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The John A. Moran Eye Center at the University of Utah is the largest ophthalmology clinical care and research facility in the Mountain West, with more than 60 faculty members, 10 satellite clinics, and 15 research labs.

Physicians provide comprehensive care in nearly all ophthalmic subspecialties, making Moran 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

MORAN EYE CENTER
Community Clinics

2019-2020
A VISION for 2020

The year 2020 at the John A. Moran Eye Center is shaping up to be one of dramatic advances driven by the passionate, talented members of our faculty who are seeing new possibilities and acting on them. They aren’t satisfied with the status quo—nor should they be. When you focus everything on improving life for your patients, amazing things happen.

In the past year, we had the distinct honor of being ranked among the nation’s Top 10 programs in an Ophthalmology Times poll of chairs and residency program directors. A new collaboration spearheaded by Moran’s Douglas Marx, MD, will benefit thyroid eye disease patients with an interdisciplinary care team and surgical options previously unavailable in the Mountain West. Additionally, several translational research efforts are poised to change the future of eye care.

In this issue of Focus, you’ll meet Berna Gomez—the first blind person to test the Moran | Cortivis Visual Prosthesis to create artificial vision. Our own Dick Normann, PhD, made it happen through an international collaboration that has built on his foundational body of research. The results are phenomenal, and I’m looking forward to future patient studies.

Paul S. Bernstein, MD, PhD, and research associate Lydia Sauer, MD, are uncovering a multitude of ways a non-invasive camera, the fluorescence lifetime imaging ophthalmoscope, can be used not only to detect eye diseases but also to identify a person’s risk for disease. It’s also notable that our Vice Chair of Education Jeff Pettey, MD, and Associate Program Director of Education Rachel G. Simpson, MD, are revamping an already strong curriculum to emphasize interactive learning.

Last but not least, Moran’s Global Outreach Division efforts in Utah are reaching new heights as we emphasize helping even more of our local underserved populations.

It’s 2020, and it is our goal to make sure our patients—now and in the future—have the vision they need to accomplish their dreams.

Sincerely,

Randall J Olson, MD
Professor and Chair, Department of Ophthalmology and Visual Sciences
CEO, John A. Moran Eye Center, University of Utah
For more than 30 years, Moran Eye Center researcher Dick Normann, PhD, has been working to create a form of artificial vision for people who have completely lost their sight. With the successful testing of the Moran | Cortivis Visual Prosthesis, the dream is becoming a reality.
ELCHE, Spain—At the age of 58, Berna Gomez has lived the past 17 years of her life in total blindness. She was not able to take one last glimpse of the school where she worked as a teacher for more than a decade before her career was cut short. She did not see the faces of her two sons change and mature as they grew into men. She cannot take in views of the orange trees in the foothills of Valencia on her daily walks or look into her husband’s eyes.

But in late 2018, inside a university research laboratory, a single bar—a white line made from white light—appeared on the midnight canvas of her mind. In a quiet, nondescript room filled with scientists who had created the image using a tiny microelectrode array implanted in Gomez’s brain, she exclaimed, “I can see something!”

Underlying her awe was the joy of a shared experience. The scientists could see a line drawn on a poster board in the lab; now, she could see one, too.

Gomez was successfully testing the Moran | Cortivis Prosthesis, developed by Moran Eye Center researcher Dick Normann, PhD, to create artificial vision, for the first time. Profoundly blind users without any vision wear eyeglasses equipped with a miniature video camera; specialized software encodes the visual data and sends it to the implanted microelectrode array to create images in the visual cortex.

While an international research team collaborates to push the science forward, its progress is dependent on the bravery of people like Gomez.

The Collaboration
At the Elche campus of Miguel Hernandez University in Spain, Professor Eduardo Fernandez, MD, PhD, runs a bioengineering lab of 20 scientists working on various projects in close collaboration with Hospital IMED Elche—artificial vision among them.

In his office and on computer screens in the lab are images of his Moran collaborators and mentors, bioengineer Normann and retinal neurocircuitry expert Helga Kolb, PhD. Working with a team of neurologists, psychologists, engineers, physicians, and surgeons, Fernandez and Normann are now putting decades of research needed to create the prosthesis to the test.

“This could give a blind person more mobility. It could allow them to identify a person, doorways, or cars easily. It could increase independence and safety. That’s what we’re working toward.”

– Dick Normann
Berna Gomez stands outside the bioengineering building at Miguel Hernandez University in Elche, Spain.
For Fernandez, the work is part of his life’s dream to help patients, sparked during his time completing postdoctoral work at Moran in the 1990s.

“During that time, I went to a talk on artificial vision given by Dick,” said Fernandez, now a Moran adjunct research professor. “For me, it was really amazing. For the first time in my life, I heard people were working on artificial vision. That was 30 years ago, and Dick and I have been collaborating ever since.”

Fernandez met Gomez in 2007, during research he was conducting using transcranial magnetic stimulation. In that study, Normann and Fernandez used an electromagnetic coil placed on her scalp to stimulate neurons in the visual cortex to produce phosphenes, or white flashes of light that both sighted and blind people can perceive. Gomez was exceptionally good at describing the phosphenes, even though they appeared for only a split second.

Years later, Fernandez reached out to Gomez to test the visual prosthesis. The effort, he told her, would involve brain surgery and months of intense experiments that would require her to temporarily relocate from Valencia to Elche. The primary goal was to evaluate safety, he said, but the research team hoped the prosthesis would turn video input into images constructed of phosphene patterns that Gomez could perceive.

Gomez would be the first person in the world to have a key part of the prosthesis—Normann’s famous Utah Electrode Array (UEA)—implanted in her visual cortex in an attempt to generate images depicting the world outside.

She didn’t hesitate to say yes.
The Right Mindset

Gomez always loved science as a child and in school. During her college years, she enjoyed biochemistry and decided to teach. She had been teaching high school biology for 15 years when she lost her eyesight.

She had just renewed her driver’s license that January before she quickly developed toxic optic neuropathy, a condition that rapidly destroys the optic nerves connecting the eyes to the brain. Within a matter of days, Gomez had completely lost her vision and any perception of light.

“It was a new year,” said Gomez, “and just like that, it was a new life for me.”

She spent months reassuring her sons, then ages 9 and 16, and learning to live with her new reality. Working with the National Organization of Spanish Blind People, Gomez learned how to be as independent as she could be. The organization taught her everything from how to locate food on a plate and shop at the supermarket to how smartphones and computers could assist in everyday life.

Her husband, Jose Luis, was already doing his part to help with household chores and the children, but now his role as her partner became even more essential. His support over their 33 years of marriage has made everything work. At home, she is not a blind person—just Berna.

When she spoke with Fernandez about the prosthesis experiments, she had accepted her new life.

“I know I am blind, that I will always be blind,” she said. “But I felt like I could do something to help people in the future. I still feel that way.”

Berna Gomez wears eyeglasses equipped with a camera as part of the Moran | Cortivis Visual Prosthesis.
The Experiments

During a three-hour surgery, a neurosurgical team needed only about a minute to implant the tiny microelectrode array, much smaller than a penny, into the visual region of her brain. The procedure went as expected, without complications.

For the next six months, Gomez spent up to four hours each day in the lab with Fernandez and his team conducting experiments that yielded important data. It wasn’t easy.

After sighted people go blind, they can still experience spontaneous phosphenes. Over time, these disappear. But Gomez’s surgery induced new spontaneous phosphenes to occur. While these decreased over time, she had to learn to distinguish a naturally occurring phosphenne from one evoked by electrical stimulation via the array. That process alone took two full months. The work was methodical as researchers asked Gomez to describe what she perceived and even rate the brightness of each phosphenne.

The experiments ultimately determined the amount of electrical current that could safely be used to produce phosphenes. The team also confirmed the biocompatibility of the equipment used in the prosthesis.

In addition to identifying lines, Gomez also described seeing a large and small “O.” She even brought one large and one small sequin to the lab from home to explain the images. To get Gomez more familiar with evoked phosphenes and to introduce variety, lab members created a video game for her to play: a simple black-and-white maze that she moved a circle through using visual images created with the prosthesis.

While a neurosurgeon placed just one array in Gomez’s brain, published research conducted by Normann indicates between seven and ten arrays in the visual cortex, working together, could produce more detailed images for useful vision.

“This could give a blind person more mobility,” said Normann. “It could allow them to identify a person, doorways, or cars easily. It could increase independence and safety. That’s what we’re working toward.”

ABOUT THE

UTAH ELECTRODE ARRAY

Invented by Dick Normann, PhD, the UEA is just 4mm by 4mm.

It has 100 microelectrodes, each 1.5mm long, that can both record and replay the electrical activities of neurons communicating in the brain.

Normann first used the array in amputees to evaluate safety and efficacy. It allowed the amputees to control artificial limbs simply by thinking about moving a finger or a hand. In Spain, a team led by Normann and Eduardo Fernandez, MD, PhD, implanted the UEA into the brain’s visual cortex for the first time.
The work to get to this point has been painstaking. “When we started this project more than 30 years ago, there was nobody doing anything in this field, and we needed so much basic information,” said Normann.

After developing the UEA in the 1990s and unique tools required to implant it, Normann conducted years of experiments to answer key questions in the quest for artificial vision. The result is a foundational body of work encompassing more than 100 published papers, cited by scientists around the world.

Normann will now work with Fernandez to conduct similar experiments with as many as four other patients in Spain before beginning additional research efforts in the United States. The next set of experiments will use a more sophisticated encoder system, capable of stimulating more electrodes simultaneously to reproduce more complex visual images.

