

# Viewpoint

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The Edward S. Harkness Eye Institute  
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Vagelos College of Physicians and Surgeons

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RESEARCH INSIGHT

## Ophthalmology Research Enterprise Moves to New Space in Hammer Health Sciences Center

**For more than 20 years,** the groundbreaking work of the Department of Ophthalmology's highly ranked basic science research faculty, now consisting of 14 Principal Investigators with \$12 million in extramural funding, has taken place in renovated laboratories in the research annex of the Edward S. Harkness Eye Institute. Beginning in August 2023, as part of the major facilities project resulting from the construction of the new cancer center, our research enterprise will move to new purpose-built space on the second floor of the Hammer Health Sciences Center.



New laboratory space in the Hammer Health Sciences Center

"The 18-story building is dedicated to research," notes Xin Zhang, PhD, Herbert and Florence Irving Professor of Ophthalmic Science (in Ophthalmology) and Pathology & Cell Biology, who is spearheading the move. "We are moving to the center of Columbia's biomedical research program, one floor above the Augustus C. Long Health Sciences Library, with excellent resources immediately adjacent to our facilities. I think the new location and its environment will be very stimulating for our basic science research."

All scientific faculty members have had significant input into the renovation. "We have had in-depth discussions with the architect and have been able to customize our laboratory space, the layout of the cell culture room, the layout of the conference room, and so on," Dr. Zhang says. "The space is brand-new and designed with our needs in mind. While there has been significant

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## Five Rising Stars Join Clinical Faculty

**Over the past year,** the Department of Ophthalmology has welcomed five outstanding physicians to our clinical faculty: retina specialists Aliaa Abdelhakim, MD, PhD, Assistant Professor of Ophthalmology and Chang-Burch Scholar, and Vlad Diaconita, MD, Assistant Professor of Ophthalmology; and glaucoma specialists Aakriti Garg Shukla, MD, Leonard A. Lauder Assistant Professor of Ophthalmology, Ives Antonio "Tony" Valenzuela, Assistant Professor of Ophthalmology, and Qing Wang, MD, PhD, Assistant Professor of Ophthalmology and Chang-Burch Scholar.

"This is a spectacular group of clinician-scientists," says G.A. (Jack) Cioffi, MD, Jean and Richard Deems Professor, Edward S. Harkness Professor and Chairman of the Department of Ophthalmology. "I can't think of

five better recruits that we could have brought onto our team to continue the growth of our clinical programs."

### Vlad Diaconita

Born in northern Romania, Vlad Diaconita and his family moved to Canada when he was nine, and it was there that he completed his undergraduate degree in neuroscience at the University of Toronto and earned his MD at the University of Western Ontario (often referred to simply as "Western"), one of Canada's top research universities.

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# VIEW FROM THE CHAIR

## Dear Friends,

It is an exciting time of great change for the Edward S. Harkness Eye Institute. As you will read in these pages, construction will soon begin on a state-of-the-art new cancer center on the Columbia University Irving Medical Center campus. The 10<sup>th</sup> floor of this modern, 17-story building, slated for completion in 2027, will be the new home of the clinical programs of the Department of Ophthalmology, where we will have significantly more space than our clinical facilities do now. With a department that is 155 years old and a building that is 90 years old, the time has come for new space that will usher us into the future of vision care and science.

Change is also bittersweet: to build this medical facility of the future, the Eye Institute building will be torn down later this year. While it will be difficult to say goodbye to the halls where Donn and DeVoe, Castroviejo and Dunnington, and so many other legendary pioneers of our field once worked, we are eager to begin work in a new building with a dedicated floor purpose-built for our needs and the needs of our patients.

In this issue of the *Viewpoint*, we will tell you all about the plans for the transitional period while the new building is under construction, as well as the new custom research space for our basic science laboratories in the Hammer Health Sciences Center, and other expansion plans for faculty practice locations elsewhere in the city and beyond. We will also pay tribute to the storied history of the Harkness Eye Institute building in our regular feature, *Making History at Harkness*.

We are pleased to have had a rich complement of clinical and research faculty members join us within the past year. Clinician-scientists Vlad Diaconita, Tony Valenzuela, Qing Wang, Aliaa Abdelhakim, Aakriti Garg Shukla, and Gabriel Rand did some part of their training at Columbia, and I couldn't be happier that they have all decided to join us as full-time faculty members. I am also delighted to welcome Kaveri Thakoor, whose Artificial Intelligence for Vision Science (AI4VS) Laboratory focuses on transforming artificial intelligence deep learning systems into teammates for ophthalmologists.

Dr. Rand joins the Westchester practice of cornea specialist George J. Florakis, MD, who after many years as a part-time faculty member has recently joined us full time as the Malcolm



P. Aldrich Professor of Ophthalmology at CUIMC and Director of Columbia Ophthalmology-Westchester. Their highly specialized practice is the choice for ophthalmologists throughout Westchester seeking referrals for complex cornea patients, and it is an essential part of our expanding hub and spoke model of care.

We are also very proud to report on recent honors for our faculty members. Chair emeritus Stanley Chang, MD, received the prestigious Seymour Milstein Distinguished Service Award, named for former New York-Presbyterian Hospital Chair and Department benefactor Seymour Milstein, while Dr. Thakoor earned the Best Paper award at a workshop on affordable AI for resource-diverse global health at an international conference on medical image computing. Several of the members of our Board of Advisors have also recently published books, which we hope you will consider adding to your reading list.

Finally, I am saddened to share the news of the death of ophthalmic technician Patrizia Isabella Ciccarello, who passed away on March 30 after a battle with cancer. She had been with the Department for many years, and was beloved by faculty, staff and patients alike. We will miss her.

The past decade has been a time of explosive growth for the Department of Ophthalmology, marked by groundbreaking research discoveries and practice-changing advances in clinical care. We have also graduated some of the nation's top young ophthalmologists, with many of our residents choosing to remain at Columbia to build their careers while others have gone on to take leadership roles at other renowned institutions.

Your support, dedication and commitment have been essential to each and every one of our accomplishments. As we move into a new era for the Eye Institute, in new facilities, we look forward to achieving even greater goals in the service of vision care, with your continued help and friendship.

Sincerely,



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

## Ophthalmology Research Enterprise Moves to New Space in Hammer Health Sciences Center

Continued from page 1

reduction in our overall square footage, the facility will accommodate our research needs, and eventually we may be able to expand and acquire additional space."

A new open floor plan will foster collaboration and creativity. "When people are in different, closed-off labs, they don't have as much opportunity to talk to one another or get to know other people in different labs," he says. "Now it's much easier to walk down the corridor and talk to someone about what they're working on. Science is all about

synergy and cooperation, and I think the new setup will stimulate advances in our research."

Laboratory space will be distributed based on current space allotments, as well as the work that is expected to be carried out over the next several years. Planning the organization of the new space and the utilization of shared equipment took several months. "We intentionally took our time, because this process is very important and we wanted it to be equitable and transparent, with all team members contributing," Dr. Zhang says.



## CLINICAL SPOTLIGHT

# Building for the Next Century: A New Chapter for the Harkness Eye Institute

In 2023, the Department of Ophthalmology begins a new chapter in its 155-year history. The historic Harkness Eye Institute building, originally completed in 1933 thanks to the generosity of philanthropist Edward S. Harkness, will be taken down to make space for a brand new building that will house state-of-the-art facilities for both ophthalmology and the Herbert Irving Comprehensive Cancer Center.

Slated for completion in 2027 and designed by noted healthcare architectural firm Ballinger, the building will include an entire floor dedicated to ophthalmology. The approximately 23,000 square feet of space on the 10<sup>th</sup> floor of the building will double the department's current footprint and accommodate 30 or more exam rooms organized in a "pod-style" layout, with four to six relatively self-contained groups of exam rooms and diagnostic space. It will also include procedure rooms, diagnostic facilities and laser suites. Dedicated eye operating rooms will be housed on a separate surgical floor.

