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# Interventional Cardiac MRI – Revisited

Kanishka Ratnayaka, MD & Robert J. Lederman, MD

### Editor's Note

*Congenital Cardiology Today previously published this article by Drs. Ratnayaka and Lederman in August 2016. We are "revisiting" it now in tribute to Dr. Ratnayaka, who recently died. The subject matter is still highly topical, and the promise of Interventional Cardiac MRI remains largely unfulfilled.*

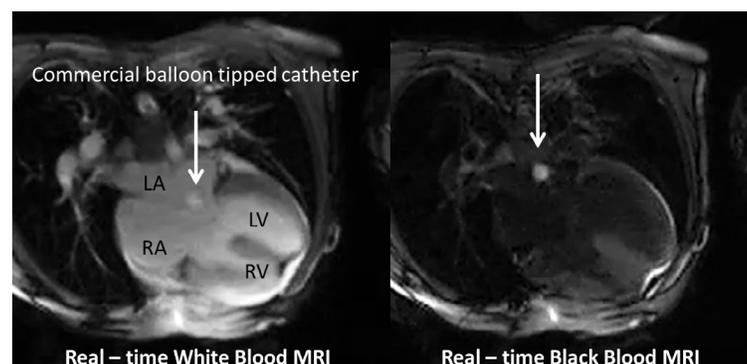
Interventional cardiologists specializing in Congenital Heart Disease (CHD) have grown adept at using what is available, whether devices or imaging modalities, to treat their patients. Nevertheless, while procedures increase in complexity, operators continue to rely on two-dimensional imaging guidance of gray and white shadows, pattern recognition, and contrast angiography. Complex 3-dimensional spatial relationships are not addressed by current techniques, which can expose patients to significant radiation. Growing and developing children are particularly radiosensitive and carry a lifetime of oncologic risk. Chromosomal damage in the peripheral blood of children exposed to catheterization-related radiation has been detected.<sup>1,2</sup> Interventional cardiac MRI (ICMR) guidance offers a potential solution.<sup>3</sup>

Cardiac MRI is a radiation-free, robust imaging modality used to: evaluate cardiac anatomy and function, measure volume and flow, measure tissue infarction, evaluate perfusion and viability, and allow for three-dimensional reconstruction of cardiac and vascular anatomy. Real-time cardiac MRI can provide excellent soft tissue imaging at approximately 5-15 frames/second in many simultaneous planes in any orientation. Combining invasive catheter hemodynamic measurements and MRI physiologic assessment power enables us to realize the full potential of catheterization diagnosis and intervention.

## State of the Art

### Diagnostic (Invasive)

In patients requiring invasive diagnostic studies, particularly serial studies (single ventricle, heart transplant) the radiation-sparing argument may be most compelling; the cumulative X-ray dose may be significant.<sup>4</sup> MRI offers a radiation and contrast-free alternative to those patients who may benefit most from the wealth of structural, functional, and biochemical information MRI can provide. In some critical instances, such as calculating pulmonary



**FIGURE 1**  
Real-time MRI  
Right and Left Heart  
Catheterization  
in Complete  
Atrioventricular  
Canal.

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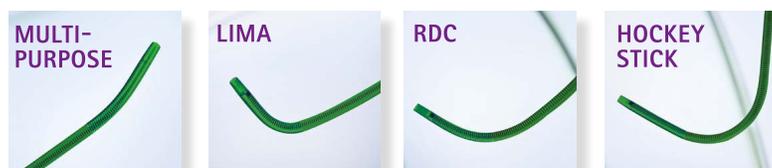
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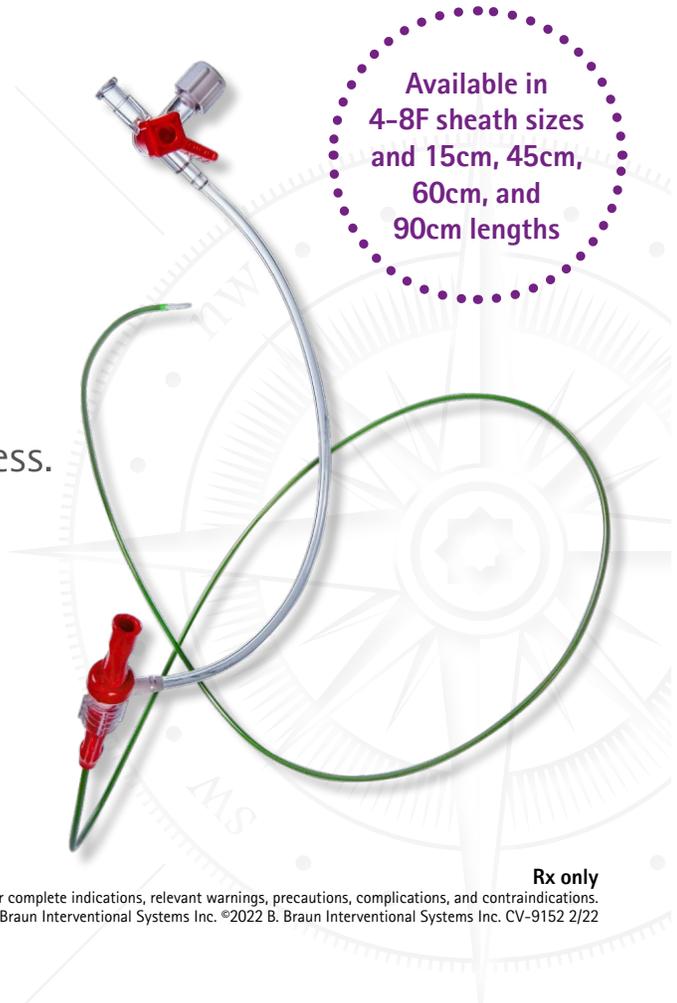
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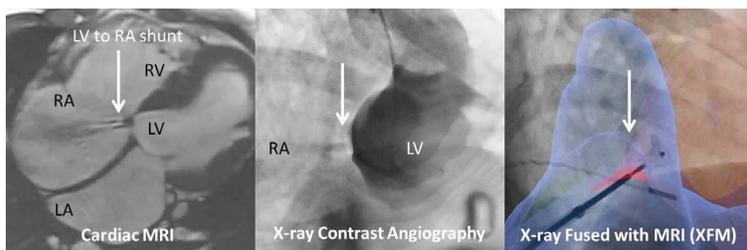


vascular resistance in patients with pulmonary artery hypertension and undergoing staged surgical palliation, MRI catheterization evaluation can be superior to the current methods.<sup>5</sup> While MRI guided catheterization emerged over a decade ago,<sup>6</sup> it has been non-glamorous, incremental workflow and user interface enhancements that have fueled steady progress. The worldwide experience approaches one-thousand patients. An understandable critique of ICMR is the lack of compatible catheter and guidewire tools, but for invasive diagnostic studies, off-the-shelf balloon endhole wedge catheters are sufficient (**Figure 1**). A commercially available MR safe and visible guidewire would enable MRI guidance for most patients requiring diagnostic cardiac catheterization. A polymer guidewire is undergoing final stage clinical testing in Europe,<sup>7</sup> and safe metallic guidewires are approaching clinical testing.<sup>8</sup> Another typical critique is that MRI catheterization is time-consuming when compared to current standard X-ray catheterization. In our experience, simple workflow enhancements and experience have substantially decreased time to approximately 15 minutes per hemodynamic condition tested.

The majority of worldwide experience has been performed at three centers (King College London, Great Ormond Street, and National Institutes of Health), but clinical progress has increased attention. Attendance at the Society for Cardiovascular Magnetic Resonance, [www.scmr2017.org](http://www.scmr2017.org), annual scientific sessions “interventional cardiac MRI” one day pre-conference has steadily grown with over one hundred participants in each of the last three years. In the past year, the National Institutes of Health (NIH) has hosted two hands-on MRI catheterization courses for eighty guests coming from twenty centers in North America and Europe; future training courses are being scheduled for interested centers.

