

Houston Methodist Hospital 6565 Fannin St., Houston, TX 77030 713.DEBAKEY houstonmethodist.org/debakey



Houston Methodist Hospital in the Texas Medical Center — **the highest nationally ranked hospital in Texas for heart, and No. 14 in the nation**.

– U.S. News & World Report



# LEADING HEART & VASCULAR CARE



### HOUSTON METHODIST DEBAKEY HEART & VASCULAR CENTER: **200 STEPS TO INNOVATION**

What truly distingushes Houston Methodist DeBakey Heart & Vascular Center is how we have integrated cutting-edge surgical, imaging and patient care facilities into one building — just steps away from the world-class Houston Methodist Research Institute and the MITIE training facility.



Center unique.

With the opening of a state-of-the-art tower in 2018, we have taken a monumental step to greatly enhance patient services. Few institutions have similar surgical, imaging and patient care facilities under a single roof. It is no surprise that the best and brightest in medicine are eager to make Walter Tower their new home.



### MESSAGE FROM THE DIRECTOR

Recognized for excellence in clinical care and outcomes by U.S. News & World Report, Houston Methodist Hospital is the highest nationally ranked hospital in Texas and the Gulf Coast for heart care, and No. 14 in the nation among 613 hospitals for cardiology and heart surgery. The Houston Methodist DeBakey Heart & Vascular Center is steeped in history, dating back to the days of Michael E. DeBakey, MD. Even with its almost 100-year legacy, the Heart Center is a young institution, with the period following 2004 representing one of rapid growth and revitalization. At that time, we essentially started with a blank slate, without research facilities or teaching programs. This allowed our leadership team to reboot, reimagine and reinvent in ways not possible before. This amalgamation of old and new, combined with an enterprising culture, is what makes the Heart

Our physicians and researchers continue to be at the forefront of innovation. At the Valve Clinic, recognized globally for transcatheter aortic and mitral valve procedures, our physicians are the leading investigators for key clinical trials. In addition, we are making significant strides in improving outcomes for our patients by expanding medical device infrastructure and expertise on our campus through all stages of development. One example of what we can achieve with this infrastructure is the development of a new minimally invasive dialysis access device that allows vascular surgeons to create a connection between an artery and a vein using a magnet, making the dialysis process easier.

Houston Methodist is committed to education, so it is no surprise that DeBakey Institute for Cardiovascular Education & Training is one of the premier cardiovascular training environments in the world. It offers unique, hands-on education for cardiovascular professionals at all stages of their careers. Moreover, surgeons have access to a dedicated hybrid operating room suite used solely for education and training.

As you read through the following pages, I hope you will learn more about our history, vision and accomplishments, and how for us, leading medicine symbolizes an unwavering commitment to every aspect of patient care, research and education.



#### Alan B. Lumsden, MD

Walter W. Fondren III Distinguished Endowed Chair Medical Director, Houston Methodist DeBakey Heart & Vascular Center Chair, Department of Cardiovascular Surgery



# SHAPING THE HEART CENTER BY LEVERAGING AN ACCOMPLISHED HISTORY

"For an institution with an almost 100-year legacy, the period post-2004 stands out as one of rapid acceleration and reinvigoration. This growth has been enabled by a nimble start-up-style approach to organizational development, a novelty in the academic medicine sector. What we have achieved in this short span of time was almost inconceivable when we started, and has set a precedent for others in academic medicine."

### William A. Zoghbi, MD, MACC

Elkins Family Distinguished Chair in Cardiac Health Chair, Department of Cardiology Houston Methodist DeBakey Heart & Vascular Center

Establish graduate medical education (GME) programs

Sign 30-year academic affiliation agreement with Weill Cornell Hedical College

Perform nation's first percutaneous implantation of a left ventricular  $\bigwedge$  assist device (LVAD)

Create continuing medical education (CME) office

Restablish Cardiovascular Imaging Institute

Form Houston Methodist Institute for Technology, Innovation and Education (MITIE<sup>SM</sup>)  $\bigcirc$ 

N Inaugurate Pumps & Pipes conference

Open Valve Clini

### Establish Houston Methodist Research Institute

Launch Aortic Network

Establish DeBakey Institute for Cardiovascular Education and Training

Announce joint faculty appointments and graduate program with Texas A&M University

