LEADING OCULAR MEDICINE
ABOUT THE BLANTON EYE INSTITUTE

At Houston Methodist Blanton Eye Institute, we are proud to be able to care for “the sickest eyes in the sickest patients.” We routinely provide eye care for the most difficult and challenging hospital patients with significant and potentially life-threatening systemic disease (e.g., organ transplant, chronic immunosuppression, metastatic cancer).

Our open staff model includes practicing physicians from academics, Houston Methodist Hospital and private practice. This model allows us to unite patients with the expertise of multiple providers and multiple specialties and creates unique partnership opportunities in clinical care, education and research. We refer to our Blanton Eye Institute as a “virtual” eye institute because our specialists represent our entire ophthalmic community, including:

8 FULL-TIME OPHTHALMOLOGISTS
who work for Houston Methodist Hospital in our physicians’ organization (i.e., Methodist Eye Associates)

22 ACADEMIC PARTNERS
with joint appointments (e.g., Texas A&M College of Medicine, Weill Cornell Medicine, UTMB, and others)

57 HOSPITAL-BASED OPHTHALMOLOGISTS
who contribute through participation in clinical care as members of our Department of Ophthalmology and who help staff our consult service, use our operating rooms and see patients in our emergency room

SURGICAL PROCEDURES

- 54% RETINA
  SURGICAL VOL: 1273
- 30% CATARACT
  SURGICAL VOL: 695
- 12% CORNEA
  SURGICAL VOL: 268
- 3% OCULPLASTICS
  SURGICAL VOL: 82
- 1% GLAUCOMA
  SURGICAL VOL: 25

based on 2017 Houston Methodist Hospital Annualized Data
MESSAGE FROM THE CHAIR

It is my privilege and honor to talk with you about the recent achievements and aspirations of all who represent the Houston Methodist Blanton Eye Institute. Although all of our physicians are performing at a high level in a tertiary/quaternary care environment in the Texas Medical Center, I would like to highlight three areas of interest in our hospital-based eye care delivery model: complex glaucoma, ocular oncology and, of course, neuro-ophthalmology.

Joanna Queen, MD, recently joined us from the University of Michigan, and brings special expertise as a glaucoma specialist. She will incorporate new procedural innovations for cutting-edge, minimally invasive glaucoma treatment techniques. Dr. Queen will lead our work treating complex and difficult glaucoma cases. Our unique referral population and large geographic capture area means that patients with severe, complex, medically recalcitrant, and often previously operated glaucoma are being sent to the Houston Methodist Blanton Eye Institute.

Likewise, the Blanton Eye Institute and our multidisciplinary partners at Houston Methodist in neuroimaging, radiation therapy, and oncology are leading the way in novel and exciting treatments for intraocular cancer. Over the past several years, through the hard work and dedication of our ocular oncology team including Dr. Amy Schefler, Houston Methodist Hospital is emerging as one of the few eye centers in the nation devoted to treating ocular cancer. The unique training and expertise of Dr. Schefler, combined with the multidisciplinary access at Houston Methodist hospital, has allowed us to welcome new and unique ocular oncology patients to the Houston Methodist Blanton Eye Institute from national and international destinations for evaluation and treatment of these uncommon but potentially life-threatening ocular tumors.

Neuro-ophthalmology, which has always been a strength of our hospital-based eye department, continues to lead the way in terms of multidisciplinary programs that cross specialties and disciplines to leverage our hospital strengths and our nationally recognized programs in neurosurgery and neurology. We are fortunate to participate with the Kenneth R. Peak Center for Brain and Pituitary Tumor Treatment and Research at the Houston Methodist Neurological Institute in the evaluation of these intracranial tumors.

On the research front, the Blanton Eye Institute has partnered with Retina Consultants of Houston (RCH) to participate in a number of national clinical trials. One unique trial explores the treatment of non-arteritic anterior ischemic optic neuropathy (NAION) using intravitreal injections of a novel, silencing RNA molecule.

In addition, because of our proximity to NASA’s Johnson Space Center, in cooperation with medical and ophthalmic specialists at NASA, we have been studying the effects of long-duration space flight on the eye. Spaceflight Associated Neuro-ocular Syndrome (SANS) has been an area of clinical and research interest for many members of the Blanton Eye Institute. In particular, our departmental vice chair for research, David Brown, MD, from RCH, and I have been key members of NASA’s research advisory panel for SANS. Our work is ongoing to help determine the cause of SANS and perhaps to predict or prevent the effects of long-term space travel in preparation for future manned missions, including Mars.

