



A Bright Vision for the Future

There's little doubt that diseases and disorders in ophthalmology, specifically those that involve the retina, are some of the most vexing conditions in medicine today. Retinal detachment, retinitis pigmentosa, and retinal vein occlusion are among retina conditions that rob the vision of countless children and adults throughout the world.

The good news? Thanks to ongoing advances by Wilmer's retina specialists, dramatic strides are being made. The most common causes of blindness, if left untreated, are retinal diseases, including age-related macular degeneration and diabetic retinopathy. Today, with advances in research, doctors can reverse vision loss in at least 50 percent of those with diabetic retinopathy. For those with macular degeneration, over 90 percent can avoid blindness.

We're proud that Wilmer's retina specialists have played major roles in these and other ophthalmic success stories, including a recent breakthrough for patients with the most severe forms of retinitis pigmentosa (RP): A new retinal prosthesis system, developed in part by scientists working at Wilmer, now offers hope for restoring some sight to people with RP who were previously completely or almost completely blind.

The seven senior faculty (professors) within the Retina Division are collaborating on multi-center projects that are sure to dramatically

improve patient outcomes in the years ahead. Fernando Arevalo serves as chief of the retina service for Wilmer's collaboration with the King Khaled Eye Specialist Hospital in Riyadh, Saudi Arabia. From 2006 to 2012, Neil Bressler led the National Institutes of Health-sponsored Diabetic Retinopathy Clinical Research Network, likely the largest collaborative clinical research program in retina in the world, and now serves as Past Chair.

WILMER RETINA DIVISION BY THE NUMBERS

- 7 Number of endowed professorships
- 19 Number of faculty positions for FY14
- 70 Number of grants supporting retina research

Susan Bressler directs Wilmer's studies on dietary supplements for macular degeneration. Peter Campochiaro develops new treatments for abnormal new blood vessels in the retina as well as for retinal degenerations. Daniel Finkelstein works with bioethicists at the University. Morton Goldberg advises the Foundation Fighting Blindness. James Handa investigates novel laboratory models to evaluate potential treatments for the earlier stages of macular degeneration.

But that's only part of the innovative research undertaken by our

Wilmer faculty. Our eight other assistant and associate retina professors—unquestionably some of the brightest stars in ophthalmology—are bringing fresh insights and energy to today's major challenges in retina research and patient care.

Read on to learn about how these junior faculty members are working to harness telemedicine in the treatment of retina diseases, attacking vision loss from retinal detachment surgery or poor circulation to the retina, developing new imaging and robotic approaches to retinal disease, and taking their renowned treatments and research to those throughout the region.

As you'll discover, Wilmer's most promising junior faculty members are establishing clinical homes in our newly opened satellite clinics—from Bel Air to Bethesda—while continuing their presence at the Johns Hopkins Hospital. For the first time, patients throughout the Baltimore/Washington region can receive Wilmer-quality care—even access to clinical trials—while staying close to home.

The Retina Division faculty at the Wilmer Eye Institute are among the most highly skilled and regarded medical specialists in the world. With your support, we will continue to work to save—and restore—the vision of countless children and adults throughout the world.

Although retinal detachment, diabetic retinopathy, macular holes and other retinal disorders often result in dire consequences, the Retina Division faculty have had incredible success with what some would consider irreparable afflictions. Faculty members use their unparalleled medical training to advance patient care and research while training the next generation of retina specialists.

Finding Answers Through Clinical Trials



Patients from throughout the United States and the world travel to Baltimore for diagnosis and treatment by **Sharon D. Solomon, MD, Associate**

Professor of Ophthalmology, who holds The Katharine Graham Professorship at Wilmer, and her colleagues.

Dr. Solomon is an internationally recognized expert in the care and treatment of patients with age-related macular degeneration, diabetic retinopathy, epiretinal membranes, macular holes, retinal tears, and detachment. She first became fascinated with the retina during the second year of her medical residency at University of California at San Francisco. As a member of Wilmer's premiere faculty, she practices at the Wilmer's Institute's main campus in East Baltimore and at the satellite facility in Greenspring.