Perform 1,000th transcatheter aortic valve replacement (TAVR)

Announce innovative engineering medical School option (EnMed) by Texas A&M University and Houston Methodist

Sign technology and research agreement with Siemens (including 7T MRI for research)

Perform 1,000th heart transplant — in collaboration with Houston Methodist J.C. Walter Jr. Transplant Center

### REVOLUTIONIZING THE FUTURE OF CARDIOVASCULAR MEDICINE

The opening of the new Paula and Joseph C. "Rusty" Walter III Tower marks the beginning of an exciting new chapter in the history of Houston Methodist DeBakey Heart & Vascular Center. "After functioning nonstop for close to five decades, the historic operating rooms — where legends like Michael E. DeBakey, MD, Denton A. Cooley, MD and Stanley Crawford, MD, operated — found a fitting new home that will transform patient experience and continue to serve as the birthplace for innovation," said William A. Zoghbi, MD, Elkins Family Distinguished Chair in Cardiac Health and Chair of the Department of Cardiology.

Conceived and constructed with an eye to the future, the 22-story Walter Tower sets a new benchmark for cardiovascular facilities across the nation. The tower has three intensive care floors with all-private rooms, six acute care floors, and a VIP suite with the latest features. The brand-new intensive care units are also built to maximize efficiency and patient satisfaction. The tower offers the most advanced amenities, on a scale and level of sophistication that is unmatched.

Walter Tower sets a new benchmark for cardiovascular facilities across the nation.

HYBRID OPERATING

SUITES

Hybrid ORs combine state-of-theart imaging devices and an operating room, allowing for more minimally invasive procedures.

**366** PATIENT BEDS CARDIAC CATHETERIZATION LABS



MRI and computed CT facilities allow imaging without moving patients during surgery.

> Video recording, production and broadcasting equipment allow for real-time transmission of surgical procedures to conferences and training programs as well as remote support to communicate with physicians all over the world.

## ESTABLISHING THE STANDARDS FOR **COMPLEX VALVE DISEASE MANAGEMENT**

diseases. However, for many patients, particularly those who are at increased risk during open-heart surgery, the advent of catheter-based techniques has been a force of positive "disruption" that has opened up new and promising options. commercial transcatheter valves as well as the latest clinical trials.

Our physicians were among the first in the nation to adopt and advance the use of to TAVR literature.

As an example, Michael J. Reardon, MD, Allison Family Distinguished Chair of Cardiovascular Research, was the national and international principal investigator for multiple TAVR trials. He is the lead author of many high-impact publications, including compared TAVR with surgical valve replacement in severe aortic stenosis patients at

Reardon is also the national principal investigator for the low-risk TAVR trial and will

The Valve Clinic is also a high-volume center for other catheter-based procedures, such as transcatheter mitral valve repair, and participated in the acclaimed COAPT MitraClip® device study. Houston Methodist DeBakey Heart & Vascular Center physicians have performed more than 300 implantations of the MitraClip device\* one of the most in the nation.

Because of a rapidly aging population with an increased risk during open-heart surgery, transcatheter procedures have witnessed an exponential growth. "The Valve Clinic is growing to meet this ever-increasing demand," said Stephen H. Little, MD, medical director of the Valve Clinic and John S. Dunn Chair in Clinical Cardiovascular Research and Education.

Cardiothoracic and vascular surgeon Marvin D. Atkins, MD, is the newest member to join the clinic. Atkins completed fellowships in thoracic and vascular surgery from University of Pennsylvania and Massachusetts General Hospital/Harvard Medical School. One of his focus areas will be less invasive options for valve disease.

Lois and Carl Davis Centennial Chair Neal Kleiman, MD, was the principal investigator for many transcatheter valve trials. "Our specialists are sought after internationally to lecture and teach," Kleiman said. "We also take active leadership roles in training others and sharing our expertise. At the annual Southwest Valve Summit, our physicians teach health care providers case-based decision-making for the accurate diagnosis and treatment of valve disorders."

According to Reardon, the Valve Clinic has set new standards for valve disease management through an interdisciplinary, streamlined and team-based approach. "The fact that we are one of the top performing programs in the nation is testament to the depth and breadth of our expertise in this rapidly evolving field."

