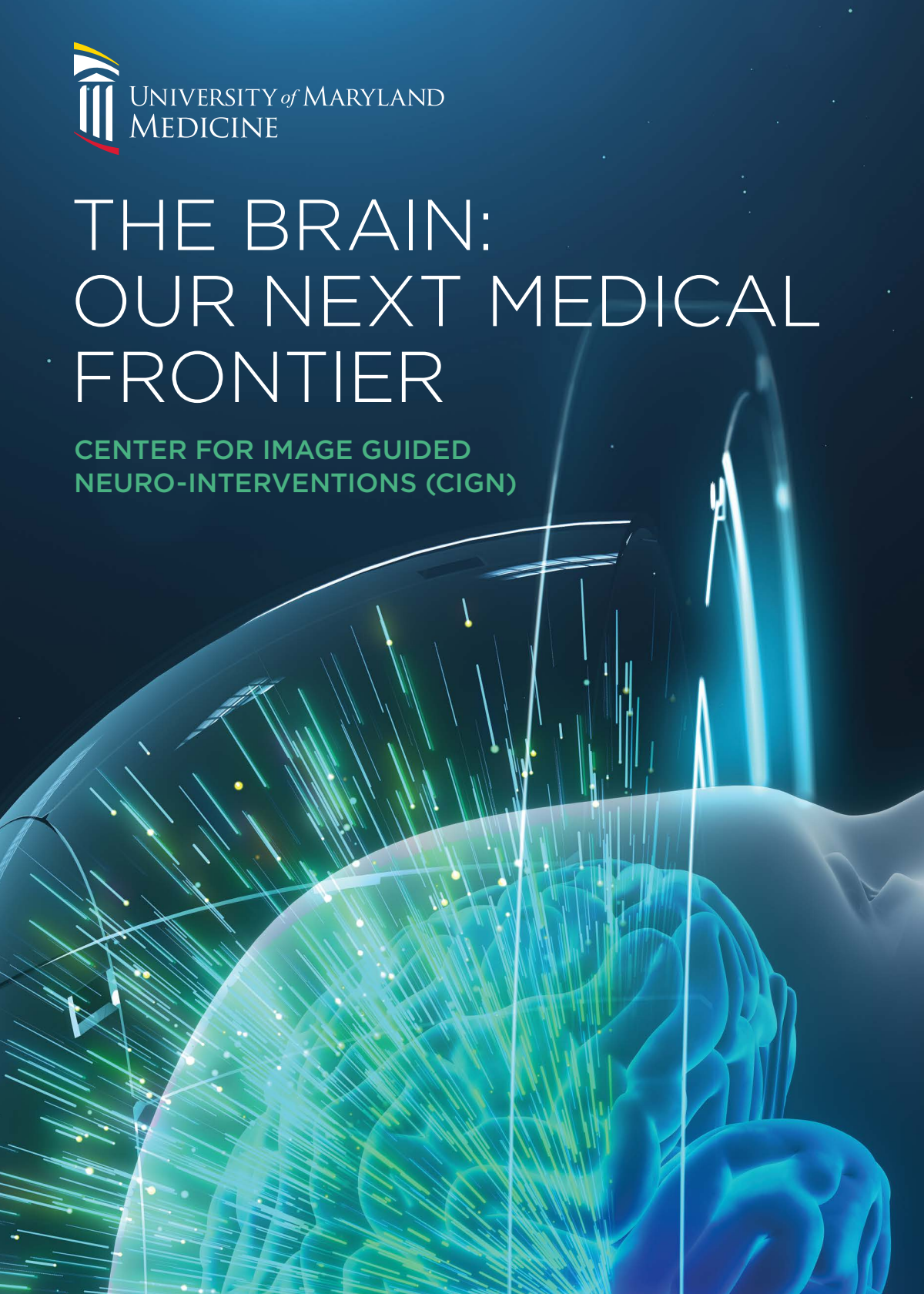
