**Overview of Emory University.** Founded in 1836, Emory University has grown into a national center for teaching, research, and service, awarding more than 2,500 undergraduate and graduate degrees annually. It is recognized by the U.S. News & World Report as one of the top 25 Universities in the US (ranked 21st in the 2018 report). In 1966 the University’s Board of Trustees integrated all of Emory’s health components into the Robert W. Woodruff Health Sciences Center. The Robert W. Woodruff Health Sciences Center joins those components of Emory University concerned with patient care, education of health professionals, research affecting health and illness, and policies for prevention and treatment of disease. It is an academic health science and service center focused on missions of teaching, research, health care and public service. Its components include schools of medicine, nursing, and public health; the Yerkes National Primate Research Center; the Emory Winship Cancer Institute; and Emory Healthcare, the largest, most comprehensive health system in Georgia. Including health sciences, Emory has a total of 15,252 students, 4,662 faculty, and 31, 477 employees.

**Funded Research at Emory.** Researchers at Emory University received $734 million from external funding agencies in fiscal year 2018. This marked the ninth consecutive year that research funding has exceeded $500 million, and with an increase from $628 million in FY17, is the largest amount of research funding in Emory's history. Federal agencies awarded $440.8 million, or more than 59 percent of the total, led by the National Institutes of Health (NIH) with $359.2 million in awards. NIH funding represented more than 80 percent of total federal dollars awarded to Emory. In FY18, Emory received a total of $685.5 million in health sciences research funding.

**The Robert W. Woodruff Health Sciences Center (WHSC)**

**The Robert W. Woodruff Health Sciences Center (WHSC)** is an academic health science and service center focused on missions of teaching, research, health care and public service. It is composed of the Emory University School of Medicine, Rollins School of Public Health, Nell Hodgson Woodruff School of Nursing, Yerkes National Primate Research Center, and Emory Healthcare, the most comprehensive health system in Georgia, which comprises those components dedicated to patient care. Major teaching affiliates of the Emory University School of Medicine include Grady Memorial Hospital and its community clinics, the Atlanta Veterans Affairs Medical Center, and Children’s Healthcare of Atlanta (Children’s). The institutions of the WHSC have long been recognized for the quality of their programs in patient care and research with $3.8 billion in operating expenditures, 25,874 employees including 3,277 faculty, 5,700 students and trainees, and an $8.2 billion economic impact on metro Atlanta. In fiscal year 2017, there was $628 million in total research funding at Emory, with WHSC receiving $584.8 million of that including $353.7 million in federal research funding awards led by the National Institutes of Health with $307.7 million. Emory Healthcare has 2,046 hospital beds, 72,832 annual hospital admissions, and 4.5 million annual outpatient/other patient services. Physicians in Emory Healthcare and affiliate hospitals are responsible for 6.9 million patient services a year. The WHSC currently has 18,977 participants enrolled in 1,895 clinical trials of investigational drugs, devices, and procedures, more than any other institution in the state of Georgia. In summary, the WHSC creates an exceptionally rich environment for clinical research.

Academic components and programs housed within the WHSC include:

**The Emory School of Medicine** is ranked among the nation’s finest institutions for education, biomedical research, and patient care, with 2,757 full- and part-time faculty and 795 volunteer faculty. Medical school faculty received nearly $456.3 million in sponsored research in fiscal year 2018, and as of 2018, was ranked 18th nationally in NIH dollars received.

* ***The Emory Department of Pediatrics*** currently includes 177 faculty conducting research, 149 of whom are extramurally funded with 399 extramurally funded research projects (grants and contracts). Growth in extramural research funding for the department has been considerable over the past 5 years. In 2005, the Department of Pediatrics had just 193 total faculty members and reported approximately $10 million in extramural funding. By the end of fiscal year 2018, the faculty members in the DOP topped out at 461 and research funding levels were at $59.4 million in total funding and almost $34.5 million in NIH funding, which allowed them to achieve a top 10 ranking (ranking #4) in the 2018 NIH rankings for Departments of Pediatrics. Of note, research grants in the Emory Department of Pediatrics are only a part of the overall research enterprise in child health at Emory (estimated total of over $137.8M in child health-related research in all of Emory in FY18).