"This brand-new Eye Institute will be designed from the ground up to accommodate our expanding department and to anticipate the needs of 21<sup>st</sup>-century cutting-edge care," says G.A. (Jack) Cioffi, MD, Jean and Richard Deems Professor, Edward S. Harkness Professor and Chairman of the Department of Ophthalmology. "We are building for the next generation. At the same time, the cherished history of the Harkness Eye Institute will be incorporated into the design."

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### VIEWPOINT

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The Department's highly ranked research enterprise will also be moving into new, purpose-built space, a modern, 12,000 square foot laboratory complex in building 2 of the Hammer Health Sciences Center. It is expected to open in August 2023 (see page 1).

Over the summer, faculty, administrative, and educational offices will move to the 18<sup>th</sup> floor of the Presbyterian Hospital building, where 10,500 square feet of renovated space will house 80 faculty members and staff, as well as a brand new ophthalmology education lab with two new microscopes and a surgical simulation unit featuring the HelpMeSee haptic-based eye surgery simulator.

"There are a lot of moving parts to this process," acknowledges Dr. Cioffi. "Departmental leadership has been working closely with hospital administration to ensure continuity and minimize disruption for our patients, students, faculty and staff."

While awaiting the completion of the new building, the majority of day-to-day clinical operations for the department will be relocated to newly remodeled sites on the CUIMC campus and will offer the same advanced equipment and patient-centered environment that our faculty, trainees, and patients associate with Columbia.

For the ColumbiaDoctors ophthalmology faculty practice, NewYork-Presbyterian Hospital is now renovating more than 7,000 square feet of clinical space on the third floor of the Vanderbilt Clinic, which will include 21 exam rooms, clinical research space, and diagnostic space. The resident clinic will also move to newly renovated clinical space on the fourth floor of Vanderbilt, with both spaces expected to open in September 2023. For pediatric ophthalmology, two additional exam rooms are being built on the fifth floor of Morgan Stanley Children's Hospital of New York.

"We are also significantly expanding our practices elsewhere in the city," says Dr. Cioffi. "We have recently doubled our space at our midtown location on the East Side, and are increasing our presence on the West Side and in Westchester County, building on our hub and spoke model of clinical care. Our core center at the Columbia University Irving Medical Center campus is the hub, and for certain aspects of our program we and our patients derive great benefit from being on campus with adjacencies to every other medical specialty and all of the medical center's facilities. In other cases, patients will prefer the convenience of our growing faculty practice spaces nearer where they live or work."

## Columbia Ophthalmology Receives Two Prestigious Grants from Research to Prevent Blindness

In December 2022, Research to Prevent Blindness (RPB) awarded two important grants to the Department of Ophthalmology. The first is an unrestricted grant to support the development and expansion of our renowned vision research program, while the second is the RPB Career Advancement Award presented to Tingting Yang, PhD, Associate Professor of Ophthalmic Science (in Ophthalmology).

First established in 2020, the career advancement award supports early- to mid-career vision researchers who have already received their first independent federal grant, the National Institutes of Health (NIH) R01, and are collecting new data to apply for a second R01—a period that has been identified as a critical gap in the funding pipeline for vision researchers.

Dr. Yang's research focuses on bestrophin proteins, a family of ion channels that play critical roles in the eye such as generating a vision-related electrical signal named "light peak" and regulating intraocular pressure. The *BEST1* gene encodes one of these proteins, which is specifically expressed in the retinal pigment epithelium (RPE), the single layer of cells at the outer surface of the retina. Mutations

in that gene are associated with a spectrum of at least five retinal degenerative diseases collectively known as bestrophinopathies. "Currently there is no treatment for any of the bestrophinopathies, and they typically result in progressive vision loss and, in some cases, blindness," Dr. Yang says.

Working with Stephen Tsang, MD, PhD, Laszlo Z. Bito Professor of Ophthalmology and Professor of Pathology & Cell Biology, Dr. Yang is collecting skin and blood cells donated by bestrophinopathy patients, and then reprogramming these cells to induced pluripotent stem cells (iPSCs) followed by differentiation to RPE cells. "Our goal is to compare RPE cells derived from wild-type donors and bestrophinopathy patients, to better understand the disease and to develop treatments," she says.

The two-year grant from RPB provides essential support at a critical time, Dr. Yang adds. "We are now at the point where we can use the patient-derived RPE cells to study bestrophinopathies in a "disease-in-a-dish" model. This award will help us move our research a step closer to developing novel gene therapies that could potentially cure bestrophinopathies."

## From Chemistry and Earthquakes to AI for Eye Disease Detection: Kaveri Thakoor, PhD

**As an undergraduate at Stanford University,** Kaveri Thakoor, PhD, was passionate about her studies in chemistry. But in the heart of Silicon Valley, at a university consistently ranked as one of the top computer science programs in the world, Dr. Thakoor also found herself increasingly intrigued by computers, algorithm development and artificial intelligence (AI). After earning her bachelor of science degree with honors in chemistry at Stanford, Dr. Thakoor earned a master's degree in computer science at the University of Southern California. Pursuing a PhD was her next step in order to fulfill her childhood dream of becoming a professor; her interdisciplinary passion for all scientific fields, inspired by her parents who are also scientists, set her on a path to explore the connections between chemistry, computers, and the human eye.

"While pursuing my computer science studies, I was also exposed to vision research and became fascinated with the field," says Dr. Thakoor, who joined the Department of Ophthalmology in September 2022 as Assistant Professor of Ophthalmic Science (in Ophthalmology) to launch the Artificial Intelligence for Vision Science Laboratory. "It was the perfect intersection of my interests in chemistry and computer science. All the way from phototransduction, a chemical process initiated when light hits the retina, to the optics of the human eye, to attempting to simulate 'sight' in computers using AI, human vision intersects with almost all fields of science!"

After completing her master's degree, Dr. Thakoor spent two years working as a research scientist with the Earthquake Early Warning team at the California Institute of Technology Seismological Laboratory. Even as she honed her algorithm development skills toward delivering early warning of ground-shaking to Southern Californians, her sights were set on earning a PhD in a vision science-related field.

She found the right program at Columbia, where along with Donald Hood, PhD, the James F. Bender Professor of Psychology and Professor of Ophthalmic Science (in Ophthalmology), and Paul Sajda, PhD,

Professor of Biomedical Engineering, Electrical Engineering, and Radiology, and Director of the Laboratory for Intelligent Imaging and Neural Computing, she was able to meld her interests in vision science and deep learning to develop computer systems that can improve detection of eye diseases such as glaucoma and age-related macular degeneration (AMD). "Meeting them enabled me to explore my passion for the synergy between deep learning, engineering, and ophthalmic science," Dr. Thakoor says.

Supported by the Graduate Research Fellowship Program (GRFP) of the National Science Foundation (NSF), she moved from California to New York to pursue her PhD in 2018. "In a sense, I had done my postdoctoral fellowship before the PhD because of all my research experience, so when I came here it was a very focused and fruitful journey," she says.

When she completed her graduate studies in 2022, with an array of prizes under her belt, including the School of Engineering's Morton B. Friedman Memorial Prize for Excellence, she was immediately offered a faculty position in the Department of Ophthalmology. "Dr. Cioffi envisioned that I could develop a program that would serve as a bridge between the engineering school and the medical school, and ophthalmology in particular," she says.

In the AI for Vision Science Laboratory, Dr. Thakoor is developing artificial intelligence and machine learning systems that can find patterns in the vast amounts of medical and scientific data available to researchers in

order to expedite the ability to detect disease. "I have a figure on my laboratory door that shows an electronic robotic hand shaking hands with a human hand," she says. "That's our passion, creating AI that will serve as a teammate to help humans better detect diseases ranging from glaucoma and AMD to amblyopia and strabismus."

Dr. Thakoor stresses three key principles for AI in vision science. "It must be robust, meaning that it can accurately detect a specific condition utilizing data collected from multiple locations, not just at Columbia but across the country and around the world," she says. "It must be interpretable, with mechanisms for decision-making that can be clearly

explained to clinicians in order to achieve trust. It must also be portable, so that it can reach populations who need it most through miniaturized optics and easily transported imaging devices."

