



# Innovators at Heart

A publication for those who support heart-related research, education, and care at the University of Minnesota

## Beyond echo and angiograms

*Advanced heart imaging at the U allows for more accurate diagnosis*

If you've ever had cause to see a cardiologist, your visit likely included echocardiography, or "echo." This test, which uses sound waves to show how well the heart is pumping blood, forms the core of traditional heart imaging, along with X-ray and nuclear imaging.

But these methods may not always provide enough information for physicians to understand the cause of a patient's symptoms or plan the best treatment.

Say you experience chest pains. Your doctor sends you for a stress test to gather information about how well your heart works during physical activity. The test doesn't show a problem. But while traditional stress tests are good at revealing areas of decreased blood flow to the heart or past major heart attacks, they're poor at showing whether a small heart attack might have happened.

Magnetic resonance imaging (MRI), however, can show extremely small amounts of scar tissue or dead cells in the heart, making it possible for doctors to detect even a tiny heart attack and pinpoint the exact site and extent of the damage.

"If I stopped at the traditional stress test, I might say, 'Everything is normal, and there is nothing to worry about,'" says Uma Valeti, M.D., who directs the University of Minnesota's cardiovascular imaging program. "That's totally different from me telling you, 'You didn't have a major heart attack, but you did have a tiny one. That tells me there is a blockage building up in your heart vessels, so we've got to be very aggressive with modifying your risk factors to prevent future heart attacks.'"

Photo by Scott Strebbe



Uma Valeti, M.D., says that imaging is the "backbone" of cardiovascular medicine—diagnosis, treatment, and even prevention.

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## Beyond echo and angiograms *(continued from cover)*

To learn how you can support the advanced imaging program at the University of Minnesota, contact Amanda Storm Schuster at 612-626-2475 or [a.schuster@mmf.umn.edu](mailto:a.schuster@mmf.umn.edu).

Valeti says the complex cases he and his colleagues see require access to leading-edge technologies. University of Minnesota Medical Center, Fairview and all University of Minnesota Physicians Heart locations provide that access.

The new frontier in advanced imaging includes cardiac MRI, CT (computed tomography), and PET (positron emission tomography). Valeti says these technologies open up a new level of information for every area of cardiovascular medicine.

While advanced imaging is helping to reduce the impact of heart disease on people's lives, it also has potential to reduce health care costs by cutting down on invasive procedures and repeated testing.

Cardiac CT, for instance, offers a lightning-fast, noninvasive alternative to angiography, which requires inserting a catheter and dye into the body. "With a CT angiogram, you get a lot more information than what you get with a traditional angiogram," says Valeti. "And all of this at a lower risk of complications and in many cases at a lower dose of X-ray exposure."

CT can show not only a blood vessel but also the walls of the vessel, including plaque that's building up in those walls before it causes

severe blockage, as well as the heart's four chambers and valves. It also shows the sac around the heart and adjacent lung tissue, which do not show up on a traditional angiogram but may be responsible for a patient's symptoms, Valeti says.

The newest tool available through the University is an ammonia PET scanner. Like nuclear imaging, PET quantifies the amount of blood flowing to the heart, but it does so with far less radiation and produces a much higher-quality image, Valeti says. PET can detect inflammation in the heart, check blood flow to a transplanted heart, and evaluate the results of cardiac regenerative therapies such as stem cell treatments and gene therapy.

"The University of Minnesota is one of only a handful of centers in the country that can offer all of these imaging modalities to patients," says Valeti. "Our goal is to make this one of the top 10 imaging programs in the country in the next five years."

Most important, he says, is that University physicians will be able to provide these advanced techniques to help "the right patient at the right time with the right technology."

### A dramatic difference



Image: Center for Magnetic Resonance Research (2010)

*Traditional imaging techniques work well most of the time. But sometimes the next level of imaging is needed to solve a puzzle, as in the case of a 42-year-old man who was having breathing problems and passing out repeatedly.*

*The patient saw Jody Rowland, M.D., a cardiologist at North Memorial Medical Center. Rowland reviewed the man's electrocardiogram, which showed that his heart was stopping intermittently and displaying dangerous rhythm problems.*

*Rowland ordered a cardiac MRI scan to be performed at University of Minnesota Medical Center, Fairview, which revealed that the man's*

*unexplained heart stoppage was due to intense inflammation in the heart muscle and multiple areas of dead tissue. He was diagnosed with cardiac sarcoidosis.*

*The patient was referred to University heart failure specialist Peter Eckman, M.D., for treatment and received a defibrillator to prevent a future cardiac arrest.*

*"This highlights the immense benefits these techniques can offer to patients and physicians in our community," says Uma Valeti, M.D., leader of the University's heart imaging program.*

## Medtronic Foundation backs effort to increase survival rates after sudden cardiac arrest by 50 percent in five years

Sudden heart failure is almost always fatal. About 92 percent of Americans who suffer sudden cardiac arrest outside of hospitals die within minutes. And in the past 30 years, the average national survival rate has not increased.

