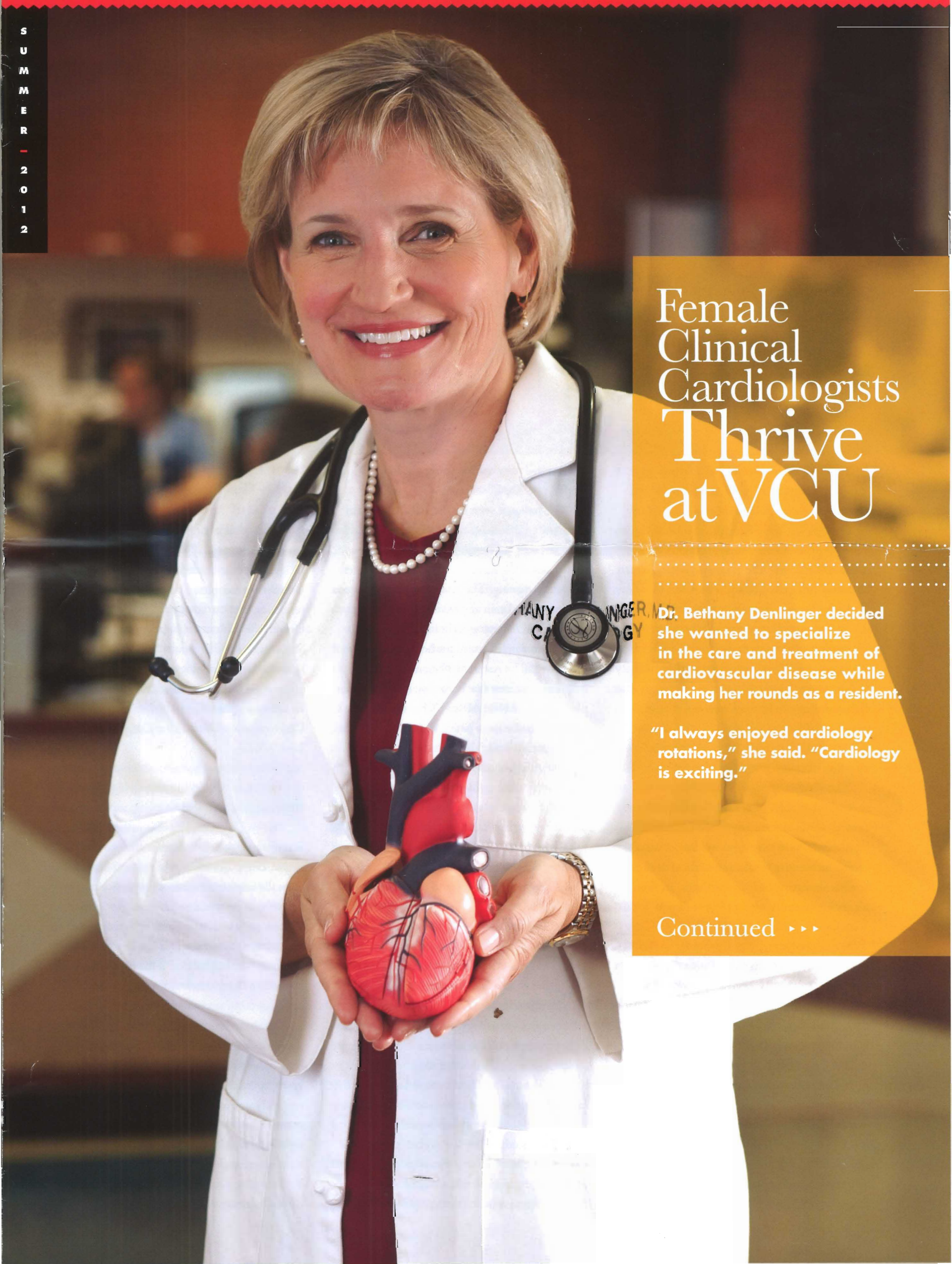
TheBeat

VCU Pauley Heart Center

A PUBLICATION OF
THE VCU PAULEY HEART CENTER
ON VIRGINIA COMMONWEALTH UNIVERSITY'S
MEDICAL COLLEGE OF VIRGINIA CAMPUS

SUMMER – 2012



Female Clinical Cardiologists Thrive at VCU

Dr. Bethany Denlinger decided she wanted to specialize in the care and treatment of cardiovascular disease while making her rounds as a resident.