One of the current projects in the AI for Vision Science Laboratory involves collecting eye movements from ophthalmologists while they review medical images. "Studying where doctors look within a medical image can tell us a lot about their decision-making process, and can be used to train AI systems to make them more interpretable, accurate and computationally efficient," Dr. Thakoor says. With a seed fund program grant from Columbia's Data Science Institute, the laboratory is creating an expert AI system that is guided by gaze data, which Dr. Thakoor hopes will revolutionize the field in three ways: expediting diagnosis of eye disease, training novices in good strategies to use when reviewing ocular images, and combining pattern recognition of the computer with the domain expertise of clinicians to identify novel ocular diagnostic signatures.

Dr. Thakoor is recruiting a cadre of residents, fellows and faculty across multiple subspecialties for the project. Wearing Pupil Core lightweight eye tracking glasses from Pupil Labs, which utilize miniature infrared cameras to detect where their eyes are fixating, they will review OCT reports to diagnose glaucoma, and the patterns of their eye movements will "teach" the AI systems what regions to look at. "There will be a host of other questions we can answer beyond just using the information to train AI systems, such as finding the differences in eye movement patterns between trainees and experts, which offers potential applications in medical education," she says.

In pursuit of accessible AI-assisted diagnostic tools in ophthalmology, Dr. Thakoor has also recently demonstrated an AI system that can successfully detect AMD from data collected with a small, portable, low-cost OCT device, in a project that earned the Best Paper award in a workshop on affordable AI in global health at the 2022 Medical Image Computing and Computer Assisted Interventions (MICCAI) conference in Singapore. "Our next step is embedding this AI into the portable imaging device's hardware and taking it out into the field to help the broadest populations possible," she says.

When not in the laboratory, Dr. Thakoor is a music lover who plays clarinet. "Last fall, I became involved with the CUIMC orchestra, and it's great to connect with a community of clinicians and scientists who are also musicians," she says.



Kaveri Thakoor, PhD

# “I’ve Lived Through a Revolution That’s Been So Exciting”: Stephen Trokel, MD

**Under slightly different circumstances,** renowned laser eye surgery pioneer Stephen Trokel, MD, Professor of Ophthalmology, might have instead become a noted nuclear physicist. Fortunately for the eyesight of millions of people around the world, Dr. Trokel spotted the limitations of nuclear power and chose a different career.

After completing his master’s degree in the then-novel field of radiation biology from the University of Rochester in 1956, when he was just 21 years old, Dr. Trokel stayed on at the university to take a position with the Atomic Energy Project (AEP). The AEP was a post-World War II continuation of the Manhattan Project, which produced the first atomic bombs; the goal was to pursue the peaceful use of atomic energy and nuclear materials. “I worked on a reactor and saw there was no future in electric power generated from them, because of significant problems with the disposition of fuel rods,” recalls Dr. Trokel. “Instead, I decided to return to school to study medicine.”

Dr. Trokel graduated from the University of Rochester School of Medicine in 1959 and completed a year’s internship at Montefiore Hospital. He then spent two years in the military as a commissioned officer in the US Public Health Service, assigned to the National Institutes of Health (NIH), before coming to Columbia as a special NIH fellow in 1962, and then pursuing a four-year ophthalmology residency. “Physicists for many years had been interested in the eye and how it works because it’s related to sensing the electromagnetic spectrum, so it should not be surprising that I developed a love for oph-

thalmology,” Dr. Trokel says. “Then I joined the faculty, and I’ve been here ever since.”

His initial interest lay in diagnosing eye disease using radiological imaging techniques. In 1969, well before the development of computed tomography (CT) and then magnetic resonance imaging (MRI) of the orbit, Dr. Trokel and radiologist Guy Potter, MD, developed a technique for hypocycloidal tomographic imaging of the optic canal. They sectioned orbital

models to correlate with the radiographic findings, and this technique was used throughout the country to image the optic nerve.

“I worked with what was then called the X-Ray Department, and we were the first to diagnose thyroid eye disease [also known as Graves’ disease] on the basis of vision loss, showing that it resulted from swollen muscles pressing on the optic nerve,” he says. Dr. Trokel was also the first to suggest the possibility of treating severe Graves’ disease with orbital decompression surgery in a publication in 1979, a procedure still used today for the treatment of advanced cases of thyroid eye disease.

When CT and MRI imaging became available, Dr. Trokel pioneered diagnostic advances for these technologies in orbital and neuro-ophthalmic disorders, working in collaboration with influential radiologist Sadek Hilal, MD, Professor of Radiology and Neurological Surgery. He also published an atlas of orbital imaging using these techniques.

In the early 1980s, Dr. Trokel became interested in the nascent field of laser technology. “It was incredible to see these high-powered lasers break up tissue and do precision controlled incision,” he says. “It became the basis for extracapsular cataract surgery, which has taken cataract procedures from a difficult, unsatisfying operation with a number of complications to one of the most common procedures performed in medicine.”

In 1983, Dr. Trokel and his collaborator, IBM physicist Rangaswamy Srinivasan, published a paper in the *American Journal of Ophthalmology* that would change vision science forever. They described using a laser in the far-ultraviolet wavelength to ablate corneal tissue without causing thermal injury or scarring. This discovery of the excimer laser was the beginning of the era of modern refractive surgery. That same year, Dr. Trokel received the first patents that led to the 1996 FDA approval of the excimer laser to treat mild to moderate nearsightedness.

“I’ll never forget the first time we tried surgical trimming and optical reshaping of the cornea,” he says. “Doing the laboratory work was exciting, but what was even more thrilling was working with the industrial engineers to create a system that was

reliable and would work at scale, and then seeing it come to fruition.”

Following the introduction of the excimer laser, Dr. Trokel helped develop clinical trials that led to FDA approval, and became involved in the commercial development of excimer technology for the VISX company so that physicians could safely and accurately treat their patients. The incredible precision of excimer laser for application to current refractive surgery

techniques would not be possible without Dr. Trokel’s visionary discovery and pioneering efforts. For this discovery, Dr. Trokel was elected to the Hall of Fame of the American Cataract and Refractive Surgery Society.

In more recent years, Dr. Trokel has contributed to the treatment of corneal diseases with the use of corneal collagen cross-linking techniques, working with David Paik, PhD, Associate Professor of Ophthalmic Science (in Ophthalmology), to develop photosensitizers to improve the technology. Dr. Trokel was among the first to use collagen cross-linking techniques as an adjunct to the treatment of severe corneal ulcers.



Stephen Trokel, MD

Now 88 years old, Dr. Trokel shows little interest in slowing down and still sees patients two or three days a week. “My day is made when I have an office full of patients. I never learned to play golf—maybe that’s why,” he says. “I love the intellectual challenge of sorting out the issues of people with interesting diseases. It’s fun figuring things out, but it’s even more fun helping people so that they can read more comfortably and their pain goes away. I’ll stop seeing patients when they dig a hole in the ground.”

He’s also still involved in research, studying the use of a variant of germicidal UV light for environmental sterilization. “Regular germicidal UV runs at 254 nanometers and has been used for close to 100 years for killing bugs, but it can cause irritation of the eye and sunburn and may induce skin cancer,” he explains. “Far-UVC light, which runs at 222 nanometers, also appears to kill pathogens efficiently, but does not appear to go through the skin or affect the eye. I got involved in this research to see if it is safe for eye exposure. If it is, it may be the germicidal UV of the future, as people are worried that the next COVID might be worse than the last.”

Over the course of his nearly six-decade career at Columbia, Dr. Trokel has witnessed the transformation of ophthalmic practice. “Cataract surgery has gone from something that required a week in the hospital to a total outpatient procedure that takes two hours from beginning to end,” he says. “In the old days, the results were terrible, and now they’re spectacular. There are diseases we can treat now that we wouldn’t come near earlier in my career. I’ve lived through a revolution that’s been so exciting, and it’s been a privilege to be part of it.”



