COLUMBIA | COLUMBIA UNIVERSITY IRVING MEDICAL CENTER

# Viewpoint

A publication of
The Edward S. Harkness Eye Institute
and The Department of Ophthalmology in the
Vagelos College of Physicians and Surgeons

FALL 2021/WINTER 2022

# Nurturing the Next Generation of Ophthalmologists

**The halls of the Harkness Eye Institute** have been busier than ever this academic year, as the Department of Ophthalmology welcomed its largest cohort of residents to work with our faculty, providing care to patients as they take the next step on their journey to becoming ophthalmologists.

"Over the past several years, we have received a record number of applications to our residency program, and this year was no different, as we had over 600 applications for four spots," says Royce Chen, MD, Associate Professor of Ophthalmology and Residency Program Director for the Department of Ophthalmology. "The competition is fierce, and we are very pleased with the applicants we are getting. They are phenomenal young physicians and scientists who are among the best and brightest in the country."

*Left to Right: Residents Zhuoying (Sophie) Gu, MD, Chloe Li, MD, (seated) Jin Kyun (Luke) Oh, MD and Alexis Kassotis, MD during a training exercise with Tarun Sharma, MD and Jason Horowitz, MD*

Just a few years ago, there were only nine ophthalmology residents at the Eye Institute, three for each year of the three-year residency. In 2015, to meet growing demand, the Department of Ophthalmology expanded each residency class to four, bringing the group to 12. And in 2021, an entirely new group was added: four first-year residents, also known as interns, for a total of 16 residents. "The new first-year interns spend three months with us in ophthalmology, broken up throughout the course of the year," explains Dr. Chen. "They spend the rest of the nine months completing rotations that are essential to becoming a physician and are directly relevant to their specialty."

The addition of the intern year is a new approach to the ophthalmology residency, not only at Columbia but nationwide. Most new

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## INSIDE



# Rosenberg Joins Faculty as Director of Pediatric Ophthalmology and Strabismus

**Steven Rosenberg, MD,** an expert in pediatric ophthalmology and strabismus, has joined the Department of Ophthalmology as the Anne S. Cohen Professor of Pediatric Ophthalmology and Director of the Pediatric Ophthalmology and Strabismus Division. Dr. Rosenberg, who previously co-directed the Pediatric Ophthalmology and Adult Strabismus Service at New York Eye and Ear Infirmary of Mount Sinai, has more than 25 years of experience specializing in all facets of pediatric ophthalmology and strabismus, including pediatric cataract surgery and complex adult and pediatric strabismus.

Dr. Rosenberg jokes that for a period in his career, he had four jobs at the same time: private practice ophthalmology, Assistant Director of Pediatric Ophthalmology at New York Eye and Ear Infirmary, Associate Clinical Professor of Ophthalmology at Mount Sinai School of Medicine, and Director of Pediatric Ophthalmology at Maimonides Medical Center in Brooklyn (through an affiliation with Mount Sinai). "I was also teaching residents at Elmhurst Hospital in Queens," he adds. "Occasionally I'd walk toward the wrong subway station, but I never actually went in the wrong direction!"

*Steven Rosenberg, MD*

Joining the Columbia faculty, he says, was an exciting opportunity to consolidate having a private clinical service with hospital-based care and medical education at an institution with a full children's hospital. "It's also a homecoming for me, as I received my medical education at Columbia," he says.

It was during that time that Dr. Rosenberg discovered his passion for ophthalmology, and for strabismus in particular. "During medical school, I initially thought that I would pursue a career in cardiothoracic surgery, and I worked in the heart-lung transplant lab," he says. "But then, during my required third-year rotation in ophthalmology, I attended a conference on strabismus and found

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# VIEW FROM THE CHAIR

**Dear Friends,**

The last two years have challenged the health care system in countless ways, and medical education has been tested as well. I am proud to say that despite these pressures, the educational programs here in the Department of Ophthalmology—from medical student rotations, through residency, fellowships and postgraduate programs, and other professional education initiatives such as grand rounds—are stronger than ever.

For example, over the last decade, 100% of medical students from Columbia University Vagelos College of Physicians and Surgeons seeking a residency in ophthalmology have successfully matched to good programs across the country, when the national ophthalmology match rate is less than 75%. Each year, between six and 10 Columbia medical students choose to pursue an ophthalmology residency, so there is a high level of interest in our specialty here at Columbia.

Within the last five years, our ophthalmology residency program, under the direction of Royce Chen, MD, and Lora Dagi Glass, MD, has grown from nine to 16 residents, now including a cohort of four first-year residents (interns). We received a record-high number of applications this year, with more than 600 candidates seeking one of the four available residency positions.

Virtually all of our residents continue to pursue further subspecialty training in ophthalmology fellowships. Some stay here at Columbia for our outstanding vitreoretinal, cornea, and glaucoma fellowships, while others receive their training at top institutions such as Harvard, Johns Hopkins Wilmer Eye Institute, and Bascom Palmer Eye Institute.

In this issue of the *Viewpoint*, you'll also read more about our PhD and postdoctoral training for the next generation of bench and translational research scientists, including the Vision Sciences Training Grant from the National Eye Institute, as well as our weekly grand rounds series with its prestigious lectureships.

I'm delighted to introduce Steven Rosenberg, MD, as our new Director of Pediatric Ophthalmology and Strabismus. We have also recently welcomed two new faculty members, Aliaa Abdelhakim, MD, PhD, and Qing Wang, MD, PhD, as the inaugural Chang-Burch Scholars.

Sadly, we must also say farewell to two of the pioneers of our specialty. Laszlo Z. Bito, PhD, Professor Emeritus of Ophthalmology, whose work transformed the treatment of glaucoma, passed away at his home in Budapest in November 2021. Our deepest condolences go out to his wife, Olivia Carino, and his family. In February, we lost Francis L'Esperance, Jr., MD, a retina specialist in our department for over 50 years who revolutionized the treatment of diabetic retinopathy around the world. We extend our deepest sympathies to his wife, Ellen, and extended family.

This past year marked a historic milestone: the 60th anniversary of the use of the laser for the treatment of eye disease. In our "Making History at Harkness" series, Stephen Trokel, MD, and James Auran, MD, share their memories of the early days of developing the laser for use in ophthalmology—including a very important discovery made while cleaning out a basement!

We know what a difficult time this has been for so many in the community we serve. We are deeply honored and humbled by the fact that, even in the face of a global pandemic and economic upheaval, our supporters have remained steadfast in their commitment to help us further advance vision science and provide essential ophthalmic care to all who need it. Thank you for your continued friendship and generosity.

Sincerely,

G.A. (Jack) Cioffi, MD
Jean and Richard Deems Professor
Edward S. Harkness Professor
Chairman, Department of Ophthalmology

## Rosenberg Joins Faculty as Director of Pediatric Ophthalmology and Strabismus

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myself still there, fascinated, late into the conference when all my fellow students had gone home. I thought, 'Hey, this might be something for me.'"

Dr. Rosenberg next spent a month's rotation with Jeffrey Odel, MD, Professor of Ophthalmology, in the neuro-ophthalmology division, before pursuing his ophthalmology residency at Manhattan Eye and Ear Infirmary. He then completed a fellowship in pediatric ophthalmology and strabismus at Piedmont Hospital and Children's Healthcare of Atlanta at Scottish Rite Children's Medical Center in Atlanta, Georgia, before returning to the northeast to begin private practice in New Jersey.

What drew him to strabismus? "I was fascinated by the way the eyes work together and how the function of one affects the other," he says. "And I liked the idea of how you treat the disease, manipulating muscles to solve the problem. I appreciate that it is as much of an art as a science. Every patient is a little different."