For Moran CEO Randall J Olson, MD, work on the Moran | Cortivis Visual Prosthesis heralds a remarkable leap forward for the field.

“The results are amazing, and I couldn’t be more excited about the possibilities for the prosthesis,” said Olson. “For years, Dick and his collaborators have been pushing the boundaries of what people believed to be possible. Their dedication has paid off spectacularly.”

The most recent advances with the prosthesis wouldn’t have been possible without Gomez, who says she’ll always answer the call to help in whatever way she can. Surgeons removed the array from Gomez’s brain at the end of the experiments, but she remains a key member of the team, currently assisting by speaking with potential new prosthesis study participants who may have questions or concerns.

She doesn’t feel especially brave, only clear about her decision to participate in the research and the useful feeling she has derived from it.

After thinking about it for a moment, Gomez says: “Someone has to do it.”
In the future, a two-minute retina scan could let doctors spot eye diseases—or even the risk to develop them—long before any symptoms appear. “With more lead time, therapies and interventions have a much better chance to stop or slow disease,” said Moran’s Paul S. Bernstein, MD, PhD. “It’s what every doctor hopes for.”
HOW FLIO WORKS

FLIO allows doctors to examine the health of the retina by measuring how long molecules known as fluorophores emit light, or glow, when stimulated with a laser. This is known as the autofluorescence lifetime of the fluorophore. Areas with the shortest autofluorescence lifetimes are color-coded red; the ones with the longest are blue. Healthy eyes show typical areas of red and blue, but these patterns change in different eye diseases, creating unique signatures that indicate diseases, disease progression, and even risk of developing certain diseases.

Bernstein and Sauer first used FLIO to study macular telangiectasia type 2 (MacTel), a rare inherited eye disease that causes a gradual loss of central vision. Working with a large study group of families with the disease as part of an international research project, the Moran team not only identified a FLIO signature for early-stage MacTel but also discovered changes in people with a genetic risk of developing the disease. Additionally, FLIO played a role in helping Bernstein and fellow MacTel Project scientists and clinicians around the world identify the first genetic cause of the eye disease in 2019.

One of the biggest potential clinical uses of FLIO could be the early diagnosis of AMD, a leading cause of central vision loss among adults age 55 and older in the U.S. Bernstein’s lab has made groundbreaking discoveries over the past two years using the only Heidelberg Engineering Spectralis-based fluorescence lifetime imaging ophthalmoscope (FLIO) in the U.S. Using FLIO, Bernstein and Sauer are mapping subtle retinal changes that could one day also indicate glaucoma, uveitis, Alzheimer’s disease, and many other conditions.

NEW SCREENING POTENTIAL

Bernstein and his lab recently published promising results of using FLIO to screen for retinal toxicity caused by hydroxychloroquine (Plaquenil). Doctors prescribe the drug to prevent malaria and treat dermatologic and rheumatologic inflammatory conditions such as rheumatoid arthritis and lupus.

“The problem is that if you’re on the drug for more than five years, about 10-20 percent of people develop toxicity that can actually blind them,” Bernstein explained.

Working with the University of Utah’s Department of Neurology, Bernstein is also exploring FLIO’s potential to detect Alzheimer’s disease. The theory is that the same kind of protein deposits seen in brain scans of Alzheimer’s patients may be detectable in the eye. If that’s the case, FLIO could potentially replace more costly brain imaging methods now used for Alzheimer’s.

RESEARCH EXPANDS INTERNATIONALLY

FLIO, developed in Germany, has been available only in a few centers in Germany, Switzerland, and at Moran. Heidelberg will soon release an upgraded version of FLIO to Moran and an expanded list of about a dozen centers in the U.S. and worldwide. Moran is poised to help lead a research consortium coming with the expanded release.

“The sites will share data, work together, see how different diseases manifest in different parts of the world,” said Bernstein, “as well as use artificial intelligence technology to improve data analysis.”

All the researchers who have worked with FLIO so far believe it has incredible potential, Sauer said. “With this new technique, we may understand eye diseases much better in the future.”

Macular Hole  MacTel  Stargardt Disease  Macular Degeneration  Choroideremia  Uveitis  Hydroxychloroquine Toxicity  Retinitis Pigmentosa
Moran Now a Center for **THYROID EYE DISEASE** Surgeries

A collaborative program designed to treat thyroid eye disease (TED) at the University of Utah offers patients access to highly customized treatments—including a delicate endoscopic surgery now available in the Mountain West.
The thyroid, a small, butterfly-shaped gland at the base of the neck, just below the Adam's apple, manufactures the hormones that regulate the body’s metabolism. For the most part, this essential organ does its amazing job and goes unnoticed. But for millions of people in the U.S., a range of thyroid disorders can create life-changing conditions—including TED.

GRAVES’ ORBITOPATHY: IT GETS COMPLICATED
One of the most common consequences of TED is an eye socket disorder in adults, seen mostly in patients with hyperthyroidism. Often referred to as Graves’ disease, this autoimmune disorder generally causes thyroid overactivity.

“About half of patients with Graves’ will develop an eye disease known as Graves’ orbitopathy, and some of this group will require surgery,” according to Douglas Marx, MD, Moran’s oculoplastic division director and co-founder of the university’s TED program. “However, Graves’ disease is not the only cause of orbitopathy, so diagnoses and treatments can be complex. I’ve seen it in patients with low thyroid and, in a handful of cases, non-thyroid issues.”

When Graves’ disease affects the eyes, the fat and muscles around them may enlarge. This inflammation causes the eyes to bulge, preventing the eyelids from closing completely. In turn, patients can experience extreme dryness or tearing and scrapes on the surface of the eye that may lead to infection. Also, because the eye socket stays the same, the enlarged eye muscles may not move properly, and this can cause double vision. Increased pressure in the eye socket can also damage the optic nerve, causing loss of eyesight.

An innovative surgery called endonasal endoscopic orbital decompression—offered at Moran—is often the solution to relieve the pressure, all done through the nose without external incisions through the skin.

TEAM APPROACH
With advances in surgical instruments and techniques, the minimally invasive endonasal endoscopic orbital decompression procedure has become a safe and effective option, according to Jeremiah A. Alt, MD, PhD, FACS, a sinus and skull base surgeon and co-founder of the TED program.

“Dr. Marx and I work in tandem to perform these endoscopic orbital and optic nerve decompressions—operating within the eye socket, through the sinuses,” he said.

For more complex cases, the two surgeons use a four-handed technique. This allows them to operate simultaneously, with the primary surgeon using both hands for the delicate removal of bone.

“In addition to the skill involved in just getting to the bone safely, the trick is knowing exactly how much bone to remove. Sometimes it’s just a millimeter,” Marx said. “Each case is completely customized. When the surgery is complete, the eye muscles have room to fit back in the socket.”

While the surgery isn’t without risks, it offers life-changing relief to patients.

“Ultimately, the endoscopic approach to the eye or orbit is safe, can be done without external scars, and is currently the least invasive corrective option available,” said Alt.

The university’s TED team includes fellowship-trained physicians in endocrinology, sinus and skull base surgery (endoscopic experts), oculoplastics, and neuro-ophthalmology. That’s because many TED patients need a team with both medical and surgical expertise.

The endocrinology team plays a pivotal role in evaluating and managing medication, helping patients get their thyroid disease under control, and then potentially starting medications that can reduce inflammation and improve vision changes associated with the condition.

“Our team approach is key to providing patients with the best possible outcomes for a condition that is often difficult to diagnose,” said Marx.
Program Helps Children Tap Creativity and Inner Calm through ART THERAPY

Although 5-year-old Maeve couldn’t see the white praying mantis about to step lightly onto her wrist, her face lit up the moment its tiny legs made contact. She sat quietly as Cinnamon Nash, CSW, explained that the day’s art class was going to be “all about bugs—listening, touching, and using all of our senses.”
The setting was “Celebrate Summer: Art Therapy for Children with Low Vision”—one in a series of classes and seminars offered by Moran’s nationally recognized Patient Support Program. The 2019 summer art class spanned five weeks and included children ages 5 to 10 with severe low vision, most of them legally blind.

FUN WITH A PURPOSE
Nash teaches new ways of thinking about art. She begins by emphasizing that “there are no rules here”—a phrase she repeats throughout every session.

“These children experience frustrating vision problems, including blindness, which will impact them the rest of their lives. But they are resilient and creative, both in navigating the roadblocks of vision loss and in using all their senses to create charming pieces of art,” explained Nash. “We build on that by encouraging them to trust their imaginations—to feel or hear something like a plant or a bug, or play with scratch-and-sniff stickers, and then decide how they want to paint or use crafts like pipe cleaners to create something based on those perceptions.”

Though she conveys simple lessons through fun and games and all kinds of tactile and auditory stimulation, the underlying purpose of art therapy is to help kids use art to tap into their inner calm. The creative process distracts them from thoughts that may be holding them back or causing anxiety. On the last day of class, each child makes a sensory box. The box is a memento containing items that engage each sense—for instance, fuzzy pom-poms for touching—that they can use at home.

“Having an art class with peers has been fun for this group,” said Nash. “Many of them know each other from local schools for the deaf and blind, but they don’t generally get together when school is out. The kids love being with each other, engaging in projects on an even playing field. Here, they can simply be in the moment.”

ART THERAPY FOR CHILDREN WITH LOW VISION
Art Therapy for Children with Low Vision is a yearly program supported by donors and is open to children ages 5 to 10 at no cost. Contact Cinnamon Nash, CSW, at 801-213-2764 or cinnamon.nash@hsc.utah.edu for information about the summer 2020 session.