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### Annual MitraClip Volume





The Valve Clinic is world-renowned for its expertise in transcatheter procedures and offers access to all commercial transcatheter valves and clinical trials.

### FULFILLING AN UNMET NEED FOR PATIENTS WITH **ADULT CONGENITAL HEART DISEASE**

Congenital heart defects are the most common birth defects in the U.S., affecting nearly one percent of all live births. Revolutionary improvements in pediatric cardiac surgery and advances in neonatal screening now enable more than 90 percent of children born with a heart defect to grow into adulthood. Today, there are more adults living with congenital heart disease in the U.S. than children - one of the most remarkable success stories in modern medicine. This shift in demographics has given rise to a new specialty: adult congenital heart disease (ACHD).

ACHD patients require continued specialized care due to inherent limitations of childhood surgeries, arrhythmias and heart failure. In addition, pregnancy and childbirth, as well as acquired comorbidities, require careful management at ACHD care centers. To meet the distinct demands of this rapidly growing population, Houston Methodist DeBakey Heart & Vascular Center established the Adult Congenital Heart Disease Program in 2012, under the leadership of C. Huie Lin, MD, PhD. Thomas E. MacGillivray, MD, a renowned cardiothoracic surgeon and adult congenital heart surgery specialist, is a prominent new addition to the program.

"I am pleased to welcome Thomas E. MacGillivray, MD, to the Adult Congenital Heart Disease Program team. With the arrival of a surgeon of MacGillivray's caliber, we will continue to be a hotbed for innovation in the emerging field of ACHD," said Lin.

Before joining Houston Methodist as the chief of cardiac surgery and thoracic transplant in late 2016, MacGillivray spent 19 years at Harvard University and Massachusetts General Hospital, where he was the surgical director of the Adult Congenital Heart Disease Program and co-director of the Thoracic Aortic Center. MacGillivray has a special interest in valve-sparing aortic root surgery for aortic root aneurysms. The technique allows him to save the patient's own aortic valve without using a prosthesis, lowering the risk of infection, blood loss and need for blood thinners. This expertise is particularly relevant to the ACHD patient population, as these patients often develop aortic root issues.



When I think back on my first visit to Houston Methodist, I remember feeling a sense of awe standing in the same ORs where Dr. Stanley Crawford and Dr. Michael E. DeBakey, operated," MacGillivray said. "I quickly realized that the future of ACHD management was being charted at Houston Methodist and I wanted to be a part of it."

#### Thomas E. MacGillivray, MD

Chief, Cardiac Surgery and Thoracic Transplant Houston Methodist DeBakey Heart & Vascular Center

# **REVERSING AGING TO TACKLE** CARDIOVASCULAR DISEASE

John P. Cooke, MD, PhD, Joseph C. "Rusty" Walter and Carole Walter Looke Presidential Distinguished Chair in Cardiovascular Disease Research, and researchers at the Center for Cardiovascular Regeneration, are taking a unique approach to tackle cardiovascular disease. "Aging is a major risk factor for heart and vascular diseases. About a third of the people in this country succumb to strokes and heart attacks. If we can find a way to stall or slow down aging, we'll find a fix for a lot of these diseases," explained Cooke.

Cooke and his team have directed their attention to identifying mechanisms that cause accelerated aging of cells in Hutchinson-Gilford progeria syndrome - an extremely rare disease that causes children to age very quickly and die in their teens of a heart attack or stroke. The team focused on the role of telomeres — the timekeepers of cells. As we age, our telomere gets shorter, ticking off the time we have left. In children with progeria, telomere shortening happens at a very rapid pace. "We saw that when we reverse telomere shortening in progeria cells and lengthen them, it reverses many of the problems associated with aging," Cooke said.

The team utilized an RNA delivery system to give the cells the information needed to extend the telomere. The results were truly dramatic. "The telomere-extending technology had a significant effect on the ability of the cells to multiply. They could function and divide more normally, and we gave them extra lifespan as well as better function," said Cooke. Even markers of cellular aging were reversed.