His immediate plans for advancing the pediatric ophthalmology and strabismus program at Columbia include developing a more thorough resident educational curriculum. "I want to expand their time in this area, and give them more of an understanding of the surgeries we are doing and why we do them," he says.

Dr. Rosenberg is also establishing an "eye muscle" conference for residents to discuss approaches to strabismus. "One day a month, all the residents on the service will present cases to the group," he says. "Our two other pediatric ophthalmologists, Sonali Talsania, MD, and Lauren Yeager, MD, will join me at the conference, discussing issues such as how to decide whether or not a patient needs surgery and what type of surgery they might need. This approach allows residents to develop surgical planning skills with input from many experts. At the beginning, the conference will be led by us as the faculty, explaining the cases and decision-making; by the end of the year, the residents should be taking charge."

Looking further into the future, Dr. Rosenberg hopes to create a pediatric ophthalmology and strabismus fellowship at Columbia. "Right now, we have no such fellowship active anywhere in New York City, so starting this fellowship would be important not just for Columbia but for the people of New York," he says. "One of the biggest challenges facing the field today is the fact that we are not producing enough specialists in pediatric ophthalmology and strabismus to meet the clinical needs of our population, so we have to inspire more young doctors to be interested in the field."

Raised in Rockland County, New York, Dr. Rosenberg spends his free time hiking, bicycling, and going to music and theatrical performances around the city with his wife. "Those are my main passions," he says. "We always have subscriptions to off-Broadway theaters like St. Ann's Warehouse, the Atlantic Theater Company and the Signature Theatre. I've been in and around New York City most of my adult life, and I love how vibrant the city is and how it's always interesting no matter what neighborhood you are walking through."

RESEARCH INSIGHT

# What Makes Grand Rounds Grand

**Thursday afternoons** are a particularly exciting time in the Department of Ophthalmology, as each week at 5 pm, the Department hosts its regular Grand Rounds. Grand Rounds is the highlight of the academic week, when all members of the department convene to exchange ideas, discuss the latest scientific advances and difficult clinical cases, and develop new collaborations and research plans.  At many academic medical centers, grand rounds begin with resident presentations of clinical cases, followed by discussion of those cases with faculty members. At some institutions, grand rounds can also include presentations from faculty or outside experts on the latest topics in the field. But in the Columbia Department of Ophthalmology, Grand Rounds are truly grand!

"The cornerstone of our grand rounds is an hour-long presentation and a Q&A session, either with a visiting professor or one of our own faculty," explains Jeffrey Liebmann, MD, Shirlee and Bernard Brown Professor of Ophthalmology, Vice Chair of the Department of Ophthalmology and Director of the Glaucoma Service. "As members of the wider Columbia community, we are fortunate to have the ability to attract the foremost researchers in the clinical and basic sciences."

For example, one of the most recent grand rounds was part of the Eighth Annual Abraham Spector Prize Lecture and Symposium, held on September 23, 2021. The Spector Lecture honors the late Abraham Spector, PhD, Malcolm Aldrich Professor and Director of Research, whose laboratory was internationally recognized for its work on the lens of the eye and the aging processes leading to cataract formation. This year's Spector Lecture featured George Church, PhD, Professor of Genetics at Harvard Medical School and Head of Synthetic Biology at the Wyss Institute, who developed the first direct genomic sequencing methods and played a pioneering role in developing CRISPR/Cas9 gene editing technology.

"When I became Chair of the Department in 1995, we had two named lectureships, and now we have eleven endowed lectureships in honor of esteemed Columbia clinicians, researchers, and other important members of our community. Dr. Cioffi and I have worked to create lectureships that focus on virtually every aspect of ophthalmology and vision science," says Stanley Chang, MD, the K.K. Tse and Ku Teh Ying Professor of Ophthalmology and former Edward S. Harkness Professor and Chair of the Department of Ophthalmology. "They are very important because they provide a mechanism to remember the history of the institution as well as to bring renowned individuals from internationally recognized institutions to Columbia to lecture and meet with our faculty and students."

One of the first lectureships Dr. Chang created was the Ulrich Ollendorff, MD, Lecture. Dr. Ollendorff practiced in Washington Heights at a time when the institution did not allow Jewish doctors to serve on the staff. "He was highly regarded by our faculty and by the community in general, but the prejudices of the times meant that he could not practice at Columbia," Dr. Chang says. "His son worked with us to establish the lectureship. Dr. Ollendorff was able to attend the first lectures, which feature topics of clinical excellence in any subspecialty, and it was a real tribute to a wonderful community ophthalmologist. This year, we celebrated the 25th Ollendorff Lecture. The family still attends every year and this makes it especially meaningful."

Once a month, the grand rounds program focuses on basic science topics in ophthalmology. "That, too, is very atypical, to have regular basic science grand rounds in a clinical department," says Dr. Liebmann.

Rando Allikmets, PhD, William and Donna Acquavella Professor of Ophthalmic Science (in Ophthalmology) and Pathology & Cell Biology and Research Director of the Edward S. Harkness Eye Institute, polls the research faculty each year for suggestions of visiting lecturers in basic science. "We want excellent speakers who will interact with the faculty. Sometimes these individuals are the world expert in their field, while on other occasions we give this forum to promising young scientists," he says. "But they do have to be working in a very hot area of basic science in ophthalmology."


*Grand Rounds: Qing Wang, MD, PhD presentation*

Grand rounds in the Department of Ophthalmology are typically part of a full day of discussing the latest advances in a particular area, such as diabetic retinopathy, glaucoma genetics, or neuroblastoma. "Usually, the visiting professor spends the whole day with us, taking time to talk with each interested faculty member," Dr. Liebmann says.

"In research grand rounds, we also have a very substantial visit, including the opportunity for junior as well as senior research faculty to have individual discussions with the lecturer," says Dr. Allikmets. "Even when we had to go virtual for COVID, we continued this tradition with Zoom meetings before the talk. I hope to go back to in-person visits as soon as this is possible."

Each week, the main lecture is preceded by a 30-minute case presentation by two residents, or a resident and a fellow—the more classic grand rounds. Periodically, there is also a journal club, in which residents or attending faculty members will present the latest scientific literature as part of the academic afternoon.

The impact of grand rounds extends far beyond listening to an expert give a lecture and asking a few questions, Dr. Liebmann says. "People meet one another and build relationships through grand rounds, and often this has resulted in novel collaborations. That's the kind of success that those high-level interactions produce."

## Endowed Lectureships in the Department of Ophthalmology

**Stanley Chang, MD**
**Arthur Gerard DeVoe, MD**
**John H. Dunnington, MD**
**Max Forbes, MD**
**John T. Flynn, MD Memorial**
**Ulrich Ollendorff, MD**
**Abraham Spector, PhD**
**Florence Epstein Teicher**
**David Pearce, MD**
**Zacharias Dische, MD**
**George K. Smelser, MD**

# FACULTY SPOTLIGHT

# Jolly Good Fellows

**The faculty of the Department of Ophthalmology** currently includes six clinical and research fellows—ophthalmologists who have completed their residency training and are now pursuing advanced training in subspecialty fields including retina, cornea, and glaucoma.

The few spots available in these fellowships are always highly sought after, says Tongalp Tezel, MD, Chang Family Professor of Ophthalmology, Director of the Retina Division and Director of the Vitreoretinal Fellowship Program. "In our field, for example, there are fewer than 10 top fellowship programs, including ours. Together we only have places for about 17 vitreoretinal fellows. This year, we had around 70 applicants for our US fellowship, known as the Foley Clinical Retina Fellowship. We interviewed 18 candidates, and selected one."

