

The Core Report

The spot for news from the cores of the Pediatric Research Alliance

Volume 3, Issue 1
Spring 2018

Core Profile: Integrated Cellular Imaging Core

ICI in HSRB



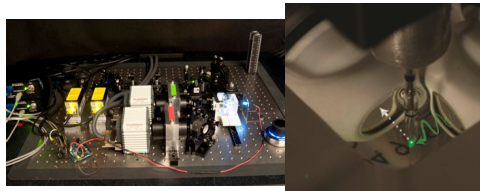
April Reedy, PhD

Greetings! I am April Reedy, PhD a microscopist with ICI. I joined ICI last January 2017 and took over the HSRB location in August 2017. I have a PhD in Genetics and Molecular Biology. I specialized in model organisms in my graduate studies as well as post-doc. I have a strong background in art, design and science. I love discussing experimental design and helping researchers get gorgeous imaging data for their publications, grants and presentations. I am very excited to announce our 2 new scopes at HSRB.

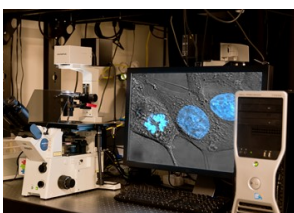
a 20X objective with an adjustable collar which allows for imaging of samples with a variety of thicknesses (cell culture, slides etc). The color camera can be used to shoot histology images.

OpenSPIM

Our custom built light sheet scope has selective illumination which decreases photobleaching and increases acquisition speed. The free rotation allows for 3D acquisition from different angles. Perfect for spheroids, small organisms and small clear tissue sections.



Olympus IX71 Widefield Fluorescence



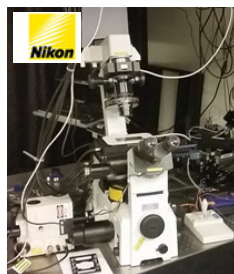
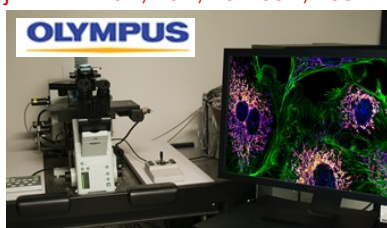
Come check the fluorescence of your sample with our newly outfitted widefield scope! It is outfitted with

We have 12 ICI scopes around campus in addition to our HSRB location. See photos for instruments at the HSRB location

~submitted by April Reedy, PhD
April.Reedy@emory.edu

F1000 confocal

Optical sections allows for 3D reconstruction
Lasers: 405, 458, 488, 515, 559, 635
Objectives: 10X, 20X, 40X 60X, 100X



Spinning Disc confocal

High speed (15f/s) acquisition live cell setup
Lasers: 444, 491, 560
Objectives: 60X, 60X TIRF

OMX

High speed live cell, SIM and TIRF
Lasers: 405, 488, 568, 642
Objectives: 60X, 60X TIRF

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Check out the ICI Core on
www.pedsresearch.org

Understanding Heart Dysfunction During Kidney Failure

Cardiovascular disease is a leading cause of morbidity and mortality for children with chronic kidney disease (CKD) and kidney failure. Left ventricular hypertrophy and diastolic dysfunction are common in children with advanced CKD, but underlying mechanisms leading to ventricular dysfunction and optimal treatment are unclear.

Physician-scientist & the Animal Physiology Core

Dr. Pam Winterberg is a junior physician-scientist in the division of Pediatric Nephrology investigating the mechanisms underlying heart dysfunction during CKD. CKD and cardiovascular disease are both considered pro-inflammatory states. We



Winterberg Lab Team

were interested in how inflammation during CKD contributes to myocardial dysfunction. Our lab partnered with the Animal Physiology (AP) Core to establish a CKD mouse model to study left ventricular dysfunction during kidney disease. As a young investigator, it was extremely helpful to have access to an experienced small animal surgeon to

Check out the
Animal Physiology Core
www.pedsresearch.org

perform and optimize our 5/6th nephrectomy model of CKD. As a result, we have consistent disease severity and lower-than-expected mortality rates.

