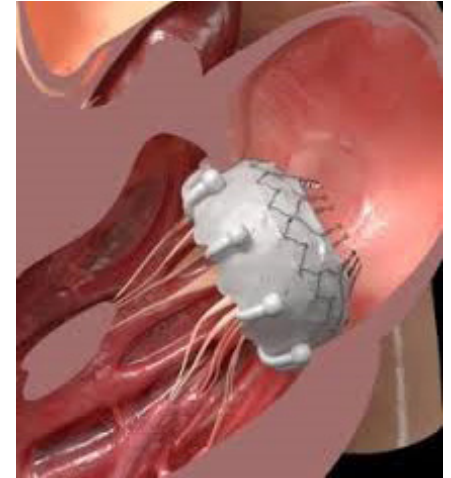


# Heart Valve Disease Research Program

The Heart Valve Disease Research Program at Northwestern University Feinberg School of Medicine uses a multidisciplinary approach to identify and treat heart valve disease. The program brings together clinicians, imagers, surgeons, interventionalists, physicists, engineers, and basic scientists to analyze the physics and physiology of heart valve disease, better define its severity, and develop novel approaches to treatment.



*Evoque Valve*

Our research projects include:

- Developing surgical and catheter-based approaches to treat mitral and tricuspid valve disease.
- Discovering precise, automated methods to quantify the severity of valve dysfunction utilizing multimodality cardiovascular imaging of the heart and its valves.
- Collaborating with Northwestern's McCormick School of Engineering to transform heart valve disease using computational fluid dynamics, deformation imaging, *in vitro* models, and advanced visualization tools.
- Uncovering the genetics of bicuspid aortic valves. This is the most common form of congenital heart disease occurring in up to 2% of the population and is a primary cause of aortic valve dysfunction in adults.
- Creating innovative tools to identify patients at risk for heart valve disease and better understand who will need valve repair or replacement.

## Did You Know?

- Northwestern cardiologists recently completed our 2,000th successful transcatheter valve procedure.
- In the past 10 years, we have performed the highest volume of procedures to repair or replace diseased heart valves in Illinois.
- We are a top enroller in clinical trials to test new minimally invasive therapies to treat tricuspid regurgitation using catheters, which is high risk to treat surgically. We are leading a trial that, if successful, will double the population that can receive the catheter-based mitral valve clip.

## Artificial Intelligence

- AI principles will help identify valve disease earlier and allow patients to receive care faster. Northwestern is leading a study to better identify patients with aortic stenosis and mitral regurgitation using AI principles to diagnose heart murmurs by stethoscope.
- Northwestern is the first in the country to use AI to guide the acquisition of echocardiographic images. This technique improves patient care by providing accurate automated images of the heart that are not dependent on the skill of the operator.
- We have three cardiology fellows annually at Northwestern who will receive a master's degree in artificial intelligence with a focus on cardiovascular disease.

## James D. Thomas, MD

**Professor of Medicine in the Division of Cardiology, Feinberg School of Medicine**

**Director, Center for Heart Valve Disease & Clinical Trials Unit, Bluhm Cardiovascular Institute**

Dr. Thomas is a cardiologist at Northwestern Medicine with a clinical focus in valvular heart disease and echocardiography. He has conducted extensive research into applying physical principles and advanced technology in cardiovascular imaging. Born and raised in Oklahoma City, Dr. Thomas attended Harvard College and Harvard Medical School before his clinical training at Massachusetts General Hospital and the University of Vermont. Dr. Thomas has over 650 peer-reviewed publications and is past-president of the American Society of Echocardiography. His other research interests include cardiac mechanics, application of new technology in cardiology, artificial intelligence, and integration of engineering principles into clinical decision-making.

Since arriving at Northwestern, Dr. Thomas has been instrumental in bringing early device trials to Bluhm Cardiovascular Institute and providing intraprocedural echo guidance for cath lab interventions. He also formed a two-year fellowship in advanced cardiovascular imaging and another in artificial intelligence in collaboration with engineers and scientists on the Evanston campus.



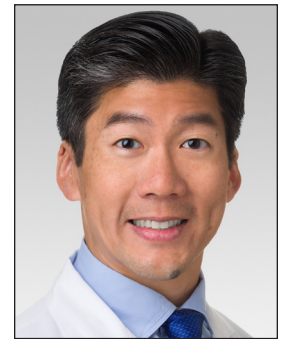
## S. Chris Malaisrie, MD

**Professor of Surgery in the Division of Cardiac Surgery, Feinberg School of Medicine**

**Director, Center for Heart Valve Disease & Clinical Trials Unit, Bluhm Cardiovascular Institute**

Dr. Malaisrie is a cardiac surgeon at Northwestern Medicine. His special interests include Marfan syndrome and related connective tissue disorders, bicuspid aortic valve, aortic aneurysms/dissections, chronic thromboembolic pulmonary hypertension, and mitral valve disease. In addition to complex aortic surgery encompassing valve repair, valve-sparing aortic root replacement, Ross procedure, aortic arch reconstruction, thoracoabdominal aortic repair, and pulmonary thromboendarterectomy, Dr. Malaisrie performs minimally-invasive valve surgery, transcatheter aortic valve replacement, Mitraclip, and endovascular stent grafting. Dr. Malaisrie is board certified by the American Board of Surgery and the American Board of Thoracic Surgery.

Dr. Malaisrie completed his thoracic residency at Baylor College of Medicine and his cardiac surgery fellowship at Stanford University. His additional leadership roles at Northwestern include director of the Thoracic Surgery Residency and Fellowship Program and co-director of the Marfan Syndrome and Related Disorders Program and Thoracic Aortic Surgery Program.



## Heart Valve Faculty

Robert Bonow, MD  
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Jyothy Puthumana, MD  
Vera Rigolin, MD  
Joshua Robinson, MD  
Ranya Sweiss, MD  
James Thomas, MD

**With our strong foundation and the help of industry and philanthropic support, we will better treat and improve the lives of those burdened with heart valve disease through our research.**

To make a gift online to the Division of Cardiology, please visit:

[wewill.northwestern.edu/cardio](http://wewill.northwestern.edu/cardio)

To learn more about supporting the Heart Valve Disease Research Program, please contact:

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