Andrew G. Lee, MD
Chair of the Blanton Eye Institute
Houston Methodist Hospital, Department of Ophthalmology
Retinoblastoma is a rare intraocular tumor that is a type of cancer of the eye (retina), which is usually identified during childhood. While only about 300 new cases are diagnosed each year in the U.S., retinoblastoma requires specialized and complex care. Although Houston Methodist Hospital is an adult care institution, one of the members of our Blanton Eye Institute faculty, Patricia Chévez-Barrios, MD, is leading the way in the diagnosis of childhood retinoblastoma in conjunction with our partners at Texas Children’s Hospital.

Dr. Chévez-Barrios is a professor of pathology and genomic medicine and ophthalmology, who leads the Ophthalmic Pathology Service at Houston Methodist Hospital Blanton Eye Institute. She is internationally recognized as one of the top ocular pathologists in the country and in particular for her work in the diagnosis of retinoblastoma. These tumors can occur sporadically or be hereditary and Dr. Chévez-Barrios has been working hard to develop techniques to differentiate high-risk manifestations of retinoblastoma.

“My expertise is to look at the enucleated eyes and identify features that will predict metastasis in children with retinoblastoma.”

Patricia Chévez-Barrios, MD

In the past, clinical practice guidelines for the treatment of retinoblastoma were sparse and controversial. Dr. Chévez-Barrios has participated in convening a consensus panel of experts who have been working on a set of more definitive evidence-based guidelines. This work (which awaits final endorsement from the American Academy of Ophthalmology and the American Academy of Pediatrics) will hopefully provide more specific guidance to clinicians treating retinoblastoma.

Although the ultimate goal is to achieve a 100 percent cure rate for children with retinoblastoma, the disease demands unique and individualized evaluation and treatment considerations for each tumor. Dr. Chévez-Barrios and her team are working to develop novel and unique tools for identification of tumor type. This is especially critical for the inherited forms of retinoblastoma as more than 30 percent of patients have a hereditary defect of the retinoblastoma (RB1 gene), a tumor suppressor protein.
SPACE-AGE EYES

The peculiarities of ocular anatomy and environmental factors that contribute to certain eye conditions are being examined in a study by NASA, examining the deleterious effects of long-term space travel on the optic nerves and choroids of astronauts. The syndrome has been called Space flight Associated Neuro-ocular Syndrome (SANS).

“Astronauts get blurred vision from some swelling in the optic nerve and engorgement of the blood supply behind the eye,” said David M. Brown, MD, associate professor of clinical ophthalmology at Houston Methodist Hospital Blanton Eye Institute and the primary retina specialist on the research advisory panel for NASA. “We presume an alteration happens in space that permanently affects the anatomy of the eye. Many of these changes do not reverse after their return.”

Brown noted that research with healthy volunteers on earth were placed in a head-down tilt to simulate the cephalad fluid shift and ocular effects of decreased gravity in space. The volunteers underwent special imaging studies using light called spectral domain optical coherence tomography (OCT) to scan the eyes during the head-down position. These experiments have shown some milder forms of the changes seen in SANS. An OCT machine was flown to the international space station to determine ocular measurements during flight.

Because Brown and others believe that increased carbon dioxide may contribute to ocular abnormalities, the eyes of hypercapnia patients are also under investigation.

“‘At the moment, we’re not sure what causes these changes, but it is a very serious problem and we need to determine how to decrease these risks,” he said.

AN INTRAOCULAR TREATMENT FACTORY

Brown and his colleagues were instrumental in the development and FDA approval of sight-saving anti-vascular endothelial growth factor (anti-VEGF) injections for age-related macular degeneration and diabetic retinopathy. However, these therapies often require lifelong monthly eye injections, an arduous treatment that both patients and physicians would like to eliminate. It would be ideal, ophthalmologists at Houston Methodist and elsewhere have speculated, if the anti-VEGF could be genetically replicated within the eye.

This hypothesis was developed into a clinical trial and Houston Methodist became one of five centers to participate in a study of a unique intraocular delivery system for anti-VEGF. The first critical step is to surgically position adenovirus vectors underneath the retina with an operation at the Houston Methodist Outpatient Surgery Center.

