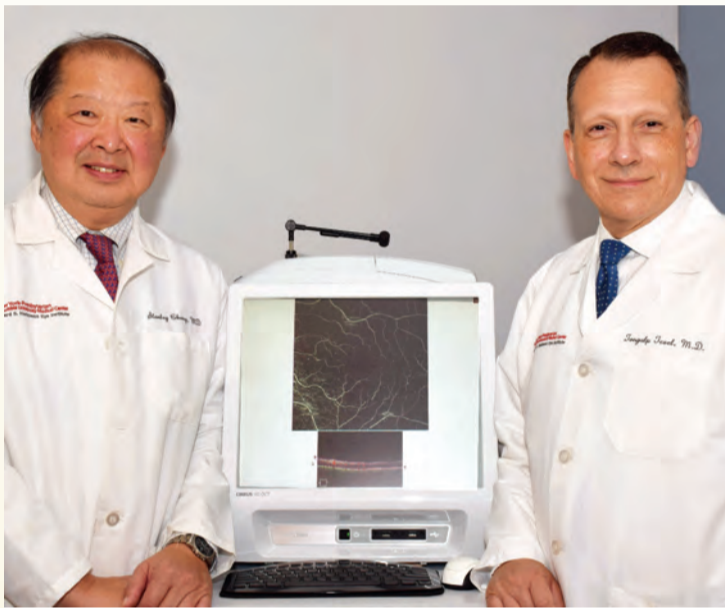




A New Chapter for the Retina Division: Reorganization, Collaboration, and Cutting-Edge Science

Under the aegis of Tongalp H. Tezel, M.D., the Retina Division is flourishing. As Director of the Division, Dr. Tezel has implemented various structural, professional, and educational changes that reflect the Division's steadfast dedication to its faculty, residents, fellows, and patients. The Division's current clinical care initiatives and new, innovative centers of excellence for research and patient treatment will maintain Columbia Ophthalmology's reputation as a leader in retina science for the foreseeable future, and may even make retinal disease a thing of the past.



From left to right: Stanley Chang, M.D. and Tongalp H. Tezel, M.D., Director of the Retina Division

The Retina Division consists of world-known clinicians, clinician-scientists, and research scientists with a long-standing tradition of excellence (*for more information about the Retina Division's scientists, please see the article on page 4*). On the clinical side, there are ten clinicians, six of whom are vitreoretinal surgeons and four of whom are medical retina specialists. The Division's retina specialists staff all three Columbia Ophthalmology locations in New York City, from the Harkness Eye Institute in Washington Heights to the Gloria and Louis Flanzer Vision Care Center in midtown to the Robert Burch Family Eye Center near Lincoln Center. The Division treats over

20,000 patients a year, with many coming from countries across the globe. The medical retina specialists are Srilaxmi Bearely, M.D., M.H.S., Assistant Professor of Ophthalmology; D. Jackson Coleman, M.D., Professor of Ophthalmology; Stephen Tsang, M.D., Ph.D., the Laszlo Z. Bito Associate Professor of Ophthalmology and Pathology & Cell Biology; and Thomas E. Flynn, M.D., Clinical Professor of Ophthalmology. These clinicians work on issues as far ranging as macular degeneration, diabetic eye disease, retinal vascular occlusions, ocular imaging research, ultrasound diagnostic technologies, and hereditary retinal diseases, such as retinitis pigmentosa and Marfan's syndrome.

The retinal surgical unit includes Dr. Tezel, the Chang Family Professor of Ophthalmology; Stanley Chang, M.D., former Chairman of the Department and the K. K. Tse and Ku Teh Ying Professor of Ophthalmology; Jonathan Chang, M.D., Assistant Professor of Ophthalmology; Royce W. S. Chen, M.D., Assistant Professor of Ophthalmology; Jason Horowitz, M.D., Assistant Professor of

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Endre A. Balazs, M.D.



Clinical Care in the 21st Century

In recent years, ophthalmology and optometry have seen tremendous advances in their application of imaging technologies. These technologies allow ophthalmologists and optometrists to visualize and map the microscopy of the eye in ways never before imagined. One benefit of these changes is that optometric and ophthalmic care have become more closely intertwined. Karina Conlin, O.D., F.A.A.O. and Luz Amaro-Quireza, O.D., Instructors in Optometric Science, comment that these new



Luz Amaro-Quireza, O.D.



Karina Conlin, O.D., F.A.A.O.

technologies have vastly improved the quality and modalities of care for patients.

According to Dr. Amaro-Quireza, "The most important effect of these new technologies is how they preserve 'the gift of sight' and impact the quality of a patient's life so profoundly. What we see and how we see determines the course of our lives." Dr. Conlin agrees that the ability to use these emergent technologies enables optometrists to better diagnose and monitor ocular health. "At Columbia, we have access to advanced technologies that assist in the diagnosis and monitoring of vision conditions, helping to ensure our patients' quality of life."

These new technologies encouraged Dr. Conlin, a corneal expert, to join the Department. "With these advances, our corneal specialists are now able to diagnose and treat complicated corneal diseases

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Dear Friends,

In this issue of *Viewpoint*, we focus on and celebrate the many achievements of the Retina Division of Columbia Ophthalmology. The outstanding work of this Division has made our Department a premier site for the treatment of retinal diseases and disorders. In addition to exploring our clinicians' and scientists' contributions to retinal science, this issue also emphasizes the collaborative work of the research and clinical sides of the Department.

Three new professorship incumbents were recently named within the Department: Jeffrey M. Liebmann, M.D., F.A.C.S. as the Shirlee and Bernard Brown Professor of Ophthalmology; Leejee H. Suh, M.D. as the Miranda Wong Tang Associate Professor of Ophthalmology; and Tongalp H. Tezel, M.D. as the Chang Family Professor of Ophthalmology.