L. to R.: Stanley Chang, MD, D. Jackson Coleman, MD, and Stephen Trokel, MD

## Westchester Cornea Experts Join Department of Ophthalmology Full-Time

**For more than 25 years**, residents of Westchester County have known that there is one expert to go to for complex corneal disease and corneal transplantation: George J. Florakis, MD, and his practice at 110 Brook Street in Scarsdale. Although Dr. Florakis has been affiliated with the Eye Institute as part-time faculty since the late 1980s, in June 2022 he formally became a full-time faculty member and Malcolm P. Aldrich Professor of Ophthalmology at Columbia University Irving Medical Center (CUIMC), as well as Director of Columbia Ophthalmology-Westchester. This new affiliation is part of the Department of Ophthalmology's continued initiative to increase its presence in locations beyond the Washington Heights campus, throughout Manhattan and in the suburbs.

A nationally known cornea expert, Dr. Florakis performs between 100 and 150 corneal transplants per year, with patients seeking him out not only from New York, but across the country and around the world. For eight years, he served as the chair of the Medical Advisory Board for the Eye Bank of New York, the first eye bank in the world, and still serves as a member of the board.

In 2013, Dr. Florakis became the first surgeon in the New York area to perform a Descemet membrane endothelial keratoplasty (DMEK), the most advanced form of partial corneal transplant procedure, which is used in diseases affecting the innermost, endothelial layer of the cornea. In DMEK surgery, only a single thin layer of cells is replaced, allowing for decreased rates of rejection and faster visual recovery. "It's a one-stitch operation with a 1% risk of rejection, compared with 20% using other techniques," he says. "In 95% of cases, patients are seeing significantly better within four to six weeks."

After completing his undergraduate education, medical degree, and residency training at Columbia, Dr. Florakis pursued a cornea fellowship at the University of Iowa before returning to New York City to set up his practice. "Since I grew up in Westchester, I also decided to open an office there and see patients on Saturday mornings," he says. "I rented space at 75 Brook Street, right across from where our offices are now. My mother was my secretary, and I got mailing lists from friends and from our church to help find patients."

As more and more patients from Westchester gravitated to the convenience of the Scarsdale location, the practice hours expanded to include Wednesday afternoons, and in 2000, it relocated to its current space. "I decided to make this a purely consultative practice, limited to corneal surgeries alone," says Dr. Florakis, who now divides his time evenly

between CUIMC's main campus and the Westchester location. "I don't perform cataract surgeries unless they are associated with cornea, which means that I don't compete with the local ophthalmologists, so they are happy to refer to me. I now have at least 100 referring physicians in the area, and this has become the premier cornea practice in Westchester."

In 2020, after completing his corneal fellowship at Columbia, Gabriel Rand, MD, joined Dr. Florakis' practice, which by then had 13 employees in addition to the two physicians. "It made sense at this stage of my career to formally affiliate the practice with Columbia and become full-time faculty. I've always taught medical students, residents, and fellows, so this is a natural extension for me," Dr. Florakis says. "The Department of Ophthalmology will also expand further into Westchester in 2024, as NewYork-Presbyterian Hospital has purchased a building in White Plains for an ambulatory multi-specialty center, where we will have a satellite office."

The addition of Dr. Rand, who is an Assistant Professor of Ophthalmology at Columbia, has also brought in a flow of new patients. "I have close relationships with the older practitioners, and he is instrumental in developing new referral patterns with the younger doctors in the area," Dr. Florakis says. "He's a major future player in cornea."

With an undergraduate degree in engineering from Cornell, Dr. Rand worked as an environmental engineer prior to entering medical school and completing his ophthalmology residency at the Albert Einstein College of Medicine. There, he won the Ronald M. Burde Award for Excellence in Research for his work in the application of advanced statistical methods with eye bank data. "I was always more of a people person, and I felt drawn to a scientific career that involved helping people more directly, with one-on-one contact," he says. The mentorship of Einstein cornea specialist Roy Chuck, MD, PhD, convinced Dr. Rand that cornea was the subspecialty for him.

"I interviewed for many cornea fellowships, but I was most impressed with Columbia," he says. "The faculty are all brilliant and all come



George J. Florakis, MD



Gabriel Rand, MD



Scarsdale building housing the Westchester specialized cornea practice

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# Awards

**Stanley Chang, MD**, K.K. Tse and Ku Teh Ying Professor of Ophthalmology and former Edward S. Harkness Professor and Chair of the Department of Ophthalmology, was presented with the Seymour Milstein Distinguished Service Award at a ceremony on April 4, 2023. The award, now in its fourth year, is presented annually to a senior member of the medical staff at New York-Presbyterian(NYP)/Columbia University Irving Medical Center (CUIMC) and Columbia University Vagelos College of Physicians and Surgeons (VP&S) for exceptional and longstanding service. Established by the Vivian and Seymour Milstein family, longtime and generous benefactors of the institution, the Milstein Award recognizes the excellence of our physicians and celebrates their vital role in making the Medical Center a leader in academic medicine and patient care.

“Receiving this award is particularly meaningful to me, because Mr. Milstein helped to recruit me as Chair of the Department of Ophthalmology back in 1995. He assured me that the Milstein family would support me and make sure that I was successful in my job,” Dr. Chang says. “Mr. Milstein was chairman of the hospi-



*Stanley Chang, MD*

*Above left: L. to R.: Philip Milstein, Lauren Hill, MD, MBA, SVP and COO, NewYork-Presbyterian Hospital, G.A. (Jack) Cioffi, MD, Stanley Chang, MD, Cheryl Milstein, Katrina Armstrong, MD, Dean, Vagelos College of Physicians & Surgeons*

tal’s board of directors at that time, and it is thanks in large part to his leadership that the hospital has reached the level of excellence that it has today. He recruited some outstanding physicians into clinical leadership and helped to dramatically improve the quality of care, which ultimately led to the merger with Cornell and the creation of NewYork-Presbyterian Hospital, one of the best hospitals in the country. He was instrumental in ensuring that the Columbia part of the hospital was first class.”

With characteristic modesty, Dr. Chang said that he shares the award with everyone in the Eye Institute. “I’m not able to do a good job unless everyone on the team around me does as well,” he says. “They make me a great doctor. If I need expertise from anyone in one of the other subspecialties, they are all excellent clinicians who can help me manage the most complicated patients. So all of the people at the Eye Institute deserve part of this award, because we go above and beyond to give our patients the best possible care, make them happy and do what is best for them.”

Kaveri Thakoor, Assistant Professor of Ophthalmic Science (in Ophthalmology) and Director of the Artificial Intelligence for Vision Science Laboratory, received the Best Paper award at a workshop on affordable AI for resource-diverse global health at the 2022 Medical Image Computing and Computer Assisted Interventions (MICCAI) conference in Singapore, for her paper on “Enhancing Portable OCT Image Quality via GANs for AI-Based Eye Disease Detection.” Optical coherence tomography (OCT) is widely used for detection of ophthalmic diseases, such as glaucoma, age-related macular degeneration (AMD), and diabetic retinopathy, but OCT systems are often bulky and expensive. They typically cost tens of thousands of dollars and weigh 50 pounds or more, making it difficult for OCT to be accessible in low-resource settings. Lower-cost, portable OCT systems are available, but their image quality and scanning rate are inferior. Dr. Thakoor’s paper described how she and her team used a deep learning system called generative adversarial networks (GANs) to enhance the quality of portable OCT data, thereby improving AI’s ability to detect AMD using this low-cost data. “By exhibiting proof-of-principle AI-based AMD detection even on low-quality p-OCT data, this study stimulates future work toward low-cost, portable imaging+AI systems for eye disease detection,” Dr. Thakoor wrote in the award-winning paper.



*Kaveri Thakoor, PhD, with the organizers of the MICCAI workshop where she received the Award*

## Five Rising Stars Join Clinical Faculty

Continued from page 1

"I always expected to pursue a career in the neurological sciences, perhaps neurology or neurosurgery, but then I was exposed to ophthalmology toward the end of my undergraduate medical education," he says. "It brought together the aspects of neurology that I was passionate about with exciting elements of physics, optics, and other basic sciences. I was able to observe new eye surgeries being pioneered when I was a medical student, and within a few days after that I knew ophthalmology was the field I would pursue."

