### Pediatric Core Resources

The following Pediatric Research Alliance supported cores are designed specifically for child health researchers and are made readily available to pediatric researchers at a significantly reduced or fully subsidized cost offering access to instruments, technologies, services, and expert consultation to biomedical and behavioral investigators:

·        **The Pediatric-Winship Flow Cytometry Core** is 640 sq ft of dedicated space on the 3rd floor of the Health Sciences Research Building (E362), linked by a bridge to the Emory Children’s Center and in 200 sq ft in the Winship Cancer Institute (C5027). The Core consists of two dedicated cell sorter rooms capable of BSL2(+) level sorting and wet lab space housing the analysis instruments. The laboratories have ample bench space for sample handling and small equipment. Scheduling of instruments, training, and billing are done through PPMS, a campus-wide core management software package. The Core has a full-time technical director providing education, analysis, and cell sorting services and another 2.5 FTE providing immunology core services, cell sorting, experimental design, and clinical specimen processing. Analysis can be performed on five analyzers: a BD FACSymphony A5 [6UV 7V 5B 6GY 3R] and an identically configured A3, two 4 laser Cytek Auoras [405nm, 488nm, 561nm, and 640nm], two 5 laser Cytek Auoras [355nm, 405nm, 488nm, 561nm, and 640nm], and a BC Cytoflex S [4V 2B 4YG 3R].

Cell sorting can be performed on a SORP FACSAria II cell sorter [3UV 5V 2B 5YG 3R]. An Amnis ImageStreamX MkII cytometer also with 4 lasers (405nm, 488nm 561nm, and 642nm; 10 fluorescent channels) provides the capability for image cytometry. Analysis workstations are available for offline data analysis with multiple software packages including FACSDiva, FlowJo, FCSExpress, SpectroFlo, CytExpert and IDEAS.  Cytometry informatics packages are available in R or MATLAB. Data storage is available through campus-wide cloud services and data backup on a separate NAS. Immunology services include equipment and technical expertise for performing immunologic and diagnostic assays for infectious pathogens. Additionally, a new sorter from Cytek has just been purchased and will be offered to users with assistance.

·        **The Pediatric Animal Physiology Core** is a centralized resource specializing in survival surgery for rats and mice in addition to assistance with other USDA-regulated animals such as rabbits, guinea pigs, and piglets. The Core Scientific Director assists all investigators with the development of IACUC protocols. The core currently offers surgical services include pulmonary banding in rat and neonatal rabbits, aortic banding, myocardial infarction, 5/6th nephrectomy for chronic kidney disease, liver-ischemia reperfusion, and ultrasound-guided injection ideally suited for targeted drug or cell therapy delivery.

The Core houses both a VisualSonics Vevo 3100 High-Frequency Ultrasound and a Vevo LAZR system. The Vevo 3100 allows high-resolution small animal ultrasound examinations for non-invasive measurement of in vivo structure and function. Users can also add the Vevo LAZR system to perform fast, non-invasive, real-time photoacoustic imaging. The Core Technical Director has been extensively trained in ultrasound techniques providing reliable and reproducible imaging data. The Core provides assisted and unassisted services, where investigators can reserve the equipment for their laboratory personnel use.

·        **The Pediatric Biomarkers Core** facility provides the equipment and technical expertise to assay samples using methods that combine the features of gas-liquid chromatography and mass spectrometry. These core services are applicable to a wide variety of sample types and will allow small-molecule metabolite profile identification. The Core has a Thermo Scientific Vanquish UHPLC/TSQ Quantis triple quadrupole mass spectrometer, a Thermo Scientific Trace 1310 gas chromatograph/ISQ 7000 single quadrupole mass spectrometer, and three Waters High-Performance Liquid Chromatographs with fluorescence, UV, and electrochemical detectors. The Biomarkers Core currently analyzes oxidative stress biomarkers, including reduced and oxidized glutathione, cysteine, cystine, amino acids, polyunsaturated fatty acids (PUFAs), isoprostanes, hydroxynonenals, and malondialdehydes. This core also analyzes Fatty Acid Ethyl Esters (FAEE) from biological samples such as meconium, hair, placenta, blood, and plasma as markers of alcohol use and exposure. The Core is in the Emory-Children’s Center building.

·        **Children’s Clinical and Translational Discovery Core (CTDC)** is a shared resource for Atlanta area child health researchers. The CTDC supports clinical trials with sample processing, shipping, and receiving correlative biology studies, and long-term biobanking of a wide variety of human tissues for future research. The lab contains six -80oC freezers and one -150oC freezer contained in a secure, key card-restricted, laboratory space. All freezers are under preventative maintenance contracts and monitored 24/7. The CTDC staff are notified in the event of temperature excursions and maintains access to backup storage units in the event of a catastrophic failure. Subsidized by Children’s Healthcare of Atlanta, the CTDC provides very competitive rates for biorepository studies. The CTDC can serve as the central biorepository for multicenter clinical studies. These services are offered to investigators conducting basic science, epidemiologic, translational, and clinical research related to improving child health.