In recent years, medicine has undergone many changes in the way it understands, assesses, and treats disease. Ophthalmology, in particular, has grown its knowledge exponentially through the introduction of cutting-edge technologies, which allow us to probe further into vision science than ever before. Our two optometric specialists at Columbia Ophthalmology, Luz Amaro-Quireza, O.D. and Karina Conlin, O.D., F.A.A.O., utilize promising new technologies on an everyday basis to help develop and augment our excellent optometry practice in the Department.

We recently expanded our electroretinography (ERG) service to five days per week to accommodate our increased patient volume. Columbia is the only medical center in New York City that offers a full ERG service. This technique of observing the retina has expanded our methods of diagnosing and treating retinal diseases and disorders.

Our retina clinicians and scientists have been involved in investigations concerning diseases such as age-related macular degeneration (AMD), retinitis pigmentosa, and Stargardt disease. With Dr. Tezel as Director of the Retina Division and Rando Allikmets, Ph.D. heading the Research Division, these clinical and research-based projects are in capable hands. Both directors have stressed the value of collaboration between the two sides of the Department, and these interactions have led to remarkable discoveries and ventures at Columbia Ophthalmology.

James Auran, M.D. was recently appointed Chief of Ophthalmology at Harlem Hospital Center (HHC). This position augments the already growing partnership between our respective ophthalmology departments. Dr. Auran will oversee all administrative functions of the department, develop new and innovative strategies for increasing patient volume and flow, and direct the residency rotation program.

Finally, we note the passing of Endre A. Balazs, M.D., a former Professor at Columbia Ophthalmology. His medical career lasted for over 70 years during which he pioneered the use of hyaluronic acid, a highly elastic substance, during cataract surgery. He will be missed.

We are indebted to all of you for your dedication to our work and your concern for those we serve. I extend my many thanks for your continued support in our effort to fight vision diseases and disorders at Columbia Ophthalmology.

Sincerely,

A handwritten signature in blue ink that reads "Jack Cioffi". The signature is fluid and cursive.

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

Clinical Care in the 21st Century *continued from page 1*

by performing corneal transplants and using corneal cross-linking therapy." After undergoing these treatments, many patients require custom contact lens fittings for additional comfort and relief. This area is one of Dr. Conlin's specialties. She fits patients with custom-made scleral lenses, or large contact lenses that create a tear-filled vault over the cornea. Scleral contact lenses are designed to treat a variety of eye conditions, many of which do not respond to other forms of treatment.

Dr. Conlin, who majored in Dietetics as an undergraduate, has always been intrigued by how nutritional deficiencies can impact a person's vision. Therefore, she approaches vision care with a keen eye towards a patient's overall health. "Many vision diseases and disorders emerge from systemic health problems," she states. "I appreciate the fact that I can combine my work in dietetics and optometry to diagnose, monitor, and suggest treatments for my patients."

Dr. Conlin received her B.S. from the University of Madison-Wisconsin and her O.D. at the Illinois College of Optometry in Chicago. She completed rotations at the Illinois Eye Institute and the

Veterans Affairs Southern Nevada Health Care System, among other locations. She later served as Instructor at the Bascom Palmer Eye Institute and the Illinois College of Optometry.

Dr. Amaro-Quireza's specialties include the diagnosis and treatment of amblyopia (lazy eye), astigmatism, hypermetropia (farsightedness) and myopia (nearsightedness), and anterior segment diseases such as dry eye, conjunctival diseases, and ocular allergies. She also specializes in electroretinography recordings, or ERGs, which measure and analyze retinal and optic nerve function (*For more information, please see the article on the ERG service on page 3*). She is particularly fond of interacting with infants and young children while administering the tests. A native of Spain, Dr. Amaro-Quireza muses, "My 'Spanish lullabies' work very well on the babies and toddlers, keeping them calm for the duration of the ERG."

Her work in optometry also inspired a passion for humanitarian causes. "A lack of access to proper vision care creates socioeconomic divides here and around the world. I have always wanted to help those who were not as fortunate as I was." About

ten years ago, Dr. Amaro-Quireza joined The Salvadoran Association for Rural Health. She has volunteered multiple times to travel to El Salvador and help individuals living in remote and poor, rural areas who do not have access to vision care.

Dr. Amaro-Quireza completed her undergraduate work at the Universidad Complutense de Madrid in Optometry and her Master's Degree in Optometry at the Center for International Optometry. She received her O.D. from the New England College of Optometry. Afterward, she completed an internship at Moorfields Hospital in London at the ERG service, and served as an Optometrist at the New England Eye Center of Tufts University and the Bronx Lebanon Hospital Center.

Given the significant advancements in recent years, Drs. Amaro-Quireza and Conlin are excited about future developments in optometric science. "At Columbia, we have so many dynamic technologies already; it makes me imagine what new ones will emerge as my time here progresses," states Dr. Conlin.

Clinical Spotlight:

Columbia Ophthalmology Expands Its ERG Service

Columbia Ophthalmology recently expanded its electroretinography (ERG) service by adding several more days of testing per week. The service provides state-of-the-art tests designed to diagnose and monitor a variety of hereditary retinal disorders. Many academic medical centers along the east coast regularly refer their patients to Columbia's tertiary ERG service.

Stephen Tsang, M.D., Ph.D., the Laszlo Z. Bitó Associate Professor of Ophthalmology and Pathology & Cell Biology, and Vivienne Greenstein,

Ph.D., Professor of Electrophysiology and Ophthalmology, jointly oversee Columbia's ERG Service. Luz Amaro-Quireza, O.D., Instructor in Optometric Sciences, administers the ERG recordings (Please

clinicians to identify a particular disease's characteristics and its rate of progression, as well as monitor any gene therapy treatments intended to slow down the progression of the disease. Some of the retinal diseases and disorders ERGs can detect are Best

disease, Stargardt disease, retinitis pigmentosa, cone dystrophies, and choroideremia.