Why is the program so competitive? "We offer world-class training with some of the top experts in the field," Dr. Tezel says. "The Harkness Eye Institute has a unique place in ophthalmology and is the birthplace of many innovations. The first human retinal cell transplantation was performed here in 1994 by Dr. Peter Gouras. The genetic basis of age-related macular degeneration was discovered at Columbia by Dr. Rando Allikmets. Dr. Endre Balazs introduced viscoelastics to ocular surgery and created the Healon device at Columbia. Intravitreal injection of prostaglandins to lower intraocular pressure in glaucoma was pioneered here by Dr. Laszlo Bito. And possibly most importantly, almost all of the major advances in vitreoretinal surgery over the past three decades can be credited to Dr. Stanley Chang, who still teaches fellows his surgical techniques. Today, we have seven world-renowned vitreoretinal surgeons and three medical retina faculty, including Dr. Stephen Tsang and Dr. Irene Maumenee, who are probably the best known experts in inherited retinal degeneration in the country. So our fellows have the opportunity to work with giants in their field."

A second vitreoretinal fellowship, the Danny Hirsch-Kaufmann Jokl International Retina Fellowship, is offered to one international medical graduate each year. "The idea is for them to return to their respective countries and establish retinal services at an academic institution there, and then pass on their knowledge to their trainees," says Dr. Tezel. "We now have a Harkness community of former fellows in a wide range of countries, including Italy, Ireland, Egypt, Turkey, Australia, Jordan, Israel, Japan, and China. We are reaching the world with this program."

The cornea fellowship also accepts a single US applicant each year out of dozens of candidates. That fellow is mentored by three faculty members: Leejee Suh, MD, Miranda Wong Tang Associate Professor of Ophthalmology and Director of the Cornea Service, who serves as the primary director of the fellowship; George Florakis, MD, Clinical Professor of Ophthalmology and Director of the Cornea Clinic; and Danielle Trief, MD, the Helen and Martin Kimmel Assistant Professor of Ophthalmology, who specializes in both adult and pediatric corneal disease and runs a monthly clinic dedicated to children with corneal disease.

"It's a very multifaceted fellowship. We pack a lot into one year," says Dr. Suh.

*Glaucoma fellow Johnny Li, MD with Noga Harizman, MD*

*Retina fellows Dvir Koenigstein, MD and Meera Ramakrishnan, MD with Tongalp Tezel, MD*

"Our fellows learn medical and surgical management of corneal disease, corneal transplantation, and infections and conditions of the external eye, along with laser vision correction. Our recent fellows are also being trained in refractive cataract surgery—not just removing the cataract, but making the patient's vision better using the different novel implants that are now available to us. Our fellows see very advanced corneal pathology in this tertiary care center, and they are extremely well trained afterward."

Cornea is a "happy subspecialty," says Dr. Suh. "You see major, dramatic results from repairing someone's cornea. We are at the crossroads of immunology, physics and optics, and it's an exciting time for our field. We find it extremely rewarding to train the next generation of cornea specialists."

The glaucoma fellowship includes one clinical fellow, the Jean and Kent Sheng Fellow, and one research fellow. "We focus on excellent surgical care and lifelong glaucoma management, because with glaucoma, the surgery is only one part of the treatment," says Noga Harizman, MD,

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# Building the Future of Vision Science

**For the past 21 years,** Columbia University Irving Medical Center has trained young PhD and MD/PhD students working toward their doctoral degrees in multiple aspects of vision science, under the auspices of a Vision Sciences Training Grant from the National Eye Institute of the National Institutes of Health. The program is led by primary investigator Carol Mason, PhD, Professor of Pathology & Cell Biology, Neuroscience and Ophthalmic Science (in Ophthalmology), and, beginning in 2021, by Carol Troy, MD, PhD, Professor of Pathology & Cell Biology and Neurology (in the Taub Institute for Research on Alzheimer's Disease and the Aging Brain). Janet Sparrow, PhD, Anthony Donn Professor of Ophthalmic Science (in Ophthalmology) participated in the preparation of the original grant application. It typically supports four predoctoral students every year, although the number declined to two in the most recent academic year as a result of the COVID-19 pandemic.

The students' training focuses on cellular, molecular and genetic aspects of the eye in both health and disease, along with a computational and systems analysis of the visual pathways from eye to brain. Vision research today is increasingly translational, with laboratory discoveries moving rapidly from the bench to the bedside, and this program provides young scientists with the best possible training for their future careers in the interdisciplinary field of vision research.

*Left: Anders S. Knudsen, PhD and Wei Kiong Ngo, MD observe Stephen Tsang, MD, PhD examine a patient*

More than 30 members of the Columbia faculty serve as mentors for the vision sciences training program. The mentors can be divided into three main groups: those like Dr. Mason, who study cellular and molecular aspects of the visual system; investigators who work on systems vision neuroscience—how the visual system sees and what parts of the brain mediate our perception of visual scenes, form and color; and faculty like Dr. Troy investigating molecular and genetic approaches to the normal and diseased eye and visual system.

Students selected for the training grant are mentored by some of the Department's leading scientists, including Dr. Sparrow; Rando Allikmets, PhD, William and Donna Acquavella Professor of Ophthalmic Science (in Ophthalmology) and Pathology & Cell Biology; Simon John, PhD, Robert L. Burch III Professor of Ophthalmic Science (in Ophthalmology); Stephen Tsang, MD, PhD, Laszlo Z. Bito Professor of Ophthalmology and Professor of Pathology & Cell Biology; and Xin Zhang, PhD, Herbert and Florence Irving Professor of Ophthalmic Science (in Ophthalmology) and Pathology & Cell Biology.

Faculty from other Columbia departments and campuses, including biochemistry and molecular biophysics, biomedical engineering, biomedical informatics, neuroscience, psychology and chemistry, also act as mentors. "This program ensures that the dialogue between vision research faculty across Columbia's campuses, and between young and more established investigators, continues," says G.A. (Jack) Cioffi, MD, Jean and Richard Deems Professor, Edward S. Harkness Professor and Chairman of the Department of Ophthalmology.

"The vision sciences training program is very competitive, and many former students are now doing magnificent things," says Dr. Mason. For example, Katherine Wert, PhD, who studied stem cells and retinal degeneration in Dr. Tsang's laboratory, is now an Assistant Professor of Ophthalmology and Molecular Biology at the University of Texas Southwestern Medical Center and has published important research on retinal degeneration. Nancy Parmalee, PhD, who studied the genetics of eye disease in the laboratory of Dr. Allikmets, is a computational biologist in the lab of Maria Chahrour, PhD, Assistant Professor in the McDermott Center for Human Growth and Development/Center for Human Genetics. Maria Avrutsky, PhD, studied mechanisms of retinal vein occlusion in the laboratory of Dr. Troy and is now Senior Scientist, Biology at Clover Therapeutics, focused on therapies for age-related ocular diseases.

Qing Wang, MD, PhD, trained at Columbia and carried out her PhD in Dr. Mason's lab , completed her residency and postdoctoral fellowship at the Jules Stein Eye Institute of the University of California-Los Angeles, and then returned to Columbia, where she is an Assistant Professor of Ophthalmology and one of two Chang-Burch Scholars (see page 6).

Under the auspices of the training program, Columbia also sponsors VisioNYC, a prestigious series of meetings for both vision scientists and trainees. "Not only are we educating the next generations of vision scientists, but this program has also served as a wonderful bridge bringing together different departments within Columbia and the wider vision community in New York," Dr. Mason says.