**The Emory Rollins School of Public Health** is ranked 5th of all U.S. Schools of Public Health by U.S. News & World Report (2020) and represents another robust component of the Robert W. Woodruff Health Sciences Center making significant contributions to research. In FY18, Rollins School of Public Health was ranked sixth in NIH funding in comparison to its peer units and currently supports 22 interdisciplinary centers. Many of its more than 296 full-and part-time doctoral level faculty members and 400 plus adjunct faculty members are linked by appointments, shared programs, or research grants with the CDC, Carter Center, American Cancer Society, CARE, Arthritis Foundation, Task Force for Global Health, and state and local public health agencies. Through these partnerships and in its role as a center for international health research and training, the School helps make Atlanta the public health capital of the world.

(more info on the Emory SPH for possible inclusion can be found at this link: - <http://www.sph.emory.edu/research/index.html>

**The Nell Hodgson Woodruff School of Nursing** is an international leader in the advancement of nursing science, education, practice, policy and research. In FY 2018, the school received $17.9 million in research funding from all sources. The School of Nursing secured $8.9 million in research grants, fellowships, training grants, and other awards from NIH in FY 2018, resulting in a ranking of top three among nursing schools for National Institutes of Health research funding. In addition to strong research programs, the Emory School of Nursing ranked 4th in the nation according to US News and World Report's 2020 America's Best Graduate Schools making it a top five nursing school in NIH research funding for the last four years. Major programs within the school include the Fuld Fellowship, targeting second-career students with interest in serving vulnerable populations; the Lillian Carter Center for International Nursing; and the Maternal and Newborn Health in Ethiopia Partnership. The school has 170 faculty, and students can learn from an additional 120 adjunct faculty at some 500 clinical sites.

(more info on the Emory SON for possible inclusion can be found at this link: -

<http://www.nursing.emory.edu/faculty-and-research/index.html>

**Georgia Clinical & Translational Science Alliance (Georgia CTSA)**, an NIH-funded collaborative with Emory School of Medicine, Morehouse School of Medicine, Georgia Institute of Technology and University of Georgia was created to increase availability and enhance efficiency of clinical trials for patients. Recently renewed for another project period, it is an inter-institutional magnet that concentrates basic, translational, and clinical investigators, community clinicians, professional societies, and industry collaborators in dynamic clinical and translational research projects. Georgia CTSA funds cores focused on improving quality, efficiency and collaboration of the research process. It also provides consultative support and new tools in bioinformatics and biostatistics, pilot funding for new research projects, training and workforce development, while integrating special populations and focusing on participant interactions, and creating local centers tackling clinical trial inefficiencies. Research educational opportunities include a Master of Science in Clinical Research program and KL2 Career Development Award for junior faculty. Community engagement is an important component of Georgia CTSA and promotes effective community participation in clinical trials to build a partnership between researchers and the community in order to reduce health disparities. Other components of Georgia CTSA include ethics and regulatory support, biostatistics, epidemiology, and research design support; a pilot grant program to promote new and multidisciplinary research and a tracking and evaluation unit.

**Children’s Healthcare of Atlanta (Children’s)**

**Children’s Healthcare of Atlanta (Children’s)**is a national leader in inpatient days, admissions, surgical admissions and emergency department visits. In 2018, Children’s managed more than 1,160,186 patient visits, 430,868 patients from all 159 counties in Georgia, 27,074 hospital admissions, 43,333 surgical procedures (inpatient and outpatient) and 243,709 emergency department visits with Emory clinicians providing the majority of the care. Children’s is also very involved in research, especially in collaboration with the Emory Department of Pediatrics. In 2018, Children’s facilitated the initial enrollment of over 5,300 of their patients in clinical trials and clinical research.