## X-ray Fused with MRI

While MR-guided intervention remains the eventual goal, XFM (X-ray fused with MRI) is an interim step that harnesses the soft tissue information from MRI to guide anatomically and spatially complex procedures. It can be viewed as a step toward wholly MRI-guided intervention. XFM allows operators to take advantage of the superiority of MRI soft tissue visualization in the familiar working environment of the fluoroscopy suite. The goal of fusion imaging is to enhance the capabilities of X-ray interventional procedures by co-registering MRI-derived roadmaps, to depict soft-tissue features not evident on X-ray. MRI-derived cardiac regions of interest are manually segmented and presented to the operator as image overlay on live X-ray fluoroscopy. Several groups have published on

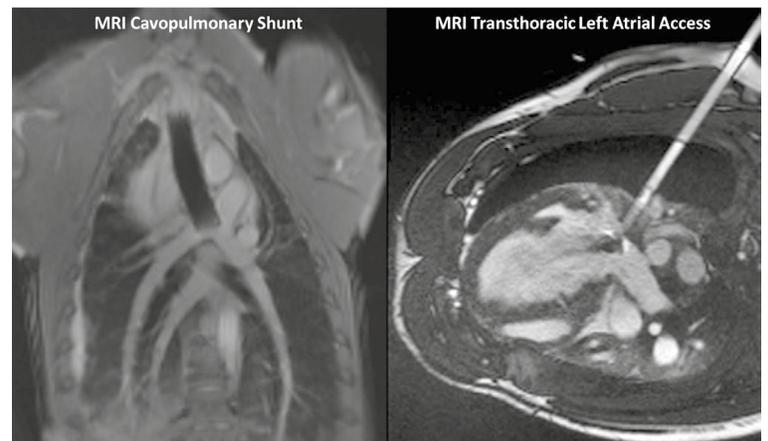


**FIGURE 2** X-ray fused with MRI (XFM) guided device closure of left ventricle to right atrium shunt.

XFM radiation/contrast sparing and enhanced operator confidence in clinical cases.<sup>9,10</sup> Other groups have shown that registration of static MRI images to live X-ray fluoroscopy takes little time<sup>11</sup> with minimal target registration error.<sup>12</sup> Nevertheless, loss of operator confidence in pre-acquired roadmaps outdated by cardiac and respiratory motion as well as stiff wires and bulky device/delivery systems, continues to be a challenge. XFM may prove most useful in guidance of unconventional interventional Congenital Heart Disease procedures<sup>13</sup> (**Figure 2**).

## Intervention

Real-time MRI-guided cardiovascular intervention promises superb tissue imaging in multiple views and any orientation to guide traditional and emerging interventional procedures. Pre-clinical MRI guided cardiac intervention has ranged from aortic stenting<sup>14</sup> to aortic endografting to peripheral artery recanalization.<sup>15</sup> MRI guided catheter intervention in patients has been limited.<sup>16,17</sup> Progress in ICMR-guided intervention continues to encounter inadequate MR safe and visible catheter devices. Increasing numbers of small companies focused on delivery of such devices is encouraging.<sup>17,18</sup>



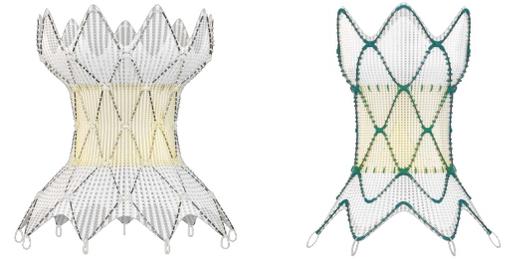
**FIGURE 3** Real time MRI guided percutaneous cavopulmonary shunt and transthoracic left atrial access.

Interventional cardiac MRI's true potential is in providing surgical-type visualization to enable closed chest, off-bypass novel cardiovascular intervention. One representative example is percutaneous navigation of extra-vascular space under direct (MRI) visualization to join vessels as our surgical colleagues do today with surgical shunts.<sup>19</sup> ICMR provides complete thoracic context imaging that may permit new access routes to the heart for cardiac intervention such as from the patient's back<sup>20</sup> (**Figure 3**).

## MR Invasive Electrophysiology

The rationale of MRI guidance for invasive electrophysiology is straight forward - direct observation of myocardial injury during tissue ablation would be attractive to guide procedural conduct; this premise has been explored by a number of groups in animals and most recently in clinical studies.<sup>21</sup> MRI safe and visible

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**Transcatheter pulmonary valve (TPV):** This device was designed for single use only. Do not reuse, reprocess, or resterilize the TPV. Reuse, reprocessing, or resterilization may compromise the structural integrity of the device and/or create a risk of contamination of the device, which could result in patient injury, illness, or death. Do not resterilize the TPV by any method. Exposure of the device and container to irradiation, steam, ethylene oxide, or other chemical sterilants renders the device unfit for use. The device is packaged with a temperature sensor. Do not freeze the device. Do not expose the device to extreme temperatures. Do not use the device if the arrow on the sensor points to the symbol that indicates that the temperature limit has been exceeded. Do not use the device if any of the following have occurred: the tamper-evident seal is broken, the serial number tag does not match the container label, the arrow on the sensor points to the symbol that indicates that the temperature limit has been exceeded, or the device is not completely covered by the storage solution. Do not contact any of the Harmony TPV system components with cotton or cotton swabs. Do not expose any of the Harmony TPV system components to organic solvents, such as alcohol. Do not introduce air into the catheter. Do not expose the device to solutions other than the storage and rinse solutions. Do not add or apply antibiotics to the device, the storage solution, or the rinse solution. Do not allow the device to dry. Maintain tissue moisture with irrigation or immersion. Do not attempt to repair a damaged device. Do not handle the valve leaflet tissue or use forceps to manipulate the valve leaflet tissue. Do not attempt to recapture the device once deployment has begun. Do not attempt to retrieve the TPV if any one of the outflow TPV struts is protruding from the capsule. If any one of the outflow TPV struts has deployed from the capsule, the TPV must be released from the catheter before the catheter can be withdrawn. Do not attempt post-implant balloon dilatation (PID) of the TPV during the procedure, which may cause damage to or failure of the TPV leading to injury to the patient resulting in reintervention.

**Delivery catheter system (DCS):** This device was designed for single use only. Do not reuse, reprocess, or resterilize the DCS. Reuse, reprocessing, or resterilization may compromise the structural integrity of the device and/or create a risk of contamination of the device, which could result in patient injury, illness, or death. Do not reuse or resterilize the DCS. If resistance is met, do not advance the guidewire, DCS, or any other component without first determining the cause and taking remedial action. Do not remove the guidewire from the DCS at any time during the procedure.

## Precautions

**General:** Clinical long-term durability has not been established for the Harmony TPV. Evaluate the TPV performance as needed during patient follow-up. The safety and effectiveness of Harmony TPV implantation in patients with pre-existing prosthetic heart valve or prosthetic ring in any position has not been demonstrated. The Harmony TPV system has not been studied in female patients of child-bearing potential with positive pregnancy.

**Before use:** Exposure to glutaraldehyde may cause irritation of the skin, eyes, nose, and throat. Avoid prolonged or repeated exposure to the chemical vapor. Use only with adequate ventilation. If skin contact occurs, immediately flush the affected area with water (for a minimum of 15 minutes) and seek medical attention immediately. The TPV and the glutaraldehyde storage solution are sterile. The outside of the TPV container is nonsterile and must not be placed in the sterile field. The TPV and DCS should be used only in a sterile catheterization laboratory (cath lab) environment. Ensure that sterile technique is used at all times. Strictly follow the TPV rinsing procedure. For TPV 25: Ensure that all green sutures have been removed from the attachment suture loops on the TPV before loading onto the DCS. Prevent contamination of the TPV, its storage solution, and the DCS with glove powder. Verify the orientation of the TPV before loading it onto the DCS. The inflow end of the TPV

with attachment suture loops must be loaded first. Do not place excessive pressure on the TPV during loading. Inspect the sealed DCS packaging before opening. If the seal is broken or the packaging has been damaged, sterility cannot be assured. Proper functioning of the DCS depends on its integrity. Use caution when handling the DCS. Damage may result from kinking, stretching, or forceful wiping of the DCS. This DCS is not recommended to be used for pressure measurement or delivery of fluids. Carefully flush the DCS and maintain tight DCS connections to avoid the introduction of air bubbles.