“It’s because we’ve been doing the same stuff for the last 50 years,” says interventional cardiologist Demetris Yannopoulos, M.D., director of the University of Minnesota Resuscitation Center.

Yannopoulos believes we can do better. He and a group of collaborators from across the country hope to improve survival rates after sudden cardiac arrest—when the heart unexpectedly stops beating—by at least 50 percent in five years through an innovative implementation and awareness effort called the HeartRescue Project.

The goal? For every American who suffers sudden cardiac arrest to receive evidence-based, state-of-the-art care at the scene, en route to the hospital, and at the hospital.

HeartRescue Project partners aim to accomplish this by teaching more people—from members of the general public to emergency medical technicians and emergency room physicians—how they can best respond to such a crisis.

Backed by grants of \$2.5 million from the Medtronic Foundation to each of five partner institutions (at the universities of Minnesota, Arizona, Duke, Pennsylvania, and Washington), the HeartRescue

Project brings together the country’s leading emergency and resuscitation experts, including Yannopoulos and his colleagues at the University of Minnesota Resuscitation Center.

HeartRescue teams also will compile statewide data on the number of cardiac arrests that occur every year and the number of people who survive, Yannopoulos says. For the first time, that data will be reported through the Cardiac Arrest Registry to Enhance Survival in partnership with the Minnesota Department of Health, so anyone can track the progress.

Yannopoulos acknowledges that the Heart-Rescue Project is undoubtedly a big undertaking. But, he says, “it’s a lot of lives saved.”



Photo by Richard Anderson

*Demetris Yannopoulos, M.D., is part of an awareness effort focused on teaching more people how to respond when someone suffers sudden cardiac arrest.*

## Make an IRA gift with major tax benefits

There is still time to take advantage of the Tax Relief Act signed into law last year and make the most of your charitable donations. You can make a gift of up to \$100,000 directly from your IRA to the Minnesota Medical Foundation (MMF) for heart research, education, or care at the University of Minnesota and avoid paying income tax on the amount of your gift. But the extended IRA Charitable Rollover option is set to expire on December 31.

These rules apply to IRA Charitable Rollovers:

- Only IRAs are eligible (other types of retirement accounts are not).
- The donor must be over age 70½.
- The gift must come directly from the IRA custodian to MMF.
- The maximum amount allowed is \$100,000 per year, per donor.
- Gifts cannot fund a charitable remainder trust or gift annuity.
- Tax deductions are not available when completing an IRA Charitable Rollover.

*To learn more, contact MMF’s gift planning team at 612-625-1440, 800-922-1663, or [giftplanning@mmf.umn.edu](mailto:giftplanning@mmf.umn.edu).*

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For one special group of students, summer isn't about waiting tables, babysitting, or hanging out at the mall. Instead, they'll be working side by side with researchers from the Lillehei Heart Institute (LHI), learning

about everything from stem cell therapies to career paths in cardiovascular medicine.

The LHI's Summer Research Scholars Program pairs qualified students with a laboratory and faculty mentor. Along with participating in intensive basic or clinical research, the students visit places like the University's Visible Heart Lab and medical device giant Medtronic, Inc.

"We give the scholars the freedom to explore, in a fairly sophisticated fashion, different career options within the world of cardiovascular

science and medicine," says Mary Garry, Ph.D., an LHI researcher who directs the 10-week program. "This helps them make educated choices as they move forward in their careers."

This competitive program is open to high school students age 16 or older and undergraduate students pursuing health-related degrees.

"We get applicants from all over the country," Garry notes. "We look for students with a great deal of curiosity and students who are willing to come in and give us their very best effort."

Many scholars describe the experience as life-changing, she says. "When young students know that a mentor takes a keen interest in their development, the sky is the limit."

*Applications for the summer 2012 program will be accepted through February 15. Apply at [z.umn.edu/summerscholars](http://z.umn.edu/summerscholars).*

## Summer program pairs students with research mentors

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