During his residency, also at Western, Dr. Diaconita found himself drawn to the retina as a subspecialty. "That program is very retina-heavy, and I was seeing dozens of retina patients every day," he says. "I had heard that Columbia had an outstanding retina program, so I emailed Dr. Tezel [Tongalp H. Tezel, MD, Chang Family Professor of Ophthalmology and Director of the Vitreoretinal Service and Fellowship Program], who arranged for me to come here as a visiting resident for a couple of weeks. I liked their approach to clinic and to surgery, with a focus on pushing the envelope and surpassing current levels of excellence."

His experience as a visiting resident convinced Dr. Diaconita to apply for the two-year retina fellowship at Columbia. "While I applied to other programs as well, this was the place where I really wanted to go," he says. "I was so excited to have the opportunity to work with giants like Dr. Tezel and Dr. Chang [Stanley Chang, MD, K.K. Tse and Ku Teh Ying Professor of Ophthalmology and former Edward S. Harkness Professor and Chair of the Department of Ophthalmology]."

Dr. Diaconita had only been in New York for about six months before the COVID-19 pandemic shut the city down. "For the next 18 months, the only people I saw were my mentors and my patients. Being in that kind of bubble was definitely challenging, but many positive experiences came out of this very negative thing," he says. "I could focus intensely on patient care, because there really was nothing else you could do."

After completing his fellowship in 2021, Dr. Diaconita returned home to Canada, splitting his time between working in Ontario and just south of the US-Canadian border in Buffalo. "In Ontario, there is a real need for retina specialists, and a lot of patients waiting for referrals, with a backlog of almost a year after the pandemic," he says. "Being able to go back home and provide that care, serving the community I grew up in, was very rewarding."

Nonetheless, when a position opened at Columbia, Dr. Diaconita felt drawn to return, officially joining the Department of Ophthalmology faculty in 2022. "As a new team member, I hope that I can bring a novel perspective because I did most of my training in a different type of health-



Vlad Diaconita, MD



Aakriti Garg Shukla, MD

care system," he says. "There's a lot I hope to bring to the table, but a lot I can learn as well. I once asked another clinician how they became so successful in their career, and they said, 'Just take care of patients.' That's my main aspiration."

When he's not in the clinic or the operating room, Dr. Diaconita spends a lot of his time planning exotic trips. "Because of my medical training, I didn't get as much of a chance to travel when I was younger, so I'm very interested in visiting parts of the world that are off the beaten path, like Tierra del Fuego or the Yukon," he says. "I am also a big reader; I never leave a book-

store without buying a book and I always have multiple books on my nightstand."

### Aakriti Garg Shukla

Aakriti Garg Shukla grew up in a medical family. Her father, a cardiac electrophysiologist, is the owner of the Arizona Heart and Arrhythmia Clinic in Phoenix, and her mother is a pediatric pathologist at Phoenix Children's Hospital. "I was always pretty sure that I wanted to go into medicine if I were given a chance," she says. "I really liked every rotation I did throughout medical school and could have seen myself doing many different specialties, but what drew me to ophthalmology in particular was the ability to make a significant impact on people's lives. It's truly remarkable

how the surgeries we perform can dramatically improve the quality of life for our patients."

After earning her undergraduate degree as a Trustee and Renaissance Scholar at the University of Southern California, Dr. Shukla moved east to study medicine at Columbia Vagelos College of Physicians and Surgeons, where she was awarded a Doris Duke Clinical Research Fellowship and earned the Edith and Denton McKane Memorial Award for Outstanding Research in Ophthalmology. After completing her residency at the Harkness Eye Institute, where she served as chief resident, she moved to Baltimore for a fellowship in glaucoma at Johns Hopkins Wilmer Eye Institute, and then joined the faculty at Wills Eye Hospital in Philadelphia.

"Returning to Columbia," she says, "felt like home to me. We have such a diverse population here, and it's a pleasure to be able to care for them. Glaucoma can be a tough condition to understand, as its symptoms often don't become noticeable until the late stages of disease. It is no surprise that glaucoma can be an anxiety-provoking diagnosis. I truly enjoy speaking with patients to educate them on glaucoma, understand their concerns, and create a personalized treatment and follow-up plan together."

Dr. Shukla treats all stages of glaucoma, from suspected to advanced disease,

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## Westchester Cornea Experts Join Department of Ophthalmology Full-Time

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from different 'lineages' in the field. Dr. Florakis, because he did his fellowship in Iowa, had as his first mentor the legendary Jay Krachmer, MD. Every cornea practitioner owns a copy of his famous textbook, *Cornea, 3<sup>rd</sup> Edition*. Then Dr. Leejee Suh [Miranda Wong Tang Associate Professor of Ophthalmology and Director of the Cornea Service] was trained in the Bascom Palmer tradition, while Dr. Danielle Trief [Helen and Martin Kimmel Associate Professor of Ophthalmology] was trained by well-known cornea expert John Seedor, MD, at the New York Eye and Ear Institute. Because of that, they approach things slightly differently, which means I've learned different ways to suture and to approach transplants. I was really attracted to that variety of training and experience."

Dr. Rand also appreciates the Department of Ophthalmology's fellow clinic. "It's there to serve the local community and welcomes Medicaid patients," he says. "I was able to have my own patients and care for people in our neighborhood. Not all programs have that; in some cases the fellow in the clinic plays second fiddle to the attending doctor with the patients. I was able

to build a relationship with my patients. It's a very familial, collegial environment where people look out for one another, and I learned a tremendous amount. When Dr. Florakis asked me if I would stay and work with him, there was no question in my mind."

As a dedicated cornea practice, Dr. Florakis' and Dr. Rand's program is almost unique. "We see a concentrated population of dense corneal pathology," Dr. Rand says. "We do a lot of transplants and manage unusual corneal dystrophies and other severe corneal diseases. When people are considering cornea fellowships, sometimes we are told that cornea is a dying field, but that's completely the opposite of my experience. My wife, who is an endocrinologist and treats patients with diabetes, is flabbergasted by how many people have cornea problems. She might see 20 patients a day while I see 40 a day."

"The boutique nature of our practice is very appealing to patients," Dr. Florakis says. "Patients know us and our entire team by name, and referring doctors can easily reach us. This affords a special connection and a caring environment that we have been able to maintain as we've become fully affiliated with Columbia."



# 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.*

## The Eye Institute Building

**On May 13, 1931**, prominent New York businessman and philanthropist Edward S. Harkness wrote a letter to Dean Sage, the attorney who served as president of what was then known simply as Presbyterian Hospital.

“You have placed before me a proposition calling for the construction and operation of an Institute of Ophthalmology to be built at the Medical Center and operated by the Board of Managers of the Presbyterian Hospital,” he wrote. “You have also submitted plans for this Institute which have been prepared by Mr. James Gamble Rogers.” In the letter, Harkness agreed to donate a total of five million dollars for the construction and endowment of the proposed Eye Institute.

“Although eye hospitals had existed before, both in the United States and in Europe, this would be the first one to be integrated into a medical center,” says Stephen Trokel, MD, Professor of Ophthalmology, whose career with the department spans more than five decades.

“At the time, there was nothing up here except a baseball field,” says Stanley Chang, MD, K.K. Tse and Ku Teh Ying Professor of Ophthalmology and former Edward S. Harkness Professor and Chair of the Department of Ophthalmology. “Edward Harkness encouraged the development of the uptown campus.”

After less than two years of planning and construction, what would become known as the Edward S. Harkness Eye Institute, located on the northeast corner of Fort Washington Avenue and 165<sup>th</sup> Street, was opened for inspection by invited guests on January 10, 1933. Less than a week later, on January 16, the Institute admitted its first patient: Columbia University President Nicholas Murray Butler.

