

NewYork-Presbyterian Advances

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Recognized with ACC's
Lifetime Achievement Award



NewYork-Presbyterian
Cardiology and Heart Surgery
Ranks #4 in the Nation

Dr. Nir Uriel: Elevating Progress in Advanced Heart Failure

Nir Uriel, MD, MSc, an internationally recognized leader in heart failure, mechanical circulatory support, and heart transplantation, has been named to the newly created position of Director, Advanced Heart Failure and Cardiac Transplantation at NewYork-Presbyterian. In this new role, Dr. Uriel will oversee heart failure programs at NewYork-Presbyterian's campuses in Manhattan, Queens, Brooklyn, and Westchester, with a goal to increase accessibility of care for those with advanced heart failure throughout the New York area.

Born and raised in Israel, Dr. Uriel earned his medical degree at the Ben Gurion University of the Negev. After completing his internship in internal medicine at Assaf Harofeh Medical



Dr. Nir Uriel

Center, he served for four years in the Israeli Defense Force, initially as a combat battalion physician and then as a clinical study supervisor in the Army's medical research corps. Returning to Assaf Harofeh Medical Center to complete his residency and a cardiology fellowship, he then moved to New York in 2008 to pursue fellowships at NewYork-Presbyterian/Columbia

University Irving Medical Center

in cardiology, heart failure, transplant, and mechanical circulatory support, remaining here as a faculty member for five years.

"I came to Columbia 11 years ago to do my fellowship and it was one of the best years of my training, if not the best," says Dr. Uriel.

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Dr. Stephanie Mick: Spearheading Minimally Invasive Cardiac Procedures

Renowned cardiothoracic surgeon **Stephanie L. Mick, MD**, has joined the Department of Cardiothoracic Surgery at NewYork-Presbyterian/Weill Cornell Medical Center as Director of Robotic and Minimally Invasive Cardiac Surgery. Dr. Mick comes to NewYork-Presbyterian/Weill Cornell from the Cleveland Clinic, where for nearly a decade she achieved national recognition for performing a range of cardiac procedures, particularly with robotic surgical approaches. Additionally, Dr. Mick served as the Surgical Director of the Transcatheter Aortic Valve Replacement Program.

Dr. Mick's appointment is especially gratifying, she says, as New York is where she received her undergraduate degree in philosophy at Columbia University and went on to earn her medical degree at Weill Cornell Medical College. There she was awarded the Janet M. Glasgow Memorial Award given to the female medical student with the best graduating academic record. Dr. Mick completed her internship and residency in general surgery at NewYork-Presbyterian/Weill Cornell and was presented with the Chief Residents' Award for Clinical Excellence. During her residency, she also

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Dr. Nir Uriel: Elevating Progress in Advanced Heart Failure (continued from page 1)

“That’s the reason I decided to stay at Columbia and had an amazing five years as an attending.”

Dr. Uriel took a particular interest in high-risk heart transplant populations, including patients with HIV and those who had undergone chemotherapy. “When you deal with advanced heart failure in which life is on the line all the time, and there is only a slight gap between being alive or dead, you find yourself asking a lot of questions along the way that may help the next patient,” says Dr. Uriel. “I began to develop algorithms to try to help those patients live a much better and normal life. We started transplanting patients with HIV and learned that we can do it as successfully as transplanted patients without HIV.”

Dr. Uriel also conducted research in heart failure, developing and validating a set of decision-making tools now used to guide the treatment of patients with mechanical assist devices, and he was one of the first to determine the prevalence of acquired Type II von Willebrand’s disease in such patients.

In 2014, he was offered the position of Director of Heart Failure, Transplant and Mechanical Circulatory Support at the University of Chicago Medicine, where he also served as the Louis Block Professor of Medicine. “The opportunities were great, and I left taking the knowledge and the experience that I had gained here at Columbia,” he says.

A Burgeoning Career

The next five years served as another period of significant professional growth for Dr. Uriel. “I had the opportunity to run the largest mechanical circulatory support study in history and will be publishing a paper about it in *The New England Journal of Medicine*,” he says. Dr. Uriel was also among the physician leaders of the University of Chicago Medicine transplant care team that made history in December 2018 after performing two triple-organ transplants within 27 hours, replacing the failing hearts, livers, and kidneys of 29-year-olds Sarah McPharlin and Daru Smith.