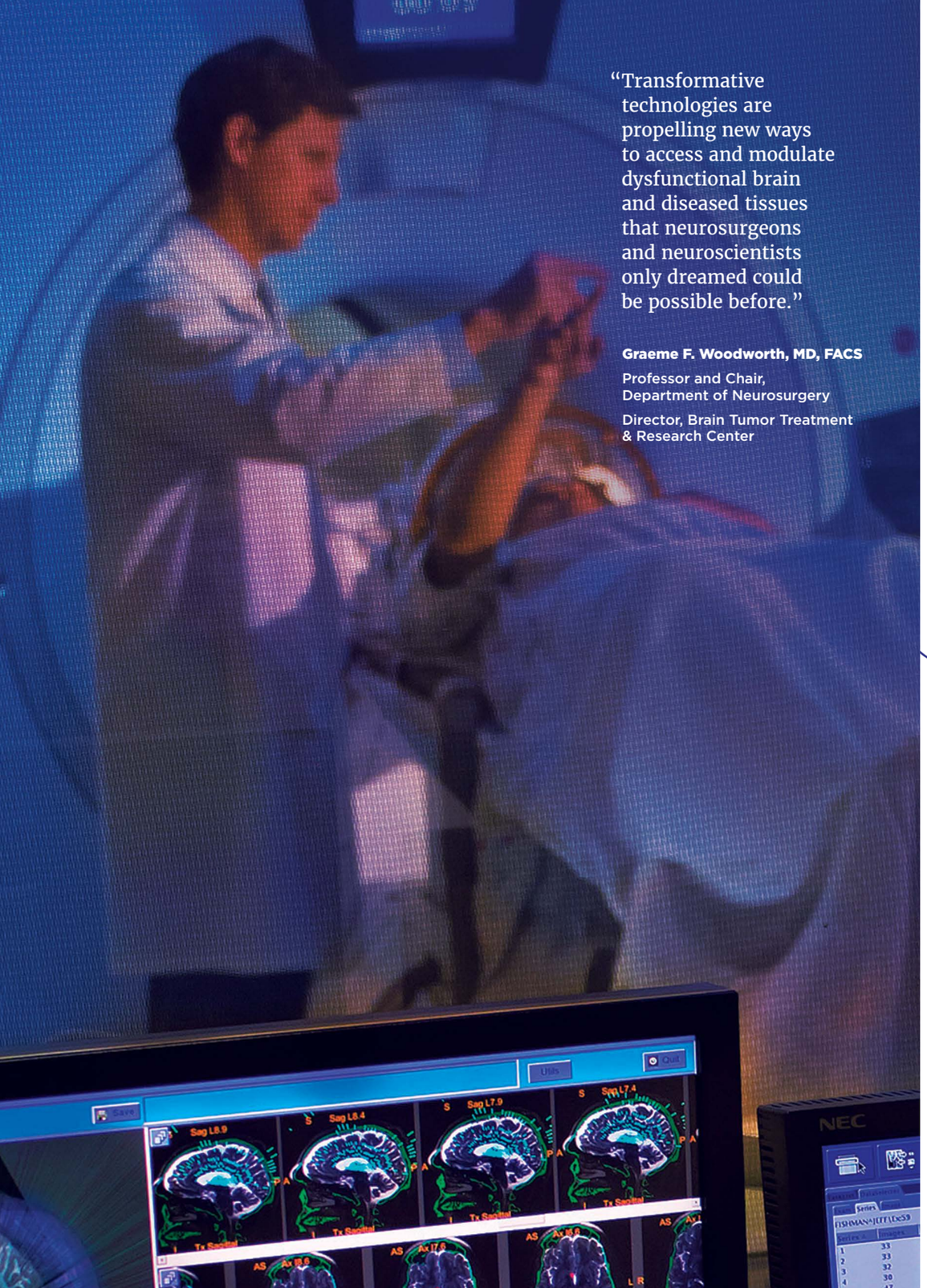
UNIVERSITY of MARYLAND MEDICINE

