal and Retinal Neovascular Diseases

Donnell J Creel, PhD
Research Professor, Ophthalmology and Visual Sciences; Neuroscience
SPECIALTY
Electrophysiology

Margaret DeAngelis, PhD
Professor, Ophthalmology and Visual Sciences
SPECIALTY
Multi-Omic and Systems Biology-Based Approaches to Pinpoint Disease Mechanism in AMD, Glaucoma, and Myopia, along with Co-occurring/Co-morbid Diseases

Jeanne M Frederick, PhD
Research Associate Professor, Ophthalmology and Visual Sciences
SPECIALTY
Retinal Cell and Molecular Biology

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

Mary Elizabeth Hartnett, MD
Professor, Ophthalmology and Visual Sciences; Calvin S. and JeNeal N. Hatch Endowed Chair in Ophthalmology
SPECIALTY
Retinal Angiogenesis Relating to ROP and AMD
# BUILDING BRIDGES FROM RESEARCH TO PATIENT CARE

<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Affiliation</th>
<th>Specialties</th>
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<tbody>
<tr>
<td>Bryan W Jones, PhD</td>
<td>Research Associate Professor, Ophthalmology and Visual Sciences</td>
<td>Retinal Degeneration Disorders; Retinal Neurotransmission and Neurocircuitry; Metabolomics</td>
</tr>
<tr>
<td>Binxing Li, PhD</td>
<td>Research Assistant Professor, Ophthalmology and Visual Sciences</td>
<td>Biochemistry and Biophysics of Macular Carotenoids; Mouse Models of Retinal Disease; Raman Imaging of Nutrients in the Retina</td>
</tr>
<tr>
<td>Nick Mamalis, MD</td>
<td>Professor, Ophthalmology and Visual Sciences</td>
<td>Ocular Pathology; Comprehensive Ophthalmology; Intraocular Lens Research; Postoperative Inflammation</td>
</tr>
<tr>
<td>Richard A Normann, PhD</td>
<td>Professor (Emeritus), Ophthalmology and Visual Sciences; Distinguished Professor of Bioengineering, University of Utah; Doctor Honoris Causa, Universidad Miguel Hernandez de Elche, Spain</td>
<td>Artificial Vision/Neural Prosthetics</td>
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<tr>
<td>Bradley J Katz, MD, PhD</td>
<td>Professor, Ophthalmology and Visual Sciences</td>
<td>Photophobia (abnormal light sensitivity); Migraine: its effects on visual quality of life; Ischemic Optic Neuropathy</td>
</tr>
<tr>
<td>Helga ET Kolb, PhD</td>
<td>Professor (Emerita), Ophthalmology and Visual Sciences; Doctor Honoris Causa, Universidad Miguel Hernandez de Elche, Spain</td>
<td>Retinal Anatomy</td>
</tr>
<tr>
<td>David Krizaj, PhD</td>
<td>Professor and Deputy Director of Research; krizajlab.vision.utah.edu; John Frederick Carter Endowed Professor of Ophthalmology</td>
<td>Retinal Neurobiology; Calcium Regulation; Glaucoma</td>
</tr>
<tr>
<td>Robert E Marc, PhD</td>
<td>Distinguished Professor (Emeritus), Ophthalmology and Visual Sciences</td>
<td>Retinal Neurotransmission and Networks; Retinal Degenerations; Metabolomics</td>
</tr>
<tr>
<td>Neda Nategh, PhD</td>
<td>Assistant Professor, Electrical and Computer Engineering; Research Assistant Professor, Ophthalmology and Visual Sciences</td>
<td>Visual Processing and Computations; Neuro-Inspired Computer Vision</td>
</tr>
<tr>
<td>Leah Owen, MD, PhD</td>
<td>Assistant Professor, Ophthalmology and Visual Sciences</td>
<td>Analysis of Genetic and Genomic Contribution to the Pathophysiology of Complex Pediatric Eye Disease including Strabismus, Myopia, ROP, and Amblyopia</td>
</tr>
</tbody>
</table>
### Adjunct Volunteer Ophthalmologists 2018-2019

**INTERNAL University of Utah**

- Paul Bressloff, PhD
- Brittany Coats, PhD
- Karen Curtin, PhD, MStat
- Michael Deans, PhD
- Michael Feehan, PhD
- Kristen Kwan, PhD
- Jason Shepherd, PhD
- Monica Vetter, PhD
- Barbara M Wirostko, MD

**EXTERNAL**

- Catherine Bowes Rickman, PhD
- Carter Cornwall, PhD
- Eugene de Juan, MD
- Eduardo Fernandez, MD, PhD
- Monika Fleckenstein, MD
- Yingbin Fu, PhD
- Sabine Fuhrmann, PhD
- Werner Gellermann, PhD
- Li Jiang, MD, PhD