“The adenovirus will infect the cells and secrete ADV-9, which makes an anti-VEGF similar to the eye injections,” Brown said. “If we can create our own factory of drug production inside the eye, we can reduce the number of injections and perhaps see a better outcome, because the delivery of the drug will be constant.”

“We presume an alteration happens in space that permanently affects the anatomy of the eye. Many of these changes do not reverse after [astronauts] return.”

DAVID M. BROWN, MD
TARGET ZERO FOR RECURRENT OCULAR MELANOMA

A critical concern for ocular melanoma patients after tumor removal is the potential for its recurrence if all cells are not completely treated. For the last five years, patients at Houston Methodist Blanton Eye Institute have experienced a zero percent recurrence rate — the best outcome statistic in the country for this rare malignancy.

These unique patient statistics are the result of a procedure perfected at Houston Methodist in which individualized brachytherapy plaques are custom designed for each patient. When these radioactive discs are placed on the surface of the eye, they deliver highly targeted radiation to the tissue. The patient-specific measurements maximize comfort and assure minimal collateral damage to the surrounding healthy retina. Amy C. Schefler, MD, assistant professor of clinical ophthalmology and ocular oncology specialist at Houston Methodist, works with a team of subspecialized radiation oncologists and radiation physicists to fashion each plaque individually for each patient.

Perfect plaque placement over the tumor is guaranteed by real-time, intraoperative ultrasound imaging. “The plaque is always centered; therefore, the cells always die,” Schefler said. “They’re very radiosensitive: as long as you hit them accurately, they die. This is important because if the cells recur in the eye, the chance of a metastasis for the patient is much higher.”

In addition to highly successful brachytherapy treatment, every patient’s tumor is sampled and immediately biopsied — live — by a specially trained ophthalmic pathologist present in the operating room.

The ocular biopsies are performed by Dr. Schefler, who uses retinal instrumentation to obtain a tiny sample of the tumor tissue, often in tumors as small as 2 millimeters, a technique that is considered too risky by many ophthalmic surgeons.

“Our frozen sections [real-time biopsies] are so critical because we are able to obtain tissue no matter how small the tumors are,” Schefler said. “This is important because even small tumors can be aggressive. The genomic information we obtain from the biopsy helps us inform patients about their future health and also informs much of our genetics research. Ultimately, those cells will help us find a cure for this cancer one day.”

“AMy C. Schefler, MD
Patients undergoing two common ophthalmic procedures — cataract surgery and corneal transplants — experience optimal outcomes at Houston Methodist Blanton Eye Institute through use of the most advanced technologies available, from wavefront aberrometry and lasers to the most intricate of graft surgeries.

**CATARACT LENS REPLACEMENT**
Taking advanced technology measurements, intraoperative wavefront aberrometry used during cataract surgery helps verify the best intraocular lens implant option for each cataract patient to achieve optimal vision.

“Wavefront analysis measures higher-order aberrations in the visual system — similar to the technology used to design the optics of the Hubble telescope,” said Rahul T. Pandit, MD, medical director of the ophthalmology operating room at Houston Methodist Hospital.

Additionally, state-of-the-art femtosecond laser-assisted cataract surgery (FLACS) makes precise incisions in the eye and softens the cataractous lens, which minimizes operative time and causes less swelling and earlier visual recovery. The procedure further augments the precision of wavefront aberrometry through standardization and automation of critical, yet common, procedural techniques.

**ENDOTHELIAL KERATOPLASTY**
With a unique focus on improving corneal transplant patient outcomes, Pandit and his colleagues use a cutting-edge procedure called Descemet membrane endothelial keratoplasty (DMEK). DMEK elevates the intricacies of standard procedures, using an implant graft only about 15 microns thick — so thin it must be stained to visualize and cannot be directly handled without damaging the tissue.

“It is a highly complex surgery where the graft is injected by an inserter and you have to unscroll and place the graft,” Pandit said. “Historically, the density of donor tissue has prevented us from fully restoring a patient’s vision. DMEK can help us bring the patient up to 20/20 vision, and with a quicker recovery.”

“DMEK can help us bring the patient up to 20/20 vision, and with a quicker recovery.”

