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When we created a vision statement many years ago, Alan S. Crandall, MD, and I knew our colleagues might view it as overly ambitious. Unrealistic. Audacious.

Who were we, a little eye center in Utah, to say we intended to create a world where no one is left behind? That no one with a blinding condition, eye disease, or visual impairment should be without hope, understanding, or treatment?

But that statement was—and continues to be—a leap of faith. It was the world as we imagined it could be and a guiding light for our efforts. It was one of many, many ways Alan shaped the culture of Moran. Together, Alan and I vowed to embrace new technologies, to empower the people who worked for us, and to always hire the best person for the job.

Throughout his 39 years at Moran, Alan personified our vision and ideals. The past year challenged us all in new ways. Yet we had Alan’s unwavering example to follow.

During the pandemic’s shutdown, we quickly implemented a battery of protocols to safely treat patients in danger of losing their sight without our care. We also ramped up telehealth to protect those most at risk.

When COVID-19 curbed our international outreach efforts, Alan and the program he created continued to provide care locally and expanded to form new community partnerships.
When the time is right, we’ll hold a real blowout to celebrate Alan’s life and legacy. It will be a party to remember, one that he certainly would have been the life of.

Alan, we dedicate so many of our past achievements and our bright future to you, dear friend. As you would often say, “Let’s get on with it.”

Sincerely,

Randall J Olson, MD
Professor and Chair, Department of Ophthalmology and Visual Sciences
CEO, John A. Moran Eye Center, University of Utah

We initiated a needs assessment to learn how we can better serve Utahns unable to access eye care. And a new endowed directorship funded by the Dr. Ezekiel R. and Edna Wattis Dumke Foundation will help take the program to new heights.

This issue of Focus acknowledges the profound loss of Alan’s unexpected passing in October 2020. His generous spirit and exceptional mind were the heartbeats of our institution.

But make no mistake: His death is not the end of our collective willpower but a rallying cry for those of us who remain to follow his example. It is up to us to continue his amazing legacy. Our calling could not be more apparent, and I am indescribably proud of the faculty and staff building on the foundation Alan created.

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ALAN S. CRANDALL, MD
June 13, 1947 — October 2, 2020
Alan S. Crandall, MD, embodied Moran’s vision to provide hope, understanding, and treatment.

The passing of our beloved friend and extraordinary colleague, Alan S. Crandall, MD, on October 2, 2020, left all of us here at the Moran Eye Center with heavy hearts. As word spread, those feelings resonated the world over. Messages poured in from India, Ghana, Nepal, and beyond. Global outreach partners, former residents and fellows, donors, and professional ophthalmological societies offered moving tributes. Patients whose lives were changed by his brilliant surgical skills sent touching memories and deepest thanks.

We are forever grateful to all who were touched by this giant of ophthalmology and humanity and took the time to let us know.

For nearly four decades, Crandall’s ever-present enthusiasm and consideration for his colleagues shaped a culture of family at Moran. He was equally passionate about his patients’ care, teaching, and humanitarian outreach. He excelled at it all, and each aspect of his life spawned more tales than we could ever tell.

As a renowned surgeon and teacher, the professional honors he accrued were legion, but so are the personal stories. Over and over, friends and colleagues describe him as the embodiment of kindness and as a joyful spirit who made you feel you were the most important person in the world.

“Alan’s contributions to our field are absolutely immeasurable,” said Moran CEO Randall J Olson, MD. “Those he taught and influenced in deeply profound ways are numberless. He was revered as one of the greatest glaucoma, cataract, and anterior segment surgeons in our lifetime. Yet that’s not the most amazing thing about him. He was also the kindest, most humble, unassuming person you could ever hope to know.”

Alan S. Crandall, MD, held the John E. and Marva M. Warnock Presidential Endowed Chair of Ophthalmology and Visual Sciences. He served as Moran’s senior vice chair, director of glaucoma and cataract, and senior medical director of the Global Outreach Division.
Crandall grew up in Salt Lake City in a family dedicated to community service. As the son of one of Utah’s first ophthalmologists, he recalled accompanying his father to the original St. Mark’s Hospital, where some of his father’s patients paid him on the barter system. “It wasn’t unusual to receive a chicken instead of cash,” Crandall said. “My father’s philosophy was that he would treat everybody the same way. As far as I could tell, he had no prejudice against anything other than stark stupidity. He was true to his word—he worked hard and loved what he did.”

Crandall attended Salt Lake’s Judge Memorial High School, where he became a football hero despite his relatively small stature. He was also an expert skier and...
loved to play basketball. He received his bachelor’s and medical degrees from the University of Utah and completed a surgery internship at Pennsylvania Medical Center and residency and a glaucoma fellowship at Scheie Eye Institute in Philadelphia.

A superb surgeon who made it his mission to learn new skills, Crandall was also a remarkable innovator. Long before it became the modern standard of care, he adopted the method of phacoemulsification for removing cataracts and taught it to others.

He led the way in adopting small-incision glaucoma surgery, known as MIGS. Wielding microscopic-sized equipment to make tiny incisions, his skilled hands helped avoid countless complications in daunting situations. His success with complicated anterior segment (front of the eye) surgery is legendary.

Crandall also invented several surgical techniques and participated in numerous research studies that improved his patients’ lives. Most recently, that had included translating surgical techniques developed for adults into pediatric cases to improve outcomes.

“Alan made it a core principle that we would never be close-minded about new surgical techniques and tools, that we would always be open to what was out there,” said Olson. “And, from early on, he wanted every surgery recorded. His analysis became part of our ‘continuous quality program’ where he would take the time to sit down and review each one. He would do a root-cause analysis for each complicated case, trying to understand what may have gone wrong. He just never quit, and he shared his experience on the national and international stage.”

Among the many honors bestowed throughout his career, Cataract and Refractive Surgery Today named Crandall as one of 50 international opinion leaders. The Ophthalmologist recognized him as one of the 100 most influential people in the ophthalmic industry. He was a past president of the American Society of Cataract and Refractive Surgery. Crandall also served as a diplomate of the National Board of Medical Examiners and the American Board of Ophthalmology.

“We are devastated. He did my surgeries 35 years ago. When I was little, I would see him down the hall and run to his outstretched arms. Thirty-five years later, and we still ended the visit with a hug. He also saved my son’s vision. He’s a miracle worker. I always called him my second dad. He will be greatly missed.”

—Erin Merill Kirby, patient
“He was my ophthalmologist, but more than that, he was my friend.”
—Glenn Clapp, patient

“We owe him so much. He loves looking at our unique eyes! He has operated on us both multiple times. ... Dr. Crandall cares so much about everyone.”
—Dale and Chris McMillan, patients

“Dr. Crandall did his best to help me through and did everything he could to try to restore my vision years ago. Even though little headway was made, I gained a friend, and he still did what he could and was supportive of me as I adapted to it.”
—Taylor Cline, patient
While his surgical talents reached legendary status and improved the lives of thousands of patients, Crandall’s innate ability to connect with patients placed him in a category of his own.

“His connection with his patients was a thing of beauty,” said Norm Zabriskie, MD, Moran’s vice chair, medical director of clinical service, and executive director of clinical operations. “He made sure he connected with each one of them at every visit. And I don’t mean just about fishing, or food, or travel, but I mean connected in the most important way—one that said he was going to do everything he could to help them keep seeing and have the best outcome possible.”

Moran colleague Bradley J. Katz, MD, PhD, described Crandall’s unique blend of surgical and people skills: “I’ve learned so much from Alan. Not just surgery, where he’s saved my bacon more than once, but also how to be kind to patients, staff, and colleagues, giving of advice and assistance without any expectation of receiving anything in return, and helping those in need.”

Mary Elizabeth Hartnett, MD, who directs Moran’s Pediatric Retina Center, said she always thought of Crandall “whenever I performed a novel or challenging surgical procedure or task. I knew he would plug on and continue, so I could also. I will always remember his kindness, his support, and his strength and believe he would want us all to push ahead in gaining the knowledge to best serve our patients.”
The founder and senior medical director of Moran’s Global Outreach Division, Crandall began his now-legendary outreach work in Kumasi, Ghana, more than two decades ago. He traveled there in response to a request from a longtime patient who had family ties in that region. She told Crandall about the lack of ophthalmologists and the dire need for eye care, including curable blindness from cataracts, and asked him to do what he could to help. True to his nature, he said, “OK, let’s do it.”

“Alan has dedicated his career to humanitarian service, and his loving, generous spirit permeates all that he does,” said renowned cataract surgeon and American Society of Cataract and Refractive Surgery (ASCRS) Foundation Co-Chair David Chang, MD, in awarding Crandall the inaugural ASCRS Foundation Chang Humanitarian Award.

“The list of places where Dr. Crandall has given his time and skill is long and varied, including Ghana, Ethiopia, South Sudan, Nepal, India, China, Guatemala, Tonga, Haiti, Micronesia, and Cuba, as well as regular service on the Navajo Nation,” said Chang. “The nature of these outreach efforts is as impressive as the list itself.”
The stories of Crandall working in makeshift operating rooms around the world, often in searing temperatures, and sometimes amid an array of tropical "visitors" in the form of bugs and bats, are seemingly endless and occasionally harrowing. Whatever the story, common threads emerge. Colleagues talk about his phenomenal stamina and enthusiasm. They recount how he always logged the highest number of procedures, hardly pausing, and never saying "no" to any challenge—whether it was continuing long past quitting time or dancing through the night. And all this despite screws in his neck, which he broke twice—the first time while skiing. The second came on a bumpy bus ride in Ghana when a 40-pound phaco machine dislodged from the luggage rack and hit the back of his neck. Later, he acquired two artificial knees and an artificial hip.

Though he was humble, Crandall wasn’t above the “humblebrag,” but always with a smile.

He was also known for his bolo ties, which he started wearing when he figured out he was “not the bow-tie type” while on the faculty at the University of Pennsylvania in the 1970s.

Crandall was the only person to receive four internationally recognized awards in ophthalmology for his outreach work: the American Glaucoma Society Humanitarian Award, the American Academy of Ophthalmology Humanitarian Award, the ASCRS Humanitarian Award, and the inaugural ASCRS Foundation Chang Humanitarian Award.

“Alan Crandall was not only a world-famous cataract and glaucoma surgeon but a great humanitarian,” said R. Venketesh, chief medical officer of Aravind Eye Hospital in Pondicherry, India. "He is truly an inspirational human and physician. For many of us at Aravind, he was a great friend, philosopher, and guide. He strongly believed that training doctors in resource-poor countries is the main solution for eradicating needless blindness.

“I am sure that for the eyes and hearts he has touched in his lifetime, Alan’s memory will be treasured by many around the globe.”

“Despite his celebrity status, Alan was approachable by all. He was warm, kind, selfless, and a man of total integrity.”

—Robert Osher, MD, director emeritus of the Cincinnati Eye Institute

“Alan and his wife Julie Crandall often volunteered together on international outreach trips.

“I had the honor of being Alan’s friend and a partner in his plan to change the world. He was my true north. I feel a bit lost, like all of us. But I still hear him when I operate or push myself to be brave, and he is telling me to keep walking. Like most corneas, this fog is going to clear.”

—Susan MacDonald, MD, associate clinical professor, Tufts University School of Medicine; president, EyeCorps

“In his too short, but amazingly full life, Alan held so many of our hands, brought joy to our journeys through life and helped us reach where we needed to go.”

—Geoff Tabin, MD, co-founder, Himalayan Cataract Project

David Chang, MD, left, and Alan S. Crandall, MD, at the ASCRS Foundation Chang Humanitarian Award ceremony.
An exacting teacher and mentor, Crandall aimed to produce the finest surgeons possible. He took special pride in seeing his students excel and become leaders in the field.

“To watch his quiet hands performing surgeries was to see a master at work. If I see a surgical video anywhere in the world, I can tell if it’s someone who trained with Alan because of a few subtle things he taught,” said Jeff Pettrey, MD, MBA, Moran’s vice chair of education.