**During use:** The TPV segment is rigid and may make navigation through vessels difficult. Do not advance any portion of the DCS under resistance. Identify the cause of resistance using fluoroscopy and take appropriate action to remedy the problem before continuing to advance the DCS. Careful management of the guidewire is recommended to avoid dislodgement of the TPV during DCS removal. Once deployment is initiated, retrieval of the TPV from the patient is not recommended. Retrieval of a partially deployed valve may cause mechanical failure of the delivery catheter system or may cause injury to the patient. Refer to the section below for a list of potential adverse events associated with Harmony TPV implantation. During deployment, the DCS can be advanced or withdrawn prior to the outflow struts protruding from the capsule. Once the TPV struts contact the anatomy during deployment, it is not recommended to reposition the device. Advancing the catheter forward once the TPV struts make contact with the anatomy may lead to an undesired deployment or may cause damage to or failure of the TPV and injury to the patient. Refer to the section below for a list of potential adverse events associated with the Harmony TPV implantation. Physicians should use judgment when considering repositioning of the TPV (for example, using a snare or forceps) once deployment is complete. Repositioning the bioprosthesis is not recommended, except in cases where imminent serious harm or death is possible (for example, occlusion of the main, left, or right pulmonary artery). Repositioning of a deployed valve may cause damage to or failure of the TPV and injury to the patient. Refer to the section below for a list of potential adverse events associated with the Harmony TPV implantation. Ensure the capsule is closed before DCS removal. If increased resistance is encountered when removing the DCS through the introducer sheath, do not force passage. Increased resistance may indicate a problem and forced passage may result in damage to the device and harm to the patient. If the cause of resistance cannot be determined or corrected, remove the DCS and introducer sheath as a single unit over the guidewire, and inspect the DCS and confirm that it is complete. If there is a risk of coronary artery compression, assess the risk and take the necessary precautions. Endocarditis is a potential adverse event associated with all bioprosthetic valves. Patients should make their healthcare providers aware that they have a bioprosthetic valve before any procedure. Post-procedure, administer appropriate antibiotic prophylaxis as needed for patients at risk for prosthetic valve infection and endocarditis. Prophylactic antibiotic therapy is recommended for patients receiving a TPV before undergoing dental procedures. Post-procedure, administer anticoagulation and/or antiplatelet therapy per physician/clinical judgment and/or institutional protocol. Excessive contrast media may cause renal failure. Preprocedure, measure the patient's creatinine level. During the procedure, monitor contrast media usage. Conduct the procedure under fluoroscopy. Fluoroscopic procedures are associated with the risk of radiation damage to the skin, which may be painful, disfiguring, and long term.

## Potential Adverse Events

Potential risks associated with the implantation of the Harmony TPV may include, but are not limited to, the following: • death • valve dysfunction • tissue deterioration • hematoma • heart failure • cerebrovascular incident • perforation • rupture of the right ventricular outflow tract (RVOT) • compression of the aortic root • compression of the coronary arteries • sepsis • pseudoaneurysm • erosion • stent fracture • arrhythmias • device embolization or migration • pulmonary embolism • occlusion of a pulmonary artery • laceration or rupture of blood vessels • device misorientation or misplacement • valve deterioration • regurgitation through an incompetent valve • physical or chemical implant deterioration • paravalvular leak • valve dysfunction leading to hemodynamic compromise • residual or increasing transvalvular gradients • progressive stenosis and obstruction of the implant • hemorrhage • endocarditis • thromboembolism • thrombosis • thrombus • intrinsic and extrinsic calcification • bleeding • bleeding diathesis due to anticoagulant use • fever • pain at the catheterization site • allergic reaction to contrast agents • infection • progressive pulmonary hypertension • progressive neointimal thickening and peeling • leaflet thickening • hemolysis. General surgical risks applicable to transcatheter pulmonary valve implantation: • abnormal lab values (including electrolyte imbalance and elevated creatinine) • allergic reaction to antiplatelet agents, contrast medium, or anesthesia • exposure to radiation through fluoroscopy and angiography • permanent disability.

Please reference the Harmony TPV system instructions for use for more information regarding indications, warnings, precautions, and potential adverse events.

**Caution:** Federal law (USA) restricts these devices to the sale by or on the order of a physician.

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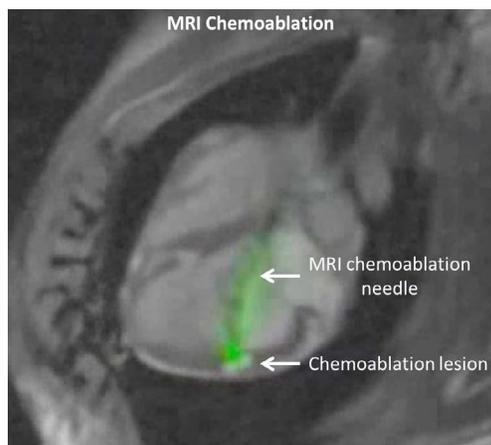
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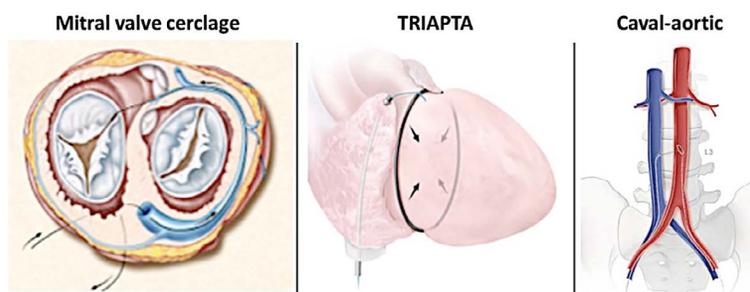


**FIGURE 4**  
Real time  
MRI guided  
chemoablation.

electrophysiology device development has enjoyed tremendous recent progress. An MRI safe and visible integrated catheter mapping and ablation system has been used in clinical translation.<sup>22</sup> The device advancement in MRI guided electrophysiology will likely permit significant progression in the coming years. Perhaps more exciting, an alternative approach to tissue ablation using injected caustic agents (acetic acid or ethanol), instead of radiofrequency ablation, exploits the unique capabilities of MRI to map and target arrhythmia substrates and interactively visualize irreversibly necrotic ablation lesions<sup>23</sup> (Figure 4).

### MRI Inspired, X-Ray Guided

Cardiac MRI provides operators with a “big picture” view of the entire thoracic context with impressive anatomic detail. Real-time imaging is presented in multiple slices and any orientation that can be manipulated quickly and easily. This ability allows an appreciation of anatomic relationships that is difficult to capture with traditional imaging. Pursuing MRI guided cardiac intervention has inspired innovative X-ray guided procedures. One novel X-ray procedure is percutaneous mitral valve repair by accessing the coronary sinus and tunneling through the myocardium to create a tensioned cerclage loop.<sup>24</sup> Exiting the right atrial appendage to deploy a circumferential loop in the pericardium to reduce tricuspid regurgitation is another.<sup>25</sup> Exiting the inferior vena cava and entering the aorta to permit vascular entry of large catheter delivery systems and devices is yet another example.<sup>26</sup> Clinical translation of caval-aortic access continues to grow. To date, there have been 204 patients at 27 centers (Figure 5).



**FIGURE 5** MRI inspired novel percutaneous procedures: mitral valve cerclage, transatrial intrapericardial tricuspid annuloplasty (TRIAPTA), caval-aortic access.

### Conclusion

Minimally invasive and catheter-based therapies are targeting increasingly complex pathologies. This agenda requires better procedural image guidance. Interventional cardiac MRI provides a range of potential radiation-sparing opportunities for conventional and novel therapy.