Dr. Greenstein notes that diseases of the retina can often go undetected until serious vision problems develop, which is why ERGs are essential tests. According to Dr. Tsang, "ERGs are important mainstays of ophthalmic testing because they provide an objective measure of visual function in each eye." While other forms of visual field testing rely on the subjective responses that patients give, ERGs provide information about the actual state of the retina.

Columbia Ophthalmology offers a variety of ERGs. The full-field ERG measures the electrical response of the eye's light sensitive cells in the retina and



Vivienne E. Greenstein, Ph.D.

diagnoses night blindness, color vision disorders, hereditary retinal disorders, and inflammatory disorders. Often, these ocular diseases cannot be diagnosed during routine examinations, and require additional studies for an ophthalmologist to determine the correct diagnosis. The full-field ERG helps determine the extent of overall damage to the retina and its layers.

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VIEWPOINT

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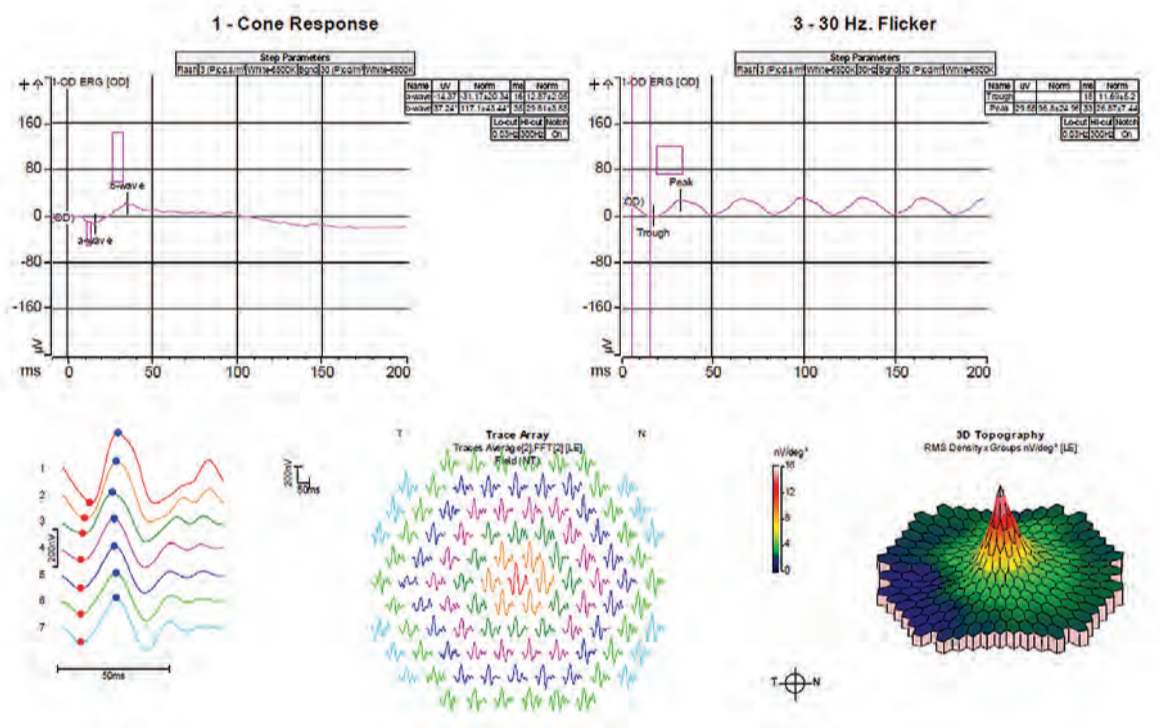
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Top row: Full-field ERG traces; Bottom: Multifocal ERG recording of the macula in a patient

see "Clinical Care in the 21st Century" on page 1 for more about

Dr. Amaro-Quireza). Winston Lee, M.A., Assistant Research

Coordinator, recruits patients for ERGs who have genetic retinal conditions.

The ERG service relies on the collaborative work of all three clinicians and the analytic work of Mr. Lee. Each faculty member contributes to the service through data acquisition, interpretation, or research. Mr. Lee states, "This collaboration makes our service stand out among other medical centers around the country." For each ERG that is administered, the ERG team collects and analyses the results of the recordings. ERGs allow

Another test is the visual evoked potential (VEP), which measures the electrical response of the visual cortex, the part of the brain that turns nerve impulses into vision. This helps physicians evaluate how well the entire visual system is working, from the cornea at the front of the eye to the visual

cortex at the back of the brain. The pattern ERG (PERG) evaluates retinal ganglion cell activity and is used to detect diseases that affect the optic nerve. The electrooculogram, or EOG, measures the health of the retinal pigment epithelium – the outermost layer of the retina – by observing changes in the resting potential of the eye. EOGs are often used in the diagnosis of Best disease, an inherited form of macular degeneration.

Although these types of ERG are generally reliable, they have shortcomings as well. One limitation of the full-field ERG is that it measures the electrical activity of the entire retina. Therefore, unless at least 20% of the retina is affected by disease, full-field ERG results can appear normal. Dr. Greenstein explains, "A legally blind person with a retinal disease that affects just the macula will have normal full-field-ERG results. Therefore, the most important development in the field of electrophysiology in recent years is the multifocal ERG recording system."

These advanced tests can map very small areas of retinal dysfunction. The multi-focal ERG, or mfERG, assesses retinal health by recording from up to a 100 or more small retinal areas simultaneously in less than 10 minutes per eye. For this reason, the mfERG is the



Stephen Tsang, M.D., Ph.D.

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Columbia Ophthalmology's Research Division: Breaking New Ground with Retinal Diseases

The Research Division of Columbia Ophthalmology is a thriving group of scientists and researchers. The Division is comprised of 15 scientists, 12 of whom conduct research in their own basic laboratories. Their research spans a wide range of ophthalmic foci: from eye genetics to adaptive optics; from cell culture systems to animal models; from biochemistry to statistical data analysis.