In addition to the training for PhD students, the Department of Ophthalmology also offers multiple postdoctoral fellowships to prepare young scientists for successful careers as independent investigators. The numbers vary from year to year, but there are typically at least 15 postdoctoral fellows working in the laboratories of faculty members like Dr. Sparrow, Dr. Tsang, Dr. Allikmets, Dr. Zhang and Dr. John.

"The collaborative laboratory research that fellows pursue in the course of their time at Columbia can be the basis for groundbreaking future studies," says Haejin Kim, PhD, Associate Research Scientist in the Department of Ophthalmology, who served as a fellow in Dr. Sparrow's laboratory for four years before joining the faculty full-time to pursue research into the mechanisms by which toxic compounds called bisretinoids contribute to the disease process in age-related and early-onset forms of retinal degeneration.

"Some of our most successful former fellows have discovered compounds that have the potential to become new therapies for eye disease, while others have identified novel pathways and processes that have allowed us to better understand the pathophysiology of eye disease," says Dr. Sparrow.

# VISIONARIES & LUMINARIES

## Two Chang-Burch Scholars Named

**Aliaa Abdelhakim, MD, PhD, Instructor in Ophthalmology, and Qing Wang, MD, PhD, Assistant Professor of Ophthalmology** have been selected as Chang-Burch Scholars, a three-year appointment that provides a source of support for early career scientists. The Chang-Burch Scholars program aims to nurture the next generation of leading clinician-scientists in ophthalmology, allowing them to pursue innovative new approaches to vision research, develop a substantial portfolio of original scientific work, and help move laboratory discoveries to the clinic where they can directly improve patient care.

*Aliaa Abdelhakim, MD, PhD*

*Qing Wang, MD, PhD*

A rising star in ophthalmic genetics, Dr. Abdelhakim is currently completing a medical genetics and genomics training program at the Morgan Stanley Children's Hospital, while at the same time serving as an attending physician on the retina service in the Department of Ophthalmology.  At the conclusion of her training program, she will join a small handful of physicians in the world who are dual-boarded in ophthalmology and human genetics, including a top pioneer in the field, one of her mentors, Irene Maumenee, MD, Professor of Ophthalmology and Director of Applied Genetics.

Dr. Abdelhakim's passion for the field is both personal and scientific. "When I was younger, my father lost an eye, and I saw the toll it can take on your quality of life when you have a visual disability," she says. "Scientifically, it's a fascinating field with so many opportunities to find a niche: you can do surgery, you can do research, you can do gene therapy. I also find the basic science and physiology of the retina as it pertains to potential gene therapies to be very exciting. I'm so thankful that the Burch Family Foundation has created this pathway to support me and others who want to hone our clinical skills while at the same time focusing on research and new medical discoveries to help patients."

In addition to the medical genetic studies involved in her fellowship, Dr. Abdelhakim is serving as an investigator on a trial of new treatments for Usher syndrome, an inherited disorder that involves both hearing impairment and the progressive retinal disorder retinitis pigmentosa (RP). She is also working on research programs to study genetic eye disease in under-represented populations, as well as to develop new methodologies for identifying new disease-causing genes in patients and to describe eye findings in patients with rare genetic syndromes.

Dr. Abdelhakim completed her PhD at MIT in Biochemistry and Molecular Biology and a post-doctoral fellowship in Structural and Cell Biology at Harvard Medical School/Children's Hospital Boston, before pursuing her

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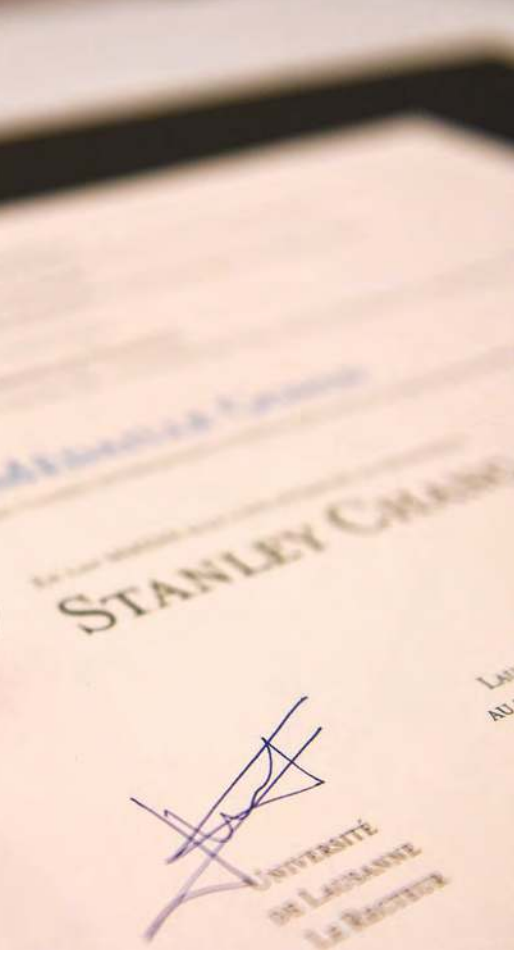
# Awards

**Stanley Chang, MD,** the K.K. Tse and Ku Teh Ying Professor of Ophthalmology and former Edward S. Harkness Professor and Chair of the Department of Ophthalmology, has been honored with the Gonin Medal, an international award given to an ophthalmologist every four years by the International Council of Ophthalmology. Named in honor of Swiss ophthalmologist Jules Gonin, MD, a pioneer in retinal detachment surgery, the medal represents the highest achievement in ophthalmology, equivalent to the Nobel Prize in the field.

Dr. Chang received the diploma for the medal and presented a special lecture at a meeting in Lausanne, Switzerland on March 24, 2022. He will be formally presented with the medal itself during the virtual World Ophthalmology Congress in September 2022. Established in 1937 by the University of Lausanne and the Swiss Society of Ophthalmology, the first Gonin Medal was bestowed in 1941. Since then there have been 21 awardees including Dr. Chang, who is only the fifth American to be so honored.

Dr. Chang also recently received Ophthalmology Innovation Source's (OIS) Lifetime Innovator Award for his work in the advancement of vitreoretinal surgery and the pioneering techniques used today. The award was presented on October 13, 2021 during OIS' Retina Innovation Summit in San Antonio, Texas. During the summit, Dr. Chang was interviewed by Firas Ruhhal, MD, an Associate Clinical Professor of Ophthalmology at the UCLA School of Medicine–Jules Stein Eye Institute. The talk can be found on YouTube by searching for OIS Podcast #301.


*Left: to right: Professor Frédéric Herman, Rector of the University of Lausanne, Stanley Chang, MD and Professor Thomas J. Wolfensberger, Head of the University Department of Ophthalmology and Medical Director of the Jules-Gonin Ophthalmic Hospital*




*Stanley Chang, MD alongside tribute wall honoring past Gonin Medalists*

## Jolly Good Fellows

*Continued from page 4*

Associate Professor of Ophthalmology, who directs the fellowships. "We have to tailor post-surgical management to the specific healing process of each patient. That's the art that fellows are learning."

Glaucoma fellows participate in high-volume clinical days with top attending surgeons, including Dr. Harizman; Jeffrey Liebmann, MD, Shirlee and Bernard Brown Professor of Ophthalmology, Vice Chair of the Department of Ophthalmology, and Director of the Glaucoma Service; Qing Wang, MD, PhD, Assistant Professor of Ophthalmology; and George A. "Jack" Cioffi, MD, Edward S. Harkness Professor, Jean and Richard Deems Professor, and Chair of the Department of Ophthalmology. They also work with C. Gustavo De-Moraes, MD, PhD, Associate Professor of Ophthalmology and Medical Director of Clinical Trials, during the weekly fellows' clinic on Mondays. The current research glaucoma fellow works primarily on better understanding structure-function relationship of glaucoma pathology. He recruits patients from the faculty practice and works closely with Donald Hood, PhD, James F. Bender Professor of Psychology and Professor of Ophthalmic Science (in Ophthalmology).

