

Pediatric Research Alliance



Children's Heart Research and Outcomes Center

Faculty Introduction:
Erin Buckley, PhD

Funding Opportunities

Phase 1 Clinical Trial

Enduring Hearts

Faculty Goodbye: Mary
Wagner, PhD



Director's Update: Mike Davis, PhD

May 2016

Once again, I am pleased to report it has been another exciting 6 months of growth for the Children's Heart Research and Outcomes Center (HeRO). We "officially" welcomed our new faculty, Dr. Erin Buckley, to the Center who will research innovative ways to view



oxygen levels in the brain with a noninvasive, handheld device. This could have major implications for congenital heart surgery outcomes, stroke, and sickle cell research. We are also active in recruiting, with 2 junior level recruits in late-stage talks to start at Emory this fall.

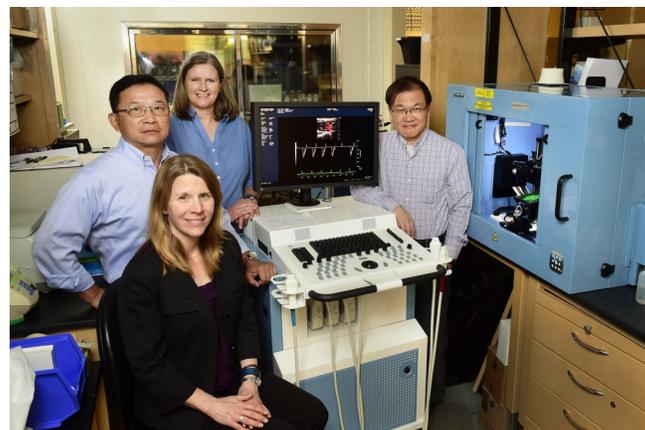
On the research front, we were pleased to enter in to a new relationship with Enduring Hearts, a local nonprofit dedicated to improving transplant research and outcomes. This major gift will allow us to research new ways to prevent transplants, and to enhance transplant longevity. We also received support from the Marcus Foundation for our plans to move forward with a stem cell clinical trial in patients with congenital heart disease. While the official application is at the FDA waiting approval, it is nice to know that the entire study has already been funded. Without seed funding from our donors, especially Ms. Katrina Ceccoli, this study would not have been possible.

As we move in to the next phase of our Center plan, we hope to build more relationships between clinicians and scientists, better fund cutting-edge translational research, and grow with the seeds we have planted both in pilot funding and new faculty recruitment. We look forward to working with everyone; scientists, patients, donors, families, and our respective institutions, to continue finding new therapies for children with heart disease.

New Vevo LAZR Imaging System by FUJIFILM VisualSonics

The Pediatric Research Alliance Animal Physiology Core is pleased to unveil the new Vevo LAZR photoacoustic imaging system. The system was awarded as a result of an NIH Shared Instrument Grant lead by Drs. Alex Kuan, Mary Wagner, and Hui Mao. The photoacoustic live animal imaging system is expected to serve as a major enabling tool to cultivate multidisciplinary research in areas such as cancer nanomedicine, regenerative medicine, tissue engineering, and drug delivery, and cardiovascular biology.

Photoacoustic imaging is a new in vivo hybrid imaging modality that combines the sensitivity and contrast of optical imaging with the depth and resolution of ultrasound. When pulsed laser light illuminates tissue, the optical absorbers there undergo thermoelastic expansion, generating an acoustic pressure wave which is detected with an ultrasound transducer.



Drs. Stacy Heilman, Hui Mao, Mary Wagner, and Alex Kuan with the LAZR Imaging System.

Our Newest HeRO: Dr. Erin Buckley



Dr. Buckley received her PhD in Physics & Astronomy at the University of Pennsylvania in 2011, followed by a postdoctoral fellowship at the Department of Neurology at the Children's Hospital of Philadelphia, and a 2nd postdoc at Massachusetts General Hospital in the Department of Radiology. Her research focuses on the development, validation, and clinical application of two complementary, non-invasive optical techniques (diffuse correlation spectroscopy and near-infrared spectroscopy) that are used to quantify blood flow, oxygen saturation, blood volume, and oxygen metabolism in the brain. These tools provide valuable information to clinicians about brain health, with the advantages that they are low-cost, non-invasive, and capable of continuous bedside monitoring.

In much of her studies, Dr. Buckley has concentrated on the application of these non-invasive optical technologies to study the brain in pediatric patients with congenital heart disease. Given the improved surgical strategies and decreased surgical mortality rates in these patients over the past 30 years, there is growing awareness that patients with severe forms of congenital heart disease encounter both short and long term neurological consequences related to their heart defects.

Dr. Buckley has investigated how her optical techniques can play a role in the individualized clinical management of these patients, primarily in the immediate pre- and post-operative periods when it is believed patients are most vulnerable to brain injury. She has quantified the effects of various clinical interventions on the brain, looked at how brain metabolism changes before, during, and after cardiac surgery, and studied risk-factors for subsequent brain injury. She plans to continue these studies at CHOA, tapping into the excellent network of researchers, clinicians, and patients and families who are devoted to improving outcomes for those with congenital heart disease.