·        **The Pediatric Biostatistics Core** was established in 2009 with a mission to support pediatric researchers at Emory University and Children’s Healthcare of Atlanta. The high-rigor expertise provided by the core bolsters the quality of pediatric research to promote impactful and reproducible research findings across all child health disciplines. The Core provides in-house assistance and collaboration in study design, grant applications, protocol development, data analysis, publication preparation, and statistical education. In addition, the Core also provides access to expertise using qualitative research methods including aid in the design, collection, and analysis of data collected through qualitative methodologies and approaches such as focus groups, interviews, and observations.

The Biostatistics Core is one of the most productive pediatric biostatistics units in the country. Three PhD level and six master’s level biostatistics manage 400-500 active projects at any given time and collaborate on up to 100 grant applications and co-authoring 100-150 scientific articles every year.

·        **The Pediatric General Equipment Core and Specimen Processing** is located within Emory-Children’s Center (ECC) and the Health Science Research Building (HSRB). It provides access to shared equipment to all Emory and Children’s affiliated investigators. Shared equipment includes ultracentrifuges, RT-PCR, gel documentation systems, TopCount system, developer, and specimen processing resources.

·        **The Pediatrics Grant Editing/Manuscript Support (GEMS) Core** provides expertise to assist with the final editing of extramural grant applications and/or manuscripts reporting data generated from our pediatric research programs. Highly qualified grant consultants work one-on-one with fellows and junior faculty towards building a research track record and securing extramural funding.

·        **The Pediatric Heart Diseases Data Registry Core** provides access to a rich registry of surgical, catheter-based, and electrophysiologic studies and interventions for multiple pediatric heart diseases. This core provides consultation assistance and can run queries, compile data, and conduct analyses for investigators wishing to perform outcome studies related to pediatric heart diseases. All requests will be subject to review/approval to ensure match with an outcomes research scope and to ensure all compliance requirements are met.

·        **Cardiovascular Imaging Research Core (CIRC)** provides non-invasive imaging services for investigators involved in clinical research involving infants, children, and adolescents. The CIRC has dedicated space, equipment, and experienced staff to provide high quality cardiovascular imaging services as well as post-processing of previously acquired images using specialized software. These services include performance of a routine complete or limited congenital or non-congenital two-dimensional echocardiography, color and spectral Doppler imaging, advanced echocardiographic imaging including three-dimensional echocardiography, tissue Doppler imaging, strain and strain rate imaging, stress echocardiography and cardiac magnetic resonance imaging. CIRC has also launched a program for assessment of vascular health in pediatric patients that includes non-invasive assessment of endothelial function using brachial artery flow-mediated dilation, measurement of arterial stiffness using applanation tonometry and assessment of structural arterial changes using carotid imaging.

·        **Medical Imaging Resources** provide a cross-disciplinary scientific, administrative, and educational home for imaging science through the Emory Center for Systems Imaging (CSI) and the Pediatric Imaging Research Core (PIRC) at Children’s Healthcare of Atlanta.

The Center for Systems Imaging Core (CSIC), one of the Emory Integrated Core Facilities (EICF), provides state-of-the-art research and pre-clinical human and animal imaging to the Emory community. The CSIC supports the Center for Systems Imaging (CSI), which is the cross-disciplinary scientific, administrative, and educational home for imaging science at Emory University. The goals of this center are to: (1) support the advancement of scientific research focused on the development of imaging biomarkers, (2) promote the development and application of biomedical imaging technology particularly magnetic resonance imaging, (3) provide core services for human and animal imaging studies, and (4) to build cross-cutting educational and training programs. The Center for Systems Imaging (CSI) is located at Wesley Woods and is focused on research projects and does not accommodate pediatric studies that require insurance billing, sedation, or increased clinical care.

·        The Pediatric Imaging Research Core (PIRC) is an interdisciplinary research program that recognizes the importance of medical imaging in the diagnosis and treatment of diseases in children and young adults. PIRC provides investigators with modern imaging technology and collaboration with imaging experts to achieve research goals. Our team consults with investigators to enhance their research through access to state-of-the-art technology, pediatric radiologists, physicists, pediatric technologists, nurses, and pediatric sedation providers. PIRC also enables the conduct of standard imaging associated with large clinical trials. Services include MRI, CT, PET, bone densitometry, fluoroscopy, nuclear medicine, interventional radiology, ultrasound, X-ray, and pediatric sedation. The Pediatric Imaging Research Core (PIRC) is housed at Egleston Hospital and Scottish Rite Hospital and can accommodate projects that include insurance billing, sedation or increased clinical care.