THE BRAIN: OUR NEXT MEDICAL FRONTIER

CENTER FOR IMAGE GUIDED NEURO-INTERVENTIONS (CIGN)





"Transformative technologies are propelling new ways to access and modulate dysfunctional brain and diseased tissues that neurosurgeons and neuroscientists only dreamed could be possible before."

Graeme F. Woodworth, MD, FACS

Professor and Chair,
Department of Neurosurgery

Director, Brain Tumor Treatment
& Research Center

INVENTING THE FUTURE OF NEUROLOGICAL INTERVENTIONS

Neurodegenerative disorders, stroke, and malignant brain tumors are among the most devastating diagnoses a patient can face. Until recently, many patients with advanced cases have required invasive brain surgery, facing significant risks and recovery time. Despite the best medical and surgical treatments available, disorders such as stroke, essential tremor, epilepsy, Alzheimer's, and Parkinson's disease are major causes of long-term disability for patients and are significant contributors to rising healthcare costs. University of Maryland Neurosurgery is a world leader in pioneering discovery-driven treatments that are providing new hope for these patients.

The ground-breaking clinical CENTER FOR IMAGE GUIDED NEURO-INTERVENTIONS (CIGN) at University of Maryland Medical Center will make cutting-edge neurological care accessible for patients throughout Maryland and beyond. The center is designed to expand treatment capacity, improve the patient experience, and open new research opportunities by co-locating core technologies.

CIGN integrates the latest minimally invasive, image-guided technologies—MRI-guided Focused Ultrasound (FUS), MRI-guided, robotics-assisted laser interstitial thermal therapy (LITT), Deep Brain Stimulation (DBS), and 3D-CT-guided endovascular treatments—to efficiently achieve optimal patient outcomes. The first of its kind in the world, this advanced, multidisciplinary center will enable precision treatments of complex neurological conditions in many cases with no or very small incisions in the skin, working from the inside out.

The sheer complexity of the brain is astounding, but recent advances in our understanding of the structure and function of the brain and central nervous system have opened new opportunities for treatments. Bringing together these innovative technologies will enable interventions that precisely target and treat areas deep within the brain in a minimally invasive way, and in the future, may even offer the potential to provide treatments remotely, bringing this advanced care closer to home.

The University of Maryland is taking the lead in pioneering technological breakthroughs that are saving lives, improving quality of life, and setting a new standard of care.

◄ "I was diagnosed at 44. I thought Parkinson's was a disease of old people but I was taking 15 to 18 pills a day, and I couldn't walk. After each of my FUS 'zaps,' I felt myself getting stronger, my symptoms and my pain getting less and less. I arrived for my last treatment in a wheelchair, and immediately after that treatment, I could walk. FUS had given me back my life. I'm able to go on hikes, run, and ride my bike again. It was like I'd never had Parkinson's. It was a miracle."