MORAN’S PATIENT SUPPORT PROGRAM
Moran’s Patient Support Program offers a variety of professionally moderated support groups and vision rehabilitation services to help patients of all ages, families, and caregivers find ways to understand, accept, and move past the limitations of vision loss. For more information, please visit healthcare.utah.edu/moran/vision-loss-support-program/.
A Journey of Hope in Tanzania

Matias was a farmer, living with his wife in a village a few hours away from Dodoma, Tanzania.

The couple had three children; each one died before reaching the age of three. Their mother, stricken by pneumonia, followed them in death. Then, in his 40s, Matias went blind.

But he was lucky.

In a society that often ignores people with disabilities, Matias had a loving big brother. Boniface took Matias into his home with his wife and five children on a few modest acres of corn. Boniface cared for his brother, bathing him and using a walking stick to lead him through the fields safely.

Each moment, though willingly given by Boniface, took time away from fields that needed tending—the family’s only means of support. They had trouble getting ahead: Boniface always needed to save a little money to take care of his brother.

**SEEKING HELP**

On one rainy April day, Boniface, his wife, and Matias set out on a four-hour walk of hope to the nearest village with health workers at a rudimentary clinic. They had heard American doctors from the Moran Eye Center’s Global Outreach Division would be there working with their Tanzanian partner surgeons.

Matias shuffled quietly into a long line of patients, head held low. When spoken to, he seemed confused.

Two circles of white completely clouded his eyes, and doctors confirmed they were dense cataracts, a natural clouding of the lens in the eye usually associated with aging. In the developing world, cataracts often occur earlier due to extreme sun exposure and malnutrition.

The doctors said they could restore his sight, and Matias was anxious to have his life back. With the aid of a translator, he explained his blindness:
“He says his soul feels disconnected from his body. He doesn’t know where to go, what to touch, how to live.”

The outreach team referred Matias to the University of Dodoma’s Benjamin Mkapa Hospital, where an international team of surgeons led by Moran’s Alan S. Crandall, MD, and Dodoma’s Frank Sandi, MD, partnered to perform surgeries that replaced the clouded lenses with clear synthetic ones.

The next morning as Matias’s eye patches were removed, he looked for his brother. With a shout of recognition, Matias hugged his brother, who led him to a window. Matias excitedly picked out buildings, houses, and trees. The colors, he told the translator, were back, and so was his life.

MORAN’S MODEL FOR CHANGE

Matias’s journey is one example of curable blindness found not only in low-resource countries but sadly in parts of the U.S. as well. Ophthalmologists can cure cataracts with surgery. But there are too few ophthalmologists in the areas of greatest need. Without access to care, patients and families suffer, and economies stagnate.

Moran’s Global Outreach Division conducts large-scale surgical outreach with strategic partners throughout the world to create sustainable eye care systems. However, Moran’s work goes beyond providing care. Through broad training initiatives with local doctors and nurses, Moran is increasing access to care.

Tanzania’s eye care system is developing rapidly. In Dodoma, the capital city, Moran has worked with the government and local partners to train physicians, nurses, and health care workers at the university hospital. There, Frank Sandi, MD, is launching the capital city’s first ophthalmology residency program—a fundamental step in addressing the extreme shortage of eye doctors. As president of the Tanzania Ophthalmology Society, Sandi also organized the first All Eye Health Workers Congress, broadening impact throughout the country that is home to 55 million people.

“It’s gratifying to see progress in Tanzania, but the country still has a long road ahead,” said Moran’s Global Outreach Division Co-Medical Director Jeff Pettey, MD. “Our next step is building eye care capacity in the surrounding region through training of public health workers in the six surrounding districts. The workers will learn to screen patients and refer them to local district hospitals to receive basic eye care, while patients requiring surgical care will be bused to Dodoma.”

Moran is already working to replicate the successes in Dodoma with partners from Weill Cornell at the Bugando Medical Centre in Mwanza, where four partner ophthalmologists serve a population base of 16 million.
Moran’s outreach team continues its commitment to provide much-needed eye care in Utah’s remote Four Corners region. Collaborating with Utah Navajo Health System and other partners, the Moran team served more than 600 patients last year.
PROJECT HOMELESS CONNECT  
LOCAL OUTREACH 2019

Expanding its reach to help meet the growing need for eye care among underserved Utahns, Moran’s Global Outreach Division joined Friends for Sight for the annual Project Homeless Connect Salt Lake City to provide vision screenings and glasses to more than 200 people.
Learning without Borders

“I use it to learn surgical procedures because the videos are so clear and the procedures so well-explained that, with some guidance, it is easy to follow the steps.”

—Saiko Mangumbe, MD, Zimbabwe

In the developing world, millions of people suffer from visual impairments because there simply aren’t enough eye doctors to care for them. While Moran’s Global Outreach Division works to train ophthalmologists around the globe, student access to high-quality textbooks and lectures is almost nonexistent in places like Tanzania or Haiti.

Even in industrialized nations like the U.S., medical students receive minimal ophthalmic education—as little as a few hours. This can leave primary care doctors with minimal knowledge of the eyes.

Moran’s Clinical Ophthalmology Resource for Education (CORE) website aims to close both of these educational gaps. The unique website provides open-access, peer-reviewed ophthalmic education for medical providers and students around the world. Since CORE’s inception in 2015, its impact has grown in leaps and bounds.

CORE HAS 876 VIDEOS
and its growing content includes training in basic eye care, instructional surgical videos, and faculty lectures given to residents.

PHYSICIANS COLLECT VIDEOS AND MEDICAL PHOTOGRAPHY FROM 7,000-PLUS YEARLY SURGERIES AND MORE THAN 145,000 YEARLY PATIENT VISITS AT MORAN.

DID YOU KNOW?
The eyes are the window to overall health, so a physician who does a routine eye exam can detect clues in the eyes that often warn of issues elsewhere in the body—including diabetes, hypertension, and inflammatory conditions.

MoranCORE.Utah.edu
The site is produced in partnership with the Spencer S. Eccles Health Sciences Library at the University of Utah.
Quantum Leaps

WATCH TIMES
CORE became searchable through YouTube in 2018. Since then, watch times have grown exponentially. Viewers may access the site directly, or go through YouTube.

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TOP 5 CORE VIDEOS
1. THE ORBITAL EXAM
2. THE NEURO-OPHTHALMOLOGY EXAM: NEURO
3. THE NEURO-OPHTHALMOLOGY EXAM: PUPILS, COLOR, EYE MOVEMENTS, PRISM
4. THE OPHTHALMIC EXAM: RETINA AND POSTERIOR SEGMENT
5. USING SUBJECT REFRACTION TO CALCULATE GLASSES PRESCRIPTION AND FIT A CONTACT LENS

PAGE VIEWS
2015 | 6,511
2018 | 67,295
2019 | 209,578 as of November 11

“...basic eye exam videos are the most viewed speaks to the reality that doing a good eye exam is still a work in progress in many places around the world.”
—Griffin Jardine, MD, Moran CORE editor-in-chief

VIEWERS BY LOCATION

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THE TOP 10 COUNTRIES BY NUMBER OF USERS VIA CORE WEBSITE:
1. INDIA
2. EGYPT
3. SOUTH KOREA
4. THAILAND
5. BRAZIL
6. SOUTH AFRICA
7. GERMANY
8. NIGERIA
9. IRAN
10. ITALY

THE TOP 10 COUNTRIES BY NUMBER OF VIEWERS VIA CORE YOUTUBE:
1. UNITED STATES
2. UNITED KINGDOM
3. CANADA
4. GERMANY
5. INDIA
6. AUSTRALIA
7. FRANCE
8. BRAZIL
9. ITALY
10. NETHERLANDS
The Utah chapter of the Achievement Rewards for College Scientists (ARCS) Foundation awards $15,000 to an incoming Moran Eye Center resident each year to support research. Moran then matches the award for the following two years of residency, providing a total of $45,000 to support research for each scholar. September 2019 marked a new milestone for the partnership: The foundation extended its support to not one but two Moran residents.

Sean Collon, MD, completed his Bachelor of Science degree at the University of Michigan and earned his medical degree at Vanderbilt University. In medical school, he held a staff position at the student-run free clinic, where he helped implement a teleophthalmology screening for diabetic retinopathy. He also traveled to Nepal and implemented a mobile phone-based teleophthalmology protocol in rural medical camps to improve detection of retinal and optic nerve pathology.

At Moran, Collon plans to continue researching health care inequities and the environmental impact and cost of high-quality eye care.

Allie Marie Simpson, MD, received her Bachelor of Science degree from the University of Northern Iowa and earned her medical degree from the University of Iowa Carver College of Medicine. She worked with the Glaucoma Genetics Lab at the university and graduated with research distinction. Her award-winning work aided in the discovery of a new disease-causing mutation in a patient with LADD syndrome and open-angle glaucoma. She also independently screened over 200 glaucoma patients from the Faroe Islands for known glaucoma-causing mutations.

Simpson plans further glaucoma and anterior segment research as a Moran resident.

From left, ARCS Foundation Utah Vice President Anne Erickson, ARCS Scholar Allie Simpson, Moran CEO Randall J Olson, ARCS Scholar Sean Collon, ARCS Foundation Utah President Sue Dintelman, and Moran Vice Chair of Education Jeff Pettey.

Research Scholar Honoree Program

Ophthalmology Times recognized Bradley Jacobsen, MD, as a Top 5 winner in its annual Research Scholar Honoree Program at the American Academy of Ophthalmology (AAO) 2019 meeting in San Francisco.

The program offers fellows and residents nationwide an opportunity to share retina research with peers and mentors.