Children’s consists of 3 pediatric hospitals, 27 neighborhood locations including 8 urgent care centers and the Marcus Autism Center. Patients have access to over 2,600 pediatric physicians and practitioners representing more than 70 pediatric specialties and programs and the reach includes more than 13 telemedicine presenting sites around Georgia. There are more than 11,500 employees and 10,000 volunteers. Children’s is the largest pediatric clinical system in the country, the largest Medicaid provider in Georgia (serving 8 out of 10 pediatric inpatient Medicaid cases in Atlanta and 4 out of 10 statewide), and is consistently ranked among the top pediatric hospital systems in the country (e.g., by U.S. News & World Report). Children’s was formed in 1998 when Egleston Children’s Healthcare System and Scottish Rite Medical Center joined to form a unified healthcare system. In February 2006, Hughes Spalding Children’s Hospital joined the healthcare system. Children’s is a not-for-profit corporation. A complete array of pediatric subspecialties is available through pediatric physicians affiliated with Children’s, including allergy/immunology, cardiology, cardiothoracic surgery, critical care, orthopedics, otolaryngology, hematology/oncology, neurology, neurosurgery, gastroenterology, neonatology, transplant medicine, infectious diseases, psychiatry, and other specialties.

Children’s is home to the only two Magnet®  - designated organizations in Georgia. In November 2018 and February 2019 respectively, the Egleston and Scottish Rite hospitals of Children’s received initial Magnet® designation by the American Nurses Credentialing Center (ANCC), being recognized for superior nursing standards in the delivery of quality patient care, leading to the highest levels of patient safety, quality and patient satisfaction.

**The Children’s Healthcare of Atlanta Investigational Drug Service (IDS) Pharmacy** is a joint venture of the Children’s Department of Pharmacy and the Department of Clinical Research. The IDS pharmacy manages the investigational medications for over 140 clinical trials conducted on the various campuses in the Children’s system. The IDS pharmacy is staffed by two full time pharmacists and one full time pharmacy technician / assistant. The hours of operation are 8:00 am - 4:30 pm, Monday-Friday. The services and staff of the main hospital pharmacies are utilized to support trials requiring off-hours support. Various services provided by the IDS pharmacy include protocol review, budget preparation, staff education, receipt of study medications, IWRS system documentation, inventory maintenance, dose preparation, medication dispensing, subject randomization, subject and family education, invoice preparation and billing, periodic meetings with study monitors, final disposition of study medications, preparation and shipping of study medications, transfer of study medications among the various campuses, and compounding services (see below a detailed list of services provided by the IDS pharmacy).

|  |  |
| --- | --- |
| Services provided by the Children’s Healthcare of Atlanta Investigational Drug Service (IDS) Pharmacy | |
| Study Initiation | Review protocol  Prepare budget  Receive and process initial shipment of study drug  Prepare study fact sheet for staff  In-service staff (as needed)  Work with pharmacy IT staff to create drug build in Epic  Prepare preprinted labels (as needed) |
| Study Maintenance | Maintain appropriate inventory storage  Maintain study records  Meet with study monitors  Order and receive inventory  Process expired inventory  Process patient returns  Store patient returns for monitor  Process drugs for onsite destruction  Periodic study billing |
| Study Closeout | Process study drug for return to sponsor / onsite destruction  Process study records to archive  Meet with study monitor for closeout visit  Final billing |
| Dose Preparation | Retrieve and sign out inventory  Calculate dose/volume (as needed)  Order entry / verification in computer  Prepare dose  Dose labeling |
| Prescription Dispensing | Retrieve and sign out inventory  Order entry into computer  Prepare prescription  Prescription labeling  Patient/family education  IVRS documentation (when required)  Prepare for shipping (as needed) |

**The Center for Advanced Pediatrics (CAP) at Children’s Healthcare of Atlanta** is a 260,000 square foot outpatient clinic facility that utilizes a multidisciplinary, coordinated care approach to provide treatment to children and teens with chronic diseases and complex care needs by enabling access to multiple specialized health services in one place. Servicing thousands of families across Georgia, the center brings together over 20 pediatric specialties under one roof, harnessing the expertise and skills of more than 450 physicians and staff. The center’s multidisciplinary framework merges both clinical and research services to provide patients with optimal treatment options and state of the art care. A service of Children’s Healthcare of Atlanta (Children’s), one of the largest pediatric healthcare organizations in the United States, the CAP is the first building of its kind for pediatrics in Georgia, conducting state of the art research and providing more than 100,000 patient visits per year.