Working with the Core

In addition, the AP core performs small animal echocardiography on our CKD mice, to evaluate myocardial deformation analysis (or strain), a newer technique that detects early, subclinical dysfunction in our CKD model. We were the first to publish the use of myocardial strain analysis in the mouse CKD model and noted that both diastolic dysfunction and impaired ventricular strain precede the development of ventricular hypertrophy.¹ We anticipate that using strain-based imaging in pre-

clinical models of CKD will provide insight into the prevention and treatment of myocardial dysfunction in children before irreversible remodeling, like fibrosis, ensue.

Results Becoming Funding

We used these data as a basis for successful K08 funding for Dr. Winterberg to study how the immune system is involved in myocardial dysfunction during CKD. With the support of a HeRO pilot grant, we have recently partnered with Dr. Claudia Morris (Pediatric Emergency Medicine) and Dr. Lou Ann Brown (Neonatology) to study the effects of dysregulated arginine metabolism on myocardial dysfunction in the CKD model. Finally, the AP core also performs the CKD mouse model for a CTID pilot grant in collaboration with Dr. Mandy Ford (Emory Transplant Center) to understand how immune changes during CKD affects transplant rejection.

~submitted by Pam Winterberg, MD

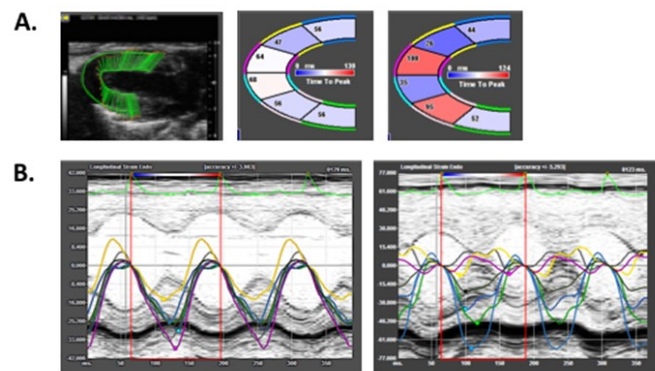


Figure 1. Echocardiographic analysis of mice with and without CKD. A) speckle-tracking strain analysis of left ventricle detects both global and regional changes in myocardial deformation. B) Strain plots of mice with CKD (right) show impaired ventricular strain and regional dys-synchrony of ventricular movement compared to mice with normal kidney function (left).

ThermoFisher Scientific Vanquish Flex Ultra High Performance Liquid Chromatography/TSQ Quantis Triple Quadrupole Mass Spectrometer New Instrument to the Biomarkers Core

The Pediatric Biomarkers Core recently purchased a ThermoFisher Scientific Vanquish Flex Ultra High Performance Liquid Chromatography/TSQ Quantis Triple Quadrupole Mass Spectrometer (UHPLC-MS/MS). The addition of this QUANTIS triple quad mass spectrometer provides an advanced ion source, mass analyzer and RF electronics that offer a robust system with increased sensitivity and precision across a wide mass range, reliability, consistency, and fast quantitation of all molecule species, even those in complex matrices. Currently, we have developed the methods for analysis of 1) a 70 Amino Acid Panel -- biomarkers of multiple diseases and disorders including oxidative stress, renal dysfunction, cancer, stroke, diabetes, sickle cell disease, cardiovascular disease, nutritional deficiencies, and psychiatric abnormalities; 2) Bile Acids – biomarkers of liver and gastrointestinal diseases and injuries found in plasma, serum, urine, cells and tissue; and 3) Phosphatidylethanol and Ethyl glucuronide – biomarkers of acute and chronic alcohol consumption or exposure measured in blood, plasma, cells, tissue, saliva, urine, meconium, hair, nails. This addition of the UHPLC-MS/MS complements the gas

“We will work with you to develop protocols and analysis tailored to your specific research questions”

chromatography-mass spectrometer/mass spectrometer and high performance liquid chromatography systems also available in the Pediatrics Biomarkers Core. Please contact us (Lou Ann Brown, PhD; lbrow03@emory.edu or Frank Harris; fharris@emory.edu) and we will work with you to develop protocols and analysis tailored to your specific research questions.