Jacobsen, a second-year Moran resident and a 2017 ARCS Scholar, earned fourth place with his AAO presentation, “Prevalence of Retinal Diseases and Associated Risk Factors in an African Population from Mwanza, Tanzania.” His research will be published in Ophthalmology Times and featured in a supplement to a peer-reviewed publication this year.

Moran resident
Bradley Jacobsen
Moving Beyond

‘THE SAGE ON THE STAGE’

When Moran Eye Center residents spoke up, Vice Chair of Education Jeff Pettey, MD, listened.

Beginning in 2020, Moran will implement an entirely revamped approach to ophthalmic education—one that stresses interactive blended learning over traditional lectures.

“Interestingly, this change came about organically,” explained Pettey. “Around the same time that residents started expressing a desire to move away from the ‘sage-on-the-stage’ model and toward more active learning, we heard from faculty who were equally eager for more dynamic educational exchanges.”

An extraordinary synergy developed, Pettey said, as residents and faculty came together. Led by Rachel G. Simpson, MD, residents, fellows, and attending physicians formed a working group, naming it the Moran Ophthalmology Learning Experience.

Simpson, a former Moran glaucoma fellow and now an assistant professor of ophthalmology and visual sciences, also serves as Moran’s associate residency program director—a role she embraces.

“The opportunity to change the long-established format is truly exciting,” she said. “Most residents are coming straight from four years of medical school, where programs have had to innovate to compete. These programs make the most of technology and active learning, so our residents are used to podcasts and online options, and more of a case-based learning system.”

Moran’s program is ranked sixth in the nation and boasts a remarkable board pass rate, so one might ask, “If it’s not broken, why fix it?”

The learning committee’s response?

“We have amazing tools and models available to us,” Simpson said. “Let’s use them and make the time that faculty and students spend together in lectures as valuable and memorable as possible.”

While Simpson and her committee acknowledge the time-consuming task of changing long-standing teaching practices, they are focused on the lasting value the changes will bring.

“We have some of the country’s top leaders in their specialties here,” she said. “It’s one thing to have them lecture to you for 45 minutes, but it’s another to have them sit with you for two hours and walk you through cases and learn about why they made the decisions they did. This is why residents come to Moran.”

Rachel G. Simpson, center, heads the Moran Ophthalmology Learning Experience Committee, which includes residents Ariana Levin, left, and Katherine Hu.
Moran offers one of the nation’s top educational programs, providing excellent didactic training and extensive surgical experience. The latest Ophthalmology Times survey of chairpersons and residency program directors at eye centers across the country ranked Moran No. 6 in the nation for Best Residency Program. A 2019 survey by physician website Doximity placed Moran’s residency program at No. 9 in the country and No. 2 in the West.

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 the 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.

FELLOWSHIP PROGRAM 2019-2020

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RESIDENCY PROGRAM 2019-2020

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**Program Growth**
The program continues to grow—resident applications increased to 505 for four spots in 2019. We’ve gone from six residents to 12, and one fellow to up to 11 for specialties including cornea and refractive surgery, glaucoma, neuro-ophthalmology, retina and vitreous surgery, uveitis, and international outreach.

**High Surgical Volumes**
Our clinical faculty members perform about 7,000 surgeries per year and see about 150,000 patients, ensuring residents and fellows have a full range of clinical and surgical experiences. In three years, one Moran resident, on average, performs about 700 surgeries and procedures. About 285 are cataract surgeries—86 is the national requirement; 200 the national average. Board-certified attending faculty supervise all surgeries and procedures. A wet lab center gives residents additional opportunities 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, at least one 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.

**HEED FELLOWSHIP AWARDS**
The Heed Ophthalmic Foundation recently chose a fellow and two recent Moran Eye Center graduates to receive 2019-2020 Heed Fellowship Awards.

The Foundation gives 24 competitive awards yearly to talented young ophthalmologists who are pursuing postgraduate fellowship training. Each recipient receives a Merit Award of $10,000 to assist in their academic pursuits.

Awardee Cecinio C. “Nikko” Ronquillo Jr., MD, PhD, completed his residency in June and is continuing his education at Moran as a retina fellow.

Former resident Christopher Conrady, MD, PhD, completed his uveitis fellowship at Moran in June and went on to a retina fellowship at the University of Michigan Kellogg Eye Center.

Rene Y.K. Choi, MD, PhD, completed a residency at Moran in 2017. He finished uveitis and retina fellowships at the Oregon Health Sciences University Casey Eye Institute.
Thomas D. “Tom” Dee II first found himself in the office of Randall J Olson, MD, in the 1990s. Olson told Dee he showed early signs of age-related macular degeneration (AMD), and there was no cure for the disease, which destroys central vision.

“Tom experienced firsthand how bad the scourge of macular degeneration can be,” Olson said. “He was also one of the first to want to change that reality.”

Dee’s friendship with Olson, and his experience dealing with AMD, led him to become one of Moran’s biggest advocates for research fighting the eye disease. He supported Moran’s AMD research until his passing in 2009. His sons, Tim and David Dee, and Tim’s sons Matt and Nate now lead the family’s philanthropic efforts through their foundation, the Lawrence T. & Janet T. Dee Foundation, named after Tom’s parents. They’ve remained involved with Moran, supporting AMD research.
“For us, this idea of being a part of health care in the community is just a part of family culture,” David Dee said. “It brought a lot of satisfaction to our grandfather and our father.”

The Dees have been behind several gifts crucial to advancing the fight against AMD, including funding the recruitment of Gregory S. Hageman, PhD, whose lab is devoted to finding new therapies for the disease.

**LEGACY OF GIVING**

The Dee family has been investing in the Utah health care community for nearly a century. Annie Taylor Dee of Ogden dedicated her life to the pursuit of better medical services after losing her husband and oldest son to preventable causes.

Her vision for improving Utah’s health services has been transformational: McKay-Dee Hospital in Ogden exists due in part to Annie’s efforts and generosity, and the nursing school at Weber State University bears her name.

Annie’s great-grandchildren continue to honor her legacy.

“I would say our values, vision, and mission are evolving, and we’re bringing on the next generation,” David said. “But we always try to honor what our dad and our grandparents cared about.”

**NEXT-GENERATION PROJECTS**

It was the next generation, Matt and Nate, who suggested the Dee Foundation fund research equipment at Moran, including a transmission electron microscope. This microscope enables the visualization of the connections between neurons in the eye for the study of neural connections, called “connectomics.” These connections between neurons are smaller than the wavelength of light and cannot be observed with regular light microscopes.

Bryan W. Jones, PhD, director of Moran’s Marclab for Connectomics, said the new microscope has transformed his research mapping the circuitry of the retina, including a new project to map corruption in circuitry that occurs in AMD and other blinding diseases.

“The addition of the second, more efficient microscope has effectively more than doubled our output,” he said.

The Dee Foundation has had a profound impact at Moran, the University of Utah, and the greater Utah community.

“The support of the Dees has kept Moran competitive with the largest institutions in the world engaged in connectomics research,” Jones said.

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Researcher Spotlight:

**BRYAN W. JONES, PHD**

Bryan W. Jones, PhD, heads the Marclab for Connectomics at the Moran Eye Center. Connectomics is the study of neural connections—specifically, in Jones’s case, in the retina. The Marclab, then under the direction of Robert E. Marc, PhD, was the first in the world to build a map of the circuitry of the retina, and that original map is still being explored and continues to provide vital research data.

Jones’s lab has two transmission electron microscopes, working nonstop nearly every day of the year, producing an unprecedented amount of data to understand retinal circuitry. His lab is the only National Institutes of Health-funded connectomics research group, competing with much larger privately funded groups yet managing to produce more publications on the retinal connectome than any other institution.

Recently, Jones received a multiyear National Eye Institute (NEI) grant totaling more than $3 million to research the next step in connectomics—the “patho-connectome,” or the study of how diseases progress through the retinal circuitry.

With the new electron microscope and the backing from the NEI, Jones is looking to unravel the mysteries of eye diseases and provide data that could be an invaluable asset for the vision science community.

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A 900-image composite of a retina is shown, made on the new transmission electron microscope and camera funded by the Dee Foundation. The microscope captures data twice as fast as an older one used in the Moran lab of Bryan W. Jones.
**Paul S. Bernstein, MD, PhD,** received the 2020 Mildred Weisenfeld Award from the Association for Research in Vision and Ophthalmology (ARVO). The honor recognizes distinguished scholarly contributions to the clinical practice of ophthalmology in memory of Weisenfeld, who suffered from retinitis pigmentosa and founded the Fight for Sight charity in 1946 to fund eye and vision research. Bernstein will present the Weisenfeld Award Lecture at the ARVO annual meeting in May 2020.

**Randall J Olson, MD,** received a 2019 Governor’s Medal for Science and Technology for his contributions in Academia and Research. Governor Gary R. Herbert, along with the Utah Science Technology and Research Initiative and the Governor’s Office of Economic Development, pays tribute each year to outstanding innovators in several categories. “I congratulate each of this year’s medal winners, and I would like to thank them for their contribution to technology innovation in Utah,” said Gov. Herbert. “It is contributions like these that keep Utah at the forefront of technology innovation and ensure we have a diverse economy that can weather any economic storm.” Former Utah Governor Mike Leavitt was the keynote speaker at the annual Utah Technology Innovation Summit, which included the medals presentation.