"I always enjoyed cardiology rotations," she said. "Cardiology is exciting."

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Dr. Denlinger attended the VCU School of Medicine for both her residency and fellowship. Today, she is an outreach cardiologist for the Pauley Heart Center. She spends three days each week in South Hill, Va., assessing patients with a wide variety of cardiovascular diseases and performing non-invasive cardiac imaging. In addition, two days a week she teaches medical students and fellows and sees patients at the Hunter Holmes McGuire V.A. Hospital in Richmond.

"She really is the ultimate clinical and academic modern physician," said Dr. George Vetrovec, Director of VCU's Adult Cardiac Catheterization Lab and Associate Chair for Clinical Affairs. "She teaches at the V.A. Hospital and is very accomplished in that regard. But she also has made a very critical contribution by bringing our traditional academic center into the South Hill community and creating a partnership there."

The busy cardiologist stands among an increasing number of women who are thriving in a field historically dominated by men.

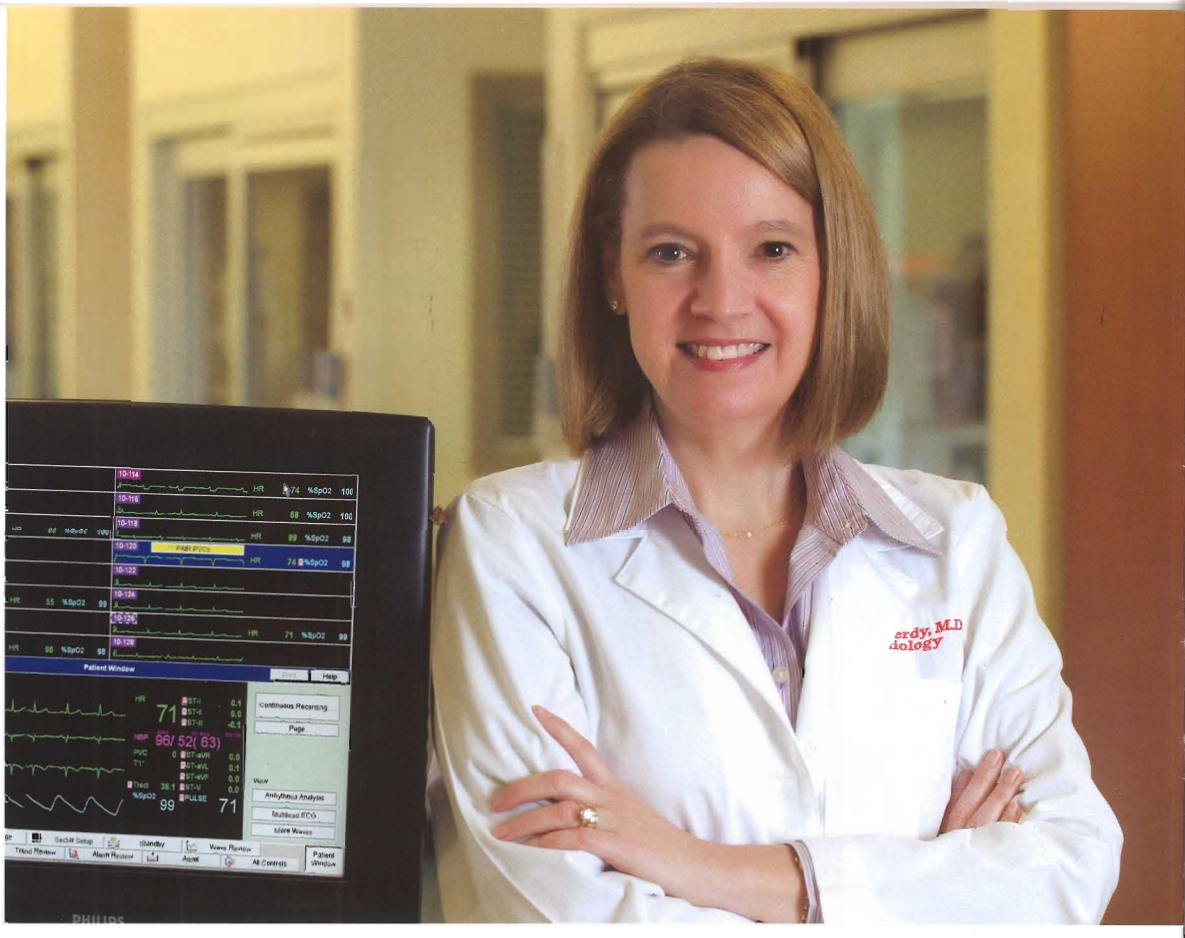
"Having more women in cardiology can bring different perspectives and different priorities in care. For instance, one of my interests is heart disease in women. Women have atypical presentations of heart disease, sometimes ignore their symptoms, and can be more difficult to diagnose," she said. "I think if more women are in the field of cardiology, then there will be more awareness of these issues."