“As would be expected, the Institute was the last word in hospital planning in 1933,” wrote Maynard C. Wheeler, MD, in *The Eye Institute in New York*, a history of the institution published in 1969. Dr. Wheeler was a Clinical Professor of Ophthalmology who spent more than 30 years at Columbia before his retirement in 1973. “Probably the most dramatic innovation was the operating room with its observation dome and complete absence of windows. The new building had many elegant features: the marble walls and gold-leaf ceiling of the entrance lobby; the real wood veneer on the walls of what was soon called ‘Dr. Bruce’s waiting room’; the three oversized private rooms on the sixth floor (600, 601 and 615) with their solid mahogany furniture and ample bathrooms (with 604, the only private bathtubs in the building because eye patients are rarely allowed in them for obvious reasons).”

Just off the main entrance, the first floor of the new building held a social service

office, an admitting office, and the superintendent’s office, while the west wing was home to private offices for Institute luminaries such as Gordon M. Bruce, MD, the youngest person ever to be elected to the American Ophthalmological Association at the age of 32; corneal transplant pioneer Ramon Castroviejo, MD; and George R. “Bud” Merriam, MD, a leader in the radiation treatment of ocular tumors. The east wing of the first floor was occupied entirely by dining rooms for about the first decade, with staff and residents having one dining hall and then a larger room for nurses. “It was more like a restaurant than a hospital cafeteria,” says Dr. Trokel. “During the Depression, people were always looking for work so the Institute could hire waiters and waitresses to serve meals. People would eat three meals a day there.”

The second floor featured a large central waiting room with a hand-tinted photomural of early New York, primarily designed for Dr. Wheeler’s patients. “For many years there was a small red spot on the ceiling over the sofa in Dr. Wheeler’s office where Nicholas Murray Butler had his tension checked,” wrote Dr. Wheeler, referring to himself in the third person.

Besides a few other small offices that were occasionally used for patient work-ups by the senior residents, the remainder of the second floor was all given over to staff living quarters, with residents (single and married) in the west wing and nursing superintendents, visiting fellows, and the occasional female resident in the east wing.

“That’s why there are so many bathrooms stuck off behind the offices on the second floor today,” says Dr. Trokel. “There were little one-bedroom apartments all through the second floor on the wings.”

“The offices in the Eye Institute were rent-free until after the end of World War II,” Dr. Trokel says. “The paid practices downtown on the East Side was where what money existed at the time was. The big practices uptown, with the exception of the Institute’s director, were voluntary, so the free rent was how the Institute attracted them. The only thing you had to pay was your secretary.”

The real hospital began on the third floor, which was planned for men: a 12-bed ward in each wing, six single “semi-private” rooms along the main corridor, and a larger room at the center used primarily as a patients’ dining room. The fourth

floor, with a similar layout, accommodated women and children, while the sixth floor was designated exclusively for women. As time went on, the “ward” model went by the wayside and these spaces were replaced by semi-private and private rooms.

The fifth floor was originally designed to house nurses, but by the late 1940s space was at such a premium that it was claimed for such services as private orthoptics, research space, and the glaucoma clinic. In 1964, a little more than half of the floor was designated for a cornea clinic.

On the seventh floor, two operating windowless operating rooms were cooled by an ingenious method in the pre-air conditioning days. “...the best the architects could dream up for hot weather was to blow air over large cakes of ice, on the floor above, before forcing it into the operating rooms,” Dr. Wheeler wrote. Even as late as the 1960s, when Dr. Wheeler’s history was published, the seventh floor had been little altered, with the only major change the addition of a recovery room for six stretchers at the center of the floor and the installation of air conditioning.

On the eighth floor, space was set aside for the Institute’s large ophthalmology library and rare book collection, where it has remained until the present day.



*The Eye Institute Building*

The volumes represent the accumulated collections of numerous benefactors. The library also features the Franz Cornelius Donders collection of historical memorabilia belonging to the famous 18<sup>th</sup>-century Dutch ophthalmologist.

During the Eye Institute’s early years, this floor also held laboratories for tissue culture of the lens, physiological chemistry, microbiology and clinical pathology, and space for ophthalmic art and photography. “The Eye Institute was conceived as having all medical specialties within it: we had our own pathology department and we had our own X-ray department, located in the basement, where we used to do localization, foreign body detection, and neurologic workups,” Dr. Trokel recalls.

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# Five Rising Stars Join Clinical Faculty

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performing complex cataract surgery as well as minimally invasive glaucoma surgery (MIGS). She is also the principal investigator on a randomized controlled trial of neuroprotective treatments for glaucoma, which will enroll nearly 200 patients over the next three years. “We are investigating whether two over-the-counter supplements, nicotinamide and pyruvate, can help people with glaucoma maintain their visual function and optic nerve structure,” she says. “In our previous phase 2 study, which took place over just two months, individuals who took nicotinamide showed improvement on several visual field test locations compared with the placebo group. In the ongoing trial, we aim to be able to demonstrate improvement and maintenance of visual function over a longer period of time and in a larger cohort of participants.”

The study is based on a foundation of basic science research, which found that the mitochondria degenerate prior to optic nerve dysfunction in glaucoma. Simon John, PhD, the Robert L. Burch III Professor of Ophthalmic Science (in Ophthalmology), demonstrated that supplementation with nicotinamide inhibits mitochondrial dysfunction in a mouse model of glaucoma, preventing the development of disease.

Dr. Shukla also has a longstanding interest in optimizing glaucoma surgery, having published multiple articles on the role of blood thinners in this setting. “Especially now that our population is aging and more people are on blood thinning agents, we need to consider this fact in our surgical planning,” she says. “Newer minimally invasive procedures are sometimes a better option than conventional surgery for people who are taking these medications or have other risk factors for failure of conventional surgery.”

Her interests in the operating room also extend to sustainability and reducing surgical waste, and she leads groups in the American Academy of Ophthalmology and American Society of Cataract and Refractive Surgery on these topics. “As ophthalmologists, we have the highest clinical volumes in medicine,” she says. “This gives us the obligation and opportunity to make systems-based changes to reduce the carbon footprint of our daily practice.”

Growing up in Arizona instilled a love of the outdoors, and Dr. Shukla loves spending time in Central Park with her husband and toddler son. “On the weekends, you can almost always find me outside with my family, enjoying all that the city has to offer,” she says.

## Tony Valenzuela

Like Dr. Shukla, Tony Valenzuela earned his medical degree and completed his ophthalmology residency at Columbia, where he also served as chief resident, and then pursued his glaucoma fellowship at Johns Hopkins Wilmer Eye Institute. “I’ve been kind of following her around,” he jokes.

“I loved everything about Columbia, but I thought it would be a good idea to learn from some other people as well,” he says. “The faculty at Wilmer are amazing, and everyone is a role model for a specific reason. I feel very fortunate to have been there, but I always knew that I wanted to go back to Columbia.

Dr. Cioffi and Dr. Liebmann, who are two of my greatest mentors, invest a lot of time and energy into their trainees, making us good ophthalmologists and good surgeons, but also developing our leadership and career skills. I know no matter what path I take, I will be well taken care of, encouraged, and expected to develop as a young surgeon.”

Health equity is a major interest of Dr. Valenzuela’s. “Glaucoma is a chronic condition, like hypertension or diabetes or high cholesterol. It’s something you always have, but if it’s well controlled it shouldn’t affect you too badly. My role as a glaucoma specialist is partnering with patients to do our best to protect the vision they have so that they can do the things they want and need to do, and live independently.”

Unfortunately, glaucoma often is not diagnosed until the end stages of the disease, and patients are often unable to remain adherent to their medications or are lost to follow-up. “I saw this a

lot in Washington Heights, and in East Baltimore too: patients are diagnosed with glaucoma and then they go missing,” Dr. Valenzuela says. “Or they come in having a strong family history, with grandparents who all went blind from glaucoma, and then the grandson or granddaughter shows up in their 60s or 70s with end-stage disease. What happened? Why didn’t we find them earlier? I’m interested in working on getting their buy-in about their care, forming partnerships around social determinants of health and health literacy in order to bridge the gap between provider and patient.”