The study findings were published in the Journal of the American College of Cardiology, a leading journal in the field of cardiovascular diseases. The next step is to move this therapy toward clinical use, and the team plans to do so by improving existing cell therapies. "Insights gained from rare disease research, like progeria, not only will help children with progeria live longer, but also will provide a greater understanding of common aging-associated diseases like stroke and heart attack, which affect millions." Cooke said.



### John P. Cooke, MD, PhD

Joseph C. "Rusty" Walter and Carole Walter Looke Presidential Distinguished Chair in Cardiovascular Disease Research, Department of Cardiovascular Sciences Houston Methodist DeBakey Heart & Vascular Center

# ENABLING THE FULL CYCLE OF **MEDICAL DEVICE** DEVELOPMENT

Eric K. Peden, MD, chief of vascular surgery at the Houston Methodist DeBakey Heart & Vascular Center, was the first in the U.S. to use this technique on two dialysis patients. MITIE was chosen as the site for some preclinical testing and serves as a physician training site for this procedure. The system was recently approved by the Food and Drug Administration, and is showing promising early results.

"From device development to preclinical and clinical studies and early adoption to physician training, Houston Methodist has developed an institutional environment that has supported successful device development for the new dialysis access system. Percutaneous fistula creation is probably the most exciting development in dialysis access in more than 50 years, and we are thrilled to be a part of it," said Eric K. Peden, MD, chief of vascular surgery.



Clinical Need

The process of translating an emerging technology from a concept to an effective device that improves patient care in the clinic is fraught with challenges. At Houston Methodist, we have created an environment with state-of-the-art translational infrastructure and expertise to support all stages of the device development process.

A new minimally invasive percutaneous device for dialysis access, the WavelinQ<sup>™</sup> endoAVF System by Becton Dickson is an example of a product that has thrived in this environment with multiple touch points along the path at Houston Methodist. The WavelinQ<sup>™</sup> endoAVF allows vascular surgeons to create a connection between an artery and a vein using magnets, instead of the traditional surgical suturing of an artery and vein together. By reducing complications, this minimally invasive system will make the dialysis process easier and involve fewer procedures.





Prototype



Preclinical Evaluation



**Clinical Trial** 



Regulator Approval



Physician Training



Postmarket Analysis

### TRAINING TOMORROW'S LEADERS: **DEBAKEY EDUCATION**

Inspired by Michael E. DeBakey's commitment to excellence in education, the DeBakey Institute for Cardiovascular Education and Training program provides learners with the most advanced practices in cardiovascular medicine.



### Skills Academy

Skills Academy offers educational workshops and training in procedural skills that are tailored to the skill level of the learner. The programs are conducted at Houston Methodist Institute for Technology, Innovation and Education (MITIE<sup>SM</sup>), a unique virtual hospital and hands-on clinical training facility, equipped with a variety of models and simulators for teaching purposes.



### Hybrid Rooms and Hybrid Procedures

The hybrid operating room suite at MITIE allows trainees to practice real-time, image-guided procedures using an array of imaging equipment and learn new minimally invasive and percutaneous techniques. For example, the International Society of EndoVascular Specialists Symposium uses the hybrid suite to train cardiovascular interventionalists in the latest endovascular disease treatments.

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### Conferences. Seminars and Online Education

DeBakey Education hosts a wide variety of seminars and conferences that provide a full spectrum of cardiovascular training opportunities, such as Cardiovascular Fellows' Boot Camp.

The DeBakey Education YouTube channel features more than 1,300 videos with more than 8.500 subscribers and more than 700.000 views.



### Methodist DeBakey Cardiovascular Journal

The Methodist DeBakey Cardiovascular Journal is a guarterly, peer-reviewed journal designed to update health care professionals on the latest advances in cardiovascular medicine.

journal.houstonmethodist.org

#### Cardiologists

Julia V. Adrogue Mouaz Al-Mallah Mohammed Attar Nabil Baradhi Arvind Bhimara Douglas Bree John M. Buergler Sarma S. Challa Su Min Chang Paul Y. Cunningham Amish Dave B. Keith Ellis Nadia Fida Ashrith Guha Thomas Hong Imad Hussain Robert G. Hust John Isaac Mateethra C. Jacob Sonia Jacob Amin H. Karim Mahwash Kassi Masroor A. Khar Ju Kim Neal S. Kleiman Michael Hosung Koo Sanjay Kunapuli Karla Kurrelmever George C. Li C. Huie Lin Kevin Lisman Stephen H. Little John Mahmarian Faisal Nabi Sherif F. Nagueh Vijay Nambi