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See additional references in the August 2016 issue of CCT  
<https://www.congenitalcardiologytoday.com/files/ugd/616c37bc2e14e255c84f1a95f86dfacf28086a.pdf>





# In Memorium: Kanishka Ratnayaka, MD (1974 – 2021)

Kanishka Ratnayaka, MD, was a pioneer who embraced the use of Magnetic Resonance Imaging to guide interventional procedures. He helped refine real-time MRI imaging to make it suitable for cardiac catheterization procedures. In 2011, he established an NIH-funded MRI Catheterization laboratory at Children's National Medical Center. In that lab, he demonstrated the feasibility and safety of performing many routine diagnostic catheterization procedures exclusively under MRI guidance. At NIH, he designed and developed new interventional procedures many of which are also exclusively MRI guided. He organized interventional MR courses and taught interventional MR in numerous educational venues. His considerable work in this field led to greater reliance on MR imaging to guide interventions. He pointed to a future when most pediatric and structural cardiac interventions will be performed under MR guidance.

At the time of his passing, he was a much-loved member of the UC San Diego faculty and of the Division of Cardiology at Rady Children's Hospital in San Diego. Shortly after arriving in San Diego in 2016, Dr. Ratnayaka began planning and fundraising for an Interventional Center combining real time MRI and traditional fluoroscopy. Ultimately, he was the principal force behind making the Dickinson Image-Guided Interventional Center at Rady Children's Hospital a reality. Tragically, the Center opened just days prior to Dr. Ratnayaka's death on Christmas Day. He was never able to perform a procedure in the Center.

In addition, to his contributions related to use of MRI guidance for cardiac catheterization procedures, Dr. Ratnayaka also designed novel cardiac devices and developed new interventional techniques. His designs include a covered stent, purpose-built for creation of percutaneous cavo-pulmonary anastomosis, and a biodegradable stent for use in pediatric



patients. Among other things, he also developed methodologies for the trans-caval access procedure (used in percutaneous aortic valve replacement), for a percutaneous Glenn procedure, and for use of coronary stents to maintain ductal patency in all cyanotic infants requiring "shunt" type palliation. Dr. Ratnayaka's legacy includes many fundamental, practice-changing contributions.

Kanishka Ratnayaka was born in Sri Lanka and grew up in Athens, Georgia. He attended Brown University and earned his medical degree at Emory University School of Medicine. He completed pediatrics training at Children's National Medical Center in Washington DC. His subspecialty training in pediatric/congenital interventional cardiac catheterization and interventional cardiac MRI was at Children's National Medical Center and at the National Institutes of Health in Bethesda, Maryland. He remained in Washington DC on the cardiology staff at Children's National and as a researcher at the National Heart Lung and Blood Institute until he was recruited to San Diego. In San Diego, he continued as a part time NHLBI researcher making regular trips to Bethesda.

Beyond his direct professional activities and contributions, Dr. Ratnayaka found many additional avenues to serve his fellow man. In 2011, he and two of his college friends founded The World Children's Initiative, a non-profit organization dedicated to improving and rebuilding the healthcare and educational infrastructure for children in developing countries. WCI has completed several major projects: In Sri Lanka, WCI helped rebuild the Children's Hospital after it was devastated by a tsunami and established a scholarship fund for promising students. In Madagascar, WCI equipped modern operating rooms and trained staff in modern surgical techniques. Most recently in Uganda, WCI built a modern catheterization laboratory and trained hospital staff in pediatric interventional techniques.

Kanishka Ratnayaka was a visionary cardiologist who worked to transform his field. He was a true pioneer and a rising thought leader. He also made major contributions to advance healthcare for less fortunate children around the world. Notwithstanding these accomplishments, he was a very humble man.

On a personal level, my colleagues and I loved his optimistic perspective and his playful sense of humor. He was truly a team player who was always available and supportive of others. Perhaps most importantly, he was a loving husband and father. He will be greatly missed by all who knew him.



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## Clinical Instructor Congenital Heart Surgery

### Position Summary

The Division of Cardiothoracic Surgery of the University of North Carolina at Chapel Hill is seeking candidates for a full-time faculty position. The appointment will be at the Clinical Instructor level on the Fixed-Term track. The UNC Children's Heart Center is a comprehensive program which performs the full spectrum of procedures including neonatal cardiac surgery and surgery for low birth weight babies, complex valve repair, pediatric ventricular assist devices and cardiopulmonary transplantation, and adult congenital heart surgery.

Candidates should possess experience in caring for complex congenital heart patients. Qualified candidates should also have completed an AGME-accredited cardiothoracic residency program or an international equivalent. Primary responsibilities will include providing exemplary care in all facets of the service including preoperative assessment of children adults and with congenital heart disease, assisting with all surgical cases, and postoperative care. Participation in educational activities with medical students and residents will be expected along with contributions to the research mission of the Department. Job duration 1-2 years with possibility of promotion and/or retention.

### Minimum Education and Experience Requirements

Medical degree from an accredited medical school. Completion of an ACGME-accredited cardiothoracic residency program or international equivalent.

### Preferred Qualifications, Competencies, and Experience

- Meets applicable credentialing and privileging standards for his/her specialty.
- Unrestricted license to practice medicine in the State of North Carolina (or the ability to obtain one prior to appointment), or completion of all steps of the United States Medical License Exam (USMLE) prior to starting the position.
- Eligible for faculty appointment in the Department of Surgery.

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# The PICS Society and the CCISC Launch New Digital Global Medical Community for Physician-to-Physician Collaboration

*This New Membership Benefit will Dramatically Advance Peer-to-Peer Interactions to Improve Pediatric and Congenital Patient Care Internationally*

The Pediatric and Congenital Interventional Cardiovascular Society (PICS), in conjunction with the Congenital Cardiovascular Interventional Study Consortium (CCISC), announced their joint venture to launch the PICS/CCISC DocMatter Community during February's Congenital Heart Disease Awareness Week. DocMatter is an established digital community platform for healthcare professionals, which will be tailored to transform peer-to-peer collaboration within the pediatric and congenital interventional cardiovascular community. The new benefit of society membership will be open to all active physician members of PICS and CCISC this month.

The annual PICS Symposium has a twenty-five-year legacy as the leading global event for stimulating peer-to-peer debate, discussion and collaboration. The Symposium has advanced interventional care for patients of all ages with Congenital Heart Disease (CHD). In 2020 the Symposium's leaders formed the PICS Society as the professional home for physicians and other health providers in this field. The PICS Society will continue the annual PICS Symposium while additionally launching the DocMatter Community to connect these professionals year-round.

Similarly, for nearly two decades the CCISC has managed an active community of more than 250 physicians that collaborate daily via an email platform. The CCISC has a long, proud history of connecting CHD interventionalists involved with research studies, through centralized patient registries that advance scientific knowledge.

The PICS/CCISC DocMatter Community resource marks an evolution point for both professional networks, which will dramatically expand collaboration in this highly specialized medical discipline. Notably, this new partnership will allow the frequency of this collaboration to increase in an archivable, secure, internet-enabled and human-supported format. The DocMatter platform and its dedicated team will improve the quality and significance of "best practice" sharing among physician society members through sharing of case images and knowledge generally in an easily accessible format.

To ensure the relevancy and utility of the PICS/CCISC DocMatter Community platform, both PICS and CCISC have appointed a Senior Steering Committee comprised of physicians in leadership roles from both organizations. The Senior Steering Committee includes Lee Benson, MD, FPICS; Thomas Forbes, MD, FPICS; Damien Kenny, MD, FPICS and Jacqueline Kreutzer, MD, FPICS. The Senior Steering Committee is supported by a group of physician Advisors, also experts from PICS and/or CCISC, that will help DocMatter identify relevant content and hold the community to a high academic standard.

"The PICS Society, as the professional global home for our specialty, will be better positioned to live our vision and mission of fostering research, education and advocacy through the formation of this digital sharing platform with CCISC," said PICS Society Vice President, Damien



Damien Kenny, MD, FPICS



Thomas Forbes, MD, FPICS



Jacqueline Kreutzer, MD, FPICS



Lee Benson, MD, FPICS

To ensure the relevancy and utility of the PICS/CCISC DocMatter Community platform, both PICS and CCISC have appointed a **Senior Steering Committee** comprised of physicians in leadership roles from both organizations. The Senior Steering Committee is comprised of Damien Kenny, MD, FPICS; Thomas Forbes, MD, FPICS; Jacqueline Kreutzer, MD, FPICS; and Lee Benson, MD, FPICS. The Senior Steering Committee is supported by a group of physician Advisors, also experts from PICS and/or CCISC, that will help DocMatter identify relevant content and hold the community to a high academic standard.