John Berdahl, MD, of Vance Thompson Vision in Sioux Falls, North Dakota, and a Moran adjunct volunteer ophthalmologist, first learned of Crandall during residency at Duke University. He had heard of Crandall’s legendary skills—and that he had a reputation of sometimes intimidating his residents and fellows.

“But I know he also made his Utah residents bulletproof,” he said. “Instead of feeling intimidated when I met him, I found he had a unique ability to inspire from afar and pull out the absolute best from those he was close to. His residents, including my colleague, Russell Swan, MD, a former Moran resident and current Moran adjunct volunteer, knew his admonitions came from a place of love and enabled them to hone skills they would carry with them for a lifetime.”

Colleagues worldwide praised Crandall’s way of clearly explaining complex surgical topics in ways that even non-surgical ophthalmologists could understand. Whenever physicians, technicians, or staff around him had questions or needed assistance, he stepped up to help.

“Lower your hands. You can’t cheat physics. You can remove more than one molecule of lens at a time. A surgery should be elegant and appear effortless.”

—ALAN S. CRANDALL, MD, TRADEMARK PHRASES TO RESIDENTS IN TRAINING
“He understood that giving someone the confidence to handle challenging cases was just as important as training their hands to produce the proper movements,” said Roger Furlong, MD, Moran adjunct volunteer ophthalmologist and glaucoma specialist in Butte, Montana. “He understood that being a good physician meant more than knowledge or technical skill.”

Said Moran colleague Nick Mamaslis, MD, who traveled the world with Crandall: “What I think is important about Alan is that he has not only done a tremendous amount of work internationally performing cataract surgeries, but also was involved in teaching others in the developing world and creating mechanisms to show other surgeons how to do these procedures and perform them elsewhere.

“It is one thing to fly in and fly out of remote locations, but it is another to set up the mechanisms to educate medical teams. It’s like the adage: Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime.”

— Iqbal “Ike” Ahmed, MD, FRCSC, Kensington Eye Institute, University of Toronto, and former Moran fellow

“Many of the most skilled anterior segment surgeons we know today owe their expertise to Alan’s efforts.”
— Robert Cionni, MD, Eye Institute of Utah

“He was my one and only mentor. I am who I am because of him, and any success I have is from his inspiration and guidance. It was a privilege to study under him as his fellow and continue to work together in surgery, clinic, research, conferences, and around the world.”

— Abba Hydara, former ophthalmic trainee now a glaucoma specialist and health care leader in Gambia

**HUMANITARIAN AWARD HONOR**

David Chang, MD, and the American Society of Cataract and Refractive Surgery Foundation in 2020 renamed their humanitarian award to bear Crandall’s name in honor of his exemplary life and commitment to charitable service: the 2021 Chang-Crandall Humanitarian Award.

**MORE PHOTO AND VIDEO TRIBUTES ONLINE**

bit.ly/AlanCrandall
A map of retinal disease generated by Moran’s Marclab for Connectomics offers a deeper understanding of a host of neurodegenerative diseases.

As Rebecca Pfeiffer, PhD, points to a 2-D image produced by a transmission electron microscope, her excitement is palpable.

“That’s one of the most gorgeous I’ve ever seen,” said Pfeiffer, a research associate in Moran’s Marclab for Connectomics directed by Bryan W. Jones, PhD.

It’s a green blob and a blue blob with a tiny gap of space between them to the untrained onlooker. But Pfeiffer can explain it as a revelation three years in the making.

The blobs are neurons in the retina of the eye. The green one allows us to detect darkness—the blue one, light. And the gap of space between is actually a new connection formed between them.

The two types of neurons shouldn’t be able to communicate with each other, but in retinal disease they do. Data from 946 retinal tissue samples is clear: The rewiring is a previously unknown way a disease-stricken eye keeps trying to do its job.
“There are several rules in the way neurons can connect, and these two didn’t have the right proteins to do that,” Pfeiffer said. “So seeing that these cells are making a whole new type of connection is really, really surprising.”

The discovery was one of many made as the Marclab in 2020 published the world’s first “pathoconnectome,” or map showing how the retina rewires itself in disease. The pathoconnectome was the next historic chapter for a lab that, in 2011, became the first to publish a connectome detailing the circuitry of a healthy retina.

**A MODEL FOR MANY DISEASES**

The lab developed the pathoconnectome from a model of early-stage retinitis pigmentosa (RP), an inherited retinal disease that can lead to blindness. RP impacts 1 in 4,000 people, and symptoms begin as a person starts to have difficulty seeing at night. The change progresses to a loss of peripheral and daytime vision as more retina cells start to die.

Yet the promise of the pathoconnectome extends far beyond one rare eye disease. It offers the potential to be used as a model to study a host of neurodegenerative diseases that attack the body’s central nervous system, such as Alzheimer’s, Parkinson’s, epilepsy, and amyotrophic lateral sclerosis (ALS).

“The components of neurodegeneration we see in the eye seem to mimic those we see in the brain,” explained Pfeiffer. “A pathoconnectome allows us to learn how neurodegenerative diseases alter neural networks in general. The ultimate goal is to identify how we might develop new therapies based on preventing or interfering with the network rewiring that happens during disease.”

The Marclab is now working to produce two more pathoconnectomes that will show how rewiring occurs in later stages of RP.

“For our first pathoconnectome, we wanted to focus on the earliest stage of disease we could because there are real implications for being able to rescue eyesight if therapies are developed at that point,” said Jones. “We had data going back years suggesting changes start really early, so we deliberately picked an early timepoint with the hypothesis that rewiring changes were already happening.”

The hypothesis was proven: The team found far more extensive rewiring than expected—so much so that scientists had to identify, classify, and understand connections never seen before in the eye.
A DATING GAME

Pfeiffer found that neurons are reaching out continually to seek new inputs and partners in the face of disease.

“One of the main things we were looking at is as these cells degenerate, what happens to their downstream partners in the eye,” said Pfeiffer. “What we find is they make new partners. But what are the rules for that? How do they make new partners, and what sorts of partners do they tend to try to find?”

For Pfeiffer’s curious mind, connectomics is the perfect research area, although she continues to work in metabolomics, or the study of small molecules.

“The world is a really, really big place, and I’m working on these tiny, tiny pieces of it that I just can’t put together yet,” she said. “I don’t think that anyone who works in connectomics for more than three months can walk away from it again because there is just more to know. It’s a really fun puzzle, and I want to put the next piece in.”

CONTINUING THE WORK

Since the first pathoconnectome has been completed, the second and third should be faster to construct. The lab could finish the second as soon as the end of 2021.

Like its predecessor, the pathoconnectome data set has been open-sourced for use by other scientists around the world.

“There is so much data, no one lab could mine it all,” said Jones. “We’re not so much interested in fame as we are in creating a body of knowledge that can be used for epiphany moments in several other fields, like electrophysiology or genetics. Connectomes are a discovery tool.”

Now, researchers around the world can use the data to begin to ask their own questions. In the myriad answers will be new hope.
Bryan W. Jones, PhD, has joined one of four interdisciplinary teams receiving more than $50 million in grants over five years as part of the National Science Foundation (NSF) Next Generation Networks for Neuroscience program. A total of 70 researchers representing four countries will investigate aspects of how brains work and interact with their environment.

Collaborating with the laboratory of University of Utah Department of Biology Distinguished Professor Erik Jorgensen, PhD, and a team based at the University of Texas, Austin, Jones will examine the relationship between the weight, or strength, of synapses and their structural components. In the retina, synapses allow for the communication between neurons involved in detecting light and the processing of information associated with vision, such as contrast, color, and movement.

Jones will study how synapses are altered in retinal degenerative disease using transmission electron microscopes to reconstruct and analyze synapses.

“Our second and newest electron microscope, recently gifted by the Lawrence T. & Janet T. Dee Foundation, will be crucial to this effort,” said Jones. “It provides a sensitive camera and another transmission electron microscope that we will need to visualize synapses at multiple angles and to perform the work required for this grant.”

WHAT IS A TRANSMISSION ELECTRON MICROSCOPE?

The technology uses electrons, or subatomic particles, that carry electricity in solids. Streaming a beam of electrons through a specimen to create an image, the microscope can magnify an object up to 2 million times.

A 2-D pathoconnectome image shows rod bipolar cell dendrites and their synapse locations with rod (red), cone (blue), and indeterminate (yellow) photoreceptors. In a healthy retina, you would expect to see many red and green connections rather than the extensive rewiring pictured here.

ABOUT THE PATHOCONNECTOME STUDY

In addition to Pfeiffer and Jones, 11 other Marclab researchers are authors on the new pathoconnectome publication, titled “A pathoconnectome of early neurodegeneration: Network changes in retinal degeneration.”

They are James R. Anderson, PhD; Jeebika Dahal; Jessica C. Garcia; Jia-Hui Yang; Crystal L. Sigulinsky, PhD; Kevin Rapp; Daniel P. Emrich; Carl B. Watt, PhD; Hope AB Johnstun; Alexis R. Houser; and lab founder and professor emeritus Robert E. Marc, PhD.

The pathoconnectome research was supported by NIH grants R01 EY015128(BWJ), R01 EY028927(BWJ), P30 EY014800(Core), T32 EY024234(RLP)], and an Unrestricted Research Grant from Research to Prevent Blindness, New York, NY, to the Department of Ophthalmology & Visual Sciences, University of Utah.
In 1792, while teaching at Cambridge University, William Farish forever changed the academic world. Paid by the number of students he could teach, Farish devised the A to F numeric grading system to measure student progress and ultimately increase class size. His system is now a universal yardstick, understood worldwide.

The Moran Eye Center’s new Utah Retinal Reading Center (UREAD), which opened in early 2020, a talented team is developing universal grading systems of its own.

Analyzing thousands of images of the human retina in a process known as “grading,” the team is investigating imaging standards that will allow scientists around the world to monitor the progress of eye diseases and the impact of treatments. Supported by a cadre of human image readers and sophisticated image analysis software, UREAD is at the forefront of a rapidly evolving field in which scientists are striving to create a common language in the fight against blindness.

“This is the work that ultimately decides key questions such as the right time to administer therapies and what data points we should be looking at to determine how effective those therapies are,” explained UREAD Director Steffen Schmitz-Valckenberg, MD.

The top row of images shows changes detected in the eye of an early-stage AMD patient with mild visual symptoms. The bottom row shows the same eye four years later when advanced atrophy and tissue loss have caused a blind spot in the patient’s central vision.
MAKING THE GRADE

Image graders at UREAD review up to 150 high-resolution image sets of the retina each day, answering unique sets of questions about each based on observations and measurements. They must work independently of each other, looking through up to 200 layers of images that constitute a complete retinal scan.

A majority of the work relates to the leading cause of blindness for adults over age 55: age-related macular degeneration (AMD). Schmitz-Valckenberg is a world-renowned physician-scientist and AMD expert who has spent years developing universal standards as private companies and public institutions race to develop a cure for this devastating condition.

UREAD is assisting the Sharon Eccles Steele Center for Translational Medicine (SCTM) to begin clinical trials of a new therapy for AMD. The effort is now combing through more than 12,000 patient visit image sets, analyzing factors such as how different layers of the retina degenerate in various stages of AMD. For example, one layer might show the earliest changes in thickness, indicating imminent vision loss, or there may be other features present indicating protective effects against rapid disease progression.

THE BIG PICTURE

UREAD stands as the only center of its kind in the Mountain West, and since its opening has grown rapidly to take on a variety of collaborations and projects. Among them is an international effort to create a new classification system of early atrophy in AMD. Schmitz-Valckenberg and University of Melbourne Professor Robyn Guymer, MBBS, PhD, are coordinating data collection and analysis among six world-leading reading centers, including UREAD.