"Our fellows are like an extension of the attending clinician," says Dr. Harizman. "We look for fellows with an excellent clinical background, academic curiosity, a strong work ethic, and great interpersonal skills. They will be treating a wide range of patients from a variety of backgrounds, and we want them to be able to connect on a personal level with all of the different patients that they see."

***Cornea fellow Joseph Kristan, MD with Leejee Suh, MD***

## Two Chang-Burch Scholars Named

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medical education, ophthalmology residency, and vitreoretinal fellowship at Columbia Vagelos College of Physicians and Surgeons.

Dr. Wang earned her BS and MS in molecular biophysics and biochemistry from Yale University before pursuing joint MD and PhD degrees at Columbia as part of the Medical Scientist Training Program. Under the mentorship of Carol Mason, PhD, she completed her doctoral thesis on molecular programs that specify different subpopulations of retinal ganglion cells (RGCs) during development. She then went on to complete her ophthalmology residency and postdoctoral research fellowship in optic nerve regeneration at the Stein Eye Institute at the University of California-Los Angeles, followed by a glaucoma fellowship at the Wilmer Eye Institute at Johns Hopkins University.

Dr. Wang's clinical practice and research focuses on glaucoma, a group of diseases in which RGCs degenerate over time, leading to vision loss. RGCs process the visual information that begins as light entering the eye and then transmit it to the brain through the optic nerve. "I am interested in understanding how these RGCs degenerate in glaucoma and developing novel treatments to restore them," she says. In particular, she is interested in understanding how the molecular changes in astrocytes influence RGC degeneration in glaucoma due to their tight association with each other at the optic nerve head.

Astrocytes, star-shaped glial cells that normally provide support and regulation for neurons, but under certain conditions, these astrocytes can undergo changes that cause degeneration of neurons. "In many other types of complex neurodegenerative diseases, like Alzheimer's disease and ALS, glial cells such as the astrocytes play a very critical role in the disease process," Dr. Wang notes. "I would like to understand what makes optic nerve head astrocytes distinct from other astrocytes found throughout the visual system and how they change in glaucoma to influence RGC death."

To study these questions in mouse glaucoma models, she is working closely with mentor Simon John, PhD, Robert L. Burch III Professor of Ophthalmic Science (in Ophthalmology), who is best known for using mouse models and genetic tools to understand the mechanisms of RGC death in glaucoma. They are also developing novel viral tools for genetically manipulating these specific astrocytes. "If we can change them from a neurotoxic to a neuroprotective state, we could open up a new avenue of glaucoma therapies directed towards optic nerve head astrocytes." With her clinical background as a glaucoma specialist, Dr. Wang will also take on the role of directing clinical trials related to novel glaucoma therapeutics developed at Columbia.

The Chang-Burch Scholars program provides essential support during a key phase of a young clinician-scientist's career, Dr. Wang notes. "Becoming a clinician-scientist requires years of training. When you finally reach the point where you are ready to start your career, you can find yourself without the protected time to do research.," she says. "Being a Chang-Burch Scholar allows me to dedicate the majority of my time to research, so that I can make a successful transition to becoming an independent clinician-scientist. I'm very grateful for this opportunity."

Other named scholar programs also offer support to rising young faculty members in the Department of Ophthalmology. Sonali Talsania, MD, an Assistant Professor of Ophthalmology who completed fellowship training in pediatric ophthalmology and strabismus, has recently been named a Jonas Scholar. Tingting Yang, PhD, Assistant Professor of Ophthalmic Science (in Ophthalmology), who studies the structure and function of ion channels in the eye and the mechanism and treatment of associated diseases, was selected as the Schaeffer Research Scholar. Meera Ramakrishnan, MD, who is currently pursuing a vitreoretinal fellowship in the Department of Ophthalmology, has been named the Starr Scholar. Nan-Kai Wang, MD, PhD, an Assistant Professor of Ophthalmic Science (in Ophthalmology), whose research focuses on developing therapies for retinitis pigmentosa and RGC degeneration through reprogramming of the mitochondria that power most of cells' biochemical reactions, has received funding from Gerstner Philanthropies to become a Gerstner Scholar.

# MAKING HISTORY AT HARKNESS

*This Viewpoint column will spotlight milestones in ophthalmic care that have taken place at Columbia, from the early "firsts" to the latest achievements.*

## 60 Years of Pioneering the Laser in Ophthalmology

**When James Auran, MD, Professor of Ophthalmology,** was a young attending physician in the 1990s, the Department of Ophthalmology maintained a huge storeroom in the basement of the Eye Institute. "It was filled with decades of junk, but maybe also treasures beyond your wildest dreams," recalls Dr. Auran. "The hospital decided that they needed the space, and Anthony Donn [MD, then the Department Chair] told me to go down there and clean it out."

Amid the junk, Dr. Auran found and rescued historical films, books, and research notes. Then he stumbled on what looked like a long, translucent piece of red glass, but was in fact an important relic in the history of ophthalmology: the ruby crystal from the first laser to be used in treating ophthalmic disease.

"The laser itself had long since been disassembled," Dr. Auran recall. "They had constantly been revamping it and it had reached the point where it was practically held together with paper clips and chewing gum. But the ruby crystal sat in the basement, neatly labeled in a folder, for years." That discovery now sits in a place of honor in a glass case in the lobby of the Harkness Eye Institute.

*Left to right: James Auran, MD and Charles Koester, PhD in 1990*

On November 22, 1961, Charles D. Campbell, MD, then the director of the Knapp Memorial Laboratory of Physiological Optics at the Edward S. Harkness Eye Institute (he would become Chair of the Department of Ophthalmology in 1974) applied a single pulse of light from the ruby laser to the retina of a young boy with a retinal tumor known as an angioma. In a fraction of a second, the tumor was destroyed and the patient's vision was spared. The historic event made headlines in the *New York Times*, which noted, "This use, in burning out a tiny and precisely located piece of tissue in the retina, amounts to extremely delicate surgery."

"They had used light in the past to burn tissue in the eye, a process called Xenon arc photocoagulation," says Dr. Auran. "But it couldn't focus the beam very well, so the scars were large and caused permanent damage. Dr. Campbell realized that the ruby laser was revolutionary for optical surgery, because you could create a very precise beam."