Kenny, MD, FPICS, on behalf of PICS President Ziyad M. Hijazi, MD, MPH, FPICS. "We are excited to launch the community...and anticipate immediate benefits to the patients we are privileged to treat."

The opportunity to create the PICS/CCISC DocMatter Community was identified and fully funded by B. Braun Interventional Systems and NuMED for Children, two long-term medical device industry sponsors of the PICS and CCISC missions. The intent is that the industry sponsors bear the full cost of the platform, and are committed to doing so for multiple years, so that this membership benefit can be made available at no cost to all members-in-good-standing.

"Both PICS and CCISC recognize the significance of industry, provider and society collaboration and its impact on the advancement of our specialty," said CCISC Founder Thomas Forbes, MD, FPICS. "Our



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The Pediatric Division of Rhode Island Hospital  
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## Division Director, Pediatric Cardiology

### Brown University, Providence, Rhode Island

The Department of Pediatrics, Rhode Island Hospital/Hasbro Children's Hospital and the Alpert Medical School of Brown University are seeking a Division Director of Pediatric Cardiology. The successful candidate will be board certified in Pediatrics and Pediatric Cardiology. Candidates must qualify for appointment to the rank of Associate Professor or Full Professor at the Alpert Medical School of Brown University. Excellence in clinical care, teaching, and scholarly contribution is required. Experience in administrative leadership and mentoring junior faculty is highly desired. National reputation and scholarly achievements appropriate for a senior level position will be expected. It is expected that approximately 25% of the incumbent's time will be devoted to research commensurate with the candidate's expertise and experience in research and scholarly activity.

Hasbro Children's Hospital is the only pediatric tertiary care center in Rhode Island and serves as the primary pediatric teaching facility for the Alpert Medical School of Brown University and the site for Brown University's Pediatric, Medicine/Pediatrics and Triple Board residency training programs. The Division of Pediatric Cardiology is a vibrant, busy and active group comprised of 6 boarded Pediatric Cardiologists, 2 Nurse Practitioners, 2.5 pediatric sonographers, 1 exercise physiologist and 1 advanced practice RN. Integrated behavioral health is staffed by 2 part time Pediatric Psychologists. Ancillary staff are considered integral members of the team, and some have been with the Division for more than 20 years.

The Division services cardiology care for Hasbro Children's Hospital and Women & Infant's Hospital. With 80 NICU beds, Women & Infant's is the only level 3 nursery in the state, and home to more than 80% of the deliveries in RI. Pediatric Cardiology enjoys long standing collaborations with Maternal Fetal Medicine, Adult CHD services in state, as well as interventional catheterization and surgical services at Boston Children's Hospital. We also support non-invasive testing for many regional smaller hospitals.

The Division enjoys a long-standing exemplary reputation for cardiology care and support of a growing population of pediatricians and family practitioners in RI, and nearby CT and MA, with over 5500 outpatient visits per year. Specialty services offered include fetal cardiology, lipid clinic, integrated behavioral health with psychology, electrophysiology and pacemaker care, trans-thoracic and trans-esophageal echo, and standard & metabolic stress lab. In addition, the Division runs Follow Your Heart Camp; an overnight program for patients 8-15 years old with a focus on behavioral health and transition readiness. The pediatric echo lab is ICAEL certified.

The Division Director is responsible for oversight of the clinical, teaching, and scholarly activities of the Division. Faculty members have teaching responsibilities at the Brown Alpert medical school in many core curriculum and elective courses. Division members also provide teaching and mentoring to a wide array of students, residents, and fellows in Pediatric Surgery, Neonatology, Emergency medicine and Adult Cardiology. Funded research collaborations exist with Pediatric Psychology, and with the regional New England Congenital Cardiology Association (NECCA).

Brown University is committed to fostering a diverse and inclusive academic global community; as an EEO/AA employer, Brown considers applicants for employment without regard to, and does not discriminate on the basis of, gender, sex, sexual orientation, gender identity, national origin, age, race, protected veteran status, disability, or any other legally protected status.

Lifespan is a VEVRAA Federal Contractor.

### Application Instructions

Candidates should upload a curriculum vitae (CV) and cover letter online at <http://apply.interfolio.com/101984>.

Please direct any questions to:  
**Jennifer Friedman, MD, PhD**  
Chair of the search committee  
[jennifer\\_friedman@brown.edu](mailto:jennifer_friedman@brown.edu)

Review of applications will begin immediately and will continue until the position is filled.



industry sponsors have experience with DocMatter specifically and believe the DocMatter Community will spark innovative ideas moving us all forward together as a collective team. We agree that open industry communication and partnership is vital in improving how we can best treat children and adults with Congenital Heart Disease.”

The DocMatter team began adding PICS and CCISC members to the PICS/CCISC DocMatter Community in late February. If you are a Society member and need help activating your DocMatter account, contact the Community’s Clinical Engagement Specialist, Inês Silva at [ISilva@docmatter.com](mailto:ISilva@docmatter.com).

#### About the Pediatric and Congenital Interventional Cardiovascular Society (PICS)

The vision of the PICS Society is a world where anyone who can benefit from minimally invasive techniques to treat CHD can access safe, effective care. PICS promotes the highest quality care globally for infants, children and adults with CHD through minimally invasive techniques. The Society partners with dedicated national societies and other stakeholders to further knowledge and skills, fostering research, education and advocacy on behalf of health professionals and the patients our members are privileged to treat. For more information about PICS, including how to become a member, visit [www.chdinterventions.org](http://www.chdinterventions.org).

#### About the Congenital Cardiovascular Interventional Study Consortium (CCISC)

The CCISC is a not-for-profit organization dedicated to advancement of the science and treatment of infants, children and adults requiring surgical or interventional procedures for treatment of Congenital Heart Disease. The CCISC mission is to design, conduct and report findings of scientific studies in interventional cardiovascular care for individuals with congenital heart disease. To learn more about the CCISC visit <https://ccisc.med.wayne.edu>.

#### About DocMatter

DocMatter was founded on the simple premise that individual physicians should be empowered with online, real-time access to discover and then collaborate with experts on any medical topic. Today, DocMatter’s artificial intelligence-driven software platform supports physicians at 60,000+ institutions across 160+ countries. The broad awareness of best practices advocated by experts and shared across specialist networks on DocMatter translates every day to better patient outcomes. To learn more visit <https://www.docmatter.com>.



**PICS Society**

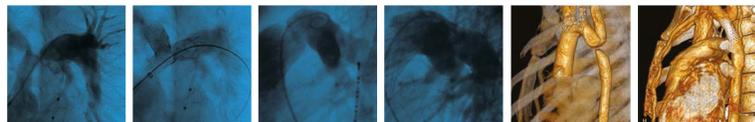
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# Interventional Pediatric Cardiologist

## Successful Pediatric Cardiology Practice - Tropical Florida Coast

Pediatric Cardiology Associates, located in Tampa Bay on Florida's Gulf Coast, is seeking a BC Interventional Pediatric Cardiologist with advanced fellowship training and experience in Congenital Intervention.