Regardless of the goals of each project, Schmitz-Valckenberg sees the big picture: helping patients. A talented retinal physician and surgeon, Schmitz-Valckenberg stresses UREAD’s enormous potential to aid the development of therapeutics and to improve clinical care. Combining telemedicine with independent assessment of imaging data could improve the quality of care. In the world of clinical trials, he envisions reading centers in different time zones collaborating using common standards to speed up global studies—and new interventions.

Schmitz-Valckenberg points out an unmet need to process increasing amounts of information produced by rapidly advancing retinal imaging technologies. That's where reading centers and artificial intelligence strategies must come in.

"Reading centers have the infrastructure and resources to develop faster, more efficient ways to process patient information," he said. "I'm confident reading centers will continue to expand their essential role in ophthalmology."

LEARN MORE

Find more information about UREAD online at uread.org.
Leah A. Owen, MD, PhD, has received a prestigious career development award.

They are the smallest of patients—premature infants at risk of developing a potentially blinding eye disease called retinopathy of prematurity (ROP). While research on this leading cause of childhood blindness has often focused on treatments, Moran Eye Center pediatric surgeon-scientist Leah A. Owen, MD, PhD, is exploring how ROP might be prevented.

In 2020, Owen received a National Institutes of Health Mentored Clinical Scientist Research Career Development Award, a three-year, $500,000 grant that will boost her work. Owen’s lab is exploring how preeclampsia, a dangerous pregnancy complication, may protect preterm infants from developing ROP. She will investigate molecular and genetic factors in the mother, infant, and placenta, which contribute to this ROP protection.

“If we can learn how these babies are naturally ‘protected’ from ROP, then we can develop interventions to prevent rather than mitigate ROP,” Owen said.

As part of the award, Owen will work closely with three international experts:

- Kathleen B. Digre, MD, Distinguished Professor of Neurology and Ophthalmology at Moran and an adjunct professor of Obstetrics and Gynecology who also serves as director for the Center of Excellence in Women’s Health at the University of Utah.
- Michael W. Varner, MD, H.A. and Edna Benning Endowed Presidential Professor and vice-chair for research for the U’s Department of Obstetrics and Gynecology.
- Margaret M. DeAngelis, PhD, Ira G. Ross and Elizabeth Olmsted Ross Endowed Chair at the Ira G. Ross Eye Institute in Buffalo, New York, and an adjunct professor of Ophthalmology and Visual Sciences at Moran.

Owen will also collaborate with a separate team representing expertise in each aspect of the project.

In ROP, abnormal blood vessels grow between the retina and the front of the eye, preventing a sufficient blood supply to the baby’s developing eyes. This can cause vision loss in even mild cases, and complete blindness in the worst.

“ROP is uniquely suited to prevention,” said Owen. “It is not present at the time of preterm birth, but instead develops four to eight weeks later. We want to change that.”
The National Institutes of Health awarded Frans Vinberg, PhD, his first major federal Research Project Grant.

There are millions of them in our eye’s retina—special photoreceptor cells known as rods and cones that allow us to perceive a wide range of light intensities and colors.

Backed by a new five-year, $2 million National Eye Institute Research Project Grant, the lab of Moran’s Frans Vinberg, PhD, is seeking a deeper understanding of photoreceptors and how major blinding diseases, including age-related macular degeneration (AMD) and diabetic retinopathy, affect them.

“There is a critical need to better understand the biology of the photoreceptors in the human retina and macula in health and disease,” said Vinberg, who joined the Moran Eye Center in 2017. “This is particularly true of cone photoreceptors, compared to rods that have been more extensively studied.”

Cones are concentrated in the macula, the small but significant area in the center of the light-sensitive retina. Cones give us color vision and help us see fine details.

Rods, which aid good vision in low light, concentrate in the outer areas of the retina and give us peripheral vision. The human retina has about 100 million rods and 5 million cones.

Vinberg’s research is unique because it will rely on donated human tissue accessed via collaborations with U.S. eye banks and organ donor societies. Important past research into light and dark adaptation in the retina has used animal models lacking a macula.

“Very little is known about photoreceptor mechanisms in the human macula,” he continued. “The long-term goals of our project will seek to change this.

We want to generate new knowledge about healthy eyes and explore macular dystrophies to identify potential targets for new therapies that could improve vision or prevent vision loss in aging or diseased human eyes.”

In related research, Vinberg’s lab in 2020 collaborated in a groundbreaking study related to photoreceptors that provided insight on how people with retinal degenerative disease can maintain their night vision for a relatively long period. Read the study at pubmed.ncbi.nlm.nih.gov/32960171/.

Frans Vinberg, PhD.
The Rise of Teleophthalmology

As the pandemic prompted new concerns for doctors and their patients, Moran’s ophthalmologists found ways to adapt.

Few medical exams require patients and doctors to sit face-to-face, inches apart, for a period of time. But it’s an everyday scenario when it comes to ophthalmology.

The COVID-19 pandemic, necessitating physical distancing and personal protective equipment, required Moran Eye Center physicians and their colleagues across the country to innovate and accelerate the use of telehealth.

Before 2020, teleophthalmology visits were mainly used for connecting eye centers with rural communities or in areas around the world, allowing specialists to help local physicians assess a patient’s condition.

While the technology doesn’t lend itself to such things as examining peripheral vision or checking eye pressure, it has proven effective for specialties diagnosing apparent conditions such as droopy eyelids.

At Moran, telehealth efforts have taken various forms depending on circumstance.

ADAPTING TO TELEOPHTHALMOLOGY

Kathleen B. Digre, MD, is a nationally renowned specialist in neuro-ophthalmology. In her words, she’s also “of a certain age.” So when COVID-19 changed the landscape of health care in March 2020, she had to pivot, almost overnight, to keep up with patients’ needs while keeping herself and her patients safe.

“My family was worried about exposure—to the point where they suggested I retire rather than keep working. I got it, but I have too much more to do,” she said. “I’ve adapted.”
From her office at Moran, she monitors an iPad while fellows and residents mask up and evaluate patients in the clinic. They then present their findings to Digre—often accompanied by visual test results—via a secured video call. If she needs to examine eye movements or pupils or evaluate visual field tests or photos, she can do so virtually.

As much as the system is working, Digre admits she would much rather be in the room with her patients.

“There have been and will be times when I do absolutely need to see a patient in person,” she said. “In that case, I put on full protective gear with a mask and face shield.”

THE PATIENT EXPERIENCE

Linda Bliss is retired and divides her time between Arizona and Wisconsin. For the past five years, she has experienced periodic episodes of light sensitivity and the sensation of “seeing a square box” in the middle of her vision. She consulted with several clinics in both of her home states but couldn’t find a doctor who understood her symptoms. Taking her search online, she found a video of Digre describing her exact symptoms and called Moran right away.

Bliss said she felt “completely comfortable” with a virtual visit. “She sent me an eye exam sheet in advance,” explained Bliss. “Then, when we were online, she had me do some eye movements, asked some questions, and told me exactly what was going on. It turns out what I was experiencing was an aura called a ‘cortical spreading depression,’ sort of like having a migraine, but without the headache. My experience with Dr. Digre was every bit as good as meeting her in person.”

OCULOPLASTIC CONSULTS THRIVING

Although virtual consultations were new for Douglas P. Marx, MD, Moran’s division chief of oculoplastic and reconstructive surgery quickly embraced them.

“As soon as things shut down in March, I felt vulnerable because I knew so many of my patients were vulnerable,” said Marx. “The need was huge, and I didn’t want to leave anyone without help.”

Because almost everything Marx treats—from tear duct infections to orbital fractures and other traumas—starts with an external, visual assessment, he used virtual visits with ease, relying on them as an excellent screening tool. Marx was then able to view scans remotely to form treatment plans.

“We kept a lot of people from coming to a place where they could possibly be exposed to other people and found that most of the time they didn’t need an in-person visit,” said Marx. “The patient satisfaction level for these visits ranks consistently high. I think it’s the future of medicine. I’m still doing a couple of telehealth visits a day.”

TELEHEALTH TREND

When pandemic restrictions in March 2020 temporarily halted in-person visits except for urgent conditions, Moran ramped up telehealth services for patients. At the height of the shutdown, video and telephone appointments represented 15% of clinical visits, more than 100 visits per week. Now, 50% of Moran providers offer telehealth options.
When the World Paused, Moran Didn’t

Amid the pandemic shutdown, Moran physicians found safe ways to continue providing urgent care and understanding for patients in danger of losing sight.

Every four weeks for the past decade, 80-year-old Kay Lipman has traveled from her home in Ogden to the Moran Eye Center’s University of Utah campus location to receive sight-preserving injections for her age-related macular degeneration (AMD).

When the COVID-19 pandemic hit, Lipman worried about her health. She was at a higher risk for COVID-19 due to her age, but she also knew AMD could rapidly blind her if left unchecked. Would her treatments be interrupted? If not, what types of safety precautions would the clinic be taking?

Her questions echoed those of millions of people nationwide facing progressive vision loss due to AMD, diabetic retinopathy, glaucoma, and other conditions requiring ongoing treatments but concerned about potential virus exposure. While the pandemic temporarily halted routine exams and surgeries, Moran Eye Center physicians let patients like Lipman know they were ready to continue providing essential, urgent treatments—with extra safety precautions.

“By restricting the number of patients and staff in the building at one time and by screening everyone for symptoms of COVID-19, including taking staff and patient temperatures, we were able to provide uninterrupted care for these patients and meet urgent eye care needs,” said Norm Zabriskie, MD, Moran’s director of clinical operations.

The Moran Eye Center enacted immediate patient safety measures when COVID-19 emerged as a pandemic. Those included:

- Temperature checks and screening questions at entrances.
- Mask requirement for everyone in the building.
- Physical distancing in waiting rooms and lobby areas.
- Hand sanitizer and masks available for patients.
- Limited visitor policy.
- Enhanced cleaning procedures for exam rooms and common areas.

Lanny McLean, of Sun Valley, Idaho, continued driving to Moran every six to eight weeks in 2020 during the pandemic for critical treatment for his age-related macular degeneration.
SIGHT-SAVING TREATMENTS IN AN UNCERTAIN TIME

The most common cause of vision loss in people over 55, AMD can take away central vision and the ability to see color and fine detail when looking directly at an object. Researchers have yet to find a cure, but treatments to slow the progression of vision loss have helped Lipman maintain as much precious vision as possible.

During the COVID-19 pandemic, she and her specialist, Paul S. Bernstein, MD, PhD, remained on track.

“I’ve been giving Kay monthly injections in both eyes for AMD for more than ten years,” said Bernstein. “If she were to go too long between visits, her vision would deteriorate. Recently, she has also been receiving chemotherapy at the Huntsman Cancer Institute, so we now have very narrow windows when we can safely give her injections. We are fortunate to be still able to provide timely injections to preserve her visual acuity.”

Lipman’s first treatment during the COVID-19 crisis reassured her safety concerns.

“At the reception desk, they took my temperature, asked me some questions, and then I was the only person in the waiting room,” said Lipman. “It felt very safe.”

GOING THE DISTANCE FOR TREATMENT

Lanny McLean, 86, drives five hours from his Sun Valley, Idaho, home to Moran’s University location every six to eight weeks to see Mary Elizabeth Hartnett, MD.

“Lanny has bilateral AMD and needs injections in both eyes. Right now, his central vision in one eye is poor, but to preserve vision in both eyes, it is important for him to come in for imaging and regular injections,” said Hartnett.

As much as he relies on his regular treatments, McLean had reservations.

“As far as the COVID-19 precautions, I was extremely concerned about going to Salt Lake and getting a hotel room. I live in Blaine County, one of the country’s hot spots,” said McLean. “But everything worked out. My experience was perfect—people were masked, it was all properly done. As for Dr. Hartnett, if you ask me, on a scale of one to 10, she is a 20. I am convinced she has saved my eyesight.”