The CAP’s pediatric specialists provide treatment to a significant number of children with medically complex conditions who require multidisciplinary, coordinated care to optimize their outcomes. Providing “patient centered” care, the center allows access to specialized programs and services, improved appointment availability, and a “child friendly” design and setup. Space for collaborative physician consultations, central locations between all three hospital campuses, and specialized exam rooms for medically complex patients help to enhance and facilitate coordinated care and physician workflow. Phlebotomy, x-ray and lab services are strategically located in the CAP building to further promote efficient, timely and seamless care delivery. The center’s comprehensive health delivery model facilitates care integration, enhances care delivery, and improves clinical trial capabilities.

Providing patients access to leading-edge clinical research opportunities is another specialized feature that enhances the center’s multidisciplinary and coordinated care environment. The CAP houses resources essential to conducting rigorous research including investigational drug services, a Children’s run Clinical Research Laboratory, an Emory run processing lab, and courier services to transport samples according to established protocol between facilities and campuses. CAP also serves as home to the Pediatric Clinical Research Unit (PCRU), which provides over 4,000 square feet of clinical research space and infrastructure for pediatric researchers to conduct innovative research giving children and their families an opportunity to take part in leading-edge clinical trials. Researchers at the CAP are involved in more than 600 active research studies to improve child health. Studies span 28 specialty areas, with an emphasis in [cancer and blood disorders](https://www.choa.org/research/studies-and-clinical-trials/cancer-studies); [concussion](https://www.choa.org/research/studies-and-clinical-trials/concussion-research); [heart disease](https://www.choa.org/research/studies-and-clinical-trials/heart-disease-research); [kidney disease](https://www.choa.org/research/studies-and-clinical-trials/kidney-disease-research); [liver disease](https://www.choa.org/research/studies-and-clinical-trials/liver-disease-research); [neurosciences](https://www.choa.org/research/studies-and-clinical-trials/neurosciences-research); [orthopaedics](https://www.choa.org/research/studies-and-clinical-trials/orthopaedic-research) and [cystic fibrosis](https://www.choa.org/medical-services/cystic-fibrosis).

# **Pediatrics Physical Research Space**

# **Health Sciences Research Building**

The Health Sciences Research Building (HSRB) opened its doors in April 2013. This state-of-the-art research space is located directly adjacent to the existing Emory-Children’s Center Building and connected via a 2-story bridge. This five-story building includes 190,000 GSF, with over half the space (115,000 GSF) dedicated to research within the Emory Department of Pediatrics. An open lab concept features natural light in labs and corridors. The building includes biosafety level 2 and 3 labs. It also features a 160-seat auditorium and a cafe dining area with an outdoor seating option. The building will house 500 people, including 74 faculty researchers and their teams of postdoctoral fellows, graduate students, and staff.

Research in HSRB is designed to facilitate multidisciplinary child health related research collaborations with space dedicated to drug discovery, immunology and vaccines, neurosciences, cancer, gastroenterology, transplant immunology, nephrology, biomedical engineering, and human genetics. The two-story working bridge that connects HSRB to the ECC Building houses researchers dedicated to informatics, outcomes research, public health research, and clinical research.

*HSRB Animal space*

An IACUC-approved 13,944 ft2 animal vivarium is located in the basement of the HSRB Building. This animal facility is designed on a single corridor concept and contains rodents and fish with the intent to maintain rodents at a higher health standard than the convention for the campus (i.e., free of Murine Norovirus, Mouse Parvovirus, Helicobacter species, and fur mites enzootic to varying degrees in Emory mouse colonies). It includes microisolator ventilated cages for housing mice, surgical, and procedure rooms. This is Emory University’s first virus antibody free (VAF) animal facility. Under this new and elevated level of animal health maintenance there are special training, access, and traffic control measures. A gnotobiotic facility is being established in a portion of the HSRB vivarium and currently houses 6 isolator units.