- Ideally seeking candidates with a minimum of 5 years of experience post-fellowship
- Large, experienced, well-established team of 14 pediatric cardiologists and 3 NPs with offices and clinics located throughout the Tampa/St. Petersburg area
- Offer comprehensive congenital cardiac care from fetal life through adulthood
- The team includes members of all pediatric cardiology sub-specialties including: fetal, advanced imaging (CT, MRI, 3D echo), intervention, electrophysiology, cardiomyopathy/heart failure, prevention, and adult congenital
- The interventional team performs over 400 catheterizations per year, about 60% of which are interventions
- Recent interventional team accomplishments include:
  - Implanting their 150th transcatheter pulmonary valve, Summer 2019
  - First program in Florida to implant the Gore Cardioform ASD Occluder, Fall 2019
  - Only program in Tampa Bay currently offering PDA device closure for premature newborns, first implant, Winter 2016
- Sub-specialty clinics include general pediatric cardiology, intervention, pulmonary hypertension, cardiomyopathy, ACHD, electrophysiology, and prevention
- Our ACHD program is the ONLY certified Adult Congenital Heart Association program in central Florida
- This position also offers:
  - Full time interventional duties with expected procedural volume of 200+ catheterizations per year
  - No expectation of inpatient service coverage
  - 24/7 collaboration with our excellent pediatric cardiac surgical and pediatric cardiac intensive care teams at St Joseph's Children's Hospital
- Our center offers a unique depth of hospital infrastructure:
  - Two state of the art 1000+ square foot hybrid capable catheterization labs/ORs (one biplane, one single plane)
  - Two additional biplane catheterization labs
  - Two EP labs
- We have the added benefits of a children's hospital inside a large tertiary adult hospital simplifying care across all patient ages with easy access to consultants from all pediatric and adult specialties
- PEDIATRIX, as a national pediatric cardiology group with over 125 pediatric cardiologists, provides opportunities for quality initiatives that can have national impact
- We offer an attractive schedule allowing freedom to enjoy a great quality of life
- Generous compensation package offered

Tampa Bay's warm weather affords plenty of opportunities to relish the great outdoors year round. You will live in a region others only get to enjoy on vacation. Golf at one of nearly 100 courses or relax on one of the many pristine white-sand beaches. The area offers an assortment of family venues such as zoos, aquariums, theme parks, and state parks. Additionally Tampa Bay offers access to world-class museums, professional sporting events and the performing arts. There is a wide range of residential choices to fit every budget and lifestyle – whether you are looking for big city downtown living, golf course communities, waterfront lifestyle, majestic horse farms or historic neighborhoods.

### Benefits

Our clinicians enjoy a competitive compensation package with many locations offering sign on bonuses, relocation and tuition reimbursement.

\*Our benefits include:

- Health (various options), life, vision, dental and disability insurance
- 401(k) with annual matching program
- Advanced and continuing medical education
- Leadership training and advancement opportunities
- Employee stock purchase plan at a 15% discount
- Professional liability insurance
- Support and payment for mandatory license/s and hospital credentialing

\*These benefits are for full time employees, employees in other types of employment classifications may be eligible for some of these benefits.

Mednax Services, Inc. is a national medical group. Over the last 40 years, through our network of over 3,500 clinicians in 39 states and Puerto Rico, we have reshaped care delivery within women's and children's specialties and subspecialties. Our clinical teams care for the unique population of high-risk pregnancies and critically ill infants and children in both hospital and ambulatory clinical settings. Over the years, clinicians practicing as part of PEDIATRIX™ and OBSTETRIX™ Medical Groups have used evidence-based tools, continuous quality initiatives, clinical research, and telemedicine to enhance patient experience, outcomes and provide high-quality, cost-effective patient care. Our nationwide team of almost 8,000 employees, including physicians, advanced practitioners, clinical leaders, business and operational experts, work together every day to fulfill our mission to take great care of the patient. We invite you to join the Mednax family and help shape the future of health care. Find additional information at [www.mednax.com](http://www.mednax.com).

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PI165690766



# How a Pig Heart Was Transplanted into a Human for the First Time

*The First Transplant of a Pig Heart Genetically Modified for Acceptance into Human Bodies Raises Hopes for a New Solution to Donor Organ Shortages*



For the first time, a human has been given a transplant of a pig's heart. David Bennett, 57, had the operation in Baltimore, Maryland, on January 7th using a heart that had been genetically modified to boost the chances of acceptance in a human body.

The donated heart came from a pig developed by US firm Revivacor, <https://pipeline.unither.com/>. In total, the animal had 10 genes modified. Four of those were inactivated, including one that causes an aggressive immune response and one that would otherwise cause the pig's heart to continue growing after transplant into a human body.

To further increase the chances of acceptance, the donor pig had six human genes inserted into its genome and Bennett is taking immune-suppressing medications. As this story went to press, Bennett was coping well with the new heart, but had not yet been taken off a heart-lung bypass machine supporting its function. His medical team told *The New York Times* that the animal heart was doing most of the work and that, so far, the heart "looks normal".

"This is a great step forward – you can compare it with the first landing on the moon," says Joachim Denner at the Free University of Berlin.

Transplants from other animals, known as xenotransplantation, have long been seen as a way to save the lives of the thousands of people who die each year while waiting for an organ transplant. The chief concern is whether our immune systems will accept such transplants, as organ rejection can happen even between carefully, immunologically-matched human donors and recipients.

Many research groups have been trying for years to modify animals, so their organs provoke less of an immune reaction, and have had success transplanting them into primates such as baboons.

These first days are a critical test, although immune rejection could take weeks or longer to develop, says Denner, who has been involved in primate research using Revivacor's pig organs, but has no financial connection to the firm. "We have to be cautious. We have to wait and see," he says.

Bennett was approved to have the risky procedure as he was too sick to go on the waiting list to get a human heart. If he is successfully taken off the bypass machine and continues to stay well, it could open the door to such transplants for a growing pool of other people. It could also lead to pig-to-human transplants of kidneys, livers and lungs in future.

There have been fears that virus genes naturally found in pig DNA could cross to humans, but these have faded after successful transplants of pig pancreas cells into people with diabetes. No such problems have arisen with transplants of whole pig organs into primates either. Still, it is likely that Bennett's doctors are closely monitoring him to check for this possibility, says Anthony Warrens at Queen Mary University of London, who was not involved in the work.

"This is a very early experiment and will not translate into clinical practice within a short period of time," he says. "If it works, it could be a small number of years away."

If this procedure succeeds, providing the organs to offer it more widely in future should not be a major obstacle. Pigs have about eight piglets in each litter and can start breeding before they are a year old, although they would need to be farmed in special hygienic conditions.

A spokesperson for NHS Blood and Transplant in the UK said in a statement: "We have been watching this particular field of research for many years. However, there is still some way to go before transplants of this kind become an everyday reality."

View the video here:

<https://www.newscientist.com/article/2304167-how-a-pig-heart-was-transplanted-into-a-human-for-the-first-time/?jwsourc=cl>



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UM/JACKSON MEMORIAL MEDICAL CENTER

## Interventional Pediatric Cardiologist

The University of Miami Miller School of Medicine (UMMSOM), Jackson Health System (JHS), and Holtz Children's Hospital, has initiated a national search for an additional **Interventional Pediatric Cardiologist** to join in support of their growing and dynamic Pediatric Cardiology program.

### Opportunity Highlights:

- **Join a collegial 6-person Pediatric Cardiology group led by Chief, Dr. Melvin Almodovar that consists of diverse interests and expertise including general cardiology, cardiac intensive care, interventional cardiology, ACHD, ECHO, fetal cardiology, heart failure/transplant and advanced cardiac imaging.**
- Excellent growth potential supported by re-vitalized surgical program led by Dr. Leonardo Mulinari and recently recruited junior surgeon with a vision and commitment towards increased international referral sources and expanding the scope of surgical care with a focus on neonatal and ACHD/transplant/LVAD capabilities.
- New care model initiated for cardiac patients with the creation of a separate, free standing Cardiac ICU as well as the pending opening of a new catheterization lab.
- **In addition to providing interventional cardiology skill sets, excellent opportunities exist for anyone to pursue additional interests in general cardiology, heart failure/transplantation, and advanced imaging.**
- Pediatric residents, medical students, and fellow teaching opportunities available through the well-established and ACGME accredited University of Miami-Jackson Memorial Hospital Pediatric Cardiology Fellowship program.
- As part of the Total Rewards benefits package, University of Miami faculty, staff, and their eligible dependents can receive tuition remission for undergraduate and most graduate degree programs.

### For more information please contact:

Marcel Barbey, VP Search Services  
Cell: 817-707-9034

[marcel@careerphysician.com](mailto:marcel@careerphysician.com)

*The University of Miami is an AA/EOE/ADA employer that seeks applicants who add to our culture of diversity and inclusion.*



## Pediatric Cardiac Interventionist Position

UC Davis Children's Hospital  
School of Medicine  
Department of Pediatric Cardiology

The Department of Pediatrics at the University of California, Davis School of Medicine is recruiting 1 full-time academic Pediatric Cardiac Interventionist within the Pediatric Cardiology specialty. We are recruiting at the Assistant/Associate/Full Professor level in the Clinical X or Health Science Clinical Series in the Section of Pediatric Cardiology, Department of Pediatrics and specifically trained and experienced in Pediatric Cardiac Interventions. Candidates must possess an M.D. or D.O. degree, be board certified in Pediatric Cardiology and must possess or be eligible for licensure in the State of California.