Moran retinal specialists, including Paul S. Bernstein, MD, PhD, continued urgent eye care during the COVID-19 pandemic.
Understanding and Help

COVID-19 Physical Distancing Challenges for People with Vision Loss

Long lines curving around buildings, markers every six feet, one-way arrows painted on floors. These and other safety steps have become part of everyday life during the COVID-19 pandemic. While intended to keep us safe, such measures are designed for people who can see them.

Darran Zenger, MSW, is not one of those people. Zenger has Usher syndrome and describes his vision as “like looking through two straws, each smeared with Vaseline on the end.”

He expertly navigates the world with the help of a white cane and his guide dog, Lou. He cooks, uses a smartphone, takes public transportation, and considers himself adaptable to just about any situation.

But physical distancing has presented challenges never imagined by Zenger and others with visual impairments that cannot be corrected with standard eyeglasses, contact lenses, medication, or surgery.

“Social distancing obviously presents a radically different world for people with visual impairments,” explains Lisa Ord, PhD, LCSW, director of the Moran Eye Center Patient Support Program.

“Heightened tensions brought on by fear of the coronavirus make it more important than ever to be aware not everyone can see physical barriers or read signs,” Ord says. “And public spaces with blocked-off chairs are confusing to guide dogs who may be getting mixed signals—their owners might say one thing, but the barrier prevents the guide dog from moving.”
THE INVISIBLE BARRIERS OF THE CORONAVIRUS CRISIS
For Zenger, everyday shopping can be especially fraught with frustration.

“I shop with a sighted person,” he says. “I also take my white cane, so it’s a signal that I may not be able to tell exactly what’s in front of me. My friend can tell me where the six-foot markers are, but what’s hardest for me are the transparent barriers between the checkers and myself.”

VISION LOSS COMBINED WITH HEARING LOSS
Rob Morrow has limited vision in some environments and no vision in bright sunlight. He is also profoundly deaf, and though a cochlear implant helps, he sometimes has trouble understanding words.

“My first outing after the coronavirus struck was to a busy Starbucks,” he says. “At the time, I was completely unaware of the required social distancing. I normally have a difficult time standing in line because it’s hard to determine where others might be in relation to me. I ended up getting too close to someone, and he yelled at me. Because of all the background noise, I couldn’t understand what he was saying, so I moved closer, and then he got louder and actually pushed me away. I finally understood what he was saying, but I was so embarrassed I left.”

Morrow shops alone and has encountered many challenges, from maintaining distance to navigating the invisible barriers.

“It’s taken me weeks and several hard experiences to figure it out,” he says. “My anxiety level increases before I even venture out.”

ABOUT 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, together with their families and caregivers, find ways to understand, accept, and move past the limitations of vision loss. Visit healthcare.utah.edu/moran/vision-loss-support-program/ for information.

HOW YOU CAN HELP

- If someone with a white cane or a guide dog seems to be confused or struggling, please don’t touch that person. Just speak up and ask if you can help.
- Describe the surroundings. If you’re waiting in a line, you can tell the person when the line is moving and verbally guide them to the next marker.
- Describe any barriers—what and where they are—with as much precision as possible. For instance, instead of “over there, to your left,” say “two feet to your left.”
- If the person is looking for an empty chair in a waiting area, tell them where it is.
- Are there written signs? Let the person know and read the sign to them.
- Remember that masks muffle voices, so speak clearly and slowly, but don’t raise your voice unless necessary because of background noise.
- If you’re getting on an elevator and there’s a passenger limit, let the person know how many people are allowed and if it’s OK to enter.
A Legacy of Giving

The Dr. Ezekiel R. and Edna Wattis Dumke Foundation has given a transformative $1 million gift to support sight-saving outreach work in Utah and around the world by creating the Moran Eye Center Global Outreach Division’s first endowed directorship.

For decades, humanitarian work has been integral to the Moran Eye Center, which has a culture of connecting its physicians and staff, working on a volunteer basis, with those in need. “This generous gift comes at a critical time,” said Randall J Olson, MD, Moran CEO and chair of the Department of Ophthalmology and Visual Sciences at the University of Utah. “It makes it possible for us to recruit an outstanding, visionary leader to guide our team as we work to expand the program and to meet increasing needs in Utah. The Dumke family has always been there for us, and we could not be more grateful for their support and confidence in our program.” Funded solely by donors, the outreach team partners with governments, academic institutions, and physicians in the developing world to create low-cost, high-volume ophthalmic surgical centers of excellence. In addition to conducting sight-restoring surgeries and ophthalmic training abroad, Moran’s outreach work is making a significant and growing impact in Utah.

In the greater Salt Lake area, Moran physicians and staff provide eye screenings and glasses regularly to the refugee, homeless, and uninsured populations. They perform much-needed charity surgeries throughout the year, making it possible for patients to continue to work and care for their families. In partnership with the Utah Navajo Health System, the outreach team has visited the Navajo Nation more than 40 times over the past five years to provide eye surgeries, vision screenings, and eyeglasses.

A LONG HISTORY OF SUPPORT
The ability to see the need and make a difference by supporting health care and humanitarian causes in Utah runs long and deep in the Dumke family, starting with the philanthropy of Dr. E.R. and Edna Wattis Dumke in the 1950s. Their philanthropic work, carried on by their children and grandchildren today, has left its mark on countless lives and institutions.

Moran’s new endowed directorship came as part of a major donation by the Dr. Ezekiel R. and Edna Wattis Dumke Foundation to University of Utah
Health. It included $5 million to support Health Sciences’ Simulation and Experiential Learning and $500,000 for the School of Medicine’s Rural and Underserved Utah Training Experience.

The philanthropic relationship with Olson began in 2003 when Zeke Dumke Jr. realized that the rapidly growing Moran Eye Center needed a larger building. He made a gift of $100,000 so Olson could hire a surveyor and get started on what would become Moran’s current, 210,000-square-foot home. The architecturally stunning center opened in 2006 with two pavilions—one to provide clinical and surgical care, and the other to house Moran’s world-class research labs.

Martha Ann “Markey” Dumke Healy, Zeke’s sister, was also a major investor in the new building. She joined with younger brother Ed Dumke to name Moran’s clinical and surgical care wing the Dr. E.R. & Edna Wattis Dumke Clinical Pavilion.

Now, after 40 years of serving as foundation board members and continued giving to the health care and arts communities, Claire Dumke Ryberg, Nancy Healy Schwanfelder, and Andrea Dumke Manship are in the process of sunsetting the foundation in hopes of creating a lasting legacy.

“This final gift strengthens the legacy of Edna and Zeke and is a tribute to the long-standing relationship between Markey, Zeke Jr., Ed, and the Moran Eye Center,” said Olson. “We will make the most of it, honoring the Dumke name as we grow our outreach programs in Utah and around the world.”
“We continue to assist members of our local community during the pandemic safely. We have precautions, protocols, and testing in place for ongoing outreach. The need for eyesight that allows people to keep their jobs, care for family members, and participate in the community is still there. We will be, too.”
—Jeff Pettey, MD, MBA, outreach division co-medical director

There for Utah

While the COVID-19 pandemic temporarily halted the Moran Eye Center Global Outreach team’s international travel for 2020, physicians and volunteers continued their local outreach work, providing much-needed eye care to nearly 200 patients in addition to triaging dozens more in line to receive treatment.

Manuela Lechuga was one of those patients. A cloudy haze caused by a cataract was stealing her vision, preventing her from driving or cooking safely. Those difficulties presented formidable barriers to the 55-year-old. But she was thinking mainly of her daughter when she lamented her failing eyesight.

Lechuga serves as the primary caregiver for the 32-year-old woman, who has cerebral palsy and requires a physically intense care level.

But Lechuga couldn’t afford the out-of-pocket costs associated with cataract surgery. Without insurance, money was simply too tight.

Thanks to Moran’s Operation Sight Day in October 2020, she was able to undergo donor-funded surgery to restore her vision and her ability to care for her daughter.

Similar scenarios played out statewide, as volunteer physicians, staff, nurses, and technicians served patients from local free clinics to the Navajo Nation.
Katherine Hu, MD, examines a child during the Teddy Bear Clinic.

Pediatric specialist Robert Hoffman, MD, asked questions during the drive-through Teddy Bear Clinic to determine whether children were experiencing vision issues. If so, he gave them a thorough eye exam in the clinic.

Consuelo Mejia’s granddaughter escorted her to Operation Sight Day. The 87-year-old mother of nine and beloved grandmother was anxious to get back to her role in the family, knitting and cooking. After her sight was restored, she said she felt like she had her “power” again.

Teddy Bear Clinic August 2020

The Moran outreach team pre-screened 420 children, conducted 20 exams, and made eyeglasses for eight children during the Teddy Bear Clinic. Utah Navajo Health System (UNHS) hosted the event in Blanding.

Operation Sight Day October 2020

Katherine Hu, MD, examines a child during the Teddy Bear Clinic.
The Moran Eye Center’s Global Outreach Division provides care to thousands of Utahns in need each year thanks to donors who provide funding for free or low-cost eye exams, surgeries, and eyeglasses at clinics around the state and on the Navajo Nation.

This outreach work to preserve or restore eyesight strengthens local communities as those who receive care can find or hold jobs, read, drive, look after children, and engage in school. Yet the need for eye care in Utah and worldwide rapidly outpaces capacity and available resources.

A newly launched Community Eye Health Assessment aims to identify how current efforts can expand or improve to keep pace with changing needs. In partnership with the University of Utah’s Division of Public Health, the Moran Outreach Division is taking an innovative, detailed look at the health care needs of four of Utah’s underserved communities: Native Americans, those experiencing homelessness, resettled refugees, and the underinsured or uninsured.

“It has become apparent to us that we don’t have a clear picture of the visual health needs in our state,” said Global Outreach Division Co-Medical Director Craig Chaya, MD. “We need to understand the many factors, such as social determinants, that may affect eye health. This has led us to take a more comprehensive, scientific approach to understanding the multitude of issues our communities face.”

Moran resident Sean Collon, MD, proposed the idea of a local outreach assessment, which is expected to take 18 months to complete.

From left: Craig Chaya, MD; Sean Collon, MD; and Sharon Talboys, PhD, MPH.
THE GOAL: EXPANDING LOCAL OUTREACH

The needs assessment will provide a road map to expand local outreach initiatives. In a typical year, those efforts include:

- 220 sight-restoring surgeries
- 1,200 eye exams
- 1,100 free pairs of eyeglasses
- 500 volunteers perform 25,000 service hours
- Northern Utah partnerships include three community clinics in Salt Lake County and Park City, and regularly scheduled care at Morani’s main campus and two satellite locations.
- A partnership with the Utah Navajo Health System includes outreach events at several community health centers and schools.

Reaching Out to Community Partners

Chaya and Division of Public Health Assistant Professor Sharon Talboys, PhD, MPH, hosted a virtual stakeholder kickoff event in September 2020. They explained their approach, learned more about myriad community providers, established new partnerships, and asked, “Who else needs to be at the table?” More than 45 participants chimed in.

“Involving local stakeholders, such as Friends for Sight, the Urban Indian Center of Salt Lake, Volunteers of America, The Hope Alliance, numerous remote medical clinics, as well as talking to the populations we serve, will help us assess strengths already out there in the community, along with quantifying the needs,” said Talboys.

Added Collon: “The goal is to better understand the problems that the most vulnerable and underserved individuals are facing with regards to eye health, and then to use that knowledge to mount an organized and unified response.”
CONFRONTING THE **Growing Problem of Worldwide Blindness**

Researchers, including Moran’s Mary Elizabeth Hartnett, MD, are identifying the scope of the challenge and looking for solutions.

Sobering statistics released by the Global Burden of Disease study in 2020 found no significant reduction in the number of people with treatable sight loss worldwide since 2010 as public health services failed to meet World Health Organization (WHO) targets.