**Adjunct volunteer faculty collaborate on research projects, participate in clinical studies, attend teaching opportunities, and assist on our outreach medical missions.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
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<tr>
<td>Jason Ahee, MD</td>
<td>St. George, Utah</td>
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<td>Iqbal “Ike” Ahmed, MD</td>
<td>Mississauga, Ontario, Canada</td>
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<tr>
<td>Lisa Arbisser, MD</td>
<td>Sarasota, Florida</td>
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<td>Nicholas Behunin, MD</td>
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<td>John Berdahl, MD</td>
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<td>Kristin O Chapman, MD</td>
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<td>David A Crandall, MD</td>
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<td>Reeta Gurung, MD</td>
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<td>Anna Gushchin, MD</td>
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<td>Matheson A Harris, MD</td>
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<td>Loren S Seery, MD</td>
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<td>Boise, Idaho</td>
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<td>Zachary J Zavadni, MD</td>
<td>Salt Lake City, Utah</td>
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- Marilyn Olson
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<td>Gretchen and Jeff Pettey, MD</td>
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<td>Michelle Colbert</td>
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<td>David C. Bradford, PhD</td>
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<th>Kathleen J. Mattes-Longo and Stephen R. Longo</th>
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<td>Merlyn W. and Bonnie T. Johnson</td>
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<td>Ronald L. Rencher, JD</td>
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Patricia A. and Daniel Young
Gerard and Dominique Yvernault
Louise M. and Norm A. Zabriskie, MD
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<tr>
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</tr>
<tr>
<td>M.C.F. Ackerlind, Sr.</td>
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<tr>
<td>Curtis E. Ackerlind, Jr.</td>
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<td>Martha Ahrens</td>
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<td>Phyllis G. Everton</td>
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<td>Marianne J. Fisher</td>
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<td>Premo Foianini</td>
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| Keven Greer |
| Ruth M. Lassig Gurgel |
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| Jeanne Rainey |
| Charles Ned Rasmussen |
| Hank Rothwell |

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<tbody>
<tr>
<td>Those in whose honor gifts were made to the Moran Eye Center July 1, 2017, through June 30, 2018</td>
</tr>
<tr>
<td>Karen and David Bachman</td>
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<tr>
<td>Paul S. Bernstein, MD, PhD</td>
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<td>Dorothy B. Burton</td>
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<td>Steve L. Chin, CPA</td>
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<td>Christine A. Fairclough</td>
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<td>Fred W. Fairclough, Jr.</td>
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<td>Richard “Reese” Feist, Jr., MD</td>
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<td>Alan E. Huish</td>
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<td>Rachael Jacoby, MD</td>
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<td>Billie Jo Jones</td>
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Gracie Jones
Bradley J. Katz, MD, PhD
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Michael P. Teske, MD
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Alix A. Truax
Ruth Zweigart

**PLANNED GIFTS**

*Those who have planned gifts in place to the Moran Eye Center from July 1, 2017, through June 30, 2018*

Joanne Ambrose
Neal R. Anderson
Karen Bachman
Elmen D. Bloedel
Lyman R. and Jane Brothers
Laura D. Byrne
Irene G. Casper and Ruth A. Morey
Richard A. and Carol M. Fay
Frank and Elaine Fox
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Curtis and Lynne Kennedy
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Linda Rankin, PhD
Don Reddish
Janet Schaap
Daniel Soulia
Sharon Steele-McGee
Susan O. Taylor
Mary E. Thompson
Haru Toimoto

*Deceased

The Moran Eye Center is grateful for the contributions made to support our mission and goals. We have made every effort to ensure that this July 1, 2017, through June 30, 2018, 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.
MORAN EYE CENTER PROFILE

July 1, 2017 – June 30, 2018

Patient Visits by Location
Patients came from 49 states and the District of Columbia and 11 countries and U.S. territories

Patient Satisfaction Surveys
16 Moran physicians earned top marks for patient satisfaction compared with peers at 33,000 health care facilities, scoring in the top 10 percent nationwide

Publications
122

Grants & Contracts
$8,365,990

NATIONAL RANKINGS

Ophthalmology Times
10th Best Overall Program
11th Clinical Care
12th Research Program
12th Residency Education Program
U.S. News & World Report
13th Best Hospitals for Ophthalmology
Doximity
10th Residency Education

SURGERIES 6,342

RETINA: 832
OCULOPLASTIC: 562
PEDIATRIC: 194
OTHER: 82
ANTERIOR SEGMENT: GLAUCOMA, CATARACT, AND CORNEA: 4,672
Physicians provide comprehensive care in nearly all ophthalmic subspecialties, making the Moran Eye Center a major referral center for complex cases. Services include:

- Cataracts
- Cornea & External Eye Disease
- Electrophysiology
- Emergency Care
- Glaucoma
- LASIK and Vision Correction Surgery
- Neuro-ophthalmology
- Oculoplastic and Facial Plastic Surgery
- Optometry
- Patient Support Program for Patients with Vision Loss
- Pediatric Ophthalmology
- Pediatric Retina
- Retinal Diseases
- Strabismus
- Ultrasound
- Uveitis