Simulation technology is another passion for Dr. Valenzuela. “Columbia has a partnership with the simulator company, HelpMeSee,” he says. “They have a cataract surgery simulator for manual small-incision procedures, which are primarily done abroad in low-resource settings. Someone who is good at that surgery can perform it within three to five minutes with minimal resources.”

He views the simulator as a key tool for improving surgical instruction and education. “The traditional ‘see one, do one, teach one’ model does not adequately prepare young surgeons and proceduralists for how to perform surgeries, how to feel comfortable in the operating or procedure room, and how to think of themselves as lifelong learners who will occasionally make mistakes,” he says. “I would like to develop better ways of teaching surgical skills across ophthalmologic subspecialties through the use of didactics, wet and dry labs, and simulation. I’m also interested in figuring out how to better assess surgical competency within ophthalmology to ensure every resident is well-trained and confident in their abilities.”

Outside of the operating and procedure rooms, Dr. Valenzuela enjoys making and listening to music and going on outdoor adventures with Otto, his German shepherd.

## Qing Wang

As an undergraduate student at Yale, majoring in biochemistry and molecular physics, Qing Wang developed an interest in neuroscience after working in a lab that studied synaptogenesis—the formation of synapses, the points of contact where information is transmitted between neurons. “We analyzed protein-protein interactions involved in synaptogenesis, which I found fascinating,” she says. “At that point, I was already interested in pursuing an MD/PhD program and a career as a clinician-scientist, and I thought that the eye provided an amazing model for understanding important questions in neuroscience.”

Dr. Wang came to Columbia to complete her MD/PhD through the Medical Science Training Program, where she worked with Carol Mason, PhD, Professor of Pathology & Cell Biology, Neuroscience, and Ophthalmic Science (in Ophthalmology). “We studied molecular programs that specify different subpopulations of retinal ganglion cells (RGCs) during the development of the eye, and their role in establishing the binocular vision pathways, which is how we have depth perception,” she says. “That work cemented my interest

in the intersection between neuroscience and ophthalmology. Glaucoma is a neurodegenerative disease of the retinal ganglion cells (RGCs), and not only is it already an area where we can do so much for patients, there is extraordinary potential for developing new treatments. It’s a very technology-driven field which is always on the cutting edge.”

After completing her MD/PhD, Dr. Wang moved to the West

Coast for 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.

In the fall of 2021, she returned to Columbia as one of two inaugural Chang-Burch Scholars and an Assistant Professor of Ophthalmology. In a Fall 2021 article on the Chang-Burch Scholars, the Viewpoint described Dr. Wang’s research on the role in glaucoma of molecular changes in astrocytes, star-shaped glial cells that normally provide support and regulation for neurons, but under certain conditions can undergo changes that cause degeneration of neurons. In neurodegenerative diseases, like glaucoma, astrocytes undergo molecular and structural changes. Dr. Wang is investigating whether these changes are protective or toxic to retinal ganglion cells—the neurons that are damaged and lost in glaucoma.

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Tony Valenzuela, MD



Qing Wang, MD, PhD



Aliaa Abdelhakim, MD, PhD

With mentor Simon John, PhD, the Robert L. Burch III Professor of Ophthalmic Science (in Ophthalmology), she is working on novel viral tools for genetically manipulating these astrocytes in a mouse model of glaucoma. “We have designed libraries to screen for the best viral vector to target the astrocytes and genetically manipulate them in an effort to change them from a neurotoxic to a neuroprotective state,” she says. “We are also trying to understand the early transcriptomic changes in optic nerve head astrocytes that occur when intraocular pressures start to rise but neurons do not show degeneration yet.” Her goal is to protect the retinal ganglion cells from damage before they are lost in human disease.

RGCs are particularly difficult to regenerate, she explains, because not only must the cells be replaced, but they must then also make very long-distance connections to targets in the brain. “After we do that in an animal model, we ultimately have to reproduce that in the context of human disease,” she says.

Dr. Wang is also working with Drs. Shukla and John on the clinical trial of nicotinamide and pyruvate in the treatment of glaucoma. “In addition to studying whether these nutritional supplements can protect patient from progression of their glaucoma disease, we will analyze patients’ blood samples to better understand how the treatment is affecting their metabolism, mitochondrial function, and oxidative stress. We also want to know what might distinguish patients who respond well from those who do not,” she says.

Dr. Wang has lived in many different environments throughout her childhood: China, Germany, California, and Texas. Having lived in New York City for eight years during her MD/PhD training, she says that the Big Apple truly feels like home now. She enjoys exploring the city’s cultural and food scenes and running along the Hudson River or in Central Park. She completed the New York City Marathon and Triathlon as a student and is working to return to that level of fitness. Outside of the city, she loves hiking with her husband in the national parks of the US and elsewhere.

### Aliaa Hamed Abdelhakim

Aliaa Hamed Abdelhakim is one of fewer than 10 physicians in the world to be dual-boarded in ophthalmology and clinical genetics. When she completed her Medical Genetics and Genomics training program at the Morgan Stanley Children’s Hospital in August 2022, while at the same time serving as an attending physician on the retina service in the Department of Ophthalmology, she joined a rarefied group of experts in both fields that includes her mentor, Irene Maumenee, MD, Professor of Ophthalmology and Director of Applied Genetics.

Along with Dr. Wang, she was one of two inaugural Chang-Burch Scholars. Prior to her medical education, Dr. Abdelhakim completed her PhD at MIT in Biochemistry and Molecular Biology and a postdoctoral fellowship in Structural and Cell Biology at Harvard Medical School/Children’s Hospital Boston. She subsequently completed her medical education at Columbia University Vagelos College of Physicians and Surgeons, where she graduated with multiple awards, including Alpha Omega Alpha and the Edith and Denton McKane Memorial Award for Outstanding Research in Ophthalmology. She stayed at Columbia to complete her ophthalmology residency followed by her first fellowship in vitreoretinal surgery, during which she was awarded the Heed Fellowship. She completed her training with a second fellowship at Columbia in Medical Genetics and Genomics, specially created with the help of clinical and molecular geneticist Wendy Chung, MD, PhD, Kennedy Family Professor of Pediatrics and Medicine, and Alejandro Iglesias, MD, Assistant Professor of Pediatrics and Director of the Inherited Metabolic Program.

Dr. Abdelhakim splits her time between clinical work caring for patients and research related to ophthalmic genetics. She is particularly interested in ophthalmic manifestations in rare syndromic genetic diseases. One of her primary projects focuses on the study of *KIF1A*-Associated Neurological Disorder (KAND), a rare, progressive neurodegenerative condition caused by pathogenic variants in the *KIF1A* gene. This gene produces a protein that is expressed in the brain and neurons, which studies suggest is essential for the function and survival of these cells. “It is typically diagnosed in childhood, and children with this condition experience neurological symptoms including seizures, diminished or exaggerated muscle tone, peripheral neuropathies and developmental delays,” she explains. “They may also have visual impairment associated with optic nerve atrophy, which is degeneration of the main neuronal conduit that carries nerve impulses from the eyes to the brain.”

Working with Dr. Chung, Dr. Abdelhakim is characterizing eye findings in these patients and how their visual disability affects their lives.

“We are mapping out the progression of the decline in vision as they go from childhood to adulthood, and documenting the percentage of patients who have different ophthalmic symptoms and manifestations in approximately 50 individuals with this disorder, which has not been done before at this scale,” she says. “If we can correlate the genotype with the severity of visual disability, we hope to understand how the *KIF1A* protein functions in the eye, with the goal of identifying some form of targeted gene therapy in the future.”

When she has time away from the clinic and the laboratory, Dr. Abdelhakim can almost always be found spending time with her seven-year-old son. “We recently went to Disney World and loved it!” she says. Whenever she can, she also tries to keep in touch with and visit her family members who live around the world, including a brother in Scotland and sister in Kenya, in-laws in Austria, and extended family in Egypt.