“Sarah came to my office after multiple institutions told her that she needed hospice because she had come to the end of her life,” recalls Dr. Uriel. “I didn’t think so, and I told her, ‘Sarah, we’re going to try to do everything we can. I can’t promise you anything, but we are going to try to do it.’ She not only needed a heart transplant, but her liver and kidney were also already destroyed due to heart failure. So, we set up the plan, designed what we were going to do, and just two days before Christmas, we did a triple-organ transplant.”

Shortly thereafter, Daru Smith arrived at the hospital emergency department requiring a triple-organ transplant due to multisystem sarcoidosis. “Our team was already in the mindset that the triple-organ transplant can be doable and that we could help Daru, too,” says Dr. Uriel. The back-to-back surgeries marked the first time a U.S. hospital had ever performed more than one of these most challenging and complex cases within one year, much less within 27 hours.

Targeting Heart Failure in a Big Way

In discussions with **Allan Schwartz, MD**, Chief of Cardiology at NewYork-Presbyterian/Columbia, about the prospect of returning to NewYork-Presbyterian, Dr. Uriel points to some of the reasons that led him to accept. “What amazed me when I was working here is that NewYork-Presbyterian is all about the patient,” he says. “Returning to the place where you were trained, you want to do something special. I thought it would be wonderful to increase the accessibility of care to all people with advanced heart failure. With a hospital network that is sitting in Manhattan, in Brooklyn, in Queens, and in Westchester, we have an opportunity to provide care to millions of people in the New York area.”

“There are a lot of treatment options today that will change people’s lives, increase their longevity, and give them a good life and another holiday to celebrate with their grandchildren, children, and spouses.”

— Dr. Nir Uriel

According to the American Heart Association, of the more than 6 million Americans living with heart failure, about 10 percent have advanced heart failure, a field that has grown dramatically in the last two years. “The problem is that most of the people are not diagnosed with this condition, and many of them do not achieve the level of care that they require,” says Dr. Uriel. “There are a lot of treatment options today that will change people’s lives, increase their longevity, and give them a good life and another holiday to celebrate with their grandchildren, children, and spouses.”

Investigations to Help a Failing Heart

Dr. Uriel has published more than 200 original peer-reviewed articles in the *Journal of American College of Cardiology*, *Circulation*, and the *Journal of Heart and Lung Transplantation*, among others. “One aspect of my research continues to focus on how we can help a failing heart with mechanical circulatory support,” he says. “It challenges us because we are creating something that is hybrid – half human and half machine. We need to understand how this interaction between the machine and the human body, specifically the blood, leads to something that will allow the patient to live and with a good quality of life. We call this condition hemocompatibility, but it is much more than that.”

“Our original study, which began at Columbia, looked at the effect of what happened to the patient’s blood with mechanical circulatory support,” continues Dr. Uriel. “Blood doesn’t like metal, blood likes tissue.”

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Dr. Stephanie L. Mick: Spearheading Minimally Invasive Cardiac Procedures (continued from page 1)



Dr. Stephanie L. Mick

pursued a three-year postdoctoral research fellowship with an interest in vascular biology at New York University School of Medicine, returning to Weill Cornell Medicine to complete her chief residency in general surgery. This was followed by subspecialty training in cardiothoracic surgery at Brigham and Women’s Hospital.

Dr. Mick recalls a defining moment that occurred during general surgery training at Weill Cornell when she encountered the beating heart during a lung operation and had an epiphany that the heart was her passion. “My decision to become a heart surgeon that day began a journey that would take me to other world class institutions where I gained experience and expertise, especially in minimally invasive and robotic heart surgery,” says Dr. Mick. “To my great happiness, the journey has led me back to where it all started, Weill Cornell.”

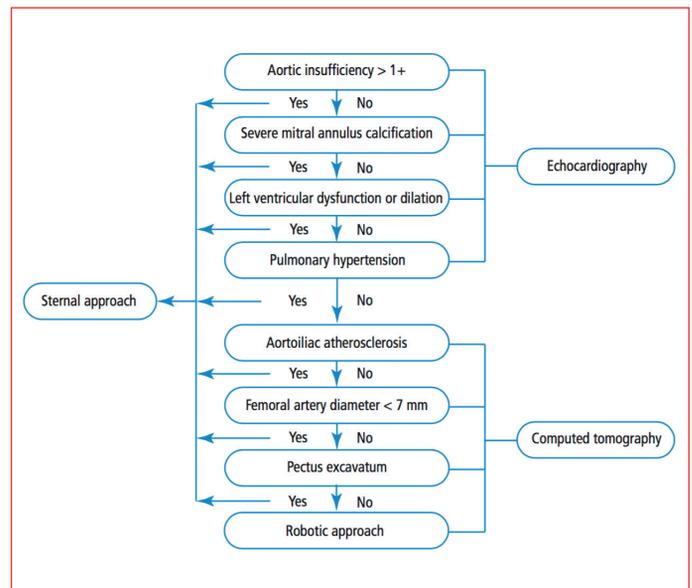
A Multipronged Strategy for Structural Heart Disease