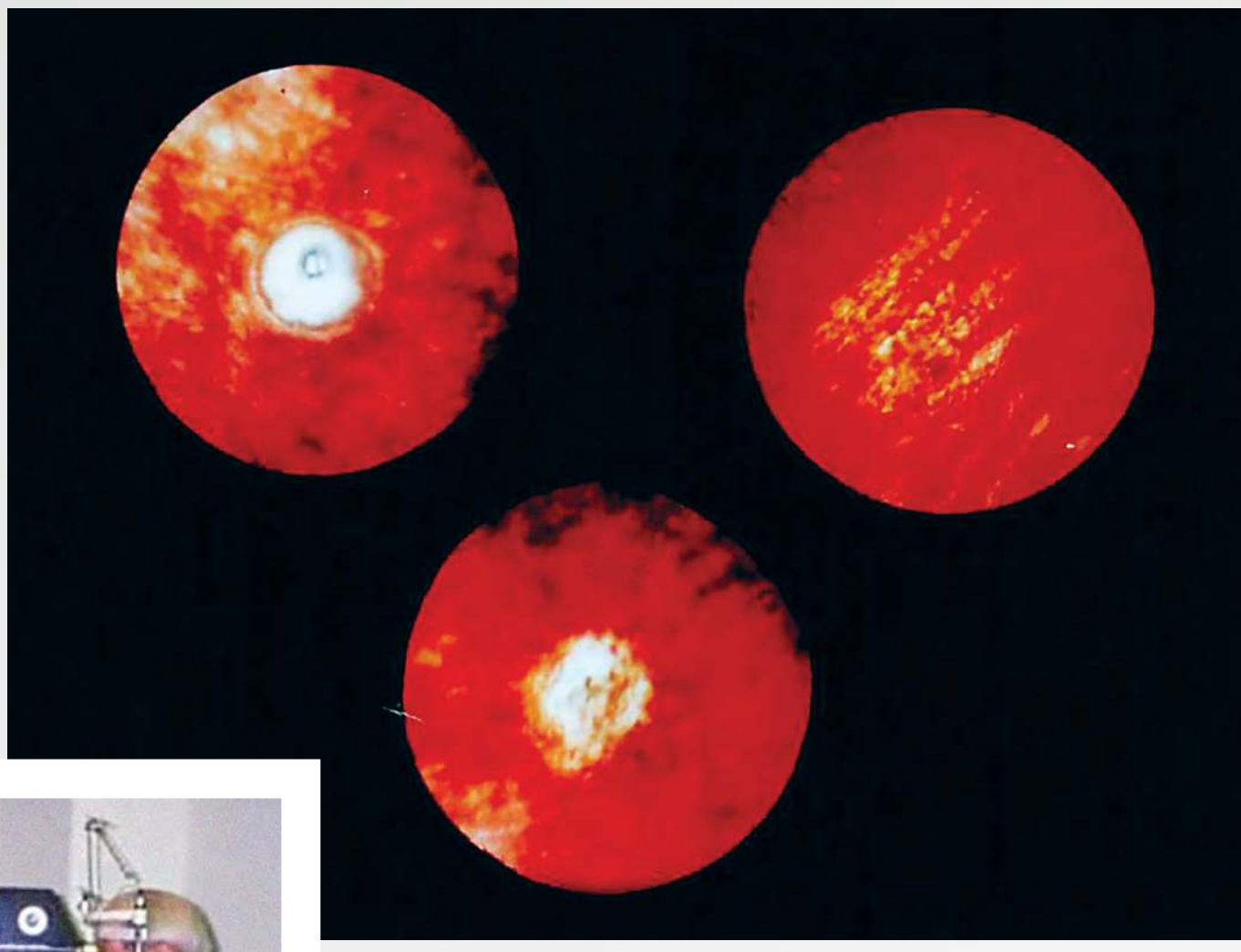

*Image: One of the earliest series of fundus photographs of a chinchilla rabbit illustrating coagulations produced by the ruby laser photocoagulator*

Working with Dr. Campbell was optical physicist Charles Koester, PhD, a scientist with American Optical who led the team that built that first laser. "American Optical was one of those companies like Bell Labs and Kodak that were constantly inventing things. He told me that he'd get $50 every time he registered a patent, and he ended up with a lot of patents under his belt," says Dr. Auran.

Dr. Koester, who passed away in 2020, later joined the Columbia faculty as Assistant Professor of Biophysical Ophthalmology. His research and design efforts included control and use of polarized light, fiber optics and lasers, lens design and specialized microscopes. "He was a brilliant scientist," Dr. Auran recalls. "You'd ask him to make something, he'd nod and say okay, and then the next morning he'd come back having fabricated a lens that could do the most amazing things."

With that first use of the ruby laser, Dr. Campbell, Dr. Koester and their team revolutionized ophthalmology. They presented the case at a meeting of the American Optical Society in March 1962, and "It changed everything," says Dr. Auran. "And Columbia has been at the center of laser applications in ophthalmology ever since."

"It was a very exciting time," recalls Stephen Trokel, MD, Professor of Ophthalmology. Then a young resident in the Department, Dr. Trokel would go on to become one of the leading pioneers in the use of lasers in ophthalmology. He was the first ophthalmologist to recognize the significance of the excimer laser for use in corneal refractive surgery. "We were just a few years past the Second World War, with an expanding technology, and new technology was appearing at a rapid rate. Charlie [Campbell] would let the residents use his laser. He thought the residents were better because they weren't afraid to try new things."

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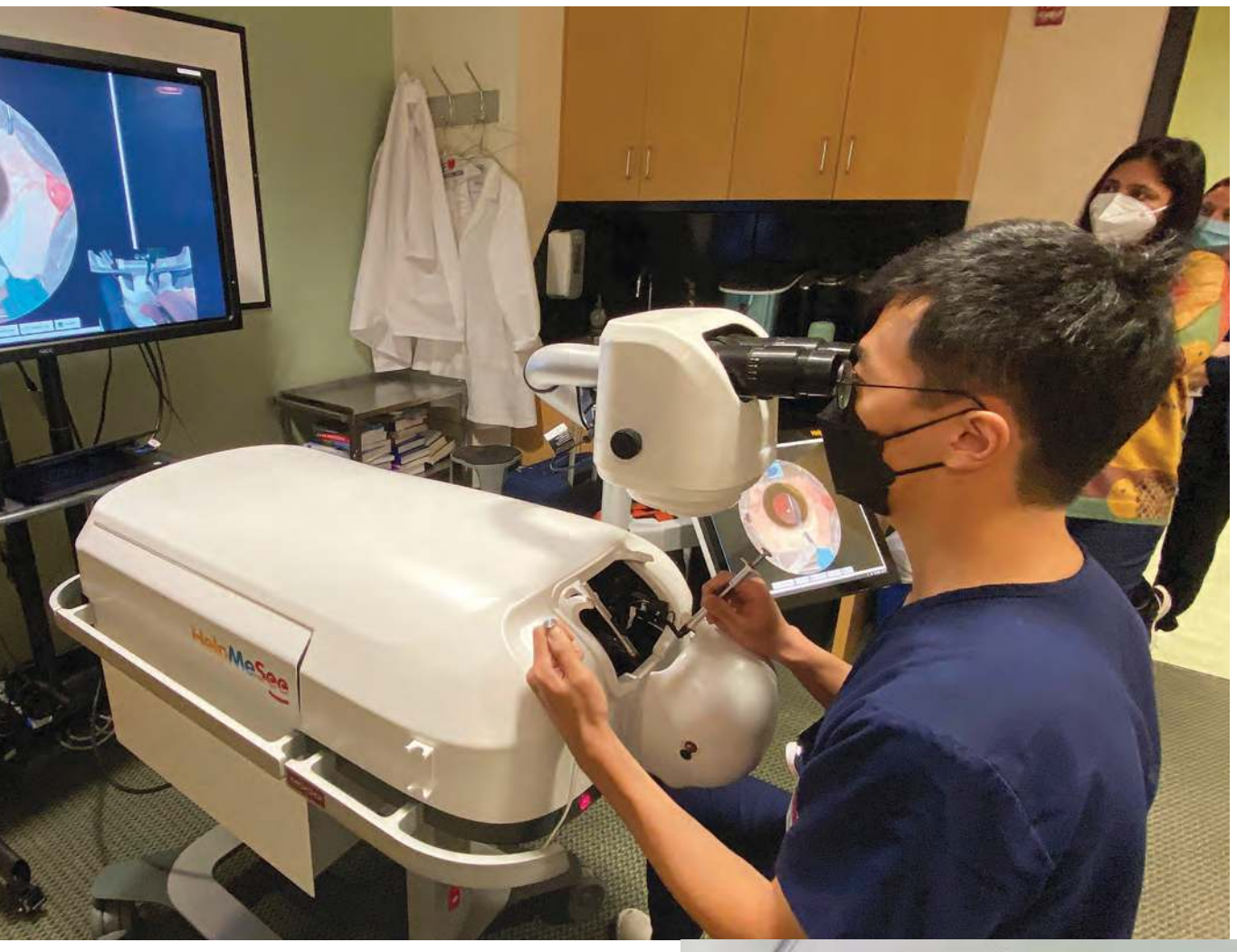
# Nurturing the Next Generation of Ophthalmologists

*Continued from page 1*

medical school graduates are assigned to four-year residency programs through the National Resident Matching Program (NRMP), also called The Match. They begin as first-year residents, also known as interns or PGY-1s (for postgraduate year 1), and stay at the same teaching hospital for all four years of residency. Ophthalmology residencies, however, have traditionally been structured in a slightly different way: they match into an internship year in addition to a separate match directly into ophthalmology residency. Many ophthalmology residents did not perform an internship year in the same institution as their residency.