**Mary Elizabeth Hartnett, MD,** is now a distinguished professor of ophthalmology at the University of Utah. The rank honors selected individuals whose achievements exemplify the highest goals of scholarship, as demonstrated by recognition accorded to them from peers with national and international stature, and whose record includes evidence of a high dedication to teaching as demonstrated by recognition accorded to them by students and/or colleagues. Hartnett also received the 2019 Paul Kayser/Retina Research Foundation Global Award for her efforts to develop a better treatment for retinopathy of prematurity, the leading cause of childhood vision loss and blindness. The award, bestowed once every two years, includes a $20,000 honorarium for Hartnett and $30,000 for Moran.
Moran held a special event in May 2019 to honor seven faculty scholars who hold endowed chairs or professorships and the generous donors who made the positions possible.

“As the university’s primary means of recognizing academic distinction, endowed chairs and professorships promote excellence and enable the university to attract, retain, and honor distinguished faculty members,” Moran CEO Randall J Olson, MD, said. “We are grateful to all of the donors who, across generations, make the Moran Eye Center the object of their lasting and generous philanthropy.”

HONORED FACULTY WERE:

- Alessandra Angelucci, MD, PhD—Mary H. Boesche Endowed Professorship
- Wolfgang B. Baehr, PhD—Ralph and Mary Tuck Presidential Endowed Chair
- Paul S. Bernstein, MD, PhD—Val A. and Edith D. Green Presidential Endowed Chair
- Alan S. Crandall, MD—John E. and Marva M. Warnock Presidential Endowed Chair
- Gregory S. Hageman, PhD—John A. Moran Presidential Endowed Chair
- Mary Elizabeth Hartnett, MD—Calvin S. and JeNeal N. Hatch Presidential Endowed Chair
- David Krizaj, PhD—John Frederick Carter Endowed Professorship

A search is underway to fill a recently created eighth endowed position, the Jack R. and Hazel M. Robertson Presidential Endowed Chair.

JON M. HUNTSMAN PRESIDENTIAL CHAIR

University of Utah President Ruth V. Watkins has named Steffen Schmitz-Valckenberg, MD, a world-renowned expert in age-related macular degeneration (AMD) and a new member of the Moran faculty, to a Jon M. Huntsman Presidential Chair.

The chair is one of 12 recently gifted to the university by the Huntsman Foundation and named after the late business executive and philanthropist Jon M. Huntsman.

Schmitz-Valckenberg co-founded and directed the Grading of Digital Fundus Examination Reading Center and served as assistant medical director of the Department of Ophthalmology at the University of Bonn, Germany. He has been at the forefront of his field, using a variety of imaging techniques to map the stages of decline in AMD.

At Moran, he is launching an ophthalmic image reading center that will play a key role in the Sharon Eccles Steele Center for Translational Medicine’s drive to take a new therapy for a prevalent form of AMD into human clinical trials.
James Gilman, CRA, FOPS, Moran’s Ophthalmic Imaging project administrator, contributed images for the covers of 12 journals in 2019.

Gregory S. Hageman, PhD, won a grant from the Chan Zuckerberg Initiative to work on the Human Cell Atlas, an international collaboration to map all cells in the human body for a better understanding of health. Hageman, executive director of Moran’s Sharon Eccles Steele Center for Translational Medicine, is part of a team creating the Cell Atlas of the Human Eye from Birth to Old Age. Key to the team’s work is the extensive human eye tissue repository Hageman began developing in the 1980s.

Colin Bretz, PhD, received a $65,000 Career-Starter Research Grant from the Knights Templar Eye Foundation, dedicated to supporting research and launching the careers of clinical and basic researchers focused on the prevention and treatment of blinding diseases in infants and children. Bretz, a member of the National Institutes of Health-funded lab of Mary Elizabeth Hartnett, MD, is working to better assess a premature baby’s risk for retinopathy of prematurity and need for treatment.

Mary Elizabeth Hartnett, MD, served as director of the 2019 Advances in Pediatric Retina Course, hosted at the University of Utah. The course focused on the advances in diagnosis and surgical management of a wide range of pediatric retinal diseases, with five keynote speakers including Paul Sieving, MD, PhD, then-director of the National Eye Institute.
In 1979, Randall J Olson, MD, became the sole physician at the University of Utah’s Division of Ophthalmology in the Department of Surgery.

Today, little more than 40 years later, the Moran Eye Center serves as the largest ophthalmology clinical care and research facility in the Mountain West, with nationally ranked residency, clinical care, and research programs.

“With your support over the past 40 years, we’ve gone from a one-person team to a 500-person powerhouse—and we’re not looking to stop anytime soon,” said Olson.

Hundreds gathered in October 2019 to celebrate Dr. Olson’s visionary leadership and to kick off a 40 Years Forward campaign to grow Moran’s endowment and raise funds for a new research facility to support efforts to eradicate blinding eye diseases.

Watch a video about Dr. Olson’s 40 years of leadership and learn more about the fundraising campaign at healthcare.utah.edu/moran/giving.
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 U.S. and worldwide. He was selected to receive the 2016 Jan Worst Medal by the International Intra-Ocular Implant Club, the 2015 Lifetime Achievement Award by AAO, the 2014 Rosenblatt Prize for Excellence by the University of Utah, the 2014 Kelman Award by AAO, the 2012 Binkhorst Medal by ASCRS, and the 2019 Governor’s Medal for Science and Technology. Dr. Olson’s practice is limited to consultations and his long-term patients at this time.

SPECIALTY
- Cataract Services and External Eye Diseases

Paul S. Bernstein, MD, PhD, is the Val A. and Edith D. Green Presidential Endowed Chair in Ophthalmology and Visual Sciences. He 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

Alan S. Crandall, MD, is the John E. and Marva M. Warnock Presidential Endowed Chair of Ophthalmology and Visual Sciences; 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 trabeculoplasty 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

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

SPECIALTIES
- Comprehensive Ophthalmology
- Cataract Services

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

SPECIALTIES
- Comprehensive Ophthalmology
- Glaucoma

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

SPECIALTIES
- Comprehensive Ophthalmology
- Glaucoma

Doctors in alphabetical order
**Alison Crum, MD,** specializes in both oculoplastic and orbital surgery—the reconstruction of the bones around the eyes after traumas, correcting drooping eyelids, and aesthetic surgeries, such as eyelid lifts. She also practices neuro-ophthalmology and provides medical and surgical treatments for visual disorders. Her interests include treatment of Graves’ disease and of papilledema.  
**SPECIALTIES**  
- Neuro-ophthalmology  
- Oculoplastic and Facial Plastic Surgery

**David C. Dries, MD,** provides medical and surgical care for eye diseases and visual impairments in children as well as the evaluation and management of strabismus in 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 and Child Strabismus  
- Craniofacial Disorders

**Mary Elizabeth Hartnett, MD,** is a Distinguished Professor and holds the Calvin S. and JeNeal N. Hatch Presidential Endowed Chair in Ophthalmology and Visual Sciences. She is Director of Moran’s Pediatric Retina Center and one of a 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 198 peer-reviewed publications and 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 Arnall Patz Medal, ARVO’s Weisenfeld Award, and the Paul Kayser/RRF Global Award. She is an ARVO Gold Fellow.  
**SPECIALTY**  
- Pediatric and Adult Retinal Diseases and Surgery

**Monika Fleckenstein, MD,** specializes in degenerative retinal diseases, including AMD. A long-time collaborator with Moran’s Sharon Eccles Steele Center for Translational Medicine (STCM), Dr. Fleckenstein is an international authority on the design, conduct, and analysis of clinical trials in retinal diseases. She will oversee the STCM’s DREAM Study, which will determine how a prevalent gene-driven form of AMD progresses in patients and the appropriate stage in the disease to administer therapy.  
**SPECIALTIES**  
- Degenerative Retinal Diseases  
- Intravitreal Drug Delivery in Exudative Retinal Diseases

**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

**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

**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
Nick Mamalis, MD, is Director of the Ophthalmic Pathology Laboratory. He focuses his clinical practice on comprehensive ophthalmology including cataract and other anterior ocular surgeries. Dr. Mamalis is president of the 8,000-member American Society of Cataract and Refractive Surgery (ASCRS). He is the editor of the Journal of Cataract and Refractive Surgery and is the author of over 200 peer-reviewed publications, one textbook, and 45 book chapters. He is also Co-Director of the Intermountain Ocular Research Center and is performing research involving 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. His awards include the 2015 Life Achievement Honor Award from AAO and the 2013 Binkhorst Medal from ASCRS.

SPECIALTIES
• Cataract Services
• Ophthalmic Pathology
• Comprehensive Ophthalmology

Eileen Hwang, MD, PhD, specializes in the medical and surgical treatment of children and adults with retina conditions such as AMD, diabetic retinopathy, diabetic macular edema, retinal vein occlusions, myopic degeneration, macular hole, epiretinal membrane, retinal tears, retinal detachment, retinopathy of prematurity, Stickler syndrome, Coats disease, familial exudative vitreoretinopathy, and traumatic eye injury. She has been accepted into the University of Utah’s Vice President’s Clinical & Translational Research Scholars Program.

SPECIALTIES
• Adult and Pediatric Retina Conditions and Surgery

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

Marissa Larocheille, MD, specializes in cataract surgery and the diagnosis and management of patients with infectious and inflammatory eye conditions. She collaborates with rheumatologists, pediatricians, and internists to ensure uveitis patients receive optimum care.

SPECIALTIES
• Uveitis and Ocular Immunology
• Comprehensive Ophthalmology
• Cataract Surgery

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

Bradley J. Katz, MD, PhD, specializes in neuro-ophthalmology, cataract services, 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
• Comprehensive Ophthalmology

Amy Lin, MD, specializes in the medical and surgical treatment of corneal and anterior segment diseases. She is Medical Director of the Utah Lions Eye Bank. 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)

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

Marissa Larocheille, MD, specializes in cataract surgery and the diagnosis and management of patients with infectious and inflammatory eye conditions. She collaborates with rheumatologists, pediatricians, and internists to ensure uveitis patients receive optimum care.