Her work includes a host of research projects including a number of clinical trials through the Diabetic Retinopathy Clinical Research Network (DRCR.net). As a co-investigator for the Wilmer Photograph Reading Center, Dr. Solomon has participated in the Submacular Surgery Trials for age-related macular degeneration.

Overcoming the Impact of Reduced Blood Flow



Ischemic retinal diseases are the most common causes of blindness in working age Americans; such diseases rob the vision of millions each year. Vascular occlusions in the eye are often associated with a concomitant systemic vascular condition, and may therefore be a marker for cardiovascular mortality or morbidity. Perhaps one of the most terrifying aspects of ischemic retinal diseases is that they often strike without warning and may be a sign of a systemic disease.

Akrit Sodhi, MD, PhD, assistant professor of ophthalmology, has undertaken studies that may well save the vision of those who suffer ischemic retinal disease, which occur when the blood flow (and therefore oxygen supply) to the retina is compromised due to a variety of mechanisms, often resulting in complete loss of vision.

“Our research program focuses on examining how specific tissues in the eye respond to reduced blood flow or oxygen. We are using molecular biology approaches to determine the molecular mechanisms, whereby reduced oxygen in the retina results in vision loss. These studies are then confirmed using animal models and ultimately corroborated by studies in patients in the clinic,” says Sodhi.

Dr. Sodhi's research also includes medical and surgical management of other vitreoretinal diseases including diabetic retinopathy, age-related macular degeneration, epiretinal membranes, macular holes, and retinal detachment. Dr. Sodhi treats patients with diseases of the retina at Wilmer's Hopkins Hospital location and also at Wilmer's Columbia location. “We are excited that our research may identify novel therapeutic targets that will reduce or even prevent vision loss in patients with ischemic retinal disease,” he says.

Harnessing Telemedicine to Expand Access to Care



“We are in an exciting era for the field of ophthalmology. There have been tremendous recent advances in diagnostic tools, in particular imaging devices, to identify and manage ocular diseases,” notes **Ingrid E. Zimmer-Galler, MD, Associate Professor of Ophthalmology.**

“Additionally, new treatments including microsurgical techniques and pharmacotherapy are now available for diseases, which until the recent past generally resulted in poor visual outcomes. As retina specialists at Hopkins, we are fortunate to be able to offer our patients access to the latest technologies and treatments while also providing opportunities for them to be involved in *continued on pg. 4*

Delivering SMART Solutions



When you realize that the retina is an extension of the brain, you begin to understand the complexity of disorders that impact it. Adding to complexity of care of the retina is its delicate, fragile structure and back-of-the-eye location, which makes diseases including diabetic retinopathy, macular degeneration, retinal detachment, and eye cancer even more difficult to diagnose and treat.

Peter Gehlbach, MD, PhD, Associate Professor of Ophthalmology, is a renowned expert on such disorders. Patients and practitioners from throughout the U.S. and the world call regularly upon his clinical expertise. In addition, he is a leader in performing and teaching complex surgical cases that require coordination with multiple ophthalmological specialists.

“Our patients come to Wilmer from all parts of the world. Many have been seen by multiple specialists and may have heard that there is no hope,” he says. Fortunately, through the cooperative effort of Wilmer’s uniquely expert clinicians, and the sharing of Wilmer’s state-of-the-art facilities and present cutting-edge treatments, there can be restoration of vision where once there was no such possibility.

Dr. Gehlbach’s creative achievements have focused on an array of complex matters ranging from precise treatment for retinal cells using novel gene delivery tools to enabling the handheld tools of the microsurgeon with “SMART” functions. “SMART” guided tools are not simply handheld but rather incorporate computer guidance and micro robotic assistance to allow unprecedented surgical maneuvers in the challenging surgical environment of the eye.

Creative Solutions to Retinal Challenges



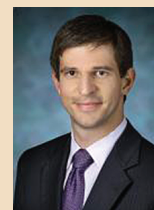
Retinal detachment is a rare but a devastating condition that generally requires a surgeon to repair the retina by placing a supporting band on the outside of the eye and by removing some of the eye’s vitreous—the filling within the eye; that is, pulling on the retina from the inside of the eye. The surgeon then replaces the vitreous with something akin to a bubble to hold the retina against the back of the eye.