**RAHUL T. PANDIT, MD**
ADVANCEMENTS IN TREATMENT – REFRACTORY CAUSES OF VISION LOSS

The subspeciality of neuro-ophthalmology requires a global, holistic viewpoint of the integration and interaction of complex and systemic disorders on the patients’ visual function. A variety of blinding and life-threatening diseases can present initially as visual loss including carotid artery dissection, sarcoidosis, intracranial aneurysm, or stroke.

GIANT CELL ARTERITIS

The most common form of vasculitis is giant cell arteritis (GCA), which frequently affects the arteries in the temples and causes headaches, jaw pain, and visual disturbances. If left untreated, GCA can lead to stroke or blindness.

At Houston Methodist Blanton Eye Institute, neuro-ophthalmologists use the recently approved humanized monoclonal antibody, tocilizumab, to target the interleukin-6 receptor that shows elevated expression in the temporal area of GCA patients. It is the first FDA-approved therapy specific to GCA.

“Prior to tocilizumab, the only successful treatment for GCA was high-dose steroids,” said Sushma S. Yalamanchili, MD, a neuro-ophthalmologist at Houston Methodist Hospital. “But relapse rates can be high for patients tapering off steroids. In addition, long-term steroid use can lead to a spectrum of secondary problems such as hyperglycemia, hypertension and osteoporosis.” Currently, tocilizumab is used concomitantly with steroids in refractory cases of GCA. We have been working with our colleagues in rheumatology to treat our refractory patients with GCA with tocilizumab.

NON-ARTERITIC ANTERIOR ISCHEMIC OPTIC NEUROPATHY

Approximately 6,000 patients are diagnosed each year with non-arteritic anterior ischemic optic neuropathy, or NAION, for which there is no current treatment. NAION is the most common cause of acute ischemic damage to the optic nerve and is second only to glaucoma as the most frequent cause of permanent nerve-related vision loss. NAION may be associated with certain vascular diseases such as hypertension, diabetes and hypercholesterolemia and that can cause damage or destruction of retinal ganglion cells (RGCs) through ischemic injury.

Physicians at the Blanton Eye Institute are participating in the ongoing QRK207 trial that targets the preservation of RGCs as a potential treatment for patients with NAION. It is a phase 2/3 randomized, double-masked, sham-controlled trial of QPI-1007 that is delivered by single or multi-dose intravitreal injection to patients with NAION. QPI-1007 is designed to be neuroprotective of RGCs.

“Prior to tocilizumab, the only successful treatment for giant cell arteritis was high-dose steroids.”

SUSHMA S. YALAMANCHILI, MD
THE STRUCTURE OF VISION

When the eye is affected by disease or trauma, the specialists at Houston Methodist Blanton Eye Institute have the ability to restore ocular health and aesthetically improve it in patients.

Two of the most common diseases treated by Blanton Eye Institute and Houston Methodist Hospital-based orbit/oculoplastic surgeons are thyroid eye disease (Graves’ ophthalmopathy), and idiopathic intracranial hypertension (IIH).

THYROID EYE DISEASE
Approximately 30 percent of patients with autoimmune thyroid disease will present with thyroid eye disease, which has a variety of clinical manifestations, including exophthalmos due to enlargement of the tissues behind the eye. Patients may also experience eye pain, abnormally open eyes, double vision or vision loss.

Oculoplastic surgeons at the Blanton Eye Institute, perform orbital decompression surgery to improve proptosis by providing space for the enlarged ocular structures to expand around the eye.

“We remove fat and bones from behind the eye to relieve the pressure and congestion that occurs. This can improve the appearance of bulging, swollen eyes and can eliminate the pain and discomfort in these patients, and can sometimes improve vision” said Amina Malik, MD, a Methodist Eye Associate (MEA) specialist in ophthalmic plastic and reconstructive surgery.

IDIOPATHIC INTRACRANIAL HYPERTENSION
Also known as pseudotumor cerebri, idiopathic intracranial hypertension (IIH) is caused by a chronic elevation in intracranial pressure that causes papilledema, or swelling of the optic nerve that can result in potential blindness.

Treatment of IIH in patients who fail maximal medical therapy can involve optic nerve sheath fenestration. Previously, this surgery was lengthy and involved removal of an extraocular muscle for access to the optic nerve. A newer, highly targeted and effective, surgery is employed by oculoplastic surgeons at Houston Methodist Hospital that takes approximately 20 minutes and results in faster patient recovery.