Among medical students, a significantly higher percentage of men choose to go into the cardiology field than women. According to the American College of Cardiology, women make up only 20% of the total number of heart doctors.

The Pauley Heart Center has a successful record of recruiting female cardiologists. Like their male colleagues, Pauley's female cardiologists are drawn to the university's vibrant clinical and academic setting. Many of them, in fact, served their residency or fellowship at VCU.

"For instance, one of my interests is heart disease in women. Women have atypical presentations of heart disease, sometimes ignore their symptoms, and can be more difficult to diagnose."

"VCU is world-renowned in cardiovascular medicine. We draw smart, hard-working doctors who want to be at the forefront of cardiac clinical research and advanced patient care," said Dr. Kenneth Ellenbogen, Chief of the Cardiology Division, Pauley Heart Center.



COVER: DR. BETHANY DENLINGER / ABOVE: VCU AND THREE OTHER ACADEMIC MEDICAL CENTERS HAVE JOINED FORCES TO LOOK AT WHAT HAPPENS TO CELLS AFTER THE HEART RESTARTS FOLLOWING CARDIAC ARREST. MARY ANN PEBERDY, M.D., IS THE LEAD INVESTIGATOR OF THE STUDY.

Dr. Mary Ann Peberdy serves as Director of the VCU's Advanced Resuscitation, Cooling Therapeutics, and Intensive Care (ARCTIC) program–featured last year on PBS's *NOVA* series–and Medical Director of the hospital's code and rapid response teams.

"Dr. Peberdy has helped build one of the best cardiac resuscitation programs in the world," said Dr. Ellenbogen.

The patients seen by the ARCTIC team have suffered sudden cardiac arrest. Often confused with a heart attack, cardiac arrest occurs when the heart suddenly and unexpectedly stops beating. The result is that blood stops flowing to the brain and other vital organs.

ARCTIC's strategy calls for paramedics to start the cooling efforts in the field, often before the heart can be restarted. Nationally, survival from cardiac arrest that occurs outside of the hospital is around 11%; ARCTIC has a consistent survival rate for these patients of about 50%.

In recent years, "there is a much deeper understanding of what causes the brain and heart injury after cardiac arrest, and new therapies, such as hypothermia and goal-directed care, can now significantly improve outcomes," said Dr. Peberdy.

She joined the VCU faculty in 1993, after completing her residency and cardiology training at the Medical College of Pennsylvania. In addition to treating patients, she undertakes clinical and translational research in the fields of resuscitation and heart failure and is the author of over 140 research papers. She also maintains an active cardiology practice, specializing in patient care for advanced heart failure and critical care cardiology.

"The last 10 to 15 years have brought dramatic changes in the therapies available to treat patients with both heart failure and cardiac arrest," she said. "They are probably two areas in cardiology that have seen a rapid advancement in the science that has translated into improved outcomes for both populations."

Dr. Peberdy enjoys the challenge of caring for acutely and critically ill patients. "The greatest reward is being able to send someone home and back to their family after suffering a cardiac arrest."

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Originally from Canada, **Dr. Evelyne Goudreau** completed her medical training, residency, and cardiology fellowship at University of Montreal Faculty of Medicine. She attended VCU for a fellowship in interventional cardiology and then accepted a position on the faculty in 1988. She works as an attending physician in both the Cardiac Catheterization Lab and the Coronary Care Unit (CCU).

"Dr. Goudreau is a critical component of our faculty–a very hardworking, highly talented clinician," said Dr. Vetrovec.

Her work involves cardiac catheterization and percutaneous interventions. Since she began, one major change in the cath lab has been the implementation of primary angioplasty for patients presenting with acute myocardial infarctions, which has significantly improved their clinical outcome. This has been possible by reducing "time to balloon"–that is, the time it takes for a heart attack victim to receive angioplasty or other revascularization procedures.