What distinguishes the Division from

those of other academic medical centers is the collaborative approach to research that sustains much of the work conducted here. Since becoming Director of the Research Division in 2004, Rando Allikmets, Ph.D. has encouraged the integration of clinical and scientific research. "We have excellent relationships that exist between the clinical and research sides of the Department. Our retinal genetics programs, which explore retinal diseases such as age-related macular degeneration (AMD), Stargardt disease, and retinitis pigmentosa (RP), is heavily reliant on these extensive collaborations," Dr. Allikmets states. These three retinal diseases are among the many that Columbia's scientists study, and allow for some of the most fruitful collaborations among the Division's scientists.

Janet Sparrow, Ph.D., the Anthony Donn Professor of Ophthalmology and Pathology & Cell Biology, researches the relationship between lipofuscin (a yellow-brown pigment) and retinal pigment epithelium (RPE) cells in AMD, RP, and Stargardt disease. Her use of novel imaging technologies has been particularly successful in measuring RPE lipofuscin in these and other diseases. With the development and broad implementation of imaging methods, it is now easier to diagnose and image retinal diseases such as AMD, Stargardt, and RP.

"Previously," Dr. Sparrow comments, "we could diagnose patients with these diseases, but now we are able to quantify features of the retina



Rando Allikmets, Ph.D., Director of the Research Division



Janet Sparrow, Ph.D.



Konstantin (Kosta) Petrukhin, Ph.D.

in vivo. We can monitor and document much more precisely how a disease progresses."

Associate Professor of Ophthalmology Konstantin (Kosta) Petrukhin, Ph.D. also conducts research on RPE cells. His research evaluates the efficacy of small molecule drugs in slowing the accumulation of lipofuscin and reducing the formation of A2E, a major component of RPE lipofuscin. Through small molecule therapies, RPE and photoreceptor cells can survive longer in patients with AMD and Stargardt disease. Drs. Sparrow and Petrukhin's collaboration within the Department have helped make Columbia University a leader in retinal research.

In order for Columbia Ophthalmology's scientists to conduct their studies, they require test subjects. To gain access to subjects for genetic analysis, intensive research, and clinical trials, researchers depend on clinicians for the evaluation, referral, and enrollment of patients into research studies. After assessing a patient, a clinician will determine whether the patient is a candidate for research into a certain disease. The clinician will then refer the patient for further testing and enroll them in a specific study.

Stephen Tsang, M.D., Ph.D., the Laszlo T. Bito Associate Professor of Ophthalmology and Pathology & Cell Biology, has been vital in the process of identifying and enrolling patients

into research projects focused on Stargardt disease and RP. Stanley Chang, M.D., the K.K. Tse and Ku Teh Ying Professor of Ophthalmology, Srilaxmi Bearely, M.D., M.H.S., Assistant Professor of Ophthalmology, and John Merriam, M.D., Clinical Professor of Ophthalmology, have identified and referred numerous patients for AMD studies, and have helped Columbia scientists identify many of the disease's clinical characteristics.

"In recent years, these collaborations among clinicians have allowed our scientists to learn more about the genetics of retinal disease," remarks Dr. Allikmets. Many genes, genetic variations, and mutations have been discovered at Columbia Ophthalmology for AMD, RP, and Stargardt disease through these cooperative efforts.

But clinical referrals only go so far. Vivienne Greenstein, Ph.D., Professor of Ophthalmology, and Donald Hood, Ph.D., the James F. Bender Professor of Psychology and Ophthalmology, have been crucial in mapping out the clinical terrain of these three retinal diseases with advanced imaging methods such as optical coherence tomography (OCT) and microperimetry. Through these joint efforts, Columbia Ophthalmology has been on the forefront

of retinal research for a very long time.

Data analysis has emerged as one of the most important aspects of research. In order to analyze and interpret large quantities of genetic data, collaboration is key. But for Dr. Allikmets, these partnerships should also include interdepartmental and interinstitutional

studies. "You must be involved in large collaborative efforts, not just between clinicians and geneticists, but also among geneticists nationally and internationally," says Dr. Allikmets. One such coalition is the International AMD Consortium (IAMDC), comprised of over 30 genetic centers from around the world which merge their respective data on AMD genetics. From this undertaking, IAMDC scientists were able to identify the rare genetic variants that increase an individual's susceptibility to AMD. Contributing scientists from Columbia Ophthalmology included Drs. Allikmets, Chang, and Merriam.

The Research Division's various programs have been extremely well-funded in recent years through the National Institutes of Health (NIH) and the National Eye Institute (NEI). Dr. Allikmets ranks fourth in the nation for individual NIH funding. The Division's productivity this year has led to over \$7 million in NIH grant funding.

More recently, the Division has been expanding its research into corneal diseases, myopia, ocular development, drug development, and glaucoma. Under the leadership of Dr. Allikmets, Columbia Ophthalmology's Research Division will further enhance its innovative and cutting-edge research projects and continue to excel. "It has been and will continue to be a real privilege working alongside this group of excellent scientists," says Dr. Allikmets. ■

Named Professorships at Columbia Ophthalmology

Three new professorship incumbents have been named within the Department of Ophthalmology.

The Shirlee and Bernard Brown Professorship of Ophthalmology was bestowed upon **Jeffrey M. Liebmann, M.D., F.A.C.S.**, Professor of Ophthalmology. Dr. Liebmann is Vice-Chairman of the Department and Director of the Glaucoma Service.

The Miranda Wong Tang Professorship of Ophthalmology was awarded to **Leejee H. Suh, M.D.**, Associate Professor of Ophthalmology. The second incumbent in the Chair, Dr. Suh is Director of the Refractive Surgery Service and Director of the Cornea Fellowship Program.