*Resident Jin Kyun (Luke) Oh, MD training on the Help Me See Simulator*

That's changing over the next few years, as the Accreditation Council for Graduate Medical Education (ACMGE), which governs medical residencies, has mandated the linking of an internship year in the ophthalmology program, whether integrated directly into the residency itself, or joint with a guaranteed match for both at the same institution. All residencies must set up this program by 2023, but Columbia is in the vanguard, having commenced an integrated internship in July 2021.

To develop the most relevant clinical rotations for the new internship, Dr. Chen and Lora Dagi Glass, MD, Assistant Professor of Ophthalmology and Associate Program Director for the Ophthalmology Residency Program, conducted a resident focus group and oversaw a nationwide survey of ophthalmology residents and fellows. "They prioritized areas such as endocrinology, rheumatology, neurology and neuroradiology, which we as ophthalmologists interact with on a regular basis but don't always get exposure to during the internship year," says Dr. Chen.

During that first year, Columbia's residents will spend a total of three months in ophthalmology and the remaining nine months in a series of ophthalmology-relevant medical and surgical rotations, including ear, nose, and throat surgery, oral maxillofacial surgery, pre-operative clearance clinic, neurology and the neurological ICU, internal medicine, neuroradiology, rheumatology, dermatology and dermatopathology, emergency medicine, and elective rotations in endocrinology, Mohs surgery, or plastic surgery. "The interns still complete the internal medicine and intensive care rotations that are essential to being a practicing physician in any specialty, but they also develop experience that is highly relevant to ophthalmology," Dr. Chen says. "We have already seen the benefits of this approach. There is much more collaboration across the specialties, and the interns are more familiar with the hospital system than they otherwise would have been when they came in as second-year residents. Meanwhile, the other specialists with whom they rotate are developing a greater understanding of ophthalmology. It's a great way to build bridges."


*June 2021 Residents Graduation*

### A "Post-COVID State"

The Department's training programs have now adapted to a "post-COVID state," according to Dr. Chen. Having been forced to conduct most of our education remotely for the better part of a year has taught faculty members how to be more flexible in education delivery. "Our daily morning report and resident didactic lectures are always done remotely now, allowing residents and faculty to contribute from wherever they are," he says. "We expect that that will continue even once the pandemic is in the past. But we know that there is irreplaceable value in human contact. In September, we began conducting grand rounds in a hybrid format, with residents once again giving case presentations in person. Some attending physicians, fellows, and other faculty are present, but we also have a large online presence watching from afar."

Recognizing that burnout is a very real part of the lives of all physicians, the Department of Ophthalmology has developed an innovative wellness curriculum to support trainees. Supported by The Dr. Robert C. and Veronica Atkins Foundation, the Empathy in Ophthalmology curriculum includes a partnership with the Metropolitan Museum of Art, where residents have seen and interacted with the work of artists with low vision. "Getting a feel for what people can do with various levels of visual acuity is very powerful for our residents to experience. It teaches all of us that our patients are individuals with rich lives, and that visual acuity is more than a number on a chart," says Dr. Chen. The curriculum also includes a narrative medicine program for residents interested in expressing their thoughts and experiences through writing, regularly planned social events, leadership courses, and an annual residency retreat. "We are trying to create renaissance individuals in terms of their interests and their

health," says Dr. Glass. "A healthier resident is a healthier person and a better doctor."

Clinical simulation, always a valuable teaching tool for residents and medical students, became even more important during the pandemic. Within the last year, Columbia has raised the necessary funds to develop a new ophthalmology "wetlab," which allows trainees to practice their surgical skills in a simulated, risk-free environment.

"We are now in the process of working with microscope companies to buy new microscopes to facilitate this work, and building an overall training room and surgical curriculum for use in the wet lab," says Dr. Chen. "We will soon have a dedicated space with state-of-the-art equipment. That's one of the lessons we learned from COVID: anything can wipe out your normal routine in a short period of time. We need to be even more methodical about how we educate our trainees, and identify novel ways to prepare them that don't rely on operating room time."

New simulation opportunities also allow medical students to have earlier and more robust exposure to ophthalmology, adds Dr. Glass. "They are exposed to the operating room during their surgical clerkship, but that's well into their medical education. Having these simulation opportunities allows us to encourage medical students' interest in ophthalmology earlier on in their preclinical education as they learn about the anatomy of the eye and neuro-ophthalmology."

Ophthalmology is woven into the fabric of medical education at Columbia in both formal and informal ways. All medical students rotate through the Department of Ophthalmology during a required clerkship week that is part of their internal medicine curriculum. Dr. Glass, who is also the Director of Medical Student Education in Ophthalmology, notes, "If they are interested in a deeper dive into the field, they can pursue a month-long elective with us after completing their core clerkship requirements." Electives include general ophthalmology, neuro-ophthalmology, oculoplastic surgery and preceptorships. "By the end of that month, they are functioning at the level of an early resident. It helps them clarify if this is really the field for them."

Medical students also have an ophthalmology "interest group," led by one or two students each year, with Dr. Glass as the sponsor. "We create events together such as simulation sessions or panel discussions with residents and fellows talking about their experiences, or advising students about what it's like to apply to an ophthalmology residency," she says.

One of the most fundamental principles of the educational program, whatever the trainee level, is to consistently review and maintain educational excellence. "Ten years ago, we were much smaller, with just nine residents and a handful of fellows. Now that we have 16 residents and at least eight fellows every year, we need an invested body of diverse faculty scrutinizing our educational efforts and thinking about what we are trying to achieve," he says. "So at our most recent faculty retreat, we developed the foundations for an educational committee to review our measures of success, how we define greatness in residents and fellows, and set expectations and best practices." With this attention to detail and commitment to education, it's no wonder that our ophthalmology training programs are among the most competitive in the country.

**IN MEMORIAM**

# Laszlo Z. Bito, PhD

**One of the giants of glaucoma treatment, Laszlo Z. Bito, PhD,** passed away at his home in Budapest on November 14 at the age of 87. Dr. Bito's research in the field of prostaglandins led to the discovery of a major class of drugs for the treatment of glaucoma.

As a young man, Dr. Bito and his family were deported from their home by Hungary's communist regime, and he was forced to work in a coal mine. After escaping to fight the occupying Soviet army in Budapest, he was ultimately granted asylum in the United States when the uprising failed.

In 1963, Dr. Bito earned his PhD in medical cell biology and biophysics from Columbia University. He served on the faculty of the Department of Ophthalmology from 1965 until his retirement in 1997, when he returned to Hungary to write fiction and plays. He remained a Professor Emeritus of Ocular Physiology (in Ophthalmology) in the Department until his death.