With clinical expertise in structural heart disease, Dr. Mick has a particular focus on the mitral and aortic valves. “My interest is in treating diseases of those valves with minimally invasive techniques if possible,” says Dr. Mick, who performs robotic mitral valve repairs, as well as other minimally invasive procedures to treat the valve surgically. “As a cardiac surgeon and a member of the Weill Cornell Valve Center, I have an active role in the treatment of patients who aren’t well-suited for surgery but might benefit from a percutaneous approach to treat the heart valves.”

Dr. Mick believes a renewed interest in robotic surgery techniques for mitral valve repair is due in part to the development of transcatheter aortic valve replacement (TAVR). “People are keenly interested in having their heart valves fixed less invasively now,” she says. “I think patients’ desires, and even those of doctors, is to pursue alternative ways to conventional open heart surgery.”

However, Dr. Mick emphasizes the importance of patient selection to maximizing outcomes for robotically assisted mitral valve surgery. While at the Cleveland Clinic, Dr. Mick and her colleagues conducted a study of 1,000 consecutive cases that showed these surgeries were effective and safe in terms of improvements in procedure time, transfusion rates, stroke risk, number of mitral valve replacements, and number of conversions to sternotomy. After 500 cases, the research team developed and implemented a patient-selection algorithm that refined the criteria for determining which patients would be eligible for mitral valve repair via the robotic approach versus a sternotomy- based approach.

“The algorithm relies on results from echocardiography and CT for most of the selection process,” explains Dr. Mick. “Echocardiography results that indicate a sternal approach would be preferred include significant aortic insufficiency, which complicates cardioplegia delivery, as well as severe mitral annular calcification, rheumatic heart disease, left ventricular dysfunction, and pulmonary hypertension. CT results assess patients for aortoiliac atherosclerosis, small femoral artery diameter, and pectus excavatum. The existence of any of these indicates that a patient is more appropriate for the sternal approach than the robotic approach.”



Algorithm for determining patient eligibility for the robotic approach to mitral valve repair (Source: Gillinov AM, Mihaljevic T, Javadikasgari H, Suri RM, Mick SL, et al. Early results of robotically assisted mitral valve surgery: Analysis of the first 1,000 cases. *The Journal of Thoracic and Cardiovascular Surgery*. Vol. 155. 2018 Jan;155(1):82-91.)

Following implementation of the algorithm with cases in the second half of the study, the stroke rate decreased by more than half and mitral replacement dropped from four to zero. The researchers concluded “that a combination of a focused preoperative assessment using the patient selection algorithm

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and increased surgical experience with robotic techniques enhanced clinical outcomes and improved procedural efficiency associated with robotically assisted mitral valve surgery.”

Dr. Mick enumerates the key benefits of robotic surgery for mitral valve repair beginning with eliminating the need to open the chest through the breastbone, thereby decreasing risk of infection and pain after surgery and accelerating the time to return to normal activities. Robotics also provides the surgeon with clearer access to the affected valve, including subvalvular apparatus. “To repair the valve, you have to be able to see it really well; the robot magnifies the view 10 times and it can also be visualized in 3D,” she says.

Optimizing Robotic Mitral Valve Repair

Much of Dr. Mick’s research centers on the optimization of robotic mitral valve repair. Among her investigations was a large clinical trial with her colleagues at the Cleveland Clinic showing that del Nido cardioplegia, previously only used in children, was also safe to use in adults. “You aren’t just stopping the heart, but you’re also actually feeding the heart with the cardioplegic solution,” explains Dr. Mick. “Inadequate cardioplegia can result in damage to the heart. When giving cardioplegia during minimally invasive surgery, and particularly in robotic surgery, conventional cardioplegia has to be given every 15 to 20 minutes. This can disrupt the flow of the surgery and extend the time it takes to complete the surgery. The benefit of using del Nido cardioplegia is that you only have to use it once every few hours, which helps to optimize the procedure. We weren’t the first to use del Nido cardioplegia in adults, but our investigation was the largest to study it. That study, in fact, has changed the practice of cardiac surgery worldwide.”