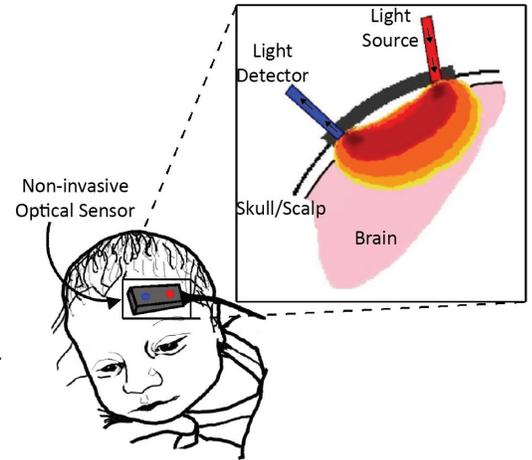


Figure 1, drawing of a simple optical sensor used for near-infrared spectroscopy & diffuse correlation spectroscopy measurements of brain blood flow and metabolism. The inset demonstrates the sensitivity of the near-infrared light to the brain.

Funding Opportunities

American Heart Association Association-Wide Research Programs

[AHA Established Investigator Award](#)

Deadline: July 26, 2016

[AHA Mentored Clinical and Population Research Award](#)

Deadline: July 26, 2016

[AHA Scientist Development Grant](#)

Deadline: July 26, 2016

[AHA Innovative Research Grant](#)

Deadline: July 26, 2016

Marcus Foundation Supports Phase 1 Clinical Trial

It is with much excitement, and gratitude, that we share the Marcus Foundation's support of our recently submitted phase 1 clinical trial. The trial, led by Drs. William Mahle, Mike Davis and Joshua Hare, will evaluate the safety and feasibility of intramyocardial injecting Autologous C-kit+ cardiac progenitor cell (CPC) for hypoplastic left heart syndrome (HLHS) patients.

HLHS is one of the most common single ventricle defects. Patients will develop reduced right ventricular (RV) function leading to complications and possible transplant. While there are ample therapies for adults with heart failure, many of these are unstudied or contraindicated in children.

The Investigational New Drug application is currently being reviewed by the FDA. Patient enrollment is anticipated to begin early this fall.

Enduring Hearts: Healthy Kids. Stronger Hearts. Longer Lives

Mya was 15 months old, and on a family vacation to Disney World, when she went into heart failure. Up until then, she had been considered a 'healthy' child. Mya was admitted to a hospital in Orlando, Florida, where she was diagnosed with dilated cardiomyopathy. After a couple weeks, Mya and her parents returned home to Marietta, Georgia, where she received follow-up care at Sibley Heart Center.

Mya did well on medication for almost two years, until the morning of her third birthday, when she began to exhibit signs of heart failure again. Her parents took her to the hospital, and later that day, Mya was placed on the transplant list as status 1A (most urgent). Mya waited in the hospital for her new heart for six months!

Exactly six months to the day, on Wednesday, September 2, 2012, Patrick and Madelyn got "the call" that a heart had been found for Mya. After five hours of surgery with Dr. Kirk Kanter, cardiothoracic surgeon and Surgical Director of the Children's Heart Transplant Program, Mya's new heart started beating immediately on the first shock. She quickly bounced back after surgery, and by that Friday afternoon, she was discharged from the hospital.

At the time, Mya held the record for the longest amount of time waiting for a heart transplant at Children's, but also the shortest amount of time after surgery to be discharged.



**Enduring Hearts
will end the need for
repeat heart
transplants.**



Madelyn and Patrick came to the realization that a transplanted organ is not a cure, it is a bridge to life with one in four pediatric heart transplant recipients needing a subsequent heart transplant within five years; a fact that is not widely known to the general public but well known among organ transplant recipients and those close to them.

In July of 2013, Madelyn and Patrick started [Enduring Hearts](http://enduringhearts.org) (enduringhearts.org), a charity dedicated to informing the public about the challenges that transplant recipients face and funding innovative research to extend the life of vital transplanted organs such as the heart. The charity has been actively raising funds to build a research endowment since inception and has attracted an impressive Scientific Advisory Committee of top cardiologists and transplantation experts that decide on what research to fund.

Since inception, Enduring Hearts has pledged or funded over \$1.3M in research grants. The long-term goal is to build up the endowment to \$100M, making up to \$10M of grants every year and ultimately ending the need for repeat pediatric heart transplants.

Enduring Hearts
3600 Dallas Highway
Suite 230-350
Marietta, GA 30064
678-306-6601
info@enduringhearts.org

Enduring Hearts funds the most promising research being conducted to increase the longevity of transplanted human organs and related tissue transplants. Our grant awards specifically target research benefiting pediatric heart transplant recipients.

To submit a grant, [click here](#).

4,208 candidates waiting for a heart

150 need a repeat transplants

123,050 candidates waiting for a vital organ

14,974 need a repeat transplant

Vevo LAZR Continued

The system incorporates photoacoustic imaging into high-resolution ultrasound. The ultrasound image provides a high-resolution view of reference for identifying anatomy, while the photoacoustic imaging enables functional measurements such as oxygen saturation, total hemoglobin and the microdistribution of biomarkers.

To view a photoacoustic effect video, [click here](#).

The system is housed in the Emory Children's Center Animal Physiology Core: 2015 Uppergate Drive. If you are interested in learning more about the Animal Physiology Core, [click here](#).

Honoring Dr. Mary Wagner

It is with mixed emotions that we share Dr. Mary Wagner will soon embark on a new and exciting career journey. Having spent more than two decades investigating postnatal changes in contractility and calcium handling in the heart, Dr. Wagner will focus upon educating the next generation of scientist.



Dr. Wagner's contribution to HeRO, Emory University, and Children's Healthcare of Atlanta are both numerous and significant. In addition to serving as an Assistant Professor of Pediatrics, Mary led the Animal Physiology Core and served as the Center's Interim Director for two years. While we wish her the very best, we will miss her as a co-worker and mentor.