"We have been at the frontier of interventional cardiology innovations," she said. "We have pioneered many new technologies over the years, and the introduction of coronary stenting was truly a revolution in the cath lab, allowing performance of more complex angioplasties with significant improvement in short-term and long-term outcomes."

Recently, "we have been involved in the clinical evaluation of robotics," she said.

ABOVE: DR. HEM BHARDWAJ / TOP RIGHT: DR. EVELYNE GOUDREAU / BOTTOM RIGHT: DR. JORDANA KRON

"Structural heart disease in the adult patient population is a field that will bring new technologies to the cath lab. We also anticipate increasing our involvement in hybrid procedures as we team with the CT surgeons."

In the CCU, she has noticed a shift in patient population, with a substantial increase in heart failure patients. As a result, she said, "we are offering more aggressive mechanical support with the expansion of the heart failure and transplant program."

Clinical electrophysiologist **Dr. Jordana Kron** found her calling while working shifts as a resident in the cardiac ICU of Johns Hopkins Hospital .

"It's a very intense rotation, and we were on call there every third night. I think what I loved about it most was that the patients would come in so sick but there was such opportunity to help them," she said.

One patient arrived with complete heart block and a pulse of 20. "The patient was critically ill and couldn't stand up. The electrophysiology team came in and put a pacemaker in, and the patient went home the next day."

Dr. Kron went on to receive her cardiology and electrophysiology training at the University of Florida in Gainesville, Fla. She now works at both VCU's downtown campus and its outreach clinic at Stony Point.

"She is an outstanding clinician, with wide-ranging interests," said Dr. Ellenbogen.

Her areas of focus include an extensive list of atrial and ventricular arrhythmias as well as device management in patients with heart failure. She has a special interest in cardiac sarcoidosis, a rare form of inflammatory heart disease that can cause both fast and slow rhythms in patients and can lead to sudden death.

"So little is known about cardiac sarcoidosis. It is hard to study these patients because it is so rare," she said.

To further research, she organized a group of colleagues from 13 medical institutions in the United States, Canada, and India. The physicians studied the data collected in the defibrillators of 235 patients with the disease–the largest sample ever–and presented their findings at the Heart Rhythm Society in May 2012. Dr. Kron also helped to create the Cardiac Sarcoidosis Consortium, a registry to track the patients worldwide.

"The last 10 to 15 years have brought dramatic changes in the therapies available to treat patients with both heart failure and cardiac arrest," she said.

She enjoys the intellectual, collaborative environment at VCU. "If we have an interesting case going on, we will pull in our partners so that we can work together," she said. "I think that leads to really good patient care and also to ongoing education, where you continually learn from your partners."

Dr. Hem Bhardwaj served her residency at University of Virginia Medical Center, and then attended VCU for her fellowship in cardiology. Upon completion of her fellowship, VCU offered her a faculty position.

"I jumped at the chance," she said. "Working at VCU provides me the opportunity to teach cardiology fellows and interact with physicians who are on the leading edge of not only cardiovascular medicine but other specialties as well."

"Hem Bhardwaj is a general cardiologist–something of a rarity in the field of academic cardiology, where the majority of cardiologists are subspecialized in some fashion. She has a better global view of the patients because of this," said Dr. Richard Cooke, Interim Medical Director of VCU's Heart Transplant and Advanced Heart Failure programs.

Dr. Bhardwaj's special interests include echocardiographic imaging, especially related to heart failure. Most of her time is spent in clinical work, she said, "but I am now starting to participate in research. I am starting to look at the role of echocardiography in patients with heart failure who have mechanical assist devices."

Additionally, she said, transcatheter aortic valve replacement (TAVR) is being introduced this year to VCU. The TAVR procedure involves replacing the aortic valve with a less invasive approach, as an alternative to open-heart surgery.

"I am very excited to have been offered the chance to be involved in the echocardiographic portion of this new venture at VCU," she said. "Having opportunities like this is instrumental to why I chose to work here."

LEADERS IN INTERVENTIONAL CARDIOLOGY:

Dr. Vetrovec and the Cath Lab Team

Dr. George Vetrovec remembers when he performed the area's first coronary balloon angioplasty at MCV Hospital.

Dr. George Vetrovec remembers when he performed the area's first coronary balloon angioplasty at MCV Hospital.