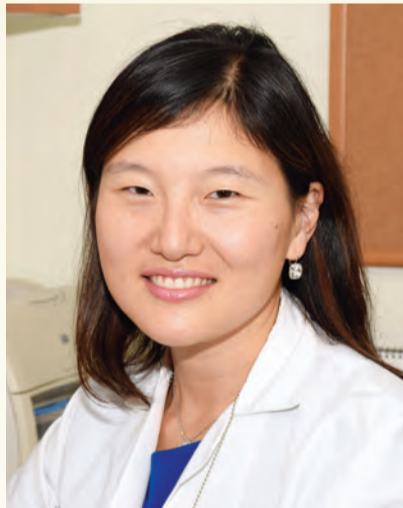
The recently established Chang Family Professorship of Ophthalmology was bestowed upon **Tongalp H. Tezel, M.D.**, Professor of Ophthalmology, the first incumbent in the professorship. Dr. Tezel is Director of the Retina Division.



Jeffrey M. Liebmann, M.D., F.A.C.S.



Tongalp H. Tezel, M.D.



Leejee H. Suh, M.D.

Columbia Ophthalmology Expands Its ERG Service *continued from page 3*

most useful ERG in diagnosing a patient who has poor central vision, but an otherwise healthy looking retina. The multifocal VEP, or mfVEP, is a way to obtain VEP responses from different parts of the visual field. The mfVEP can record up to 60 different responses from the visual field. It is a very useful test for diagnosing patients with optic neuritis or multiple sclerosis, and evaluating patients with unreliable or questionable visual fields.

The expansion of the ERG service is one way that Columbia Ophthalmology maintains a competitive edge over other academic medical centers. By evaluating the retina and its cells through ERGs, Columbia's clinicians and scientists are now able to detect rare and degenerative retinal diseases that were previously difficult to diagnose. With increasingly more patients referred to our highly specialized ERG service, Columbia Ophthalmology will continue to be a premier site for ERG service throughout the tri-state area. ■

Honors & Announcements

Ilyas Washington, Ph.D. Honored at Bard College

On May 23, 2015, Bard College in Annandale-on-Hudson held its 150th Commencement and honored its graduates and distinguished alumni. Ilyas Washington, Ph.D., Assistant Professor of Ophthalmology and a Bard College graduate, was awarded the John and Samuel Bard Award in Medicine and Science. This award goes to an alumnus who has achieved great success in the pursuit of knowledge in medical science.

Kathleen C. Oktavec, M.D. receives Gold Humanism Honor Society Award

On November 23, 2015, Kathleen C. Oktavec, M.D., Chief Resident in the Department of Ophthalmology, was selected by her peers for induction into the Gold Humanism Honor Society (GHHS). The mission of the GHHS is to recognize individuals who are exemplars of humanistic patient care and who serve as role models, mentors, and leaders in medicine.

Columbia Ophthalmology in the News

Stephen Trokel, M.D., Professor of Ophthalmology, and Stephen Tsang, M.D., Ph.D., the Laszlo Z. Bito Associate Professor of Ophthalmology and Pathology & Cell Biology, were recently featured on a CBS news segment regarding a case of a young man whose vision was marred by a black spot in his visual field. He visited several doctors who were convinced he had a rare form of macular degeneration. Upon examination, Dr. Tsang disagreed, concluding that the burn marks on the adolescent's retina represented damage sustained from powerful hand-held lasers. Dr. Tsang and Dr. Trokel stated that they had previously observed the same laser burn damage in five other patients. The young man's retina has partially healed and he has recovered some of his previously compromised sight.

Advances in ATF6 Gene Mutations and Achromatopsia

Our clinician-scientists at CUMC have made a remarkable finding concerning a vision disorder called achromatopsia. Achromatopsia is an inherited childhood disorder marked by photosensitivity, color blindness, uncontrolled eye movements, and impaired vision. It is a blinding disease affecting approximately 10,000 Americans. Stephen Tsang, M.D., Ph.D., among other collaborating scientists, has discovered that specific mutations to a gene called ATF6A can cause achromatopsia. Researchers have hypothesized that these mutations to the ATF6A gene, which controls the build-up of protein within the eye, might actually be reversible.

Discovery of Gene that Causes Myopia in Children

Andrei Tkatchenko, M.D., Ph.D., Associate Professor of Ophthalmology and Pathology & Cell Biology and the Acquavella Scholar, and his team of researchers have discovered a gene – APLP2 – that causes myopia in adolescents who spent extended periods of time engaging in “nearwork” such as reading during childhood. The high-risk variant of the gene is five times more likely to cause myopia in children who read more than one hour per day. Children who carried the high-risk variant, but engaged in very little reading, did not demonstrate any additional risk of developing myopia. This scientific breakthrough illuminates the ways in which genes and environmental factors collude in developing certain ophthalmic conditions. Dr. Tkatchenko and his team are currently working to elucidate how the genetic variation of the APLP2 gene increases the risk for myopia, and the possibility of a gene-specific therapy to reverse these effects could be possible in the years to come.

Annual Columbia Ophthalmology AAO Alumni Association Event

The Department of Ophthalmology held its 2015 Edward S. Harkness Alumni Association cocktail reception during the 2015 AAO meeting in Las Vegas on November 15. The annual alumni event honors the tradition of fostering faculty and alumni relations. The event was well attended by alumni, sharing their experiences and learning about the Department's new and current activities.

Faculty Spotlight:

Rando Allikmets, Ph.D.: Eye-to-Eye with the Director of the Research Division

An internationally renowned scientist and the Director of the Research Division, Rando Allikmets, Ph.D. has been instrumental in efforts to identify and understand the genetic basis of several debilitating and potentially blinding retinal diseases and disorders. As the William and Donna Acquavella Professor of Ophthalmology and Pathology & Cell Biology, he oversees the Laboratory of Molecular Genetics within the Research Division. He has been working at Columbia Ophthalmology since 1999, and directing the Research Division since 2004.