SPECIALTIES
• Uveitis and Ocular Immunology
• Comprehensive Ophthalmology
• Cataract Surgery

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SPECIALTIES
• Adult and Pediatric Retina Conditions and Surgery

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SPECIALTIES
• Uveitis and Ocular Immunology
• Comprehensive Ophthalmology
• Cataract Surgery

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

Bradley J. Katz, MD, PhD, specializes in neuro-ophthalmology, cataract services, 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
• Comprehensive Ophthalmology

Amy Lin, MD, specializes in the medical and surgical treatment of corneal and anterior segment diseases. She is Medical Director of the Utah Lions Eye Bank. 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)
Douglas Marx, MD, specializes in pediatric and adult oculoplastic and reconstructive surgery, particularly pediatric and adult orbital tumors, eyelid and orbital reconstruction, and congenital defects. His research interests include congenital ptosis; eyelid and orbital defects; thyroid disease; orbital inflammation; neoplasms; and reconstruction.

**SPECIALTIES**
- Eyelid Reconstruction
- Ptosis, Brow Ptosis
- Ectropion and Entropion
- Nasolacrimal Diseases
- Orbital Tumors, Fractures

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

**SPECIALTIES**
- Pediatric Ophthalmology
- Adult Strabismus

Bhupendra C. K. Patel, MD, FRCS, is a general surgeon, plastic surgeon, and ophthalmic surgeon, with training in the United Kingdom and the United States. He has advanced fellowships in cosmetic and reconstructive head and neck surgery and also in ophthalmic plastic surgery, including orbital surgery, lacrimal surgery, socket surgery, and eyelid surgery. He has published three textbooks, including the 2020 edition of *Orbital Tumors*. He has developed and published many new surgical techniques and designed surgical instruments used worldwide. He has an international practice and has operated in Africa, Asia, and Europe. He is recognized as an expert in the management of thyroid orbitopathy, facial fractures, orbital tumors, blepharospasm, lacrimal surgery, and facial and eyelid tumors.

**SPECIALTY**
- Oculoplastic and Facial Plastic Surgery

Jeff Pettey, MD, is Moran’s Vice Chair of Education; Residency Program Director; Co-Medical Director, Moran Global Outreach Division; and Chief of Ophthalmology at the Salt Lake VA. Dr. Pettey specializes in post-traumatic and complex cataract surgery. His international work focuses on building training capacity through education and academic development. He received AAO’s 2017 Artemis Award in recognition of his international and local work on behalf of the underserved. Dr. Pettey is a provider for University of Utah Athletics and the U.S. Ski & Snowboard Association.

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

Mark D. Mifflin, MD, is the Director of Cornea and Refractive Division, Chief of Surgical Services at Moran, and Associate 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 and intraocular lenses. Dr. Mifflin also directs Moran’s prestigious Cornea Fellowship Program.

**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)

Steffen Schmitz-Valckenberg, MD, is a Jon M. Huntsman Presidential Chair at the University of Utah. He specializes in clinical and surgical treatment of macular and retinal diseases, including AMD, and is an expert in high-resolution retinal imaging. He is launching an ophthalmic image reading center at Moran that will play a key role in the SCTM’s drive to take a new therapy for a prevalent form of AMD into clinical trials.

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

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

Meagan Seay, DO, specializes in neuro-ophtalmology and treats patients with neurological disorders that cause decreased vision or double vision, including abnormalities of the brain, optic nerve, and eye movements.

**SPECIALTY**
- Neuro-ophthalmology
## Ophthalmologists

### Barbara M. Wirostko, MD
- **Specialties**
  - Glaucoma
  - Comprehensive Ophthalmology
  - Clinical Research and Drug Development
  - Sustained Delivery of Therapeutics
  - Exfoliative Syndrome
  - Genetic and Systemic Diseases

### Marielle Young, MD
- **Specialties**
  - Pediatric Ophthalmology
  - Adult Strabismus

### Judith E. A. Warner, MD
- **Specialties**
  - Neuro-ophthalmology
  - Diplopia
  - Giant Cell Arteritis
  - Papilledema
  - Optic Neuritis
  - Episodic Vision Loss
  - Idiopathic Intracranial Hypertension
  - Ischemic Optic Neuropathy
  - Unexplained Vision Loss

### Michael P. Teske, MD
- **Specialties**
  - Retinal Diseases and Surgery
  - Medial and Surgical Diseases
  - Retina and Vitreous
  - Diabetic Retinopathy
  - Macular Degeneration

### Rachel G. Simpson, MD
- **Specialties**
  - Glaucoma
  - Cataract Surgery
  - Anterior Segment Surgery

### Jean Tabin, MD
- **Specialties**
  - Comprehensive Ophthalmology

### Albert T. Vitale, MD
- **Specialties**
  - Uveitis and Ocular Immunology
  - Vitreoretinal Diseases

### Brian C. Stagg, MD
- **Specialties**
  - Glaucoma
  - Comprehensive Ophthalmology
  - Cataract Surgery
  - Geriatric Ophthalmology

### Kim Taylor, MD
- **Specialties**
  - Comprehensive Ophthalmology
  - Vitreoretinal Immunology

### Judith E. A. Warner, MD
- **Specialties**
  - Neuro-ophthalmology
  - Diplopia
  - Giant Cell Arteritis
  - Papilledema
  - Optic Neuritis
  - Episodic Vision Loss
  - Idiopathic Intracranial Hypertension
  - Ischemic Optic Neuropathy
  - Unexplained Vision Loss

### Michael P. Teske, MD
- **Specialties**
  - Retinal Diseases and Surgery
  - Medial and Surgical Diseases
  - Retina and Vitreous
  - Diabetic Retinopathy
  - Macular Degeneration

### Rachel G. Simpson, MD
- **Specialties**
  - Glaucoma
  - Cataract Surgery
  - Anterior Segment Surgery

### Jean Tabin, MD
- **Specialties**
  - Comprehensive Ophthalmology

### Albert T. Vitale, MD
- **Specialties**
  - Uveitis and Ocular Immunology
  - Vitreoretinal Diseases

### Brian C. Stagg, MD
- **Specialties**
  - Glaucoma
  - Comprehensive Ophthalmology
  - Cataract Surgery
  - Geriatric Ophthalmology

### Kim Taylor, MD
- **Specialties**
  - Comprehensive Ophthalmology
  - Vitreoretinal Immunology

### Judith E. A. Warner, MD
- **Specialties**
  - Neuro-ophthalmology
  - Diplopia
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  - Optic Neuritis
  - Episodic Vision Loss
  - Idiopathic Intracranial Hypertension
  - Ischemic Optic Neuropathy
  - Unexplained Vision Loss

### Michael P. Teske, MD
- **Specialties**
  - Retinal Diseases and Surgery
  - Medial and Surgical Diseases
  - Retina and Vitreous
  - Diabetic Retinopathy
  - Macular Degeneration
Patrick G. Bakke, MD, is the Medical Director of Anesthesia Services at Moran. Dr. Bakke provides and directs anesthesia care for ophthalmic patients before, during, and after surgery. His clinical interests also include anesthesia for labor and delivery, neurosurgery, and liver transplant, as well as the general practice of anesthesia.

SPECIALTY
• General Anesthesiology

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 quantify 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

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
• Psychosocial and Functional Issues Related to Vision Loss

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

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

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, phakic intraocular lens, and clear lens extraction. His research interests focus on improving efficiency and safety in cataract surgery as well as refractive surgery outcomes. Dr. Zaugg works closely with the Utah Jazz as team ophthalmologist.

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)
<table>
<thead>
<tr>
<th>Optometrists</th>
<th>2019-2020</th>
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| **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 Redwood 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* |  |
| **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,** offers full-scope optometric eye care and contact lens services for all ages, with an emphasis on children and sports vision.  
*Redstone Health Center* |  |
| **Craig M. Smith, OD,** specializes in children’s vision, sports vision, contact lenses, and general optometry.  
*Midvalley Health Center* |  |
| **Bryan H. Vincent, OD,** specializes in ocular pathology and contact lenses.  
*Midvalley Health Center John A. Moran Eye Center* |  |
Alessandra Angelucci, MD, PhD
Professor, Ophthalmology and Visual Sciences; Mary H. Boesche Endowed Professor of Ophthalmology and Visual Sciences
SPECIALTIES
Visual Cortex Circuitry and Function

Wolfgang B. Baehr, PhD
Professor and Director of Research; Ralph and Mary Tuck Presidential Endowed Chair 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 of Ophthalmology and Visual Sciences
SPECIALTIES
Vitreoretinal Diseases and Surgery; Retinal Biochemistry; Macular and Retinal Degeneration

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

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

Monika Fleckenstein, MD
Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Degenerative Retinal Diseases; High-Resolution Imaging; Identification of Prognostic Biomarkers for Disease Progression; Validation of Clinical Endpoints for Interventional Trials

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 Endowed Chair 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 Presidential Endowed Chair of Ophthalmology and Visual Sciences
SPECIALTIES
Retinal Angiogenesis Relating to ROP and AMD

Eileen Hwang, MD, PhD
Assistant Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Vitreous; Collagen; Extracellular Matrix; Aging; Protein Aggregation

Bryan W. Jones, PhD
Research Associate Professor, Ophthalmology and Visual Sciences; Director, Marclab for Connectomics, marclab.org; Editor, webvision.med.utah.edu
SPECIALTIES
Retinal Degeneration Disorders; Retinal Neurotransmission and Neurocircuitry; Metabolomics
BUILDING BRIDGES FROM RESEARCH TO PATIENT CARE