"It was a little scary, but there was a lot of excitement about it," said Dr. Vetrovec, Director of the Adult Cardiac Catheterization Lab and Associate Chair for Clinical Affairs. "We started doing balloon angioplasties in July 1979, less than two years after the first one had been done in the world. Dr. Michael Cowley and I went to Switzerland to train with the procedure's pioneer, Dr. Andreas Gruentzig."

Today, about 800 to 1,000 balloon angioplasties are performed each year in the VCU Pauley Heart Center's Cardiac Catheterization Lab. The around-the-clock facility has four individual procedure rooms, where about 3,000 planned and emergency procedures take place each year. These procedures include angioplasty, rotational and directional atherectomy, valvuloplasty, and stent placement.

"Dr. Vetrovec is a nationally and internationally renowned pioneer in cardiac catheterization and interventional cardiology. He has built one of the best and most advanced cardiac catheterization laboratories and teams in the world," said Dr. Kenneth Ellenbogen, Chair of the Cardiology Division of the VCU Pauley Heart Center.

In addition to Dr. Vetrovec, two other highly esteemed, senior interventional cardiologists–Dr. Michael Cowley and Dr. Evelyne Goudreau–lead the cath lab team. A staff of physicians, nurses, and technicians specially trained in invasive cardiology also provide support. In July, Dr. Zachary Gertz joined the team as Director of the Structural Heart Disease program. His experience includes catheter-based techniques in heart valve replacements and repair.

VCU's team has piloted much work over the years and recently took part in a multicenter study using robotics to control angioplasty guide wires. Dr. Vetrovec is also introducing balloon angioplasty of the renal artery as a means of treating hypertension.

Dr. Vetrovec, who joined the MCV faculty in 1976, enjoys the rewards of helping individual patients. But he also likes being part of a facility where his work can have farther-reaching effects.

"If you work in some small area and develop something new, you can really magnify your impact on the number of patients that you can ultimately help," he said.

Dr. Vetrovec completed his M.D. at the University of Virginia and then undertook his cardiology training at MCV. He has been a member of the MCV faculty since 1976 and has enjoyed watching the evolution of the modern cath lab.

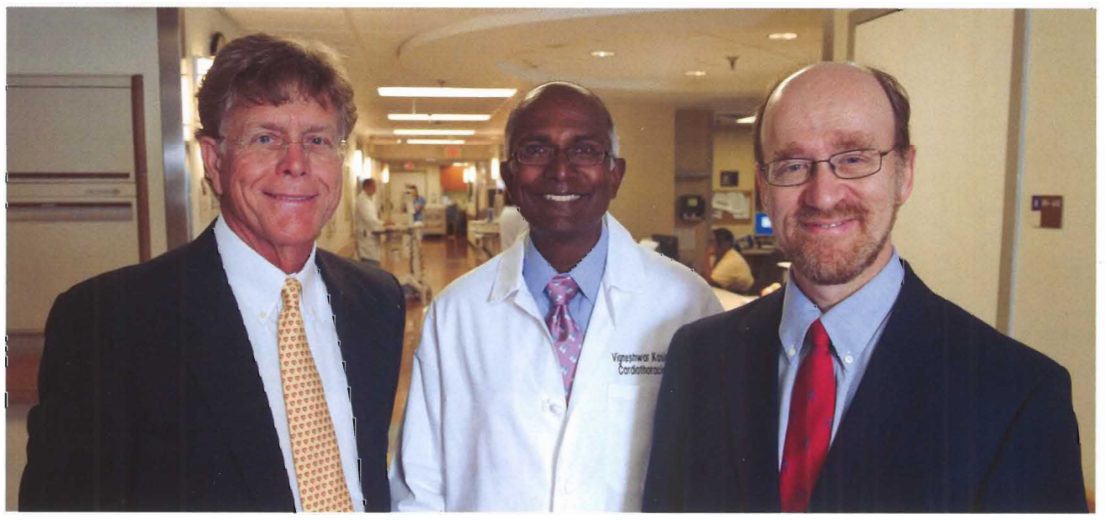
"We've gone from being afraid to do a catheterization after someone had a heart attack to now trying to get them in as quickly as possible," he said.

When his father survived a heart attack over 50 years ago, "mortality rates were probably 25%," he said. "Today, they are probably 2-3%. So, it's a huge difference."

RIGHT: DR. GEORGE VETROVEC
BELOW: DR. VETROVEC IN SURGERY

Charting a New Course Without A-fib

Bill McAllister had worked hard his whole life and wasn't planning on slowing down in retirement.