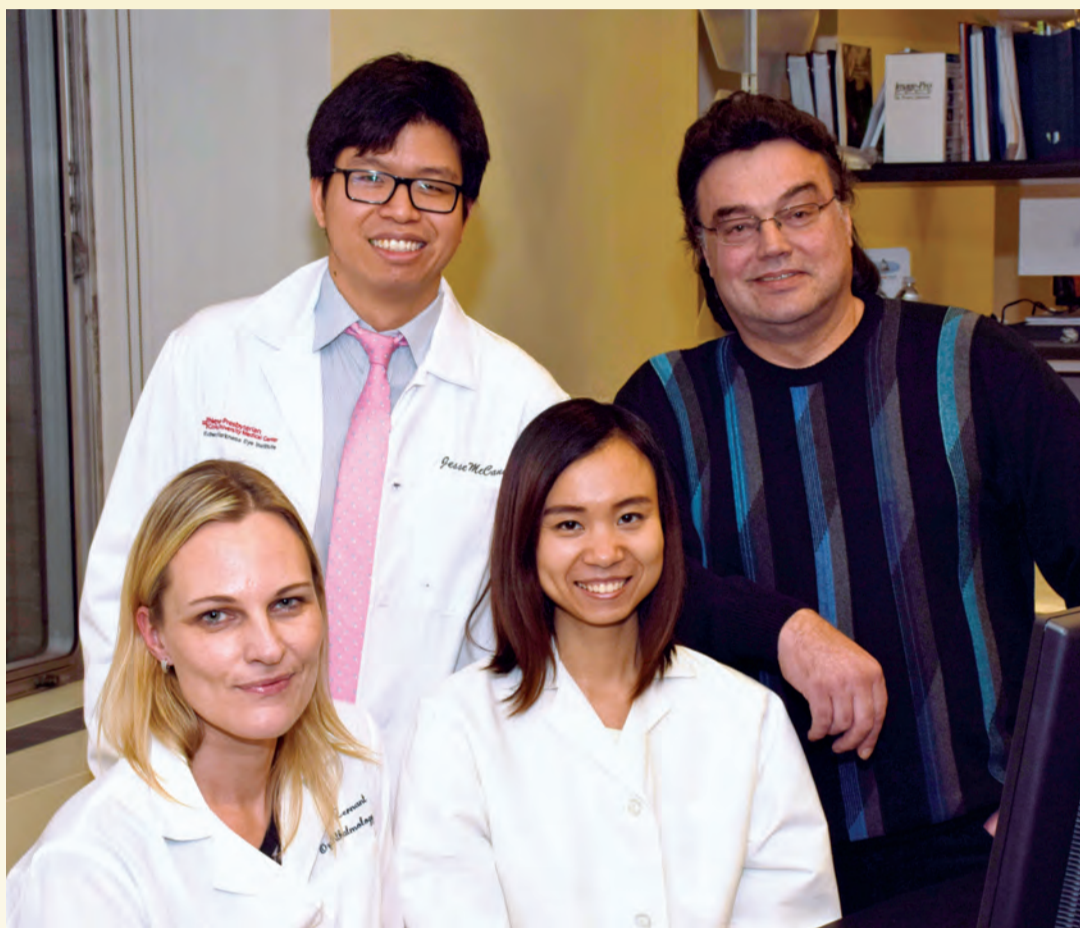
Much of Dr. Allikmets's research has focused on genetic studies of both Mendelian (or rare, single gene diseases) and more complex eye diseases, including Stargardt disease, age-related macular degeneration (AMD), and macular telangiectasia. In 1997, while working as a molecular biologist and gene researcher at the National Institutes of Health (NIH), Dr. Allikmets first discovered that mutations that occur in the ABCA4 gene cause Stargardt disease, an inherited form of juvenile macular degeneration. The disease affects the macula, the oval-shaped area near the center of the retina responsible for producing fine-tuned and sharp, central vision. It can result in the loss of vision within the central visual field, making activities such as driving, reading, and walking extremely difficult.

Dr. Allikmets's work on AMD has also been groundbreaking. He discovered that some ABCA4 mutations that cause Stargardt disease also increase one's chance of getting AMD, a vision disorder in the elderly that impairs the central visual field. After arriving at Columbia, Dr. Allikmets worked alongside Stanley Chang, M.D. and other clinician-scientists, further exploring the genetics of AMD. These studies resulted in the discovery of major AMD genes from 2005 through 2006.

Over the last few years, Dr. Allikmets has been involved in several large consortia that are attempting to unravel the genetic basis of a number of retinal diseases. One of these is The MacTel Project, where Dr. Allikmets serves as the main geneticist for the project's Laboratory Research Group. The initiative pools resources from scientists around the world to help ascertain the origins of a vision disorder called Macular Telangiectasia type II or MacTel, a relatively rare retinal disorder affecting the macula's vasculature. He is one of the founders of a National Eye Institute (NEI) organization called eyeGENE, which provides patients with free genetic testing and allows researchers with access to DNA samples, clinical information, and participants for

research studies and clinical trials. As a contributor to the European Rare Disease Consortium (ERDC), Dr. Allikmets exchanges genetic information about Mendelian eye diseases

associates is that you have to live in science, not just work in science." Each one of the three researchers in the ABCA4 program is absolutely vital to the everyday functioning of his laboratory.



Seated, from left to right: Jana Zernant, M.A., Angela Xie, M.S.
Standing, from left to right: Winston Lee, M.A., Rando Allikmets, Ph.D.

through a central repository into which data is uploaded. Scientists can then check their own genetics data vis-à-vis the amassed data within the system.