Binxing Li, PhD

Research Assistant
Professor, Ophthalmology and Visual Sciences

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

Nick Mamalis, MD

Professor, Ophthalmology and Visual Sciences; Co-Director, Intermountain Ocular Research Center

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

Robert E. Marc, PhD

Distinguished Professor (Emeritus), Ophthalmology and Visual Sciences

SPECIALTIES
Retinal Neurotransmission and Networks; Retinal Degenerations; Metabolomics

Richard A. Normann, PhD

Professor (Emeritus), Ophthalmology and Visual Sciences; Distinguished Professor of Bioengineering, University of Utah; Doctor Honoris Causa, Universidad Miguel Hernandez de Elche, Spain

SPECIALTIES
Artificial Vision/Neural Prosthetics

Behrad Noudoost, MD, PhD

Associate Professor, Ophthalmology and Visual Sciences

SPECIALTIES
Cognitive Neuroscience; Visual Processing

Leah Owen, MD, PhD

Assistant Professor, Ophthalmology and Visual Sciences

SPECIALTIES
Analysis of Genetic and Genomic Contribution to the Pathophysiology of Complex Pediatric Eye Disease including Strabismus, Myopia, ROP, and Amblyopia

David Krizaj, PhD

Professor and Deputy Director of Research; krizajlab.vision.utah.edu; John Frederick Carter Endowed Professor of Ophthalmology and Visual Sciences

SPECIALTIES
Retinal Neurobiology; Calcium Regulation; Glaucoma

Helga E. T. Kolb, PhD

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

SPECIALTY
Retinal Anatomy

Bradley J. Katz, MD, PhD

Professor, Ophthalmology and Visual Sciences

SPECIALTIES
Photophobia (abnormal light sensitivity); Migraine: its effects on visual quality of life; Ischemic Optic Neuropathy

Neda Nategh, PhD

Assistant Professor, Electrical and Computer Engineering; Research Assistant Professor, Ophthalmology and Visual Sciences

SPECIALTIES
Visual Processing and Computations; Neuro-Inspired Computer Vision

David Krizaj, PhD

Professor and Deputy Director of Research; krizajlab.vision.utah.edu; John Frederick Carter Endowed Professor of Ophthalmology and Visual Sciences

SPECIALTIES
Retinal Neurobiology; Calcium Regulation; Glaucoma
MORAN EYE CENTER

Research Team 2019-2020

Steffen Schmitz-Valckenberg, MD
Professor, Ophthalmology and Visual Sciences; Jon M. Huntsman Presidential Chair
SPECIALTIES
AMD; Retinal Imaging; Fundus Autofluorescence; Molecular Imaging; Structural-Functional Analysis

Brian C. Stagg, MD
Assistant Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Population Health; Glaucoma; Personalized Medicine

Ning Tian, PhD
Professor, Ophthalmology and Visual Sciences; Adjunct Professor, Neurobiology
SPECIALTY
Retinal Neurobiology

Frans Vinberg, PhD
Assistant Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Biomedical Engineering; Biophysics; Photoreceptor Physiology

Haibo Wang, MD, PhD
Research Associate Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Vascular Biology: abnormal vessel growth implicated in pathological neovascularization in AMD, ROP, and Diabetic Retinopathy

Liliana Werner, MD, PhD
Professor, Ophthalmology and Visual Sciences; Co-Director, Intermountain Ocular Research Center
SPECIALTIES
Ocular Biodevices Research; Different Intraocular Lens Designs; Materials and Surface Modifications; Interactions between Ocular Implants and Ocular Tissues

Larry A. Wheeler, PhD
Research Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Ophthalmic Drug Discovery and Development; AMD; Pharmacology of Glaucoma; Dry Eye and Neuroprotection

Jun Yang, PhD
Associate Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Cell Biology of Photoreceptors; Retinal Diseases

Oleg Yarishkin, PhD
Research Assistant Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Ion Channels; Mechanoelectrical Transduction; Neurodegenerative Diseases; Glia-Neuron Interactions

Guoxin Ying, PhD
Research Assistant Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Retinal Degeneration Diseases; Neuroscience; Gene Therapy

Moussa A. Zouache, PhD
Research Assistant Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Engineering; Mathematical Modeling; Data Analysis; Ophthalmic Drug Development; AMD
### ADJUNCT VOLUNTEER OPHTHALMOLOGISTS

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

#### 2019-2020

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<tr>
<th>Internal University of Utah</th>
<th>External</th>
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<tr>
<td>Paul Bressloff, PhD</td>
<td>Ferhina Ali, MD</td>
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<td>Brittany Coats, PhD</td>
<td>Catherine Bowes Rickman, PhD</td>
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<td>Karen Curtin, PhD, MStat</td>
<td>Carter Cornwall, PhD</td>
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<td>Michael Deans, PhD</td>
<td>Margaret DeAngelis, PhD</td>
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<td>Kristen Kwan, PhD</td>
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<td>Maureen A. Murtaugh, PhD</td>
<td>Eduardo Fernandez, MD, PhD</td>
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<td>Jason Shepherd, PhD</td>
<td>Yingbin Fu, PhD</td>
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<td>Monica Vetter, PhD</td>
<td>Sabine Fuhrmann, PhD</td>
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<td>Barbara M. Wirostko, MD</td>
<td>Werner Gellermann, PhD</td>
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<td>Li Jiang, MD, PhD</td>
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<td>Jason Ahee, MD</td>
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<td>St. George, Utah</td>
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<td>Iqbal “Ike” Ahmed, MD</td>
<td>Trent Richards, MD</td>
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<td>Mississauga, Ontario, Canada</td>
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<td>Arwa Alsamaree, MD</td>
<td>Christopher Ricks, MD</td>
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<td>Santa Rosa, California</td>
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<td>Lisa Arbisser, MD</td>
<td>Sanduk Ruit, MD</td>
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<td>Sarasota, Florida</td>
<td>Kathmandu, Nepal</td>
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<td>Nicholas Buhnun, MD</td>
<td>Derek J. Sakata</td>
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<td>St. George, Utah</td>
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<td>John Berdahl, MD</td>
<td>Joshua Schliesser, MD</td>
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<td>Sioux Falls, South Dakota</td>
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<td>Ashlie Bernhisel, MD</td>
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<td>Merced, California</td>
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<td>Ronnie Bhola, MBBS</td>
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<td>Eric Brinton, MD</td>
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<td>Gregory Brinton, MD</td>
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<td>Kristin O. Chapman, MD</td>
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<td>Joseph Chen, MD</td>
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<td>Richard P. Corey, MD</td>
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<td>David B. Petersen, MD</td>
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<td>Salt Lake City, Utah</td>
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Robert L. Trefz, MD
Layton, Utah

James Tweeten, MD
Boise, Idaho

Albert Ungricht, MD
Salt Lake City, Utah

Jeremy Valentine, MD
Provo, Utah

Aaron N. Waite, MD
Lehi, Utah

Gary Wallace, MD
Idaho Falls, Idaho

Charles H. Weber, MD
Oregon City, Oregon

Robert C. Welch, MD
Twin Falls, Idaho

Brice J. Williams, MD, PhD
Ogden, Utah

Darcy Wolsey, MD
Salt Lake City, Utah

Gilbert C. Wong, MD
West Jordan, Utah

Don Raphael Wynn, MD
Boise, Idaho

Zachary J. Zavodni, MD
Salt Lake City, Utah
The following individuals and organizations contributed to the Moran Eye Center from Jan. 1, 2019, to Dec. 31, 2019.

DONORS 2019

GIFTS OF $1,000,000 AND ABOVE

Anonymous | David Kelby Johnson Memorial Foundation

GIFTS OF $100,000 AND ABOVE

Eveline Bruenger* | Lawrence T. & Janet T. Dee Foundation
Christine A. and Fred W. Fairclough | Foundation Fighting Blindness
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Carl Marshall & Mildred Almen Reeves Foundation | Research to Prevent Blindness, Inc.
Sharon Steele-McGee | Bart and Elizabeth Warner

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Pauline and George Mulligan | New World Medical
Hazel M. Robertson* | Joseph & Kathleen Sorenson Legacy Foundation
### Donor Report for 2019

#### Gifts of $25,000 and Above

- Altabank
- Bamberger-Allen Health and Education Foundation
- Carolyn H. Brady
- The Chrisman Foundation
- Katherine W. & Ezekiel R. Dumke Jr., Foundation
- Willard L. and Ruth P. Eccles Foundation
- Willard L. Eccles Charitable Foundation
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<td>Revocable Family Trust</td>
<td>David K. Sias</td>
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<tr>
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<td>Vicki Ann Slotte</td>
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<td>IN MEMORY OF</td>
<td>IN HONOR OF</td>
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<tr>
<td>Judith A. and Adam M. Warden</td>
<td>Helen Daly Uhalde</td>
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<td>Garda L. and Gary H. Wardle</td>
<td>Warren Jensen Walters</td>
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<td>Lana and Charles Weber, MD</td>
<td>Lillis Wood Woodall</td>
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<td>Lana Smith Weber, MD</td>
<td>Paul J. Zabolotney</td>
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<td>Bart L. and Marlene G. Wheelwright</td>
<td>Lillian Zancanella</td>
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<td>Pauline Wiessner, PhD</td>
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<td>Joleen S. Willey</td>
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<td>Stephen P. and Nancy Z. Williams</td>
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<td>Kurt Wimberg</td>
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<td>Pamela and Robert W. Wing, MD</td>
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<td>Judy Wolfe</td>
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<td>Hope H. and William A. Worner</td>
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<td>Vanessa and Jeffrey Wright</td>
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<td>Deana Znamenacek</td>
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</table>