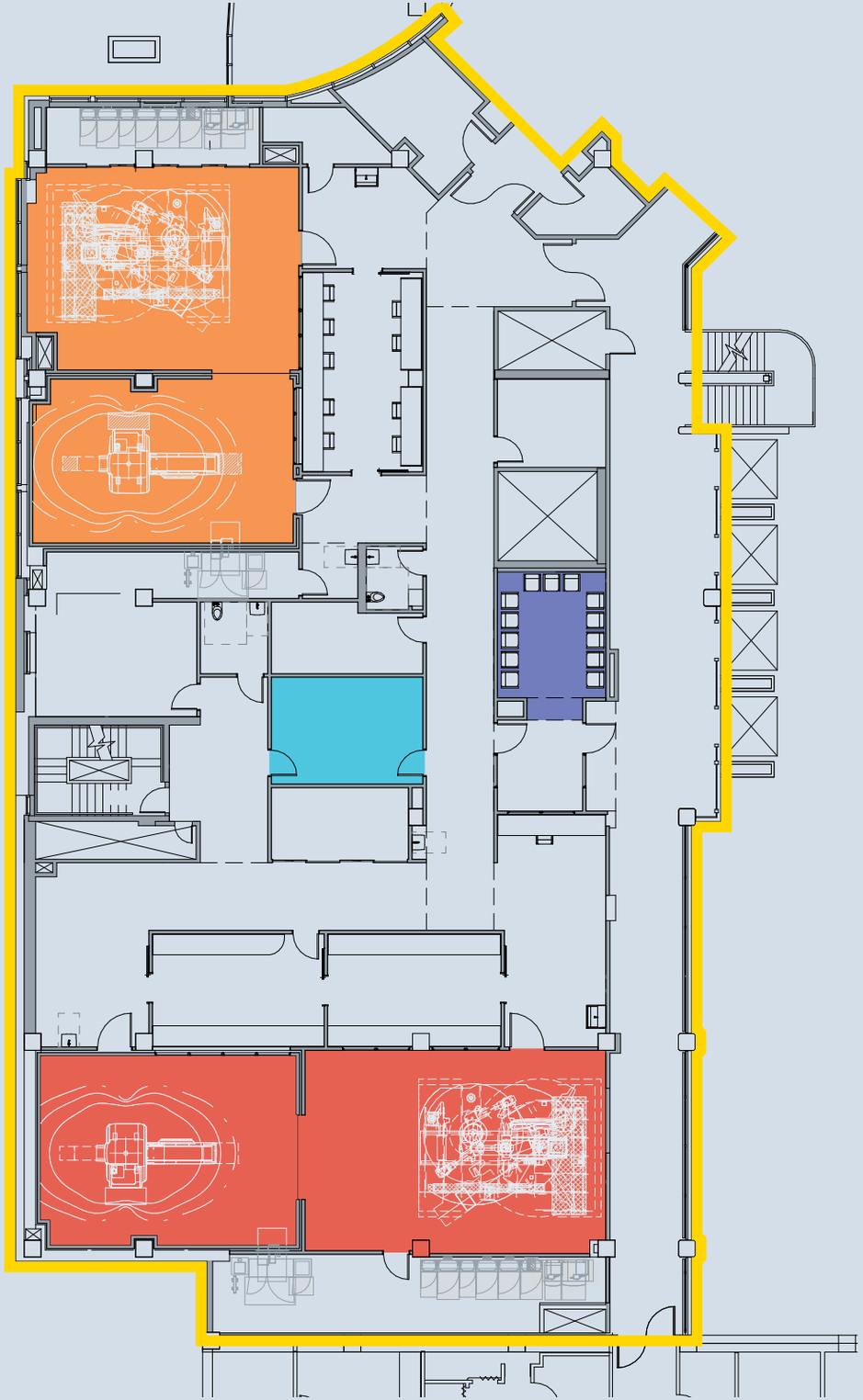
KIMBERLY SPLETTER
was one of the first patients in the U.S. to receive FUS to relieve debilitating symptoms from her Parkinson's medication, through a clinical trial led by UM's Dr. Paul Fishman and Dr. Howard Eisenberg. This trial led to FDA approval in November 2021 of FUS for treatment of advanced Parkinson's Disease patients suffering from mobility, rigidity, or dyskinesia symptoms.

KATHY LADIPO
was transferred to UMMC after clot-busting drugs did not work for her stroke. CIGN will enable robotic stroke interventions, in an effort to increase the availability of life- and function-saving therapies like the mechanical thrombectomy Dr. Dheeraj Gandhi performed on Kathy, at other UMMS hospitals remotely.

"It's amazing that this little clot almost took me out, that a tiny piece of tissue in my brain caused so much havoc. I'm so happy that things all lined up so that I could be not just alive, but that I could be really okay—that my family got me to the hospital so fast, and my hospital made the call to transfer me in a helicopter to University of Maryland, which happened to have a research study on stroke, and they were able to get me in for a procedure that improved my condition immediately." ►

◄ "Having LITT saved my life. We knew my tumor couldn't be removed, and Dr. Woodworth told us this treatment had only been done on ten people in the world and isn't available anyplace else in Maryland. I was my high school quarterback, and one year later I still can't throw a football the way I did before, but I take it one day at a time. I'm back in school, and I'm grateful to be alive. My family is so grateful for Dr. Woodworth and everyone at University of Maryland. To us this is a miracle."