According to Dr. Mick, despite the potential benefits of a robotic approach, there has been a reluctance in its widespread adoption due to concerns over increased operative and crossclamp times as compared to conventional sternotomy approaches. In an article published in *Seminars in Thoracic and Cardiovascular Surgery*, she and her mentor Dr. Marc Gillinov and mitral valve team colleagues at Cleveland Clinic identified opportunities to improve the efficiency of robotic mitral valve repair by the application of five innovations and surgical strategies.

Myocardial Protection Using del Nido cardioplegia and systemic cooling to 30°C greatly reduces the need to redose cardioplegia as crossclamp times are generally less than 60 minutes

Neochordae for Mitral Valve Prolapse Employing neochordae in a robotic approach for leaflet preservation provides unparalleled exposure of the papillary muscles, facilitating easy placement of chords

Running, Preknotted Annuloplasty Suturing the annuloplasty in place with nonabsorbable 2 preknotted sutures in a running

fashion reduces the number of manually tied knots, and therefore the time, necessary to complete the mitral valve repair while ensuring a sturdy annuloplasty suture line

Looped Sutures for Left Atrial Closure Using a suture fashioned with a small loop at its end further simplifies closure of the left atrium

Direct Venting Through the Mitral Valve Applying carbon dioxide insufflation throughout the procedure into the chest at 6 L/min, left lung recruitment, and placement of an additional basket vent across the mitral valve deep into the left ventricular cavity expedites deairing and the return of cardiac rhythm and function

“While the progress in mitral structural heart disease with percutaneous approaches has been much slower than TAVR, I think the role of minimally invasive surgery for mitral valve disease will remain very strong for a long time to come,” she says. “There are a number of devices being developed and tested for the mitral valve. We will have more options for patients that might include additional percutaneous techniques, particularly for patients who can’t have surgery. TAVR basically just exploded and took over surgical aortic valve replacement. I don’t think that same trend will occur with the same speed in the mitral area, but that will be the area of intense focus going forward. That’s why it’s nice for me to be involved in both. As a heart surgeon today, it’s no longer enough to focus only on open surgical procedures. You need to know all of the different approaches to address a particular kind of structural valve disease.”

Dr. Mick is equally comfortable operating in the realm of percutaneous, robotic, and minimally invasive cardiac surgery. “From a technical standpoint my top priority is to provide safe and effective surgical treatments to my patients in the least invasive way possible. From the human perspective, I take a personal approach to patient care and consider it my privilege to shepherd people through the major life event of undergoing cardiac surgery.”

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TAVR Marks Another Milestone

A multicenter clinical trial has found that transcatheter aortic valve replacement (TAVR) performed better than open heart surgery in patients with severe aortic stenosis at low surgical risk. This latest PARTNER trial found that TAVR using the SAPIEN 3 valve when compared to conventional therapy significantly reduced the rate of death, stroke and re-hospitalizations by 46 percent at one year. PARTNER 3 is the fifth randomized trial of the PARTNER (Placement of AoRtic TRaNsScathetER) series of studies, which collectively includes over 9,000 patients with severe aortic stenosis.

“This is a landmark study because it involves 80 percent of the people who are currently being treated with surgery for aortic stenosis,” says **Martin B. Leon, MD**, Director, Center for Interventional Vascular Therapy at NewYork-Presbyterian/Columbia University Irving Medical Center, and principal investigator of the trial. “Our hope was that TAVR would be non-inferior or comparable to surgery. We were surprised to find an almost 50 percent reduction in the primary endpoint, from 15.1 percent in the surgical group to 8.5 percent with TAVR. This is beyond what we could have expected, mostly because surgery is an excellent therapy in treating aortic stenosis in these low-risk patients.”

PARTNER 3 included 1,000 patients with severe aortic stenosis at 71 centers in the U.S. and several other countries with over 95 percent of patients enrolled at U.S. sites. Participants were randomly assigned to receive the SAPIEN 3 TAVR valve or undergo surgical valve replacement. Compared with the earlier PARTNER trials with intermediate- and high-risk surgical patients, this low-risk group was younger (73 years on average), and had fewer co-morbid conditions and fewer symptoms. There were also more men than women enrolled (67.5 percent vs. 32.5 percent, respectively).