Dr. Allikmets recently turned his focus back to ABCA4 genetics, and has been working with and teaching a team of young researchers. "Education has always been a main focus for me," he comments. "One thing I always teach my research

Angelia Xie, a Ph.D. candidate, engages in computer-based analyses of genetic sequencing data, and uses computers to conduct exomic and genomic sequencing for the laboratory. She is especially instrumental in discovering new genes using these computer-based analyses. Jana Zernant, M.A. has been a contributor to Dr. Allikmets's research team for over a decade. She focuses on all aspects of ABCA4 genetics, completes data analyses, and designs the screening systems for the laboratory. Finally, Winston Lee, M.A., the main study coordinator, manages the clinical half of the laboratory. He recruits patients for research trials, images the patients, and completes image analysis for the laboratory. "Each one of my associates does something that no one else can do. That is why

they are so important. Even I cannot do some of the work they do," Dr. Allikmets adds.

The more his team of researchers studies the ABCA4 gene, the more interesting and complicated their work has become. While they know the gene causes certain diseases, the mechanisms behind the mutations are still not completely clear. Although over 1,000 mutations have already been discovered within the ABCA4 gene, Dr. Allikmets and his team are looking forward to unlocking the additional mysteries this gene may hold. ■

A New Chapter for the Retina Division *continued from page 1*

Ophthalmology; and Quan V. "Donny" Hoang, M.D., Ph.D., Assistant Professor of Ophthalmology. For many years, under the leadership of Stanley Chang, M.D., the Division's world-renowned surgeons contributed significantly to ophthalmic science, pioneering the use of perfluorocarbon gases and liquids in retinal detachment surgeries and creating the algorithms used throughout the world in vitreoretinal surgeries today. The clinician-scientists continue to engage in groundbreaking work on retinal cell transplantation, angiogenesis, pharmacologic vitreolysis, tissue engineering, and pharmaceutical drug development. They are also involved in several large-scale clinical trials to develop new treatments for disorders such as Stargardt disease, retinitis pigmentosa, and age-related macular degeneration (AMD).

To encourage collaboration within the Division, Dr. Tezel has implemented monthly retina faculty meetings to keep faculty members aware of ongo-

ing scientific projects and clinical initiatives within the Division. He has also introduced conferences at which residents and fellows present clinical cases in front of senior colleagues, and then receive feedback and advice for their future clinical work. "Our more experienced clinicians, scientists, and surgeons have an ethical imperative to pass on the knowledge we have to the next generation," remarks Dr. Tezel. "We want to ensure they are not only experts in their specialties, but creative in their approaches to research, patient care, and surgical techniques."

Dr. Tezel is also an advocate of resident training assessment methods. He regularly compiles the results of the residents' clinical evaluations in a database to monitor their training and clinical practice over time. This process allows Dr. Tezel to identify areas in which these young clinicians may require improvement. Finally, residents and fellows are given the opportunity to partner with a clinical or research faculty member to design and

The Ties That Bind: A New Vision Care Partnership in Upper Manhattan

When asked about his recent appointment as Chief of Ophthalmology at Harlem Hospital Center (HHC), James D. Auran, M.D., Professor of Ophthalmology, replied, “I am so thrilled. It’s a brave new world for me. I have been preparing for an opportunity like this one for years, and I think it is a wonderful way to cap off my career.” Over the past 18 months, the Department has been working with HHC to develop a new teaching site for the residency program and an expanded care platform for patients within the HHC system. After a nationwide search, Dr. Auran was appointed to this new position by the HHC Medical Director, Maurice Wright, M.D., and the Columbia University Chair of Ophthalmology, G. A. Cioffi, M.D.

Dr. Auran’s move to HHC is part of a new era of collaboration in vision science that has emerged in upper Manhattan, linking the ophthalmology departments of CUMC and HHC. With Chief Robert L. “Linsy” Farris, M.D.’s impending retirement, HHC was in need of a new Chief of Ophthalmology. Columbia Ophthalmology’s residency program was also recently enlarged to help extend its clinical outreach. The timing seemed perfect for instituting a new partnership between the medical centers. Dr. Cioffi commented, “We owe a great debt of gratitude to Dr. Farris for his more than four decades of service to our two institutions. With the expansion of our residency program and the opportunity to bring our programs close together, we felt that Dr. Auran would be the perfect leader for the future.”

After extensive negotiations, the two centers agreed to establish a permanent rotation of Columbia Ophthalmology residents at HHC and to hire a Chief of Ophthalmology at HHC who would work part-time at HHC and part-time at CUMC. The selection committee sought an experienced faculty member who would be responsible for administrative functions as Chief, and who would develop mechanisms for community outreach, faculty and staff recruitment, and the expansion of the resident educational program. Another primary concern for the review committee was appointing a clinician who was an advocate of serving the underserved.

Bryan Winn, M.D., Director of the Residency Program, served on the selection committee for the position. “I could not be happier with James Auran as the candidate. His compassionate approach to medicine, his administrative and leadership skills, and his consummate professionalism make him ideal for the position,” states Dr. Winn.

Dr. Auran is looking forward to taking on more of an administrative role and heading a division for the first time in his career. He is particularly excited about adopting many of Columbia Ophthalmology’s methodologies and protocols to help increase patient volume and flow. Dr. Auran sees this example as one in which he can bring in new modalities of patient treatment that will increase HHC’s patient base and ensure that patient care is cutting-edge.

Having worked at HHC in the past, Dr. Auran is happy about the prospect of returning and reuniting with former colleagues. “It’s perfect for me. I was at Harlem Hospital years ago, and I always remember my time there very fondly. The Department was like a family and always had such a warm feeling. So in a way, I feel as if I am going home.”

HHC is known for its extensive outreach into the community, through free lectures and educational programming. Dr. Auran intends to collaborate with the community advisory board at HHC to better serve the needs of the community. “This is a hospital that brings the community into the hospital and educates them. They are not just committed to being a community hospital, but *the* community hospital.”