*Laszlo Z. Bito, PhD*

While at Columbia, Dr. Bito's basic science research led to the development of latanoprost (Xalatan), a prostaglandin-based eye drop that lowers intraocular pressure by increasing the flow of natural eye fluids out of the eye. At the time, conventional scientific wisdom said that prostaglandins raised intraocular pressure and were therefore always dangerous in people with glaucoma, but Dr. Bito believed that small doses of these hormone-like fatty acids could actually lower eye pressure. His experiments in animals and even in his own eyes proved that he was right, and in 1982, he patented the concept. Over the next decade, he oversaw the clinical development of the treatment, and in 1996, latanoprost was approved by the US Food and Drug Administration. It ultimately became one of the leading medications used in the treatment of glaucoma worldwide.

Dr. Bito's legacy at Columbia is honored with the Laszlo Z. Bito Professorship of Ophthalmology, currently held by Stephen Tsang, MD, PhD. We extend our deepest condolences to his wife, Olivia Carino, his children and family.

**IN MEMORIAM**

# Francis L'Esperance, Jr., MD

**Francis L'Esperance, Jr. MD,** Clinical Professor of Ophthalmology at Columbia University Irving Medical Center, passed away on February 1, 2022, at the age of 89. Dr. L'Esperance was an innovator and pioneer in the field of laser development and treatment of retinal diseases. He was one of the first to introduce the use of argon laser to ophthalmology. His work revolutionized the treatment of diabetic retinopathy globally, saving the sight of many patients affected by the leading cause of blindness under age 60.

Dr. L'Esperance also pioneered other treatments, notably for retinal vascular diseases such as retinal vein occlusions and for age-related macular degeneration. He continued working with colleagues to develop the next generation of lasers that had greater precision, such as dye lasers, holmium lasers, and the excimer laser. He held 23 patents in the field of ophthalmology. In recognition of his immense contributions, he was awarded the Rank Prize in Optoelectronics in London in 2010.

*Francis L'Esperance, Jr., MD*

Dr. L'Esperance joined the Columbia faculty of Ophthalmology after completing his residency at Massachusetts Eye and Ear Infirmary in the late 1960's and was affiliated with us for over 50 years. He initially joined the private practice of Dr. John Dunnington on Fifth Avenue, and later formed his own private practice at that location until 2007. He was instrumental in facilitating Columbia Ophthalmology's 2000 move of the faculty practice to a convenient midtown location. Personally, Dr. L'Esperance was brilliant, generous and always a gentleman. His patients spoke frequently of his excellence and compassion and most grateful of all he did for them. His colleagues admired him and enjoyed his company. He will be greatly missed.

We extend our deepest condolences to his beloved wife, Ellen, children, Linda and Francis, and their grandchildren.

# 60 Years of Pioneering the Laser in Ophthalmology

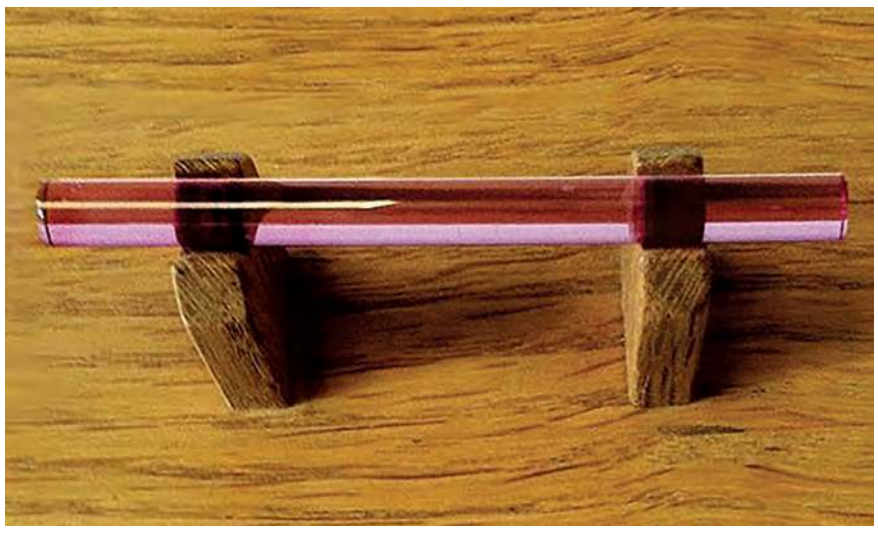
*Continued from page 9*

Dr. Trokel had majored in physics and engineering in college, earned a master's degree in radiation biology, and spent a year with the US Atomic Energy Commission studying radiation and radioactive materials before completing medical school at the University of Rochester and then coming to Columbia to pursue his ophthalmology residency. "I was already interested in light as a therapeutic tool, and Dr. Campbell's and Dr. Koester's success encouraged me to keep pursuing it."

Dr. Trokel credits Arthur Gerard DeVoe, MD, who served as chairman of the Department of Ophthalmology and director of the Edward Harkness Eye Institute from 1959 to 1974, with fostering an environment that was open to exploration and risk-taking. "Medicine was fairly conservative then, and people were reluctant to adopt new technologies like the laser," he recalls. "But while most department chairs of the time said, 'Do it my way or don't do it at all,' Gerry said, 'It may work, try it, let's see.' If you wanted to use a new surgical technique or try a new instrument, he encouraged you. He thought change was important and accepted it."

The new ruby laser was quickly deployed to treat more childhood tumors in the ocular oncology division, led by Algernon B. Reese, MD and Robert Ellsworth, MD. "We had dramatic results, and the positive impact it had on patients was thrilling," Dr. Trokel says. "There were cancer cures, early treatment of diabetic retinopathy, and treatment of retinal tears. In my first year of practice, I remember treating the periphery of a retinal tear with the laser, something we couldn't have done even five years earlier."

More milestones followed. Realizing that blue-green wavelengths are better absorbed by the retina than red wavelengths, Francis L'Esperance, Jr., MD, Clinical Professor of Ophthalmology, developed the argon laser, first used in a human patient with diabetic retinopathy in 1968. And in 1983, Dr. Trokel introduced photorefractive keratectomy (PRK), a revolutionary ocular surgery using the excimer laser (a device that uses a mixture of argon and fluorine gases) to reshape the cornea.



*Ruby Laser*

In the early 1980s, Columbia also became one of the first institutions in the United States to acquire a laser photodisruptor. This tool allowed cataract surgery to shift from an intracapsular procedure, which required removal of the lens and surrounding capsule in one piece and was associated with a higher rate of complications, to extracapsular surgery, which leaves the lens capsule partially intact. "This approach made implantation of the artificial intraocular lens safe," explains Dr. Trokel.

Columbia remains a leader in the application of lasers in ophthalmology today. In 2017, the Department of Ophthalmology opened a new Refractive Surgery Suite and Laser Vision Correction Center in the Gloria and Louis Flanzer Vision Care Center, directed by Leejee Suh, MD, Miranda Wong Tang Associate Professor of Ophthalmology. The laser vision center offers state-of-the-art vision correction lasers for LASIK and PRK.

"Lasers have reduced the complication rate from cataract surgery to a few in 100 to a few in thousands. You can't name an ocular disease that's not going to be improved by the application of the laser, from tumors to macular degeneration to diabetic retinopathy," says Dr. Trokel. "A long time ago, I heard someone refer to the laser in medicine as the 'healing finger of God,' and that seems apt."

Viewpoint

**IMPORTANT PATIENT CARE INFORMATION**

Specialties:
Cornea/External Ocular Disease
Glaucoma
Pediatric Ophthalmology and Strabismus
Refractive Surgery/LASIK
Vitreoretinal and Uveitis

*For inquiries and appointments, please call 212.305.9535*

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