Two studies examined rates of blindness and vision impairment worldwide in light of WHO goals to achieve a 25 percent reduction in avoidable sight loss in the decade leading up to 2020. Efforts fell short, failing to keep pace with population aging and growth. That puts global blindness and severe vision impairment on track to double by 2050.

Cataracts were the leading cause of blindness worldwide, accounting for 15 million people or around 45% of global blindness. Diabetic retinopathy was the only cause of blindness to show a global increase in age-standardized prevalence between 1990 and 2020, according to the research, and the global prevalence of nearly every major cause of blindness and vision loss is higher in women than men.

Moran Eye Center surgeon-scientist Mary Elizabeth Hartnett, MD, an author on the research who serves as a co-chair for the Presidential Commission on the Status of Women and director of Women’s Eye Health, said the information paints a clearer picture of where efforts should be focused.

“We have made some strides in reducing blindness, but we really have work to do to address moderate to severe vision impairment,” said Hartnett. “It’s crucial that we fund research to focus efforts on improving outcomes and to examine the unequal burden of blindness for women, including the root causes for disparity, the potential barriers to accessing care, and potential biologic differences. Additional data on childhood blindness is also needed.”

With population growth estimated to be greatest in countries designated as least developed, many in sub-Saharan Africa, it’s important to train more eye doctors in these areas and to increase access to low-cost eyeglasses, said Hartnett.

The study underscores the need for continued gender disparity research and two Moran Eye Center programs: the Global Outreach Division and Patient Support Program. The outreach team works to create sustainable eye care systems in low-resource nations and reach underserved populations in Utah. The Patient Support Program offers professionally moderated support groups and vision rehabilitation services.

### By 2050, researchers estimate the numbers of blind and visually impaired at:

- **61 million blind**
- **474 million** with moderate and severe vision impairment
- **360 million** with mild vision impairment
- **866 million** with uncorrected presbyopia, or farsightedness due to age

**Prevalence of Blindness and Moderate and Severe Vision Impairment (MSVI)**

![Graph showing the prevalence of blindness and moderate and severe vision impairment by age.](image-url)

Source: Vision Loss Expert Group
Connecting Fellows TO ADVANCE Global Ophthalmology

In 2020, the Moran Eye Center co-hosted the first Global Ophthalmology Symposium to bring together fellowship trainees from across the nation.

One of the few academic eye centers in the U.S. to have a dedicated outreach division, the Moran Eye Center established the nation’s first global ophthalmology fellowship.

Now, six more programs offer a fellowship, and in 2020 Moran co-hosted the first annual Global Ophthalmology Symposium with Emory University. The virtual event created discussions and collaborations designed to push the field forward and strengthen an international mission of sustainable eye care. The symposium covered topics including the global burden of blindness, public eye health campaigns, cultural competence, ethics, and tackling medical and surgical approaches that differ in low-resource settings.

“The event was exciting,” said Ashlie Bernhisel, MD, Moran’s current global fellow. “We exchanged knowledge and experience and established a sense of camaraderie. That was especially welcome during the unique circumstances of the coronavirus pandemic.”

Fellows continue to connect digitally for journal clubs, guest speakers, and domestic outreach collaborations.

“Global ophthalmology is a burgeoning field with new fellowships coming online throughout the country,” said Moran Vice Chair for Education Jeff Pettey, MD, MBA. “As more academic departments establish fellowships, Moran’s experience allows for rich collaboration on topics such as public health, healthcare disparities, and unique surgical procedures used in global ophthalmology settings.”

Fellowships provide opportunities to deepen compassion and become a better physician, said Pettey. “We pride ourselves in allowing Moran global fellows to lead projects in their unique areas of interest and expertise.”

Bernhisel recently completed a master’s degree in Public Health in Eye Care. Currently, she is researching telehealth and participating in a major community eye care needs assessment at Moran.

Past Moran fellows have taken on projects including initiating glaucoma training for ophthalmologists in Tanzania; developing an open-access, interactive online ophthalmic curriculum for nurse training in Ghana; and coordinating efforts to produce critical personal protective equipment for outreach partners in Haiti, Tanzania, Ghana, and Nepal.

MAKING CONNECTIONS

Seven U.S. institutions offer global fellowships and participated in the symposium:

- Emory University
- University of Illinois-Chicago
- Thomas Jefferson University
- University of Michigan
- University of Oklahoma
- Stanford University
- University of Utah

Ashlie Bernhisel, MD, Moran’s current global fellow, performs outreach care during a pre-2020 international trip.
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. 9 in the nation for Best Residency Program. A 2020 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**

Our residents leave the program exceptionally prepared for their next steps. Interns complete a combined ophthalmology and internal medicine program. They spend three 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. Interns may use additional elective time to improve their preparation for ophthalmology training.

Moran goes beyond the traditional model to teach residents and fellows how to provide patients with the best outcomes at the lowest cost. Residents and faculty recently collaborated to build a dynamic, interactive ophthalmology curriculum and launched a wellness program that includes protected academic time.

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**FELLOWSHIP PROGRAM 2020-2021**

**RETINA**

- Hong-Gam Le, MD
- Nikko Ronquillo, MD, PhD
- Joseph Simonett, MD
- Wen Fan Hu, MD, PhD

**UVEITIS**

**GLAUCOMA**

- Austin Nakatsuka, MD
- William W. Stoddard, MD
- Amanda J. Redfern, MD
- Srav Vegunta, MD

**NEURO-OPTHALMOLOGY**

**CORNEA**

- Brett M. Gudgel, MD
- Eric Weinlander, MD
- Ashlie A. Bernhisel, MD

**GLOBAL**

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**RESIDENCY PROGRAM 2020-2021**

**FIRST YEAR**

- Sean Collon, MD
- Abigail Jebaraj, MD
- Allie Simpson, MD
- Cole Swiston, MD

**SECOND YEAR**

- Katherine Hu, MD
- Marshall Huang, MD
- Ariana Levin, MD
- Michael Murri, MD

**THIRD YEAR/CHIEF RESIDENTS**

- Christopher Bair, MD
- Bradley Jacobsen, MD
- Theresa Long, MD
- Rachel Patel, MD
Program Growth
The program continues to be in high demand, with 504 resident applications for four spots in 2020. Including interns, Moran trains 16 residents and 11 fellows in specialties like cornea and refractive surgery, glaucoma, neuro-ophthalmology, retina and vitreous surgery, uveitis, and global outreach.

High Surgical Volumes
Clinical faculty members perform more than 7,000 surgeries per year and see about 140,000 patients, ensuring residents and fellows have a full range of clinical and surgical experiences. In three years, one Moran resident, on average, performs about 740 surgeries and procedures. More than 300 are cataract surgeries—86 is the national requirement; 197 the national average. Board-certified attending faculty supervise all surgeries and procedures. A wet lab and surgical simulator give residents additional opportunities for hands-on experience.

Dedicated Research Time
Moran residents may receive up to one-half day of dedicated research time per week for projects during their training. We also provide funding opportunities such as the Achievement Rewards for College Scientists (ARCS) Foundation’s scholars program. 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 residents complete four-week international rotations during training, and many fellows travel with faculty to a number of countries in partnership with Moran’s Global Outreach Division.

MOCHA WITH A MENTOR
Created by residents as part of a new medical student wellness initiative, Moran’s Mocha with a Mentor program bypasses formal pairing of mentors and residents. It instead empowers residents to seek out a faculty member they admire. The team sends an email invitation on behalf of residents to faculty, indicating that a resident would like to meet and treat the faculty member (with a department-issued $10 gift card) for one-on-one time. Residents can ask mentors about their careers, research, and ophthalmology in general—or anything else on their minds.

“It’s been a hit,” said Griffin Jardine, MD, Moran’s director of wellness. “Faculty are flattered, residents get their undivided attention, and it goes a long way in terms of making meaningful connections.”
Supporting Student Physician-Scientists

Each year, the Achievement Rewards for College Scientists (ARCS) Foundation awards $15,000 to an incoming Moran Eye Center resident to support research. This generous gift allows promising young scientists to pursue research during their residencies with the hope they will choose careers that continue their scientific investigations. Moran matches the award for the following two years of residency, providing a total of $45,000.

Moran’s 2020 ARCS Scholar, Lydia Sauer, MD, is an accomplished researcher who has already contributed to medical advances using new imaging technology to detect eye diseases earlier than ever before.

Sauer completed medical school at Friedrich Schiller University in Jena, Germany, where she also pursued a doctoral degree in the Department of Experimental Ophthalmology.

Her thesis focused on a new retinal imaging technology—fluorescence lifetime imaging ophthalmoscopy (FLIO). She received a prestigious award for her work from the German Ophthalmological Society.

Sauer’s research in FLIO related to retinal carotenoids, which serve as antioxidants, connected her with Moran’s Paul S. Bernstein, MD, PhD. She accepted a visiting scholar position, helping establish Moran as the first FLIO imaging and research center in the U.S.

From 2018 until 2020, Sauer worked as a postdoctoral researcher in Bernstein’s lab, helping publish numerous FLIO studies that could revolutionize how clinicians diagnose diseases. She received the Heidelberg Engineering Xtreme Research Award in 2019.

As a resident, Sauer aims to continue establishing FLIO as a clinical diagnostic tool.

She is proud to receive the ARCS Foundation’s Mark and Kathie Miller Award, which was established in honor of Moran CEO Randall J Olson, MD.

Lydia Sauer, MD, left, performs a scan using fluorescence lifetime imaging ophthalmoscopy (FLIO).
NATIONAL RANKINGS

U.S. News & World Report ranked the Moran Eye Center No. 13 in the nation for providing excellent patient care.

The ranking, published as part of the magazine’s annual Best Hospitals for Ophthalmology report, is based on voting results asking ophthalmologists across the nation where they would send patients with the most complex eye conditions.

“I’m delighted our peers across the country realize the exceptional care the Moran Eye Center offers,” said Moran CEO Randall J Olson, MD. “Among patients, the Moran Eye Center may be one of the best-kept eye care secrets in the country, so I couldn’t be more pleased the word is out with this new ranking.”

In the annual Ophthalmology Times survey of chairpersons and residency program directors nationwide, the Moran Eye Center ranked among the top 12 programs in the nation in clinical care, research, and education.

THE LATEST OPHTHALMOLOGY TIMES RANKINGS:
- No. 11 in the nation for Best Overall Program.
- No. 9 in the nation for Best Residency Program.
- No. 12 in the nation for Best Research Program.
- No. 12 in the nation for Best Clinical Care Program.

The Moran Eye Center ranked third-highest of any institution for its number of faculty represented on the list.

Also named to the Power List with ties to the Moran Eye Center:
- Sharon Eccles Steele Center for Translational Medicine adjunct research professors Eugene de Juan, MD; and Anat Loewenstein, MD.
- Moran adjunct ophthalmologists Iqbal “Ike” Ahmed, MD, FRCSC; John Berdahl, MD; Sanduk Ruit, MD; and Geoff Tabin, MD.
Liliana Werner, MD, PhD, has been named Moran’s inaugural Vice-Chair for Equity, Diversity, and Inclusion (EDI). As a key part of Moran’s senior management team, Werner will lead a range of efforts, including a top goal of increasing diversity in faculty and student ranks.

“When I moved to Salt Lake City to join the Moran Eye Center faculty in 2002, feeling welcomed, appreciated, and respected in my identity as a woman, Latina, and Brazilian immigrant was vitally important to me,” Werner said. “We do not take for granted that all potential candidates and newly recruited faculty, staff, and trainees yearn for the same feeling, especially those from historically excluded communities.”

Werner co-directs the world-renowned Intermountain Ocular Research Center based at Moran, vetting new intraocular lens technology and conducting groundbreaking research on related complications. She lectures worldwide and recently became the new U.S. associate editor of the *Journal of Cataract & Refractive Surgery*.