The Edwards SAPIEN 3 transcatheter heart valve is now FDA approved for low-risk patients with severe symptomatic aortic stenosis.

“The results of this trial in low-risk patients indicate that the choice of TAVR versus surgery for severe aortic stenosis should be independent of surgical risk profiles and more dependent on anatomic and clinical factors,” adds Dr. Leon. “Based on these findings, this choice should be a shared decision-making process that respects patient preferences and considers some of the knowledge gaps, especially in treating young patients.”

On August 16, 2019, the FDA approved an expanded indication for SAPIEN 3 and several other transcatheter heart valves to include patients “at low risk for death or major complications associated with open heart surgery to replace the damaged valves.” The FDA is the first medical products regulatory body in the world to expand the indication for TAVR to this patient population.

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Mack MJ, Leon MB, et al PARTNER 3 Investigators. Transcatheter aortic-valve replacement with a balloon-expandable valve in low-risk patients. *The New England Journal of Medicine*. 2019 May 2;380(18):1695-1705.

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Dr. Martin B. Leon Recognized with American College of Cardiology’s Top Honor

Martin B. Leon, MD, Director of the Center for Interventional Vascular Therapy at NewYork-Presbyterian/Columbia University Irving Medical Center, has been awarded the 2019 Lifetime Achievement Award by the American College of Cardiology (ACC) in honor of his contributions to the field of interventional cardiology.

“I am honored and incredibly humbled to be recognized by my peers and the ACC with this Lifetime Achievement Award,” said Dr. Leon. “This is less a personal recognition and more a celebration of my team at NewYork-Presbyterian and Columbia and their contribution to cardiovascular medicine. I am proud of our transformative impact on patient care.”

The Lifetime Achievement Award recognizes an individual who has had a lifetime of outstanding achievements in the field of cardiovascular disease and has served as a role model through service, basic or clinical research, and teaching.



Dr. Martin B. Leon

Dr. Leon has served as principal investigator for more than 75 clinical trials, including the PARTNER trials, which have helped shape the field of interventional cardiovascular medicine. A globally recognized thought leader and innovator in the development of interventional cardiovascular device and drug therapies, Dr. Leon has co-authored more than 2,000 publications and performed more than 10,000 procedures.

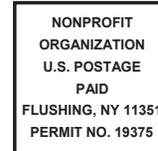
“Dr. Leon’s dedication to improving cardiovascular health and enhancing patient care is a testament to his expertise and professionalism,” said C. Michael Valentine, MD, President of the ACC. “It is a privilege to be able to honor Dr. Leon with the Lifetime Achievement Award.” Dr. Leon was presented with the award at the ACC Convocation, Inauguration and Awards Ceremony on March 18, 2019, during the ACC’s 68th Annual Scientific Session in New Orleans.



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Dr. Nir Uriel: Elevating Progress in Advanced Heart Failure (continued from page 2)

“This led us eventually to require changes in the medical therapy,” adds Dr. Uriel. “And slowly we have built medical algorithms on how to treat those patients so that the body will not be bothered by the presence of a mechanical component inside of it.”

Dr. Uriel also collaborated on and studied the HeartMate3™ Left Ventricular Assist System, serving as principal investigator in the multicenter MOMENTUM 3 trial. “MOMENTUM 3 was an important step forward for patients living with advanced heart failure,” says Dr. Uriel. “The study results will allow for wider use of the technology thanks to a significantly improved adverse event profile.” Among patients with advanced heart failure, this fully magnetically levitated centrifugal-flow left ventricular assist device was associated with less frequent need for pump replacement than an axial-flow device and was superior with respect to survival free of disabling stroke or reoperation to replace or remove a malfunctioning device.

Dr. Uriel will also continue research in heart transplantation. “The quality of a patient’s life after heart transplant is amazing.

And we always try to push the envelope,” he says. “So, another huge focus of my research is how to improve and reduce adverse events associated with medications given to patients going to heart transplantation. At the end of the day, you’re trying to find a solution for people that have a deadly disease.”

Reflecting on his passion for medicine and for helping his patients, Dr. Uriel is clear on what it means to him on a personal level. “I think what drives me is something very simple,” he says. “When you believe that life is the most precious thing, our highest priority is to try to preserve our patients’ lives and give them the opportunity to enjoy life.”

Reference Article

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For More Information

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