Veterinarians and care staff are available for consultation on routine and special procedures, and on call after work hours and on holidays. Investigators using rodents of a lesser health status use the ECC animal research facility immediately across the street and accessible by bridge.

# **Emory-Children’s Center**

The Emory-Children’s Center (ECC) building was constructed in 2004 and is designed for optimal performance of modern biomedical research. This facility is a five-story building that includes 64,500 square feet of research space, an active pediatric subspecialty clinic on floor 1 staffed by Emory faculty physicians and operated by Children’s Healthcare of Atlanta, and a 12,500 ft2 small animal vivarium in the basement. The ECC building is presently occupied by the Department of Pediatrics with the clinic space leased to Children’s Healthcare of Atlanta. The ECC Building houses research programs in a variety of child health-related areas. Department of Pediatrics faculty are actively involved with the pediatric clinical care, teaching, research and child advocacy efforts throughout the building and the physicians and staff of Emory-Children’s Center are developing critical research to treat many childhood illnesses and injuries. The E-CC building is physically connected to the Health Sciences Research Building via a functional two story bridge.

# *ECC Animal space*

An IACUC-approved 12,500 ft2 small animal vivarium is located in the basement of the ECC Building. Housing is available for rodents and *Xenopus*. The facility is managed by professional staff of the Division of Animal Research. Veterinary services with the Emory Division of Animal Resources (DAR) include vendor surveillance, quarantine and isolation, preventive medicine, daily observation, treatment and intervention for injury or illness, health evaluations of sentinel animals, necropsy, histopathology, parasitology, microbiology, serology, hematology and blood chemistries. Veterinarians and care staff are available for consultation on routine and special procedures, and on call after work hours and on holidays. Investigators using rodents of higher health standard than the convention for the campus use the HSRB animal research facility immediately across the street and accessible by bridge.

**Clinical Research Services and Facilities**

# **Clinical Research Unit (CRU) at the Center for Advanced Pediatrics (CAP)**

The Pediatric Clinical Research Unit (PCRU) provides the space and infrastructure for pediatric researchers to conduct innovative research to treat childhood illnesses and injuries, giving children and their families an opportunity to take part in leading-edge clinical trials.

Located on the 5th floor of the Center for Advanced Pediatrics (CAP), the PCRU provides 4,237 square feet of clinical research space. The outpatient clinical research unit includes six private rooms; three with beds, one with an exam table and two with infusion chairs. All have the capability for full cardiac-respiratory monitors and vital sign equipment. There is also an observation room with two chairs and an intake room equipped with stadiometer, infant through adolescent scales and vital signs equipment. There is a nurse’s office and an open work station with ten computers available for coordinator and investigator use along with a registration area. Additionally, there is a large supply storage area, family nourishment room, soiled utility room, large medical records space and small conference room. Within CAP, there is also a Café, beautiful outdoor gardens, and wireless internet access.

The CRU at CAP offers access to many of Children’s Healthcare of Atlanta clinical services and departments including radiology for x-rays, EKG, clinical laboratory for research only resulting and research lab processing.

A dedicated and fully equipped Investigational Drug Services (IDS) covers 672 square feet within the CRU and is staffed by a research pharmacist and pharmacy tech. The IDS includes an anteroom and a hazardous medical prep room as well as ample storage for current and future trials.

The CAP staffs dedicated trained research nurses to perform medication administration, intravenous access and port access, vital signs monitoring and assessment, phlebotomy and other timed specimen collections including Pharmacokinetics Studies (PK) studies and oral glucose tolerance tests (OGTT).