“We make an incision through the medial upper eyelid crease and position the eye so that we can dissect straight down to the optic nerve,” said Malik. “We then cut into the optic nerve sheath and create a portal for fluid egression to prevent blindness in these patients.”
REVERSING THE COURSE OF DIABETIC EYE DISEASE

Diabetic eye disease involving the retina, known as diabetic retinopathy (DR), is traditionally characterized by progressive vascular damage and is the most common cause of blindness among working-age adults in the U.S. The most common blinding forms of DR are proliferative diabetic retinopathy (PDR) and diabetic macular edema (DME). With current generation therapies, individuals with PDR or DME typically receive repeated intraocular injections, and laser in specific situations. In an attempt to improve clinical outcomes in the management of PDR and DME, Charles C. Wykoff, MD, PhD, deputy chair of ophthalmology at the Houston Methodist Blanton Eye Institute, designed and is overseeing two ongoing, multicenter phase II trials studying innovative approaches to care delivery.

THE RECOVERY TRIAL (Intravitreal Aflibercept for Retinal Non-Perfusion in Proliferative Diabetic Retinopathy)

In PDR, abnormal blood vessels and associated scar tissue grow on the retina, leading to retinal distortion and detachment. Appropriately placed lasers, as well as pharmaceutical treatments with anti-vascular endothelial growth factor (VEGF) pharmaceuticals, can lead to stabilization or regression of these pathologic blood vessels. In the RECOVERY trial, patients with PDR without DME are dosed with off-label aflibercept, an anti-VEGF agent. The objective is to consider if aflibercept can not only stop disease progression, but also potentially lead to regeneration of previously damaged blood vessels within the retina.

"Retinal nonperfusion has been viewed as an inexorable process of accumulating vascular damage over time," Wykoff said. "We have learned that anti-VEGF treatments can cause regression of pathologic blood vessels, but can we actually improve the vasculature and turn back the clock? Can non-perfused retina become re-perfused? This possibility fascinates me and the clinical implications are tremendous. That’s what we are investigating in the RECOVERY trial."

THE HULK TRIAL (Suprachoroidal Injection of CLS-TA Alone or With Aflibercept in Subjects With Diabetic Macular Edema)

Corticosteroids have been used for decades to treat ocular diseases. The prospective HULK trial is evaluating the safety and efficacy of a new corticosteroid formulation of triamcinolone acetonide (CLS-TA) delivered via a novel route of administration. In contrast to traditional routes of delivery, in HULK, CLS-TA is delivered into the suprachoroidal space. The corticosteroid is being administered either alone or in combination with intravitreal aflibercept.

"Corticosteroids in the eye can cause increased intraocular pressure and cataract," Wykoff said. "We hope that application of corticosteroids into the suprachoroidal space will minimize steroid-associated side effects and achieve a longer durability of action.

"Currently, a substantial proportion of patients who receive anti-VEGF monotherapy for DME have an incomplete clinical response. Ideally, suprachoroidal corticosteroid delivery for DME will allow improved outcomes while decreasing treatment burden."

WHERE DEDICATED RESIDENTS TRAIN IN OPHTHALMOLOGY

The Blanton Eye Institute is pleased to be the training site for two ophthalmology residency programs, Baylor College of Medicine (BCM) and the University of Texas Medical Branch (UTMB). Residents rotate on neuro-ophthalmology and ocular pathology. In addition, two Houston Methodist Scholar Program neuro-ophthalmology fellows per year train at Houston Methodist. The Houston Methodist Fellowship program is approved by the Association of University Professors in Ophthalmology (AUPO) Fellowship Compliance Committee. Houston Methodist is proud to participate in the graduate medical education of medical students from BCM, UTMB and Texas A&M College of Medicine.
FACULTY LIST

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David Brown, MD* Retina Consultants of Houston
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*Denotes Best Doctor® recognition
LEADING MEDICINE
YESTERDAY, TODAY AND TOMORROW

At Houston Methodist, we have a proud tradition of revolutionizing medicine. Our past achievements have built a legacy that spans multiple decades and disciplines, and that same culture of excellence inspires us to be the pioneers of tomorrow.