JERRY O'NEILL
was diagnosed with a deadly, inoperable brain tumor in fall 2020. LITT treatment helped improve the effectiveness of radiation and chemotherapy treatments.



GIVING & NAMING OPPORTUNITIES

$20 million

UNIVERSITY OF MARYLAND MEDICINE NEUROSCIENCES brings together the experts and leaders in the Departments of Neurology and Neurosurgery to serve as the nexus for excellence and innovation in patient care, education, and research related to neurological disorders for the State of Maryland and beyond.

$15 million CENTER FOR IMAGE GUIDED NEURO-INTERVENTIONS (CIGN)

Giving Opportunities within the center

$1.5 million **Nexaris Suite A**

$1.5 million **Nexaris Suite B**

$100,000 **Patient/Family Waiting**

$50,000 **Patient/Family Consultation Room**

Clinical Research and Innovation Fund
$1.5 million

Donor Wall Levels

$20,000	Platinum
$10,000	Gold
$5,000	Silver

CIGN has the potential to transform treatment for millions of patients as University of Maryland clinicians and scientists establish new treatment paradigms in clinical neuroscience. The clinical center brings together all of the technology for cutting-edge, life-saving treatment combinations in one space—making the most advanced treatment technology available for patients through our Neuroscience Network.

Precision. Using MRI-guided robotic laser therapy for surgical removal of tumors and therapies that target pinpoint areas deep within the brain through a tiny incision rather than open brain surgery.

Improved outcomes. Pioneering new approaches with the potential to effectively and safely open the blood-brain barrier to allow delivery of effective chemotherapy treatments for brain cancers.

Personalized care. Non-invasive diagnostics allow sampling of tissue within the brain to better understand the genetic profile of each patient and deliver precision-based treatments.

Efficiency. Incisionless and minimally invasive surgeries mean cost-effective care leading to shorter lengths of stay and less risk to patients for infection and surgical complications.

Multi-disciplinary expertise. Designed to bring together all of the technology and clinical expertise for these complex procedures, including Neurosurgery, Neurology, Diagnostic Radiology and Nuclear Medicine, Anesthesiology, Anatomy and Neurobiology, and Pharmacology.

Improved access. Making care by our nationally recognized Stroke Center available remotely to patients at hospitals in their communities through our Neuroscience Network.

Worldwide impact. Serving thousands of patients in Maryland while continuing clinical investigations that have the potential to transform and translate treatments for millions of patients worldwide.

MRI-guided Focused Ultrasound (FUS)

CIGN brings the disruptive, incision-free technology of Insightec's Exablate Neuro system to the patients through the University of Maryland Neuroscience Network. This is the first system for treating essential tremor and advanced Parkinson's disease by delivering ultrasound waves to precisely target dysfunctional neural circuits deep within the brain. The Exablate Neuro is also the first system to provide controlled, targeted opening of the blood brain barrier for localized delivery of therapeutics to the brain. One day, endovascular intervention may be combined with focused ultrasound to allow targeted therapeutic delivery of drugs to patients suffering from brain tumors.

University of Maryland Neurosurgery is a leading center for non-invasive FUS technology worldwide—designing and conducting clinical trials to gain approval for uses of the technology, and to expand the number of patients served. Through these efforts, the FDA has approved FUS for treatment of essential tremor and patients with advanced Parkinson's Disease suffering from mobility, rigidity, or dyskinesia symptoms.

Laser Interstitial Thermal Therapy (LITT)

University of Maryland Neurosurgery has partnered with Monteris to take LITT technology to a next level of impact in the treatment of brain cancer and epilepsy. The Monteris NeuroBlate System uses a minimally invasive, MRI-guided robotic laser tool to heat tumors and diseased brain areas from the inside out.

University of Maryland Neurosurgery is leading the only two clinical trials worldwide comparing LITT plus radiation to radiation alone and is currently the 2nd highest-volume laser center in the U.S.