### HOUSTON METHODIST DEBAKEY HEART & VASCULAR CENTER MEMBERS

Christie M. Ballantyne Mohammed Chamsi-Pasha Lakshmi Chebrolu-Makam Clement A. DeFelice Stanlev M. Duchman Gholamreza Khoshnevis

Raghunandan Muppidi

Myung H. Park Apoor Patel Robert Philips Craig Pratt Miguel A. Quiñones Albert E. Raizner Michael E. Raizner Tapan Rami Manuel Reves Ali N. Rizvi Monica Ross-Sanchez Howard S. Rubin Sangeeta Saikia George Schroth Paul Schurmann Alpesh Shah Dipan J. Shah Gopi Shah Kesavan Shan Scott R. Sherron Hue-Teh Shih Toussaint Smith Ahmed Soliman Stuart L. Solomon Sherman Tang Cyril Tawa Guillermo A. Torre Barry Trachtenberg Miguel Valderrábano Raiesh Venkataraman Brian Walton Htut Win William L. Winters Eric Y. Yang David Yao Nadim M. Zacca William A. Zoghbi

Nadim Nasir

#### Cardiovascular Surgeons

Marvin D. Atkins Ulises Baltazar Charudatta S. Bavare Jean Bismuth Brian Bruckner Charlie Cheng Lucas Duvall Zsolt Garami Javier Lafuente Gerald Lawrie Linda Le **Richard Lee** Alan B. Lumsden Thomas E. MacGillivray Imran Mohiuddin Joseph Naoum Jacobo Nurko Walter O'Hara Eric K. Peden Maham Rahimi Mahesh Ramchandani Michael Reardon Dewei Ren Ross Michael Reul Erik Suarez Michael Sweenev Uttam Tripathy Randall Wolf Moritz Wyler von Ballmoos

### Cardiovascular

Anesthesiologists Mohamad Abdalla Jason Alexander Nicolas Athanassiou Jian Azimi-Bolourian Jessica Brown James Carter Jane Carter Victoria Contreras Diane Gibson Marty Giesecke Elizabeth Herrera

Craig S. Ignacio Jin Jung Saraswathi Karr Gary Monteiro Joseph Naples Karanbir Singh Zbigniew J. Wojciechowski

#### Investigators in Basic or **Clinical Research**

Mouaz Al-Mallah Ulises Baltazar Colin Barker Charudatta S. Bavare Arvind Bhimarai Jean Bismuth Brian Bruckner Mohammed Chamsi-Pasha Su Min Chang John Cooke Amish Dave Nadia Fida Zsolt Garami Ashrith Guha Imad Hussain Mahwash Kassi Ju Kim Neal S. Kleiman Karla Kurrelmever Gerald Lawrie Linda Le C. Huie Lin Stephen H. Little Alan B. Lumsden Thomas E. MacGillivray John Mahmarian Faisal Nabi Sherif F. Nagueh Myung H. Park Eric K. Peden Craig Pratt Maham Rahimi Mahesh Ramchandan Michael Reardon

Ross Michael Reul Paul Schurmann Alpesh Shah Dipan J. Shah Roozbeh Sharif Erik Suarez Guillermo A. Torre Barry Trachtenberg Miquel Valderrábano Moritz Wyler von Ballmoos Eric Y. Yang William A. Zoghbi

#### Intensivists

Mastian Chand Uddin Faisal Javier Finkelman Faisal N. Masud lobal Ratnani Roozbeh Sherit Kamlesh Thaker Divina Tuazon Prakruthi V. Voore Saleem Zaidi Asma Zainab

#### Administration

Michael Garcia. Senior Vice President, COO Brenda Campbell, Vice President Jordan Jeon, System Program Director, Cardiology/Cardiovascular Services Susmitha Gadde, Director of Research Angela Mitchell. Program Director, DeBakey Education Tammy Plumb, Administrator, Cardiology/Cardiovascular Services