## IN MEMORIAM

# Patrizia Isabella Ciccarello

**Ophthalmic technician Patrizia Ciccarello**, who had worked in the Department of Ophthalmology for ten years, passed away on March 30, 2023, after a battle with ovarian cancer. Born December 4, 1970, to Gaspare and Maria Ciccarello in the Bronx, she graduated from St. Catherine’s Academy in 1988 and moved to Italy to participate in the family-run atelier business. She later returned to New York to pursue a career in ophthalmology and joined the Department in October 2011.

“Patrizia had the biggest heart and the most beautiful smile,” said a family member in an email shared with her colleagues. “She was an outgoing and friendly person, witty and fun! She was fearless and independent, yet sensitive and incredibly compassionate towards her colleagues and friends. She loved her dogs, vacations to see her distant relatives in Italy, and gardening. She was strong-willed and stubborn, but those traits defined Patrizia. They were part of who she was, and her strength undoubtedly helped her deal with life’s challenges.”



Patrizia Isabella Ciccarello

Colleagues agreed, saying of Pat, “She was full of life and could make anyone smile. Pat was the sunshine that lit up the rainiest day.”

We extend our deepest condolences to Pat’s family and loved ones.

## The Eye Institute Building

*Continued from page 9*

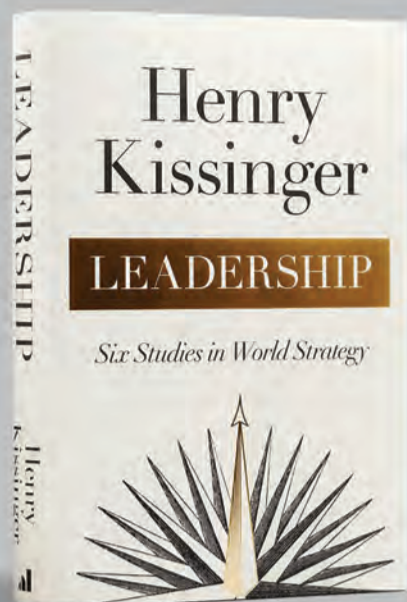
Space limitations did not allow for much research to take place in the original Eye Institute building—although Charles Campbell, MD, director of the Knapp Memorial Library of Physiological Optics, did his research on the 9<sup>th</sup> floor, where renowned retinal specialist Francis L’Esperance, MD, Clinical Professor of Ophthalmology, later used some space in the west wing for his investigation of the argon laser in the 1960s. Between 1933 and 1963, most laboratories were housed in the 7<sup>th</sup> floor of the P&S Building, after which they briefly moved to the 15<sup>th</sup> floor of the Black Building.

In the 1960s, Department Chair A. Gerard DeVoe, MD, arranged a donation from the Commonwealth Fund, which had been entrusted with the bulk of the Harkness charitable trusts, to finance the construction of a separate research building adjoining the Eye Institute. The research annex opened in 1969.

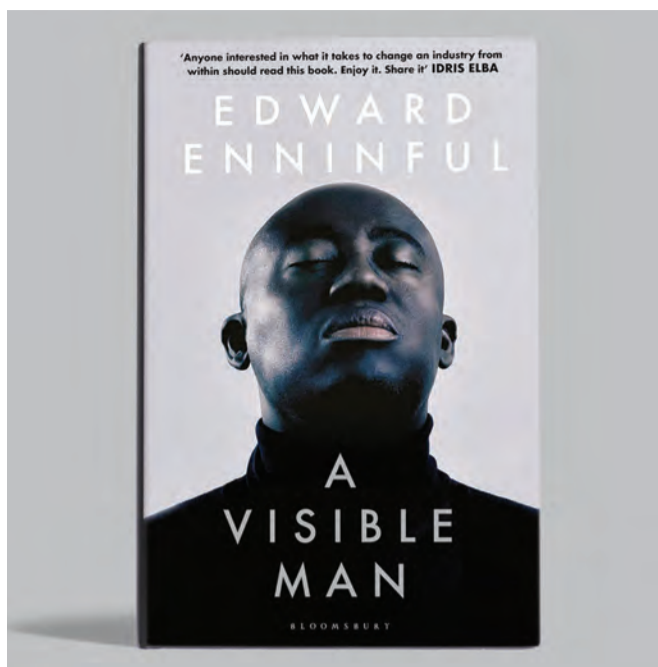
Unfortunately, during the 1960s and 1970s, the building fell into some disrepair. “When I arrived in 1995, no real renovations had been done for probably 20 years,” recalls Dr. Chang. “As the Eye Institute changed from an eye hospital to an ambulatory surgery center where surgery was performed and patients went home, a lot of the rooms that had been inpatient rooms became used for various temporary purposes. When Seymour Milstein became chair of the board, he took charge and raised funds to support a major renovation of the operating rooms and the practice spaces in the mid-1990s, which helped to revitalize the department and bring it to the standing that it has today.”

“The Harkness Eye Institute really set the standard for American ophthalmology programs,” says Dr. Trokel. “Many other eye institutes followed in our path.”

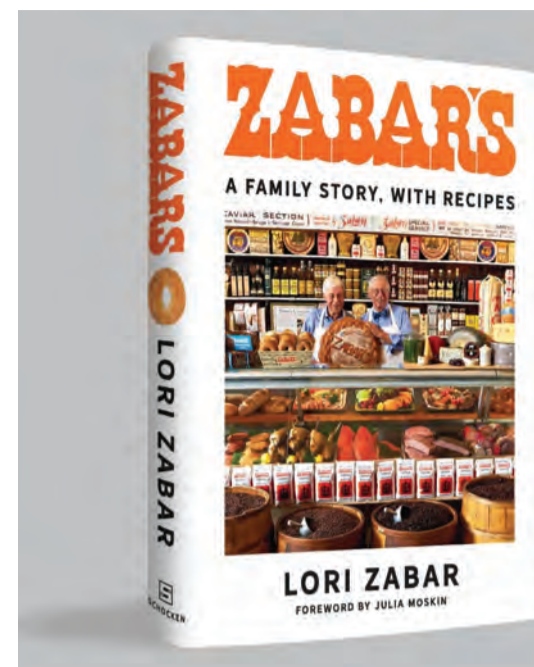
# Literary Leaders



*Leadership: Six Studies in World Strategy*



*A Visible Man*



*Zabar's: A Family Story, with Recipes*

**Three prominent members** of the Eye Institute's Board of Advisors have recently published books deserving of a place on your shelves.

*Leadership: Six Studies in World Strategy* is the latest book from former Secretary of State Henry Kissinger, a supporter of our program for decades. This *New York Times* bestseller analyzes the lives of six world leaders through their strategies of statecraft: Germany's Konrad Adenauer, France's Charles de Gaulle, the US' Richard Nixon, Egypt's Anwar Sadat, Singapore's Lee Kuan Yew, and Britain's Margaret Thatcher.

One of our newest board members, Edward Enninful, has published *A Visible Man*, a memoir of his life in the media and fashion worlds and his career as the first Black editor-in-chief of British

*Vogue*. Beginning with his childhood in Ghana and his teen years as a model in London, the insightful and deeply personal book traces Enninful's rise to become one of fashion's most influential changemakers.

Historian Lori Zabar, daughter of longstanding board member Stanley Zabar and his wife Judith and granddaughter of Louis and Lilian Zabar, who founded the upper West Side gourmet food emporium Zabar's, shared her family legacy in *Zabar's: A Family Story, with Recipes*. The book describes her grandparents' roots in Ukraine, where they were known as the Zabarkas, and their journey to New York, where they first established their Jewish-style food store in 1934. The book includes family photos, tales of the famous staples sold at Zabar's, and treasured recipes. Ms. Zabar passed away in February 2022 after a five-year battle with cancer.

## 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*

# Viewpoint

 **COLUMBIA**  
COLUMBIA UNIVERSITY  
IRVING MEDICAL CENTER

Department of Ophthalmology/Edward S. Harkness Eye Institute  
Presbyterian Hospital Building, 18th Floor  
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