As part of her new position, Werner will serve as chair of a Moran committee with faculty, staff, and student representatives to help guide EDI initiatives.

“Our goal is to be the model EDI program for the country with results our only signs of success,” Moran CEO Randall J Olson said in announcing the leadership position.


Kathleen B. Digre, MD, received the 2020 John R. Graham Lecture Award from the American Headache Society (AHS) for her preeminent work as a clinician and educator.

Digre, a neuro-ophthalmology specialist and past president of AHS, will use the $1,000 award to support her eye pain and photophobia research. As part of the award, Digre delivered a lecture during the AHS Annual Scientific Meeting.

A surgical education video produced by a team including the late Alan S. Crandall, MD, and Liliana Werner, MD, PhD, received awards during the American Academy of Ophthalmology (AAO) and American Society of Cataract and Refractive Surgery (ASCRS) virtual meetings in 2020.

The video, “New Pupil Expander Used for Capsular Bag Support,” received Best of Show honors at AAO and was named the winner in the Instruments & Devices/IOLs category at the 38th ASCRS Film Festival.
Nick Mamalis, MD, received the 2020 Distinguished Alumni Award from the University of Utah School of Medicine Alumni Association for excellence in clinical practice, academic activities, and research accomplishments.

Mamalis, director of the Ophthalmic Pathology Laboratory, is a noted physician-scientist who has led research into virtually every artificial intraocular lens (IOL) on the market at Moran’s Intermountain Ocular Research Center, where he serves as co-director. Among his many professional accomplishments, he is the immediate past president of the 8,000-member American Society of Cataract and Refractive Surgery and editor emeritus of the *Journal of Cataract and Refractive Surgery*.

Mark D. Mifflin, MD, was named an “unsung hero” by the American Academy of Ophthalmology, which shared stories in 2020 of physicians “quietly serving the underserved, mentoring the next generation and sharing their skills with the world.”

"Dr. Mifflin quietly finds time to give back in his own community and overseas as a volunteer,” wrote Jeff Pettey, MD, MBA, in nominating his colleague for the honor. "Dr. Mifflin lends his time as a volunteer for underserved Utahns. He has tirelessly worked to establish an eye bank in Bolivia. Dr. Mifflin, his fellows, and other surgical volunteers will continue to return to Bolivia to provide ongoing surgical and eye banking training."

Karen Curtin, PhD, MStat, and Barbara M. Wirostko, MD, FARVO, will serve as co-principal investigators for a two-year project funded by a BrightFocus Foundation National Glaucoma Research award of nearly $180,000. The research project, “Prognostic Factors and Predictive Markers of Progression to Exfoliation Glaucoma in Exfoliation Syndrome,” will include a multidisciplinary university team of experts.

BrightFocus has awarded nearly $35 million since 1978 to support research projects on the causes and potential prevention and treatment of glaucoma.

Curtin is associate director of the Utah Population Database and an adjunct professor of Ophthalmology and Visual Sciences at the Sharon Eccles Steele Center for Translational Medicine. Wirostko specializes in treating glaucoma patients and researching drug development for glaucoma pharmaceutical therapies.

Mary Elizabeth Hartnett, MD, in 2020, took the helm of key initiatives, including women’s eye health education, diversity initiatives, and masking promotions during the pandemic.

As part of the nonprofit Women’s Eye Health organization, Hartnett spearheaded a relaunch of *w-e-h.org*. Women account for more than two-thirds of the world’s population of blind and visually impaired persons. The group’s website aims to provide the knowledge women need to understand their risk, protect their vision, improve their eyesight, and empower their families. The site is produced in partnership with the National Eye Health Education Program and Women in Ophthalmology and features content written by women for women.

As co-chair of the Presidential Commission on the Status of Women, Hartnett was asked to serve on the University of Utah’s One U Thriving steering committee, an initiative launched by Equity, Diversity, and Inclusion Vice President Mary Ann Villarreal. One U Thriving brings together four campus committees to examine policies that perpetuate racism and inequity at the University.

As the pandemic began to spread, Hartnett saw firsthand the critical need for educating younger people about the importance of wearing masks. She spurred the creation of an awareness campaign using videos and social media to help students speak to their peers and educate the community.

Hartnett also served as the 2020 chair-elect of the School of Medicine College Council and has continued as the 2021 chair.

As director of Moran’s Pediatric Retina Center, Hartnett is one of a few pediatric retina specialists trained to diagnose and treat pediatric retina disorders. She created the first-ever academic textbook on the subject, *Pediatric Retina*, recently released in its third edition, with contributions from experts worldwide. The textbook has proven to be an essential resource for residents and ophthalmologists internationally.
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

Doctors in alphabetical order

William Barlow, MD, is a comprehensive ophthalmologist and oculoplastic 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. Dr. Barlow is a team ophthalmologist for the Utah Jazz.

SPECIALTIES
• Comprehensive Ophthalmology
• Cataract Services

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

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 papilledema.

SPECIALTIES
• Neuro-Ophthalmology
• Oculoplastics and Facial Plastic Surgery

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

SPECIALTIES
• Comprehensive Ophthalmology
• Glaucoma

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

SPECIALTIES
• Comprehensive Ophthalmology
• Glaucoma
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 the Physician-Scientist 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. Working with Moran’s Sharon Eccles Steele Center for Translational Medicine (SCTM), Dr. Fleckenstein is an international authority on the design, conduct, and analysis of clinical trials in retinal diseases. She oversees the SCTM’s DREAM1 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 the Distinguished Professor of Neurology and Ophthalmology. She is past president of the American Headache Society and the North American Neuro-Ophthalmology Society. She specializes in neuro-ophthalmology and evaluates and treats complex visual complaints. Her clinical research focuses on gender differences in neuro-ophthalmic disorders, pseudotumor cerebri, photophobia, headaches, and eye pain. She has authored over 250 professional publications and five textbooks. She lectures nationally and internationally. She worked with the North American Neuro-Ophthalmology Society and the University of Utah Eccles Health Sciences Library to develop the Neuro-Ophthalmology Virtual Educational Library (NOVEL), novel.utah.edu. She chairs Moran’s Clinical Ophthalmology Resource for Education (CORE), morancore.utah.edu, and library committees. Honors include the Rosenblatt Prize, an honorary degree from the University of Zurich, and a Distinguished Alumna award from the University of Iowa.

**SPECIALTY**
- Neuro-Ophthalmology

Eric Hansen, MD, specializes in treating tumors and cancers of the eye and medical and surgical diseases of the retina and vitreous. He is Director of Ocular Oncology at Moran, with clinical and research interests in intraocular tumors, such as uveal melanoma and retinoblastoma, as well as tumors of the surface of the eye. His clinical and surgical interests also include retinal detachments, diabetic retinopathy, epiretinal membranes and macular holes, and macular degeneration. Dr. Hansen is actively involved in local and international outreach work, with a focus on building capacity through education and systems development.

**SPECIALTIES**
- Vitreoretinal Diseases and Surgery
- Ocular Oncology

Kathleen B. Digre, MD, is the Distinguished Professor of Neurology and Ophthalmology. She is past president of the American Headache Society and the North American Neuro-Ophthalmology Society. She specializes in neuro-ophthalmology and evaluates and treats complex visual complaints. Her clinical research focuses on gender differences in neuro-ophthalmic disorders, pseudotumor cerebri, photophobia, headaches, and eye pain. She has authored over 250 professional publications and five textbooks. She lectures nationally and internationally. She worked with the North American Neuro-Ophthalmology Society and the University of Utah Eccles Health Sciences Library to develop the Neuro-Ophthalmology Virtual Educational Library (NOVEL), novel.utah.edu. She chairs Moran’s Clinical Ophthalmology Resource for Education (CORE), morancore.utah.edu, and library committees. Honors include the Rosenblatt Prize, an honorary degree from the University of Zurich, and a Distinguished Alumna award from the University of Iowa.

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**SPECIALTIES**
- Vitreoretinal Diseases and Surgery
- Ocular Oncology
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 immediate past president of the 8,000-member American Society of Cataract and Refractive Surgery (ASCRS). He is the editor emeritus 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 Life Achievement Honor Award from AAO and the Binkhorst Medal from ASCRS.

SPECIALTIES
- Cataract Surgery
- 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 participates in the University of Utah Vice President's Clinical & Translational Research Scholars Program.

SPECIALTIES
- Adult and Pediatric Retina Conditions and Surgery

Robert O. Hoffman, MD, is Chief of the Division of Pediatric Ophthalmology and Eye Muscle Disorders, and Co-Medical Director of the Moran Global Outreach Division. He has special interests in retinopathy of prematurity, ocular genetics, craniofacial disorders, pediatric cataracts, and complicated strabismus, as well as local, regional, and international pediatric ophthalmology outreach.

SPECIALTIES
- Pediatric Ophthalmology
- Adult Strabismus

Giffin Jardine, MD, specializes in pediatric eye diseases and 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

Rachael Jacoby, MD, specializes in 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, Retinal Degeneration

Marissa Larochele, 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

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
- Vision Correction Surgery (LASIK, PRK, Phakic Intraocular Lenses)
- Ocular Surface Disease/Dry Eye Syndrome

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

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 participates in the University of Utah Vice President’s Clinical & Translational Research Scholars Program.

SPECIALTIES
- Adult and Pediatric Retina Conditions and Surgery
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
- Pediatric Eyelid, Eye Socket, Tear Duct Abnormalities

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

**SPECIALTIES**
- Pediatric Ophthalmology
- Adult Strabismus

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 many new surgical techniques and designed surgical instruments used worldwide. He has an international practice and focuses on building training capacity in Africa, Asia, and Europe.

**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)

Mark D. Mifflin, MD, is the Director of Cornea and Refractive 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)

Jeff Pettey, MD, MBA, is Moran’s Vice Chair of Education; Residency Program Director; and Co-Medical Director, Moran Global Outreach Division. Dr. Pettey specializes in post-traumatic and complex cataract surgery. His international work focuses on building training capacity through education and academic development. He was recognized by the American Academy of Ophthalmology for his ongoing local and international outreach work.

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

Steffen Schmitz-Valckenberg, MD, specializes in diseases of the retina and vitreous as well 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

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
### Specialties

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<tr>
<th>Name</th>
<th>Position</th>
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<td>Rachel G. Simpson, MD</td>
<td>Associate Program Director of Education</td>
<td>Glaucoma</td>
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<td>Jean Tabin, MD</td>
<td>Provides urgent vision care and comprehensive ophthalmology services</td>
<td>Uveitis and Ocular Immunology</td>
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<td>at Moran’s Triage Clinic</td>
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<td>Albert T. Vitale, MD</td>
<td>Director of Moran’s Uveitis Division and a member of the Vitreoretinal Division</td>
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<td>Michael P. Teske, MD</td>
<td>Director of Vitreoretinal Diseases and Surgery</td>
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<td>Kim Taylor, MD</td>
<td>Practices comprehensive ophthalmology and has extensive experience in</td>
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<td>fitting contact lenses. He has many years of experience in diagnosing</td>
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<td>and treating eye diseases of all kinds</td>
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<td>Judith E. A. Warner, MD</td>
<td>Chief of Neuro-Ophthalmology</td>
<td>Retinal Diseases and Surgery</td>
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<td>Barbara M. Wirostko, MD, FARVO</td>
<td>Resident Research Director and Adjunct Professor in Ophthalmology, with</td>
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<td>specialized fellowship training in glaucoma. She treats glaucoma and</td>
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<td>comprehensive ophthalmology patients and specializes in clinical research.</td>
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<td>As a serial entrepreneur, she has large and small pharmaceutical company expertise and focuses on drug development for glaucoma pharmaceutical therapies. Her research interest is in sustained delivery of therapeutics for ocular pathologies and in better understanding the genetics and associated systemic diseases of exfoliative syndrome, a common cause of open-angle glaucoma.</td>
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<td>Brian C. Stagg, MD</td>
<td>Specializes in the diagnosis and treatment of glaucoma. He also performs cataract surgery and has a special interest in geriatric ophthalmology. During his residency at the University of Michigan, he practiced as a comprehensive ophthalmologist and was a national clinician scholar research fellow studying population health. He participates in the University of Utah Vice President’s Clinical &amp; Translational Research Scholars Program.</td>
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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, electrocuculograms, multifocal electroretinograms, and multifocal visually evoked potentials. These tests quantitate retinal, optic pathway, visual cortical, and brainstem auditory pathway function. Dr. Creel has written some of the most-read online chapters on these tests.