He is also looking forward to working with the diverse patient base of HHC. “This is a great opportunity for me to work for more people. This hospital is a big city hospital, situated in an extremely vulnerable neighborhood,” he noted. “I am looking forward to engaging with the diverse populations of Harlem. There is such a mix of ethnicities and socioeconomic classes. This neighborhood *is* New York City.”

HHC’s patient base frequently includes patients who need the most care, but have the least means to obtain it. Many patients have systemic health problems that complicate their ophthalmic conditions, while others have suffered severe ocular trauma. HHC is one of the few trauma centers throughout New York City, which expands what Columbia Ophthalmology’s residents are exposed to in terms of ocular trauma. Dr. Auran wants the residents to have as much experience as possible with more complex vision injuries.

His goal is to make HHC the highlight of the Columbia Ophthalmology residency program. He wants the residents to receive excellent training and supervision, treat as many patients as possible, and engage extensively with surgical trauma cases.

While he is sad to part with some of his Columbia patients, Dr. Auran is determined to make his mark at HHC. “I see this as a mission,” he states. “I am going to work very hard to make this work my legacy. I am ready to roll here.”



James D. Auran, M.D.

explore projects they will pursue over the course of their tenure here. As a result, retina fellowship positions at Columbia Ophthalmology have become some of the most desired and competitive fellowships in the country.

The Division will advance its technological capabilities with the acquisition of an Optical Coherence Tomography (OCT) Angiography unit. This new technology facilitates better imaging methods for retinal vascular dis-

eases. Dr. Tezel notes that as the pace of development in ocular imaging technology accelerates, diagnostic instruments have become more adept at the early detection and monitoring of retinal diseases. OCT angiography allows clinicians to see the



From left to right: Jonathan Chang, M.D., Srilaxmi Beareilly, M.D., M.H.S., Royce W. S. Chen, M.D., Stanley Chang, M.D., D. Jackson Coleman, M.D., Vivienne E. Greenstein, Ph.D., Tongalp H. Tezel, M.D., Stephen Tsang, M.D., Ph.D., Jason Horowitz, M.D. Not pictured: Quan V. “Donny” Hoang, M.D., Ph.D.

fine details of the retinal vasculature, without the need of injecting a fluorescent dye. This non-invasive technique can yield results in a short period of time, prevent complications from injections into the eye, and make the process of viewing retinal

vasculature more comfortable for patients. More big plans are underway. Dr. Tezel and his colleagues intend to introduce initiatives on stem cell treatments to regenerate retinal cells; tissue engineering to reconstruct damaged maculas; and gene therapy to treat ocular genetic diseases. These clinical, surgical, and research initiatives, Dr. Tezel comments, have made Columbia Ophthalmology’s Retina Division a premier site for the diagnosis and treatment of retinal diseases, not just in New York City or the tri-state area, but around the world. Smiling, Dr. Tezel states, “Columbia is the place where ideas are put into practice. I am proud to be a part of the outstanding work emerging from the Retina Division.”

In Memoriam Endre A. Balazs, M.D.

Endre A. Balazs, M.D., a former Columbia Ophthalmology physician and scientist, passed away in August at his summer home in St. Tropez, France at the age of 95.

Dr. Balazs's career, which spanned more than 70 years, contributed greatly to the fields of Ophthalmology and Orthopedics. The primary focus of his research was on the medical uses of hyaluronic acid and its derivatives, which are used both in ocular and orthopedic surgery. He helped pioneer the use of the substance in cataract surgery, which allowed the eye to retain its shape during lens implantation. He also promoted its use as a lubricant to decrease arthritic pain in joints that have lost their elasticity as a result of aging or trauma. His inventions had a worldwide impact.



Endre Balazs, M.D.

Dr. Balazs was the Director of Research for the Columbia Department of Ophthalmology from 1975 until 1982. Afterward, he opened the Biomatrix Research Center at BYU Polytechnic School of Engineering, a biotechnology venture with his son. He will be missed for his ingenuity and innovation in biotechnologies, as well as his leadership within the department. ■

Named Lectureships at Columbia Ophthalmology

Zacharias Dische Lecture featuring James Lupski, M.D., Ph.D.

The Departments of Ophthalmology, Biochemistry, and Molecular Biophysics sponsored the Zacharias Dische Lecture featuring James Lupski, M.D., Ph.D. on April 23, 2015. The Lecture, established in 1991, is the oldest standing lecture in the Department and takes place biannually.

Dr. Lupski delivered a lecture entitled "Personal Genomes, Clan Genomes, and the Clinical Implementation of Genome Analyses to Understand Disease." His lecture not only explored the intersections of genomic science, genetic instability, and epidemiology, but also delved into his very personal experience living with Charcot-Marie-Tooth peripheral neuropathy and how it has affected the research he conducts on genomic disorders.

Dr. Lupski is the Cullen Professor of Molecular and Human Genetics at Baylor College of Medicine. Among Dr. Lupski's most significant contributions to genomic science are the conceptualization and understanding of genomic disorders. His laboratory was among the first to use chromosome engineering to develop mouse models for genomic disorders.

Stanley Chang, M.D. Lecture delivered by Gary W. Abrams, M.D.

The Department of Ophthalmology held the 4th Annual Stanley Chang, M.D. Lecture on September 3, 2015. It was delivered by Gary W. Abrams, M.D., Professor of Ophthalmology at Wayne State University School of Medicine and Clinical Professor of Biomedical Sciences at the Eye Research Institute of Oakland University. His lecture, entitled "Stanley Chang and the Advancement of Vitreoretinal Surgery," paid tribute to Dr. Chang's extensive work and legacy in the creation, development, and standardization of surgical techniques for vitreoretinal surgery.

Dr. Abrams served as the Department Chair at Wayne State University from 1994-2011. He remains there today, investigating optogenetic strategies for vision restoration. ■

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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