**Lab Processing**

Labs can be processed for shipping in the Research Core lab located on the first floor of CAP. Also in the CAP is a CLIA-certified, clinical lab capable of on-site resulting from a specified test menu. For clinical labs not offered on-site, there is an established process to courier specimens to CHOA’s Egleston Main Lab for processing results. Additionally, Core laboratory services are offered at both Egleston and Scottish Rite Campuses of Children’s and include sample processing and aliquoting, short-and long-term sample storage in ultra-cold freezers, and IATA certified shipping. Lab resources at Scottish Rite include a research coordinator desk, a sample bench processing and aliquoting area for use by CHOA research laboratory staff and trained study staff members, general and refrigerated centrifuges and microcentrifuges and 1 [-80oC], 1 [-20oC] and 1 [4oC] freezers for sample storage. All freezers/refrigerators are equipped with 24-7 iSensix temperature monitoring alarm systems.  Lab resources at Egleston include a research coordinator office, a sample bench processing and aliquoting area for use by CHOA research laboratory staff and trained study staff members, general and refrigerated centrifuges and microcentrifuges and 1 [-80oC], 1 [-20oC] and 1 [4oC] freezers for sample storage. All freezers/refrigerators are equipped with 24-7 iSensix temperature monitoring alarm systems.  Investigational Pharmacy Services provided include pharmacy expertise for researcher protocol planning, set-up, and initiation, ordering and maintenance of investigational drug inventory per sponsor, state, and federal requirements, preparation of investigational drug information fact sheets for pharmacy and nursing staff to fit researcher protocol needs and compounding and dispensing investigational medications per protocol requirements.

**The Emory-Children’s Center Research Unit (ECC-RU)** is a 984 square foot unit located on the first floor of the Emory-Children’s Center Building. The Emory University space managed by the Department of Pediatrics is dedicated to clinical research activities and is available for IRB approved protocols conducted by Emory or its academic partners. The unit contains a research staff workroom, 4 exam rooms, 2 interview rooms, and a storage room.  Phlebotomy services are also offered. . The ECC-RU is self-service and appointments may be booked in a dedicated on-line scheduling system at which time the study staff will gain access for the informed consent process and subsequent study participant interactions

**Satellite research space at Egleston hospital campus** provides space for research study visits that include services not offered at CAP such as MRI, CT, and the Cardiovascular Imaging Research Core. The fully equipped two-bed patient area is located on Egleston’ s ground floor in the sleep lab area and is staffed by PCRU team members. Use of this space for visits not offering services in CAP also includes access to all Children’s clinical services and departments including radiology, cardiology, vascular access team, sedation services, Canines for Kids pet therapy, etc. Additionally, participants enjoy access to family-centered amenities including wireless internet, an exercise area, sleep rooms, business center, family library, cafeteria, and coffee shop.

**Children’s Pediatric Research Alliance Centers & Cores**

**The Pediatric Alliance Research Centers and Cores** were launched in 2007 via an initial $430M endowment from Children’s Healthcare of Atlanta (Children’s) to enhance the research infrastructure towards supporting and facilitating child health research in the Atlanta area. This effort has been extremely successful in bringing together multidisciplinary groups from multiple institutions to collaborate on research topics important to child health. It is now jointly sponsored via a financial investment from Children’s, the Emory University Woodruff Health Science Center and Georgia Institute of Technology (GA Tech) resulting in a unique collaboration between a Children’s Hospital, a state university and an academic medical center. The collective Children’s-Emory-GA Tech initiative has resulted in establishing robust research centers that offer a thematic home for basic, translational and clinical investigators to interact and collaborate.

**The Pediatric Research Centers** **are**

* Aflac Cancer & Blood Disorders Center
* Center for Childhood Infections and Vaccines
* Center for Clinical & Translational Research
* Center for Cystic Fibrosis & Airways Disease Research
* Clinical Outcomes Research & Public Health
* Center for Drug Discovery
* Center for Transplantation and Immune-mediated Disorders
* Children’s Center for Neurosciences Research
* Children’s Center for Pediatric Cellular Therapies
* Children’s Heart Research and Outcomes Center
* Marcus Autism Center
* Pediatric Technology Center at Georgia Tech

This Center structure supports robust research centers that offer a thematic home for basic, translational and clinical investigators to interact and collaborate in the represented areas of research strength and expertise. Each Center’s activities are supported through an NIH-funded leader, a series of primary faculty, and a wide array of collaborators from Children’s, Emory, Morehouse School of Medicine, Georgia Institute of Technology and other area institutions.