SPECIALTY
• Electrophysiology

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, Executive Director of Clinical Operations, and Director of Glaucoma. 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

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

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
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

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

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. Pettry, 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, Ophthalmology and Visual Sciences; Ralph and Mary Tuck Presidential Endowed Chair of Ophthalmology and Visual Sciences
SPECIALTIES
Phototransduction, the Retinoid Cycle, Membrane Protein Transport in Photoreceptors; Photoreceptor Biochemistry; and Molecular and Cell Biology

Paul S. Bernstein, MD, PhD
Professor and Director of Clinical and Basic 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
Genetics and Assessment of Pathways Involved in AMD Etiology; 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
Associate Professor, Ophthalmology and Visual Sciences; Director, Marclab for Connectomics
SPECIALTIES
Retinal Degeneration Disorders; Retinal Neurotransmission and Neurocircuitry; Metabolomics
BUILDING BRIDGES FROM RESEARCH TO PATIENT CARE

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

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

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

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

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

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

Jeff Pettey, MD, MBA
Associate Professor, Ophthalmology and Visual Sciences
SPECIALTIES
Cataract Surgery; Surgical Education
**MORAN EYE CENTER**

**Research Team 2020-2021**

**Steffen Schmitz-Valckenberg, MD**
Professor, Ophthalmology and Visual Sciences; Jon M. Huntsman Presidential Chair; Director, Utah Retinal Reading Center, uread.org

**Specialties**
- AMD; Retinal Imaging; Fundus Autofluorescence; Structural-Functional Correlation

**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

**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

**Frans Vinberg, PhD**
Assistant Professor, Ophthalmology and Visual Sciences

**Specialties**
- Biomedical Engineering; Biophysics; Photoreceptor Physiology

**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

**Steffen Schmitz-Valckenberg, MD**
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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.

### 2020-2021

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The following individuals and organizations contributed to the Moran Eye Center from July 1, 2019, to June 30, 2020.

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<th>Organization/Role</th>
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<td>George M. Ahn</td>
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<td>Theresa Ferraro</td>
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<td>Jeanne M. Howerton</td>
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<td>Edward L. Hughes and Roberta L. Anner-Hughes</td>
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<td>Daniel C. and Gloria J. Hurlbutt</td>
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<td>Robert M. Graham, JD</td>
<td>Albert Imesch</td>
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<td>The Grand America Hotel</td>
<td>Harry F. Immerman</td>
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<td>Bernard I. Grosser, MD and Karen J. McArthur</td>
<td>Indian Wells Tennis Garden</td>
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<td>Pamela J. Irwin</td>
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<td>Allen L. and Kathleen A. Isaac</td>
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Thurman and Barbara Locke
Carol and Samuel D. Loftin
Loveland Living Planet Aquarium
Dr. Denis R. and Diane Robards Lyman
James K. Lyon and
Dorothy Burton Lyon
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William R. Tanner and Susan D. Heath
Sally A. Taylor
R. Burke Teichert
Gretchen and Michael P. Teske, MD
Thanksgiving Point
Daniel M. and Carol C. Thomas
John R. Thomas and Jennifer C. Lawton
Marva Thomas
Michael A. and Dinny T. Trabert
Tracy Aviary
Roger L. Tucker
Timothy J. and Patricia K. Tulon
Jim and Candy Turnbull
Randy and Susan Turpin
Ingrid and Stephen Tyler
Douglas Unger
Utah Jazz
Utah Olympic Park
Deane Van Wagenen
L. Craig and Margaret B. Vernon
Milan Vinich

Vivian Dowsett Interiors
I. J. & Jeanne Wagner Jewish Community Center
Ann T. Wagstaff
Verdon R. and Laurene S. Walker
M. Walker and Sue R. Wallace
W. Jeffrey and Mona Walters
Haibo Wang, PhD
Matthew and Lynn W. Ward
Adam M. and Judith A. Warden
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Willa Dean Cocorinis
Bianca Coppa
Ruth Hagnlund Craig
Helen Daly Uhalde
Edmund W. Dumke
Ernest Earl
Joachim Enge
Charlene Evans Allen
W. Knox Fitzpatrick, Jr., MD
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Alan E. Huish
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William M. Kleinschmidt
Ray Larsen
Margaret Weber Martinez
Paul R. Martinez
Gayland Mason
Phillip J. Mataya
Nassim A. Mostaghel
Steven J. Nichols
Delmer O’Connell
Ted H. Olsen
Julie C. Palfreyman
Judith C. Peterson

IN MEMORY OF
Those in whose memory gifts were made to the Moran Eye Center from July 1, 2019 through June 30, 2020.
Curtis E. Ackerlind, Jr.
Martha S. Ahrens
Teresa Kay Beardall
Barnie P. Bobbitt

Colleen H. Bowman
Rourke H. Bowman
Lauren Elyse Bradley
LaRee Page Brown
Bill Buhl
Lyman Buhler
Dorothy B. Burton
Kent M. Campbell
Willa Dean Cocorinis
Bianca Coppa
Ruth Hagnlund Craig
Helen Daly Uhalde
Edmund W. Dumke
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William M. Kleinschmidt
Ray Larsen
Margaret Weber Martinez
Paul R. Martinez
Gayland Mason
Phillip J. Mataya
Nassim A. Mostaghel
Steven J. Nichols
Delmer O’Connell
Ted H. Olsen
Julie C. Palfreyman
Judith C. Peterson
Lynda Rae Peterson
Darlene M. Phillips
Charlene Polychronis
Hazel M. Robertson
Ruby M. Slotte
James R. Silar
Lester L. Thomas
Richard Dick Tomlin
Warren Jensen Walters
Lillis Wood Woodall
Paul J. Zabolotney
Lillian Zancanella

IN HONOR OF
Those in whose honor gifts were made to the Moran Eye Center from July 1, 2019 through June 30, 2020.

David W. Bernolfo
Gayle Brooks
Ryan Colby Campbell
F. Burton Cassity
Craig J. Chaya, MD
Richard O. Christiansen
Kim Corbin-Lewis, MD
Alan S. Crandall, MD*
David Alan Crandall, MD
Julie T. Crandall
Lisa Z. Crandall
LaVerne A. Diehl
Christine A. Fairclough
Fred W. Fairclough, Jr.
Luella B. Freed
Heidi L. Furlong
Roger C. Furlong, MD
Sergio Gor
Gloria J. Hannon
Jim Hannon

Donald Cathcart
Tim and Candace Dee
Richard A. and Carol M. Fay
Daniel Forman, MD
Frank and Elaine Fox
Bernard Grosser, MD, and Karen McAthur
William B. Hale*
Cliff Hammer
Joseph Hatch, MD
Claudia and Jerry Howells
Curtis and Lynne Kennedy
Thomas and Wendy Lacy
John and Carole Moran
Sylvia E. Prahl-Brodbeck
Ruth L. and Randall J Olson, MD
Linda Rankin
Don Reddish
Janet Schaap
Edward Skinner
Daniel Soulia
Sharon Steele-McGee
Susan O. Taylor
Mary E. Thompson
Haru Toimoto

PLANNED GIFTS
Those who have planned gifts in place to the Moran Eye Center as of June 30, 2020

Joanne Ambrose
Neal R. Anderson
Karen S. and David R. Bachman
Bonnie Barry
Elmen D. Bloedel
Irene G. Casper and Ruth A. Morey

The Moran Eye Center is grateful for the contributions made to support our mission and goals. We have made every effort to ensure that this July 1, 2019 through June 30, 2020, 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.

*Deceased
MORAN EYE CENTER At a Glance JULY 1, 2019-JUNE 30, 2020

SURGERIES PERFORMED

7,031

$8,616,674 GRANTS AND CONTRACTS

94 CLINICAL TRIALS/STUDIES

180 PUBLICATIONS

View a complete listing of grants, clinical trials, publications, and more at bit.ly/MoranAnnualReports.

PATIENT VISITS

135,825

175 Low Vision

4,176 Neuro-Ophthalmology

4,415 Uveitis

5,588 Oculoplastic

10,735 Other

14,205 Glaucoma

14,943 Pediatric

16,130 Retina

17,032 Cornea/Refractive

23,403 Optometry

25,023 Comprehensive Ophthalmology
EXPERTS ON EXPERTS
We’re proud and honored to share the news that a panel of our peers—chairpersons and directors of academic programs across the country—voted the John A. Moran Eye Center at the University of Utah No. 11 in the nation—and that’s not all.

Ophthalmology Times 2020 Survey Results

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<th>BEST OVERALL PROGRAM</th>
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Physicians provide comprehensive care in all ophthalmic subspecialties, making Moran a major referral center for complex cases. Services include:

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

## NIH AWARDS

**Alessandra Angelucci, MD, PhD**

- *Parallel Pathways in Visual Cortex: Functional Connectivity of Output Pathways from Area V1 to Area V2*  
  $378,125

- *Anatomical and Functional Organization of Inter-Areal Feedback Circuits in the Visual Cortex, and Their Impact on Neuronal Responses*  
  $389,942

- *Role of Top-Down Feedback in Visual Perception*  
  $106,064

**Wolfgang B. Baehr, PhD**

- *Photoreceptor Ciliopathies: Unc119 Paralogs and Nphp10/Nphp5*  
  $372,500

- *Core Vision Research Grant*  
  $707,139

- *Vision Research Training Grant*  
  $155,277

**Paul S. Bernstein, MD, PhD**

- *Biochemistry & Pharmacology of the Macular Carotenoids*  
  $381,250

- *Carotenoid Supplementation During Pregnancy: Ocular and Systemic Effects*  
  $228,750

**Mary Elizabeth Hartnett, MD**

- *Mechanisms of Angiogenesis in ROP*  
  $394,976

- *Endothelial Transmigration in Neovascular Age-Related Macular Degeneration*  
  $381,250

- *Medical Student Research Program in Eye Health and Disease*  
  $25,473

**Bryan W. Jones, PhD**

- *Retinal Remodeling*  
  $399,904

- *Retinal Circuitry*  
  $726,748

**David Krizaj, PhD**

- *Molecular Mechanisms of Mechanotransduction in the Aqueous Outflow Pathway*  
  $381,250

**Neda Nategh, PhD**

- *Extrastriate Mechanisms of Visuospatial Perception During Eye Movements*  
  $381,250

**Behrad Noudoost, MD, PhD**

- *Understanding the Prefrontal Mechanisms Involved in the Enhancement and Maintenance of Visual Signals*  
  $380,000

- *Sensory Recruitment by Working Memory: Neuronal Basis and Neural Circuitry*  
  $350,750

- *Understanding the Neural Basis for Recruitment of Visual Areas by Working Memory*  
  $190,625
## Research Grants for Fiscal Year 2020