A New Way to Connect Advanced Brain Imaging with Advanced Brain Treatments

Working with University of Maryland Neurosurgery, Siemens Healthcare has created a revolutionary design called **Nexaris** that offers a new paradigm in MRI-guided Neuro-interventions. CIGN will be home to two **Nexaris** Treatment Suites, which position and connect a hybrid operating suite with the most modern MRI scanner to allow precise targeting of MRgFUS, LITT, and Endovascular treatments directly into the brain without a single incision, with real-time feedback and continuous treatment monitoring.

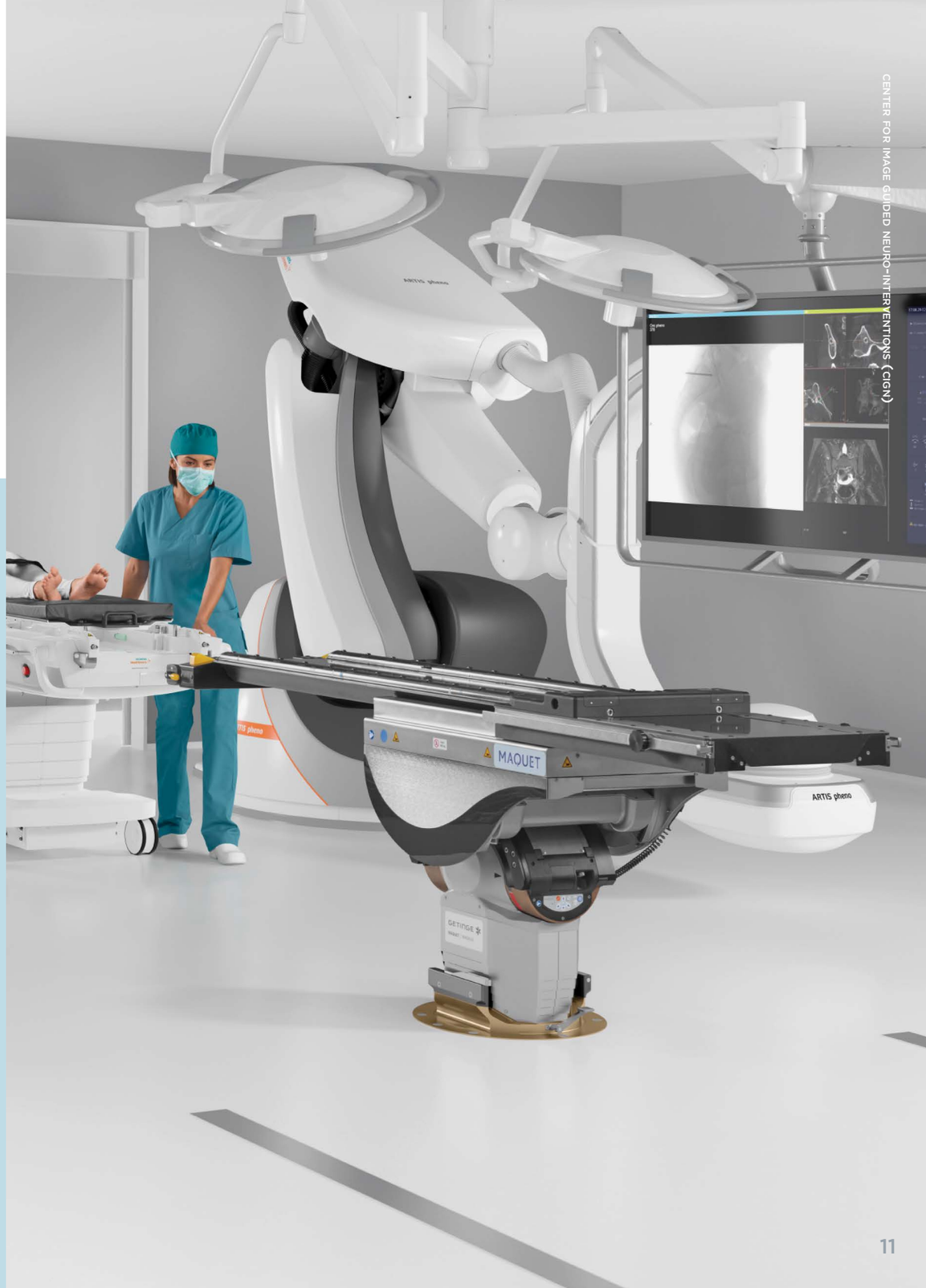
This will be the first center of its kind in the world and set the new standard for image-guided therapies for brain diseases and disorders.