The interventional cardiology candidate must have at least 3 years of experience in interventions in congenital heart disease and have the desire and ability to build and grow a practice in interventional cardiology volume.

Work distribution will depend on the specific skillset of the candidate. It is expected that the candidate will share in the on-call and weekend/holiday coverage schedule.

In addition to the clinical responsibilities, the ideal candidate will be expected to participate in teaching of medical students, residents and fellows, research activities of the Department of Pediatrics, and serve on departmental committees.

The candidates must have the following qualifications:

- M.D. or D.O.
- Successful completion of an approved pediatric residency training program.
- Successful completion of an approved Pediatric Cardiology fellowship training program.
- Successful completion of a Pediatric Interventional Cardiology advanced fellowship training program.
- Board certification in Pediatric Cardiology.
- Eligibility for a California Medical License.
- Demonstrated proficiency in the teaching of students and housestaff.
- Demonstrated proficiency to perform clinical research.
- Ability to foster collegiality and work collaboratively in a diverse environment, including working closely with Adult Congenital Heart Disease services.
- Service including committees, leadership ability, and community outreach.
- Have Board Certification in Adult Congenital Heart Disease (preferred).

The Pediatric Heart Center at UC Davis Children's Hospital is inland Northern California's only full-service cardiac care facility for children and young adults, offering the latest tests and treatments for a range of congenital or acquired cardiovascular conditions. Our integrated multidisciplinary team of surgeons, specialists, physicians, nurses and researchers offer Northern California's most sophisticated specialized diagnostic, interventional and surgical expertise in comprehensive diagnostic, therapeutic, and surgical procedures for children with heart defects.

For full consideration applications should be received by December 27, 2021. However the position will remain open until filled. Completed applications include CV, Cover Letter, Statement of Contributions to Diversity, Equity, and Inclusion and contact information for 3-5 references.

Candidates should submit their application online at:

<https://recruit.ucdavis.edu/JPF04580>.



## Medical Director of Pediatric Echocardiography Pediatric Electrophysiologist Adult Congenital Heart Disease Cardiologist General Pediatric Cardiologist Charlotte, NC

The Congenital Heart Center at Levine Children's Hospital (LCH) and Sanger Heart & Vascular Institute (SHVI), seek to recruit a **Medical Director of Pediatric Echocardiography, Pediatric Electrophysiologist, Adult Congenital Heart Disease Cardiologist, and General Pediatric Cardiologist** to join their existing faculty. All are new positions in our dynamic, rapidly growing program. Team currently includes: 12 cardiologists, 3 congenital heart surgeons, 5 cardiac intensivists, 4 pediatric cardiac anesthesiologists, 2 pediatric cardiac radiologists, 20 APPs (includes 3 surgical ACPs), 16 sonographers, 5 nurse navigators, and 9 dedicated RNs.

- **Imaging candidates** will have completed an ACGME-accredited fellowship in pediatric cardiology and be BC/BE by the American Board of Pediatrics; with expertise in echocardiography for congenital heart disease, including transthoracic, transesophageal, and fetal echocardiography. Candidate will be recruited as echocardiography lab director or will be expected to transition into that role within one year. Responsibilities will also include both outpatient and inpatient cardiology. A minimum of 5 years of experience and a 4th year imaging fellowship are preferred. Call/weekend coverage on a rotating basis including echo backup call with 5 other imaging physicians.
- **Electrophysiology candidates** will have completed ACGME-accredited fellowships in pediatric cardiology and pediatric electrophysiology, be BC/BE by the American Board of Pediatrics, and be expected to accomplish pediatric electrophysiology certification by the International Board of Heart Rhythm Examiners. Candidate should be skilled in outpatient and inpatient congenital electrophysiology with experience and interest in transcatheter ablations and device implantation/management. Days will be split between the EP lab and clinic. Responsibilities will include on-site/satellite EP outpatient clinics including pacemaker/ICD clinics, inpatient/consult service coverage, remote device management and cardiology/EP call/weekend coverage on a rotating basis. The Pediatric/Adult Congenital Electrophysiology program has grown in procedural volume over 40% in each of the last two years, and is currently staffed by a single electrophysiologist, dedicated EP APP, and dedicated nurse navigator.
- **Adult Congenital Heart Disease (ACHD) candidates** will have completed an ACGME-accredited fellowship in pediatric cardiology or internal medicine, be BC/BE by the American Board of Pediatrics or American Board of Internal Medicine, and be ABIM board certified in Adult Congenital Heart Disease. Responsibilities will also include both outpatient and inpatient pediatric or adult cardiology, depending on primary board certification, and inpatient ACHD service. Call/weekend coverage on a rotating basis including ACHD call split with two other ACHD providers.
- **General Pediatric Cardiology candidates** will have completed an ACGME-accredited fellowship in pediatric cardiology and be BC/BE by the American Board of Pediatrics. Responsibilities will primarily be in the outpatient pediatric cardiology setting with opportunities to rotate on the inpatient pediatric cardiology service. Call/weekend coverage on a rotating basis.

**The Congenital Heart Center**, established in 2010, has been ranked as one of the top-50 pediatric heart centers in the country by U.S. News and World Report for the last nine years. Our comprehensive services include cardiac imaging, diagnostic and interventional catheterization, invasive electrophysiology, dedicated cardiovascular intensive care staff, and regional referral programs in heart failure/transplantation, adult congenital heart disease, and fetal echocardiography. Surgical and cardiac catheterization volume are growing at a rate of 10-15% per year. Our state-of-the-art two lab cardiac catheterization and electrophysiology suite opened in February of 2017, with dedicated staffing and anesthesia teams. Our new outpatient office complex opened in December 2020, designed to treat all patients from fetal cardiology to ACHD. We have one of the most comprehensive Cardiac Neurodevelopment programs in the Southeast, providing a multitude of specialty services to our congenital heart patients in the same office suite. Participation in investigator initiated and multi-center industry sponsored studies is ongoing within the Heart Center, with the support of a clinical research department.

**Sanger Heart & Vascular Institute (SHVI)** is one of the Southeast's largest cardiac and vascular programs. Sanger employs more than 110 physicians in a network of more than 25 locations to provide the highest quality care available to patients with cardiovascular disease throughout North and South Carolina. SHVI has more than 50 years of experience providing world-class, comprehensive acute and chronic cardiovascular services including the region's only heart transplant center and pediatric/congenital heart surgery program.

**Levine Children's Hospital (LCH)** is a state-of-the-art facility in beautiful Charlotte, North Carolina. LCH has 11 floors and 234 inpatient beds, including on-site PICU and CVICU covered 24/7 by in-house intensivists, Progressive Care Unit, Inpatient Observation Unit, Pediatric Rehab Unit, and Pediatric Emergency Department. We are committed to being the region's leading provider of pediatric health care services.

For more information or to submit a CV, please contact:

Phillip Christofferson  
[Peter.Christofferson@atriumhealth.org](mailto:Peter.Christofferson@atriumhealth.org)



# Australian Researchers Develop New Technique to Uncover Genes Involved in Congenital Heart Disease

One in every 100 babies is born with a Congenital Heart Disease (CHD), and CHD is the major cause of death in newborns – however, the genetic cause of these developmental disorders is not fully understood, hindering the development of accurate pre-natal genetic testing.

Now researchers from Monash University in Melbourne, Australia, have developed a way to determine which genes are "in play" in causing these cardiac abnormalities. The technique not only confirmed well-known CHD genes, but also discovered 35 new genes not previously suspected in the disease. The research opens the way, in the future, for more accurate pre-natal genetic testing for congenital heart disease.