FROM LEFT: BILL MCALLISTER, DR. VIGNESHWAR KASIRAJAN AND DR. KENNETH ELLENBOGEN

He had grown his company, Colonial Mechanical Corporation, from two employees to 700. When he sold the company to FirstEnergy and retired, he planned to spend more time captaining his 59' custom-built sport fishing boat. He and his wife, Rennie, liked to fish in marlin tournaments and take the boat on long-distance journeys through open ocean waters.

But Bill began experiencing cardiac episodes. While working out at the gym, for instance, his heart rate would suddenly shoot up from 125 to 185 beats per minute. He'd often wake up in the middle of the night with a fever and a strange sensation in his chest.

"Have you ever seen the movie 'Alien'? I felt like there was something in my chest that wanted to get out," he said.

Two months into his retirement, Bill learned that he had atrial fibrillation, an irregular rhythm in the upper chambers of the heart.

Within a month, Bill was exercising regularly. That May, Dr. Ellenbogen reported that Bill had a perfect EKG—without the help of Coumadin.

His cardiologist put him on a regimen of heart medications. Over the next few years, Bill's dosages went up and left him feeling increasingly fatigued. The medications required blood tests every two weeks, putting a curb on extended traveling. His doctor ruled out surgery.

"He said I had to learn to live with a-fib and stay on Coumadin for the rest of my life," he recalled.

He sought a second opinion from Dr. Kenneth Ellenbogen, Chair of Cardiology at the Pauley Heart Center, and a leading researcher in the treatment of a-fib. After carefully evaluating Bill's condition, Dr. Ellenbogen recommended Maze surgery, a procedure in which a surgeon uses an energy source to make precise scars on the heart to block the irregular impulses that cause the arrhythmia and restore the heart to a normal rhythm.

"I loved it, because it was a positive fix," said Bill. Although the open-heart surgery came with some risks, he said, "I was told there was an 85-90% chance that it would permanently fix the atrial fibrillation."

Dr. Vigneshwar Kasirajan, Chair of Cardiothoracic Surgery at Pauley, performed the surgery on Bill—without any complications—in March 2004.

After his release from the hospital, Bill went home, where his wife helped in his recuperation. A graduate of the MCV nursing program, Rennie had once served as the nursing coordinator of the hospital's pediatric emergency room.

Within a month, Bill was exercising regularly. That May, Dr. Ellenbogen reported that Bill had a perfect EKG—without the help of Coumadin.

Since that time, Bill has resumed an active lifestyle that includes captaining his boat to Nantucket and Mexico and playing guitar in a bluegrass band with his college friends. In the eight years since his surgery, he has never experienced another episode of atrial fibrillation.

He is grateful to Drs. Ellenbogen and Kasirajan for turning his life around. Before the surgery, he sometimes couldn't make it upstairs without sitting down.

"Now I take the steps two at a time," he said.

Note: In June 2006, Dr. Kasirajan helped develop a modified "mini Maze" surgery that does not require open-heart surgery. In this innovative method, the surgeon accesses the heart through three small incisions on each side of the chest. The surgeon uses endoscopic cameras and instruments to perform the ablation. Because the chest does not have to be opened, recovery is much easier and the average hospital stay is around four days.

Harvey's Moving!

When the VCU School of Medicine moves into new quarters, "Harvey" will be along for the ride.

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Harvey is a life-sized mannequin that can realistically simulate the heart and lung sounds of 30 cardiac conditions. The mannequin, one of the patient simulators in the medical school, is popular among medical students and cardiology fellows.

With the turn of a dial, instructors can create a new set of symptoms for students to diagnose. One moment, Harvey is a 45-year-old man with a heart murmur; the next, he's a woman in her late 30s experiencing chest pain.

"Harvey represents an exciting shift toward more active learning opportunities in the medical school curriculum," said Dr. Ellen Brock, who heads the Center for Human Simulation and Patient Safety. "Simulation and standardized patients are important tools for maximizing quality of patient care as students, residents, and other healthcare professionals spend time honing their skills in a safe and controlled setting."

Brock's center will occupy two floors of the new McGlothlin Medical Education Center, scheduled to open in Spring 2013. The 200,000-square-foot, 12-story facility will house a significant part of the school's research and classroom space. A skywalk will link the building to the main hospital on the MCV campus.

The $158.6 million project is a public-private partnership, with over $37 million raised to date in private funds. The state-