Those in whose memory gifts were made to the Moran Eye Center from Jan. 1, 2019, through Dec. 31, 2019

Curtis E. Ackerlind, Jr.
Martha Ahrens
Charlene Allen
Teresa Kay Beardall
Samuel Earl Berry
Barnie P. Bobbitt
Colleen H. Bowman
Rourke H. Bowman
LaRee Page Bradley
LaRee Page Brown
Bill Buhl
Lyman Buhler
Shirley E. Burke
Dorothy B. Burton
Kent M. Campbell
Elizabeth M. Carnahan
Arlene Cathcart
Bianca Coppa

Ruth Haglund Craig
Edmund W. Dunke
Charlene Evans Allen
John J. Frederick
Margaret M. Frederick
Maurine Frerichs
Belva B. Higgins
Kim A. Howes
Alan E. Huish
Norman C. Jensen
William M. Kleinschmidt
Ray Larsen
Nellie Allen Leighton
Allan M. Lipman, Jr., JD
Jaime Lynn
Margaret Weber Martinez
Paul R. Martinez
Gayland Mason
Phillip J. Mataya
Marlene B. McDonough
My Mother
Steven J. Nichols
Delmer O’Connell
Ted H. Olsen
Julie C. Palfreyman
Judith C. Peterson
Lynda Rae Peterson
Darlene M. Phillips
Charlene Polychronis
Ruby M. Slotte
John Smith
Thelma Smith
Marilyn M. Stevens
Helen Sweeney
Lester L. Thomas
Richard Dick Tomlin

IN HONOR OF

Those in whose honor gifts were made to the Moran Eye Center from Jan. 1, 2019, through Dec. 31, 2019

Richard Anderson, MD
Margaret Bath
David W. Bernolfo
Rourke H. Bowman
Gayle Brooks
Ryan Colby Campbell
F. Burton Cassity
Richard L. Christiansen
Richard O. Christiansen
Kim Corbin-Lewis, PhD
Alan S. Crandall, MD
David Alan Crandall, MD
Julie T. Crandall
Lisa Z. Crandall
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Kathleen B. Digre, MD
Christine A. Fairclough
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Kelton Gubler
Dottie Hannon
Gloria J. Hannon
Jim Hannon
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 Jan. 1, 2019, through Dec. 31, 2019, 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.

**PLANNED GIFTS**
*Those who have planned gifts in place to the Moran Eye Center as of Dec. 31, 2019*

Joanne Ambrose  
Neal R. Anderson  
Karen Bachman  
Bonnie Barry  
Elmen D. Bloedel  
Lyman R. and Jane Brothers  
Donald Cathcart  
Tim and Candace Dee  
Richard A. and Carol M. Fay  
Frank and Elaine Fox  
William B. Hale  
Cliff Hammer  
Joseph Hatch, MD  
Jerry and Claudia Howells  
Curtis and Lynne Kennedy  
Thomas and Wendy Lacy  
John A. and Carole Moran  
Irene G. Casper and Ruth A. Morey  
Sylvia E. Prahl-Brodbeck  
Linda Rankin, PhD  
Don Reddish  
Janet Schaap  
Edward Skinner  

Rick Hannon  
Mary Elizabeth Hartnett, MD  
Billie Jo Jones  
Curt Jones  
Gracie Jones  
Travis Jones  
David R. Lewis, PhD  
Amy Lin, MD  
Mark D. Mifflin, MD  
Randy Moseman  
Majid Moshirfar, MD  
Randall J Olson, MD  
Stef and Wyat Olson  
Jeff Pettey, MD  
Joyce Phillips  
Pat Phillips  
Charles Pieper  
Marion Raish  
Chris Reddish  
Jonathan Tanner Reddish  
Patrick M. Reddish  
Akbar Shakoor, MD  
Dinny T. Trabert  
Shari Wells  
Norm A. Zabriskie, MD  
Ruth Zweigart  

Daniel Soulia  
Sharon Steele-McGee  
Susan O. Taylor  
Mary E. Thompson  
Haru Toimoto  
*Deceased
MAXIMIZE THE BENEFITS OF YOUR GIFT TO MORAN

Two ways to get the most out of charitable giving under new tax laws.

1. BUNCH YOUR CHARITABLE CONTRIBUTIONS:
   You can pay two years of contributions in the same tax year and then none in the following year. This way, your itemized deductions may be higher than the standard deduction in the year you give. Essentially, you would be reporting your itemized deductions in the first year and claiming the standardized deduction in the next year. By combining two years of contributions in one, you may realize an additional tax benefit that otherwise might be lost.

   If you implement this strategy and have any concerns with the disruption to the cash flow of your designated charity, consider establishing a donor-advised fund. This way, you will make contributions to your donor-advised fund every other year and the fund will continue to make annual distributions to your designated charities of choice.

2. MAKE A QUALIFIED CHARITABLE DISTRIBUTION:
   If you are 70½ years of age or older, you can make a qualified charitable distribution (QCD) from your individual retirement account (IRA). This distribution will count toward your annual required minimum distribution and is not deductible as a charitable contribution. The QCD is limited to $100,000 per year, per taxpayer. With this strategy, you are reducing the amount of your taxable IRA distribution, which is an above-the-line deduction. You can still claim the standard deduction if your total itemized deductions are below the standard deduction.

   Effectively, QCDs allow you to reduce your itemized deductions and increase the tax benefits of the standard deduction. Please note that you are required to obtain supporting documentation from a charity for any contributions that exceed $250.

If you have any questions about employing these strategies for your giving to Moran, please contact the Moran External Relations team at 801-585-9700.
MORAN EYE CENTER

AT A GLANCE

JULY 1, 2018 – JUNE 30, 2019

PATIENT VISITS
150,568

GRANTS AND CONTRACTS
$9,803,581

CLINICAL TRIALS/STUDIES
86

PUBLICATIONS
115

SURGERIES PERFORMED
6,583

Oculoplastic: 695

Other: 246

Retina: 656

Pediatric: 390

Anterior Segment: Glaucoma, Cataract, and Cornea: 4,596

DOXIMITY

9th Nationwide
2nd in the West
for Residency Education

U.S. NEWS & WORLD REPORT

High Performing Hospital for Ophthalmology

2019 Survey Results

BEST OVERALL PROGRAM
1. BASCOM PALMER EYE INSTITUTE
   University of Miami
2. WILMER EYE INSTITUTE
   Johns Hopkins University
3. WILLS EYE HOSPITAL
   Thomas Jefferson University
4. MASSACHUSETTS EYE AND EAR
   Harvard University
5. UNIVERSITY OF IOWA
   Carver College of Medicine
6. W.K. KELLOGG EYE CENTER
   University of Michigan
7. DUKE EYE CENTER
   Duke University Hospital
8. MORAN EYE CENTER
   University of Utah
9. STEIN & DOWNEY EYE INSTITUTE
   University of California, Los Angeles
10. CASEY EYE INSTITUTE
    Oregon Health & Science University
11. DEAN MCGEE EYE INSTITUTE
    University of Oklahoma
12. STORM EYE INSTITUTE
    Medical University of South Carolina

BEST RESEARCH PROGRAM
1. BASCOM PALMER EYE INSTITUTE
   University of Miami
2. WILMER EYE INSTITUTE
   Johns Hopkins University
3. WILLS EYE HOSPITAL
   Thomas Jefferson University
4. MASSACHUSETTS EYE AND EAR
   Harvard University
5. UNIVERSITY OF IOWA
   Carver College of Medicine
6. W.K. KELLOGG EYE CENTER
   University of Michigan
7. DUKE EYE CENTER
   Duke University Hospital
8. MORAN EYE CENTER
   University of Utah
9. BECKMAN VISION CENTER
   University of California, Los Angeles
10. STEIN & DOWNEY EYE INSTITUTE
    University of Southern California
11. CASEY EYE INSTITUTE
    Oregon Health & Science University
12. DEAN MCGEE EYE INSTITUTE
    University of Oklahoma

BEST RESIDENCY PROGRAM
1. BASCOM PALMER EYE INSTITUTE
   University of Miami
2. WILLS EYE HOSPITAL
   Thomas Jefferson University
3. WILMER EYE INSTITUTE
   Johns Hopkins University
4. MASSACHUSETTS EYE AND EAR
   Harvard University
5. UNIVERSITY OF IOWA
   Carver College of Medicine
6. W.K. KELLOGG EYE CENTER
   University of Michigan
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   University of Utah
9. BECKMAN VISION CENTER
   University of California, Los Angeles
10. CASEY EYE INSTITUTE
    Oregon Health & Science University
11. DEAN MCGEE EYE INSTITUTE
    University of Oklahoma
12. UNIV DEPARTMENT OF OPHTHALMOLOGY AND VISUAL SCIENCES
    University of Wisconsin

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Expanded Care for Thyroid Eye Disease
Art Therapy for Children with Low Vision

OUTREACH

EDUCATION

Consultants
Virginia Roneey, Writer/Editor
Catherine Reave Nixton, Copy Editor

Graphic Design
Spatafore Design

Photography
Michael Sorenson, Major Portrait Photography
Austen Diamond
Charles Eberli
James Gilman, CRA, FOPS
Kristen Jacobson
Donna Creative
Scott Peterson
Tang Media Lab

illuminations
Russ Gray | Design & Illustration (Pages 4-5)
Freestyle Marketing Group (Pages 24-25)