The collaborative study, published in *Genome Biology*, and co-led by Associate Professor Mirana Ramialison from Monash University's Australian Regenerative Medicine Institute and the Murdoch Children's Research Institute, and Dr Travis Johnson from Monash University's School of Biological Sciences, aimed to improve on the current conventional approach to identifying disease-causing genes "which focuses on screening genes that are present in heart only– an approach that often overlooks genes that are present in other tissues as well, despite still playing important roles in heart development," Dr. Hieu Nim from Australian Regenerative Medicine Institute, the first author of the study said.

The resulting computational pipeline to identify not only genes specific

for the heart, but genes that may also be associated with other organs such as the liver or kidney "These could comprise many of the missing congenital heart disease genes, but have been, to date, discounted because they are not unique to the heart," Associate Professor Ramialison, said.

The researchers then used the vinegar fly, *Drosophila melanogaster*, as a testing model to determine some of the functional impacts of these novel genes. Researchers use *Drosophila* because it is a well-established model organism to understand the genetic mechanisms of many human diseases. This is because: about 75% of human disease-causing genes are found in the fly in a similar form, it is easy to work with and breeds quickly, and many tools are available to manipulate any genes in it.

According to Dr Johnson, the vinegary studies revealed "a long list of high-quality candidate genes for causing heart abnormalities in humans, giving real insight into just how susceptible this organ is to genetic mutations."

Dr Johnson cautioned that the identification of dozens of new CHD candidate genes is some time from providing more accurate pre-natal genetic testing for CHD. "We now need to conduct functional studies on all of these genes in animal experiments to determine what they actually do, so its early days, but we now have an excellent starting point."



## Pediatric Cardiologist Hasbro Children's Hospital

The Department of Pediatrics, Rhode Island Hospital/Hasbro Children's Hospital is seeking an early career general Pediatric Cardiologist. The successful candidate will have the following:

- Board certified/board eligible in Pediatrics and Pediatric Cardiology
- Qualify for appointment to the rank of Assistant Professor, Clinician Educator at the Alpert Medical School of Brown University
- Strong clinical background in general pediatric cardiology, clinical teaching
- Strong interpersonal skills
- Interest and/or experience in Fetal Cardiology is preferred

Hasbro Children's Hospital is the only pediatric tertiary care center in Rhode Island and serves as the primary pediatric teaching facility for the Alpert Medical School of Brown University and the site for Brown University's Pediatric, Medicine/Pediatrics and Triple Board residency training programs. The Division of Pediatric Cardiology is a vibrant, busy and active group comprised of 6 board certified Pediatric Cardiologists, 2 Nurse Practitioners, 2.5 pediatric sonographers, 1 exercise physiologist and 1 advanced practice RN. Integrated behavioral health is staffed by 2 part time Pediatric Psychologists. Ancillary staff are considered integral members of the team, and some have been with the Division for more than 20 years.

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Cardiology division members provide teaching and mentoring to students and residents, as well as neonatology and adult cardiology fellows. Funded research collaborations exist with Pediatric Psychology, and with the regional New England Congenital Cardiology Association (NECCA). The faculty members have teaching responsibilities for the Brown Medical School core curriculum, Pediatric residents core curriculum, and the teaching of fellows in Neonatology and Pediatric Surgery.

### Candidates should contact:

**Sara R. Ford, MD, Associate Professor of Pediatrics, Clinician Educator, 401.793.8838, [sford@lifefspan.org](mailto:sford@lifefspan.org)**

Brown University and its affiliated teaching hospitals are equal opportunity (EEO/AA) employers and are committed to increasing the diversity of its faculty. The hospital and the university welcome nominations and applications from minorities, women, and individuals with varied experiences, perspectives, and backgrounds, which would enrich the university's research, teaching and service missions. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, age, ethnicity, sexual orientation, ancestry, genetics, gender identity or expression, disability, protected veteran, or marital status. Lifespan is a VEVRAA Federal Contractor.





# Pediatric Cardiologist

Orlando, FL, United States



## JOB DESCRIPTION

As one of the nation's leading pediatric health care systems, Nemours Health System is a not-for-profit pediatric health system dedicated to life-changing medical care and research, helping kids grow up healthy, advocating for kids nationally, and training tomorrow's pediatric experts. We offer integrated, family-centered care to more than 300,000 children each year in our pediatric hospitals, specialty clinics, and primary care practices in Florida, Georgia, Maryland, New Jersey, and Pennsylvania. Nemours strives to ensure a healthier tomorrow for all children – even those who may never enter our doors – through our world-changing research, education, and advocacy efforts. At Nemours, our Associates help us deliver on the promise we make to every family we have the privilege of serving: to treat their children as if they were our own.

Nemours Children's Hospital in Orlando, Florida is seeking a board-certified/board-eligible, full-time non-invasive pediatric cardiologist to serve as the director of pediatric cardiology for the winter garden office.

This is a full-time employed opportunity to join an expanding program dedicated to meeting the growing needs of Central Florida.

## REQUIRED QUALIFICATIONS

- Be proficient in general cardiology and noninvasive testing (EKG, Holter/ event monitoring, and echocardiography)
- Additional training in echocardiography would be welcomed and able to participate in reading in the echocardiography laboratory or perinatal cardiology clinics at Nemours
- Be eligible for an unrestricted FL license
- Be board certified or board eligible in pediatric cardiology
- Able to take calls which includes a 1:9 rotation at the hospital

Nemours cardiac center in Florida is a comprehensive program with cardiac surgery, interventional cardiology, advanced imaging program (MRI/CT), electrophysiology, heart failure/ pulmonary hypertension, adult congenital and preventative cardiology programs. The candidate would be joining a seventeen-person group that is expanding and dedicated to meeting the growing needs of children in the Central Florida region.

## For confidential consideration, please forward your formal CV to:

Fernando Moncada, CPRP, Physician Recruiter

[Fernando.moncada@nemours.org](mailto:Fernando.moncada@nemours.org)

Our Orlando hospital is located in beautiful Lake Nona, a nationally recognized healthy community: [Lake Nona](#)

A hospital designed by families for families, Nemours Children's Hospital blends the healing power of nature with the latest in healthcare innovation to deliver world-class care to the children of Central Florida and beyond. In keeping with our goal of bringing Nemours care into the communities we serve, we also provide specialty outpatient care in several clinics located throughout the region.

Nemours offers a competitive salary and a robust benefits package that includes productivity and quality-based financial incentives, relocation, health, life, dental, CME, 403B Retirement Plan with matching, 457-retirement savings plan, licensure, and dues allowance. Florida has no state income tax, and Nemours is a not-for-profit; full-time employed physicians qualify for Public Service Loan Forgiveness. Academic appointment(s) are also available with the University of Central Florida Medical School and the Florida State University School of Medicine for qualified applicants.

## ABOUT US

As one of the nation's premier pediatric health care systems, we've made a promise to do whatever it takes to prevent and treat even the most disabling childhood conditions. It's a promise that extends beyond our nationally recognized clinical treatment to an entire integrated spectrum of research, advocacy, education, and prevention.

Equity, diversity, and inclusion guide our growth and strategy. We are looking for individuals who are passionate about, and committed to, leading efforts to provide culturally relevant care, reducing health disparities, and helping build a diverse and inclusive environment. All Nemours Associates are expected to ensure that these philosophies are embedded in their day to day work with colleagues, patients and families.

To learn more about Nemours and our commitment to treat every child as if they were our own, visit us at [www.nemours.org](http://www.nemours.org), take a [virtual tour](#) of Nemours.

[Apply Now](#)



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**02-04**

**ACC22**

Washington, D.C., USA

<https://accscientificsession.acc.org/>

**03-05**

**EHRA 2022**

Copenhagen, Denmark

<https://www.esccardio.org/Congresses-&-Events/EHRA-Congress>

**29-01**

**Heart Rhythm 2022: Bringing the World of EP Together**

San Francisco, California, USA

<https://heartrhythm.com/>

## MAY

**06**

**CiCA 2022**

Washington, D.C., USA

[info@cica-ep.org](mailto:info@cica-ep.org)

**19-22**

**SCAI 2022 Scientific Sessions**

Atlanta, Georgia, USA

<https://scai.org/scai2022>

**24-26**

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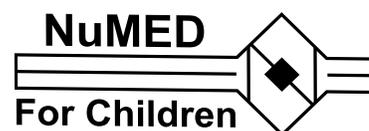
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