### Research Grants

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<th>Name</th>
<th>Organization</th>
<th>Amount</th>
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<tr>
<td>Frans Vinberg, PhD</td>
<td>Assessment of Retinal Function in Health and Disease from Mouse to Human</td>
<td>$240,537</td>
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<tr>
<td>Jun Yang, PhD</td>
<td>Function of C8orf37 in Photoreceptors</td>
<td>$581,250</td>
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<td>Understanding the Functions of USH2A and ADGRV1 in Photoreceptors by Identifying Their Interacting Proteins</td>
<td>$228,750</td>
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<td>Mary Elizabeth Hartnett, MD</td>
<td>Knights Templar</td>
<td>$63,226</td>
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<tr>
<td>Bryan W. Jones, PhD</td>
<td>Research to Prevent Blindness</td>
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<td>Eileen Hwang, MD, PhD</td>
<td>Thrasher Research Foundation</td>
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<td>Randall J Olson, MD</td>
<td>Research to Prevent Blindness</td>
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<td>Frans Vinberg, PhD</td>
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<td>Research to Prevent Blindness</td>
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<td>Paul S. Bernstein, MD, PhD</td>
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<td>Knights Templar</td>
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<td>Foundation Fighting Blindness</td>
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### Other Federal Awards

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<td>Alessandra Angelucci, MD, PhD</td>
<td>National Science Foundation—Optogenetic Investigation</td>
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### Foundation Awards

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<td>Wolfgang B. Baehr, PhD</td>
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<td>July 17, 2019</td>
<td>Kathleen Digre, MD, Faculty, Moderator</td>
<td>Eccles Health Sciences Library Resources &amp; Moran CORE Update</td>
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<td>Nancy Lombardo and Christy Jarvis,</td>
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<td>Eccles Health Sciences Library, University of Utah</td>
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<td>July 31, 2019</td>
<td>Karl Andersen, MSIV, Geisinger Commonwealth School of Medicine</td>
<td>Proliferative Retinopathy in Hemoglobin C Trait</td>
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<td>Kathryn Lewis, MSIV, University of California, Riverside</td>
<td>Aniridia: More than Meets the Iris</td>
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<td>Rami Gabriel, MSIV, University of California, Irvine</td>
<td>Machine Learning and its Applicability in OCT Angiography</td>
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<td>Austin Bohner, MSIV, University of Utah</td>
<td>A Case Presentation</td>
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<td>August 14, 2019</td>
<td>Jeff Pettey, MD, Faculty, Moderator</td>
<td>Morbidity &amp; Mortality Series</td>
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<td>August 21, 2019</td>
<td>Andrew Nelson, MSIV, USC</td>
<td>Diagnosis and Management of Choroidal Metastases</td>
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<td>Samaeh Dadashazar, MSIV, Texas Tech</td>
<td>Ectropion Uvea and Secondary Glaucoma</td>
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<td>Celestine Gregerson, MSIV, University of Utah</td>
<td>Case Presentation: Reversible Cataracts</td>
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<td>Braedon Murdock, MSIV, George Washington</td>
<td>Punctate Inner Choroidopathy (PIC)</td>
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<td>Brian Bird, MSIV, University of Nevada</td>
<td>A Case of Axenfeld Anomaly</td>
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<td>Samuel Whittier, MSIV, University of Utah</td>
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<td>August 28, 2019</td>
<td>Mark Mifflin, MD</td>
<td>Update on Cornea Collagen Crosslinking and Keratoconus</td>
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<td>Austin Nakatsuka, MD, Cornea Fellow</td>
<td>Glad We Caught That</td>
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<td>Maddie Rippa, MD, Cornea Fellow</td>
<td>Recurrent Keratitis</td>
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<td>September 4, 2019</td>
<td>Sneha Bontu, MD, Ocular Pathology &amp; Research Fellow</td>
<td>Posterior Capsule Opacification Prevention by an Intraocular Lens Incorporating a Micropatterned Membrane on the Posterior Surface</td>
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<td>Sean Kennedy, MD, Ocular Pathology &amp; Research Fellow</td>
<td>Uveal and Capsular Biocompatibility of a New Hydrophobic Acrylic Microincision IOL</td>
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<td>September 11, 2019</td>
<td>Michael A. Dyer, PhD, St. Jude Children’s Research Hospital</td>
<td>Translational Research for Retinoblastoma</td>
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<tr>
<td>September 25, 2019</td>
<td>Lisa Ord, PhD, LCSW, Moderator</td>
<td>Patient Support Program</td>
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<td>Corinna Trujillo Tanner, PhD, RN, MSN, ANP</td>
<td>Reframing Expectations of Life Potential of Older Adults with Vision Impairment</td>
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<td>Robert M. Christiansen, MD, FACS</td>
<td>Vision Rehabilitation at the Moran Eye Center</td>
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<td>October 2, 2019</td>
<td>Amy B. Locke, MD, FAAFP, Co-Director, University of Utah Resiliency Center</td>
<td>In Pursuit of Professional Fulfillment: Moving Beyond Burnout</td>
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<td>October 9, 2019</td>
<td>Lydia Sauer, MD, University of Utah Ariana Levin, MD, Resident Michael Murri, MD, Resident</td>
<td>Clinical Advances in Fluorescence Lifetime Imaging Ophthalmoscopy (FLIO) Rethinking the Preoperative H&amp;P Requirement Prior to Cataract Surgery Unilateral Blurry Vision and Headache</td>
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<td>October 16, 2019</td>
<td>Wai T. Wong, MD, PhD, National Eye Institute</td>
<td>Geographic Atrophy in AMD: Clinical Features and Interventional Trials</td>
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<td>October 23, 2019</td>
<td>Brian Zaug, MD, Faculty, Moderator</td>
<td>Morbidity &amp; Mortality Series</td>
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<td>October 30, 2019</td>
<td>Judith Warner, MD, Faculty, Moderator Judith Warner, MD, Faculty Bradley Katz, MD, PhD, Faculty Shanna Swartwood, MD, Pediatric Neurology Resident Samantha Colby, MD, Neurosurgery Resident</td>
<td>Neuro-Ophthalmology Update on Studies Update on Studies Case Presentation: Bilateral Ptosis Ophthalmoplegia and Whooshing</td>
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<td>November 13, 2019</td>
<td>Joyce Liao, MD, PhD, Stanford University School of Medicine</td>
<td>Hot Topics in Eye-Brain Diseases</td>
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<td>November 20, 2019</td>
<td>Rachel Simpson, MD, Faculty, Moderator Brian Stagg, MD, Faculty Arezu Haghhighi, MD, Glaucoma Fellow Tina Mamalis, MD, Resident</td>
<td>Glaucoma Glaucoma Update Bleeding Love A Unique Case of UGH Syndrome</td>
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<td>December 4, 2019</td>
<td>Rachel Patel, MD, Resident; Srav Vegunta, MD, Resident</td>
<td>Theory, Lore, and Intuition</td>
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<td>December 11, 2019</td>
<td>Chris Bair, MD, Resident Marshall Huang, MD, Resident</td>
<td>The Ocular Hazards of Trumpet Playing Passing on Cypass</td>
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<td>December 18, 2019</td>
<td>Robert Hoffman, MD, Faculty, Moderator David Dries, MD, Faculty Griffin Jardine, MD, Faculty Rachel Patel, MD, Resident</td>
<td>Pediatric Ophthalmology Brown Syndrome: Superior Oblique Tendon Lengthening Sudden-Onset Strabismus: To Image or Not to Image? Peculiar Pediatric Papilledema</td>
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<td>January 8, 2020</td>
<td>Bradley Jacobsen, MD, Resident</td>
<td>O Captain! My Captain!</td>
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<tr>
<td></td>
<td>Katherine Hu, MD, Resident</td>
<td>20 Years Later... My Captain Was Wrong</td>
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<td>Jeffrey L. Nadel, MD, MS, Neurosurgery Resident</td>
<td>Surgical Management of Idiopathic Intracranial Hypertension</td>
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<td>January 15, 2020</td>
<td>Roxana A. Radu, MD, UCLA Stein Eye Institute</td>
<td>Complement Dysregulation: A Link for Stargardt Disease &amp; Age-Related Macular Degeneration</td>
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<td>January 22, 2020</td>
<td>Christina Mamalis, MD, Resident</td>
<td>You’ll Shoot Your Eye Out, Kid</td>
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<td>Michael Burrow, MD, Resident</td>
<td>Brain Attack!</td>
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<td>Doni Widyandana, MD, International Observer</td>
<td>Pesticide Exposure and Ocular Disorders in Ngablak Village, Central Java, Indonesia</td>
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<td>January 29, 2020</td>
<td>Albert Vitale, MD, Faculty, Moderator</td>
<td>Retina Ophthalmology</td>
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<td>Nikko Ronquillo, MD, PhD; Chris Komanski, MD; Eric Hansen, MD, Retina Fellows</td>
<td>Advancements in Gene Therapy: Exploring the What, Why, and How</td>
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<td>February 12, 2020</td>
<td>Brian Zaugg, MD, Faculty, Moderator</td>
<td>Morbidity &amp; Mortality Series</td>
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<td>February 19, 2020</td>
<td>Yvonne Ou, MD, University of California, San Francisco</td>
<td>From Clinic to Lab to Clinic Again: Improving Glaucoma Diagnostics</td>
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<td>February 26, 2020</td>
<td>Mark Mifflin, MD, Faculty, Moderator</td>
<td>Cornea, Cataract, Refractive SX</td>
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<td>Brian Zaugg, MD, Faculty</td>
<td>The Preoperative Cataract Surgery Cornea Eval</td>
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<td>Austin Nakatsuka, MD, Cornea Fellow</td>
<td>Should I Be Scared, Doc?</td>
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<td>Maddie Ripa, MD, Cornea Fellow</td>
<td>Cataract Surgery and Management of Astigmatism</td>
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<td>March 4, 2020</td>
<td>Monika Fleckenstein, MD, Faculty</td>
<td>The Other Faces of AMD</td>
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<td>Steffen Schmitz-Valckenberg, MD, Faculty</td>
<td>Drusen and Function</td>
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<td>April 8, 2020</td>
<td>Nancy J. Newman, MD, Emory University School of Medicine</td>
<td>Neuro-Ophthalmology Update</td>
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<td>April 15, 2020</td>
<td>Ariana Levin, MD, Resident; Theresa Long, MD, Resident</td>
<td>COVID-19 Masks: Review of the Latest Science, Sustainable Innovations, and Practical Use</td>
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<td>Albert Vitale, MD, Faculty, Moderator</td>
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<td>Akbar Shakoor, MD</td>
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<td>Inna Stroh, MD, Uveitis Fellow; Marshall Huang, MD, Resident</td>
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<td>April 29, 2020</td>
<td>Jay A. Jacobson, MD, University of Utah School of Medicine; Richard E. Nelson, PhD, University of Utah School of Medicine</td>
<td>COVID-19 Lessons Learned: Infections, Epidemics, Economics</td>
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<td>Brian Zaugg, MD, Faculty, Moderator</td>
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<td>Marshall Huang, Resident; Ariana Levin, Resident; Katherine Hu, Resident; and Mike Murri, Resident</td>
<td>Resident Research Projects</td>
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<td>Austin Nakatsuka, MD, Cornea Fellow; Alan Crandall, MD, Faculty</td>
<td>Update on the Acute Ocular Management of Stevens-Johnson Syndrome: A Modified Surgical Technique</td>
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<td>Chris Bair, MD, Resident; Brad Jacobsen, MD, Resident; Rachel Patel, MD, Resident; Theresa Long, MD, Resident</td>
<td>Underrepresented Minorities in Ophthalmology: A Moran Update</td>
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<td>Cavitary Optic Disc Anomaly in a Family: In Search for a New Genetic Mutation</td>
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<td>Implementation of a CPRS-Based Electronic Medical Record at the SLC VA Ophthalmology Clinic</td>
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<td>Fluorescence Lifetime Imaging Ophthalmoscopy (FLIO) in Patients with X-Linked and Other Foveal Schisis</td>
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<td>June 10, 2020</td>
<td>Sophia Fang, MD, Global Fellow, Moderator; Craig Chaya, MD, Faculty; Sanduk Ruit, MD, Tilganga Institute of Ophthalmology; Dan Neely, MD, Orbis International</td>
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