Howard S. Ying, MD, PhD, Associate Professor of Ophthalmology, is exceptional in both his approach and treatment for patients with retinal disease. Having additional training in strabismus,

vestibular neurophysiology, and neuroscience allows a more integrated approach to patient issues, which sometimes leads to creative, personalized solutions.

Although he maintains a full clinical practice in East Baltimore and at Greenspring, Dr. Ying conducts a host of research projects that investigate such challenges as ocular dysmotility and double vision after retinal surgery. His research has led to the understanding that muscle imbalance in the eyes after retinal surgery is caused by both mechanical imbalances (in part due to the supporting band outside of the eye to repair retinal detachment) and sensory imbalances (caused by the retinal detachment itself).

Focusing on Pediatric Disorders



Pediatric retina abnormalities and diseases are among the most vexing issues in ophthalmology. In fact, an underdevelopment of the optic nerve is the leading cause of blindness in infants in the United States. Yet few researchers and practitioners have the expertise and support to investigate the causes and possible treatments of that and other issues that affect the retina and other posterior segments of children’s eyes.

Adam S. Wenick, MD, PhD, Assistant Professor of Ophthalmology, treats both adult and pediatric patients with retinal disorders and conditions that impact other structures of the posterior segment of children’s eyes.

Dr. Wenick’s research focuses on the study of the interaction of the retina with the vitreous gel of the eye. While we are just beginning to understand the specifics of this interface, it is understood that such abnormalities are central to the development of vision loss from eye diseases as diverse as macular hole, epiretinal membrane, diabetic retinopathy, retinal detachment, a variety of pediatric retinal diseases, and possibly the development of wet age-related macular degeneration. His research offers promise for the development of novel treatments for the conditions noted above, including the development of medical treatments for conditions that currently require surgery.

Dr. Wenick is among those practicing at Wilmer’s satellite location in Bethesda.

Expanding Access to Clinical Trials



Clinical trials have long been a vital tool used by researchers to gain insights into specific, often life-changing

health conditions and possible treatments. Although many hope to volunteer for such studies, the urban locations of such clinical trials often prevent such participation.

As medical director of Wilmer Eye Institute at Parris-Castoro in Bel Air, Maryland, Adrienne W.

Scott, MD, Assistant Professor of Ophthalmology, is working to change the accessibility of such trials by bringing some to that campus, in addition to those at Wilmer's main location. Dr. Scott and the other clinicians at Wilmer at Parris-Castoro are in a unique position to do so because of the vast and complex focus of their patient population and research investigations across a broad spectrum of vitreoretinal medical and surgical diseases and occurrences.

Age-related macular degeneration,

diabetic retinopathy, retinal vascular occlusions, macular holes, retinal detachments and epiretinal membranes are among the conditions Dr. Scott, and the other faculty at Wilmer in Bel Air diagnose, treat and research each day. "In our field, much of the information we have today regarding diagnosis, prognosis, treatment, and prevention of devastating eye conditions has come from our clinical trials," she says. "It is critical we make access to participation in these trials as convenient as possible for our patients."

Harnessing Telemedicine continued from page 2

clinical research trials for potentially blinding disorders for which optimal therapies are still evolving."

Yet all the expertise and technology can't help patients if they have no access to the practitioners that can deliver world-class treatments. Dr. Zimmer-Galler has spent years researching how telemedicine might improve public health programs of common retinal diseases.

"Evidence-based medicine has proven that vision loss from diseases such as diabetic retinopathy

is largely preventable with appropriate and timely treatment. Nonetheless, almost half of all patients with diabetes still do not undergo recommended examinations for diabetic retinopathy," she says. "Telemedicine evaluation for diabetic retinopathy by remote retinal imaging has been shown to be an effective and viable adjunct option to improve access to the diagnosis and management of diabetic retinopathy as well as decreasing the cost of identifying patients with

vision threatening disease. Our work over the past decade has focused on promoting telehealth to enhance the availability, quality, efficiency, and cost-effectiveness of remote evaluation for diabetic retinopathy.

She is also working on ways to have community-based practices that work within a university setting—including Wilmer Eye Institute's satellite at Frederick, Maryland, where she is the Satellite Chief—become centers of excellence for clinical research trials.



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