**Pediatric Core Resources**

The following ***Pediatric Alliance supported cores*** are designed specifically for child health researchersand 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 located in 640 sq ft of dedicated space on the 3rd floor of the Health Sciences Research Building (E362) that is linked by a bridge to the Emory Children’s Center and in 200 sq ft in the Winship Cancer Institute. 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 performed on 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 seven analyzers: a BD FACSymphony [6UV 7V 5B 6GY 3R] two 4 laser Cytek Auoras [405 488 561 640], two BD LSR IIs [3UV 5V 2B 5YG 3R] and [5V 2B 5YG 3R], and a BC Cytoflex [4V 2B 4YG 3R]. Mid-term clinical biobanking (2 years) and multi-parameter flow (100 validated antibodies) can be performed on a Zellkraftwerk Chip Cytometer.

Cell sorting can be performed on a SORP FACSAria II cell sorter [3UV 5V 2B 5YG 3R] or a Sony SH800 (4 laser; 405nm, 488nm, 561nm and 640nm) with 6 fluorescent detectors. An Amnis ImageStreamX MkIIcytometer also with 4 lasers (405, 488, 561 and 642; 10 fluorescent channels) provides the capability for image cytometry. Analysis workstations are available for off line data analysis with multiple software packages including FACSDiva, FlowJo, FCSExpress, 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 the performance of immunologic and diagnostic assays for infectious pathogens, including a Luminex 100 multiplex bead array system for detection of cytokines or RNA.

* **The Pediatric Animal Physiology Core** is a centralized resource specializing in survival surgery for rats and mice in addition to USDA regulated animals such as rabbits, guinea pigs and piglets. Surgical services currently offered by the Core include pulmonary banding in rat and neonatal rabbit, aortic banding, myocardial infarction, and intramyocardial injections (echo-guided or open chest). The Core houses a Visualsonics Vevo 2100 High Frequency Ultrasound system that allows high resolution small animal ultrasound examinations towards characterizing cardiac function and liver and kidney blood flow.
* **The Pediatric Biomarkers Core** – provides the equipment and technical expertise to perform small-molecule metabolite profile identification including analysis of markers related to oxidative stress.
* **Children’s Clinical and Translational Discovery Core** – Offers laboratory and technical assistance for collecting, storage and analysis of biological samples including blood and biological fluids collected as part of a clinical study. These services are offered to investigators conducting basic science, epidemiologic, translational and clinical research related to improving child health.
* **The Pediatric Biostatistical Core** – Two PhD level and four master’s level biostatisticians provide quantitative statistical assistance to investigators for analytic help and statistical methodology for study design, grant proposal preparation and manuscript preparation; database design for data collection is also available. In addition, a Qualitative Research Core arm is available to provide assistance in the design, collection, and analysis of data collected through qualitative methodologies and approaches such as focus groups, interviews, and observations.
* **The Pediatric General Equipment Core** **and Specimen Processing** – common use equipment such as ultracentrifuges, RT-PCR, gel documentation systems, TopCount system, developer and specimen processing resources.
* **The Pediatrics Grant Editing/Manuscript Support Core** provides expertise to assist with final editing of extramural grant applications and/or manuscripts reporting data generated from our pediatric research programs. Emory faculty member, Becky Kinkead, PhD, and grant consultant Janet Gross, PhD, 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 compile data for outcome studies related to pediatric heart diseases.
* **Cardiovascular Imaging Research Core (CIRC)** – provides non-invasive imaging services (including EKG, echocardiography, stress test, stress echocardiography and cardiac MRI) for cardiovascular research involving infants, children and adolescents. The CIRC has dedicated space, equipment and staff to provide quality cardiovascular imaging data that is collected in a systematic manner.
* **Medical Imaging Resources** – Both inpatient and research specific outpatient facilities exist to accommodate a variety of medical imaging needs including MRI, CT, PET, PET-CT, bone densitometry, fluoroscopy, nuclear medicine, interventional radiology, ultrasound, and X-ray. Pediatric sedation services are available, when needed.