~submitted by Lou Ann Brown, PhD
Core Director
lbrow03@emory.edu



Biorepository of the CTDC: up and running

The mission of the Children's Clinical and Translational Discovery Core (CTDC) is to support and compliment the research efforts of investigators by providing laboratory research services, technical assistance, and access to biological samples that represent a variety of diagnoses and healthy volunteers. Through the use of our Emory University IRB approved protocol, consent, and assent, the CTDC is currently building a repository of biological samples from both healthy control participants and patients with a variety of diagnoses. Biological samples being collected include whole blood, plasma, serum, peripheral blood mononuclear cells (PBMCs), urine, saliva, and stool. Information, such as gender, ethnicity, race, age, height, weight, basic medical history, and family medical history are also collected and provided with all samples. If you are interested in learning more or requesting samples for research projects, please contact us at CCTDC@emory.edu.

Flow Cytometry Core: Staff Profiles

Technical Director: Aaron Rae

My name is Aaron Rae and I am the Technical Director of the Pediatrics Flow Cytometry core. I have 25 years' experience in Flow Cytometry instruments, techniques and analysis. I am responsible for the day to day running of the Flow Core including cell sorting, maintenance, bookings, finance and running the PPMS bookings system. I volunteer in the Civil Air Patrol as a Mission Scanner as well as a Trip Leader in the Atlanta Outdoor Club running hikes and adventures across the USA and the globe.

~submitted by Aaron Rae



Senior Research Specialist: Kira Smith

My name is Kira Smith and I am a Sr. Research Specialist in the Pediatric Flow Cytometry core helping maintain the flow analyzers and run the cell sorters, along with training new users in the flow core. I believe that having high quality flow cytometry and sorting is crucial for meaningful downstream experimental results, and that excellent flow cytometry data is critical for getting top tier flow related publications. I have more than 10 years of flow cytometry experience. I hold a BSc in Biology from Texas A&M University and a PhD. in Clinical Medicine from the University of Oxford. In my free time I enjoy baking, reading, traveling the globe, and spending time with my friends and family.

~submitted by Kira Smith, PhD

Research Specialist: Bridget Neary

I have been doing flow cytometry for eight years and I have been a member of the Emory Pediatrics Flow Cytometry Core for the past two and a half years, specializing in the immunology techniques supported by our core. I help scientists design and execute flow cytometry analysis and cell sorting assays as well as multiplex bead-based protein assays. I also am heavily involved in training new users to our facility on how to use our instruments. Outside of work, I am currently pursuing a master's degree in bioinformatics.