Enabling Remote Stroke Care and Enhancing Endovascular Interventions

New technology at CIGN **aim to expand the University of Maryland Stroke Center's Telestroke program by allowing UM physicians to perform endovascular procedures as complex as mechanical thrombectomy and aneurysm treatments remotely.** Combining angiography and MRI suites can dramatically shorten the time between imaging studies and intervention. CIGN connects UMMC expertise and technology with patients in hospitals across Maryland through the University of Maryland Neuroscience Network, enabling patients to receive the highest quality stroke care in their community, reducing the time for them to receive life- and functionality-saving treatments such as mechanical thrombectomy to treat large clots that don't respond to IV TPA clot-busting medication.

Endovascular intervention allows minimally invasive treatment of many cerebrovascular diseases such as brain aneurysms and ischemic stroke by working within the arteries of the body. University of Maryland Neurosurgery and Radiology have built an interdisciplinary team to expand the reach of this approach. A randomized control trial is underway to explore endovascular treatment of chronic subdural hematomas, a common reversible neurologic condition which can present as a slow cognitive decline in the elderly. CIGN will support multiple trials that are currently investigating novel devices and materials in treating stroke, brain aneurysm, and arteriovenous malformation patients.

The Comprehensive Stroke Center at the University of Maryland Medical Center (UMMC) has been recognized by the American Heart Association (AHA) as among the best in the nation for patient care.



WHY INVEST IN CIGN AT UNIVERSITY OF MARYLAND MEDICINE?

University of Maryland Neurosurgery is fulfilling the promise of advances in neuroscience to save lives and improve outcomes through cutting-edge treatments for the brain and spine. Your investment in CIGN will help us to fulfill our promise to be the epicenter of innovation in neurosurgery in our region, drawing talent, research dollars, and prestige to our city and state.

Working from the principle of "bench to bedside and back," we are improving patient care while advancing scientific breakthroughs that are creating a new standard for neurosurgery.

+ Participated in a multi-center clinical trial using FUS to treat essential tremor. As a result of this pivotal clinical study, MRI-guided FUS is now FDA approved to treat patients with essential tremor.

+ Led a pivotal phase-3 multi-center clinical trial using FUS to treat Parkinson's disease (PD) – Howard Eisenberg, MD *was the first physician in the country* to treat PD patients using FUS—now FDA approved for treatment of patients with advanced Parkinson's Disease suffering from mobility, rigidity, or dyskinesia symptoms.

+ Initiated *the first clinical trials in the United States* using FUS technology to open the blood brain barrier for therapeutic delivery to combat deadly brain tumors such as glioblastoma.

+ Leading a clinical trial using FUS to treat patients with chronic neuropathic pain and trigeminal neuralgia as a non-addictive treatment to reduce the need for narcotics.

+ The University of Maryland endovascular program represents an apex tertiary center receiving patients with emergent conditions from throughout the state of Maryland and region.

+ Using LITT technology to treat malignant brain tumors for patients who are not surgical candidates or have tumor recurrence; developing research protocols to do the same for malignant spine tumors.

+ University of Maryland Neurosciences is the national lead for multi-center the SOFAST thrombectomy trial and additionally participates in six additional clinical trials for complex cerebrovascular disorders.

Self Reflected (detail of cerebellum)
22K gold reflective microetching
96" X 130", 2014-2016
Greg Dunn and Brian Edwards

To discuss ways your investment can fuel these exciting innovations, contact:

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Pioneering solutions
to complex neurological
disorders and innovating
the future of patient care.

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