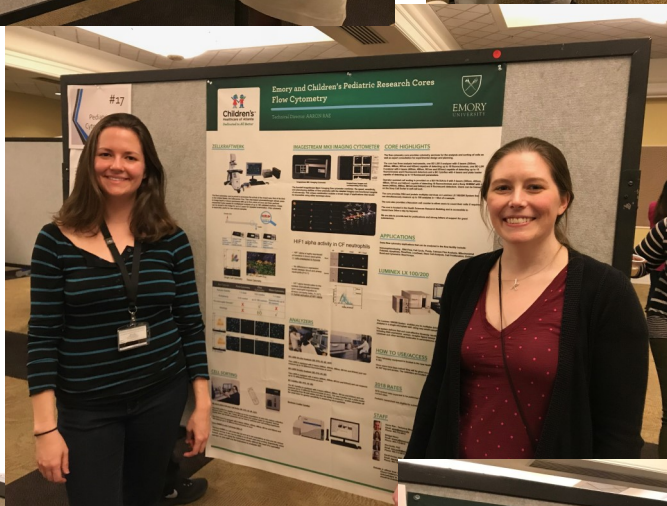
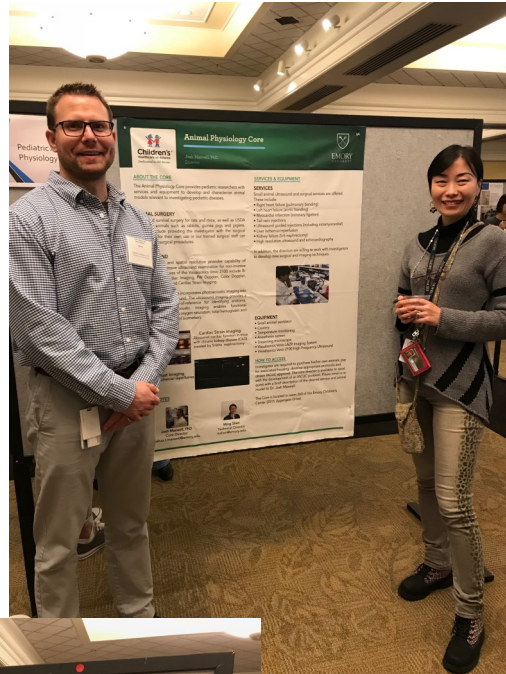
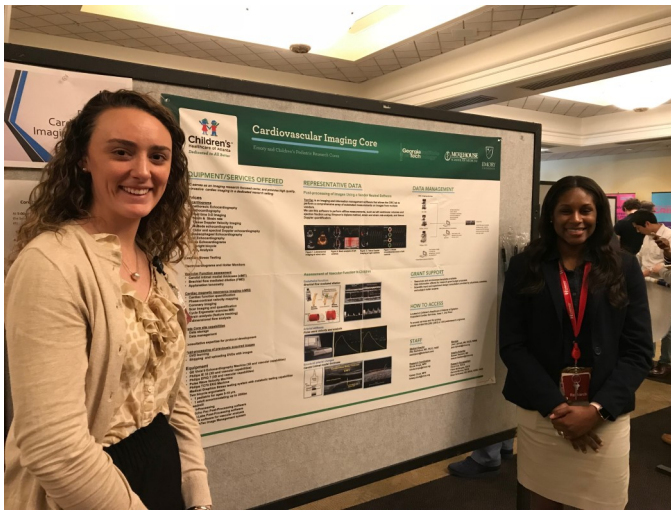
~submitted by Bridget Neary



Please visit the [Flow Cytometry Core website](#) for addition information about using the core

Pediatric Cores at Emory Core Day 2018

On February 8, several of our cores participated in Core Day at the Emory University Cox Hall. A great event to see the many cores available throughout the state of Georgia!



Contact Information

Core	Director	Contact
Animal Physiology Core	Joshua Maxwell, PhD	joshua.t.maxwell@emory.edu
Biomarkers Core	Lou Ann Brown, PhD	Frank Harris fharris@emory.edu
Biostatistics Core	Courtney McCracken, PhD	tinyurl.com/pedsbiostat
Cardiovascular Imaging Core	Ritu Sachdeva, MD	circ@choa.org
CF Discovery Core	Arlene Stecenko, MD	Julie Flores julie.flores@emory.edu
CF Animal Models Core	Nael McCarty, PhD	Barry Imhoff Barry.Imhoff@emory.edu
Clinical and Translational Discovery Core	Chris Porter, MD	CCTRBiorepository@emory.edu
Flow Cytometry Core	David Archer, PhD	emory.pedsflow@emory.edu
General Equipment Core	Kira Moresco, MS	kira.moresco@emory.edu
Grant Editing & Manuscript Support Core	Stacy Heilman, PhD	sheilma@emory.edu
Integrated Cellular Imaging Core	Neil Anthony, PhD	April, Reedy, PhD ici@emory.edu
Laboratory & Pathology Clinical Research Core	Beverly Rogers, MD	labresearchcoordinator@choa.org

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Pediatric Research Alliance

Check out all cores at
[www.pedsresearch.org/
research/cores](http://www.pedsresearch.org/research/cores)

How to Acknowledge the Cores:

These cores are generously supported by Children's Healthcare of Atlanta and Emory University. When presenting or publishing work completed using the core, please include "Children's Healthcare of Atlanta and Emory University [core name]" in the acknowledgments.

This newsletter serves to highlight the activities of the cores supported by Emory University's Department of Pediatrics and Children's Healthcare of Atlanta. If you have a story idea for a future edition, please contact Karen Kennedy (kmurra5@emory.edu).