Emory University also offers many other centralized core facilities available for pediatric researchers to use for their research. These ***Emory Integrated Core Facilities*** include:

* **Center for Systems Imaging (CSI)** is a cross-disciplinary scientific, administrative, and educational home for imaging science at Emory University. The center is housed in a 17,000 square foot newly-renovated facility on the 2nd floor of the Wesley Woods Health Center Building.
* **Emory Comprehensive Glycomics Core** is supported by the Atlanta Clinical & Translational Science Institute and the Emory University School of Medicine, and provides investigators with the tools and expertise needed to use rapidly evolving methods and technologies in the area of glycomics.
* **Emory Flow Cytometry Core** **(EFCC)** is supported by the Atlanta Clinical & Translational Science Institute and the Emory University School of Medicine. They are a full-service flow cytometry facility offering Emory researchers the ability to use the latest sorters and analyzers in their research.
* **Emory Integrated Genomics Core (EIGC)** is supported by the Winship Cancer Institute, the Atlanta Clinical & Translational Science Institute, and the Emory University School of Medicine, and provides investigators with the tools and expertise needed to use the latest genomics technologies in their research.
* **Emory Integrated Proteomics Core (EIPC)** is supported by the Winship Cancer Institute, the Emory Neuroscience NINDS Core Facilities, the Atlanta Clinical & Translational Science Institute, and the Emory University School of Medicine. They are a full-service proteomics facility offering Emory researchers the ability to use the latest technologies in their research.
* **Integrated Cellular Imaging (ICI)** provides state-of-the-art light microscopy tools including confocal and live cell imaging, multi-photon animal and tissue imaging, widefield & deconvolution, super resolution, and image analysis, providing consultations, expert training, and support for all Emory’s systems. Although this is officially an Emory Integrated facility operated out of the School of Medicine, there is a Pediatrics satellite located conveniently on the ground floor in HSRB. Moreover, child health researchers using equipment at any of the ICI locations receive a generous subsidy off regular pricing.
* **Mouse Transgenic and Gene Targeting Core (TMF)** is supported by the Atlanta Clinical & Translational Science Institute, and the Emory University School of Medicine, providing state of the art equipment and expertise for generating and characterizing genetically altered mouse models.
* **Robert P. Apkarian Integrated Electron Microscopy Core** **(IECM)** is supported by the Emory College of Arts and Sciences and the Emory University School of Medicine, providing investigators with instrumentation, technical assistance, and training in transmission and scanning electron microscopy.
* **Rodent Behavioral Core (RBC)** is supported by the Emory Neuroscience NINDS Core Facilities (P30NS055077), the Atlanta Clinical & Translational Science Institute, and the Emory University School of Medicine. This core is available to help plan, execute, and analyze behavioral experiments examining activity, arousal, coordinated movement, learning and memory, anxiety, depression, seizure susceptibility, reward/reinforcement, and aggression in mice and rats.
* **Emory Personalized Immunotherapy Center** is located on the 6th floor of Emory University Hospital (EUH), within the Emory Healthcare Blood Bank. Construction of the EPIC Cell Processing Core compliant with FDA cGMP Phase I good manufacturing practices has been completed. This Cell Processing Facility will foster development of novel personalized cellular therapies for Emory patients facing catastrophic ailments and unmet medical needs.
* **Emory Multiplexed Immunoassay Core (EMIC)** is supported by the Atlanta Clinical & Translational Science Institute and the Emory University School of Medicine, providing input and expertise to help investigators use the latest multiplexed immunoassays in their research.
* **The Emory Gnotobiotic Animal Core (EGAC)** offers investigators the opportunity to experimentally manipulate the microbiomes of mice in a controlled environment to gain insight into important biological mechanisms. The facility contains Parkbio rigid isolators and has a Tecniplast ISOcageP Bioexclusion system specifically designed for cage-scale germ-free, gnotobiotic, and bioexclusion studies.

**General Research Resources: Faculty Development, Mentoring, Seed Grants, Intellectual Interactions**

**Formal Workshops and Seminars**

* ***Pediatric Research “K-Club” Meeting Series (monthly):*** Sponsored by the Emory Departments of Pediatrics and Medicine, Center for AIDS Research (CFAR) and the Georgia Clinical & Translational Science Alliance (CTSA), K-Club brings together young scientists with senior faculty who serve on study sections and who have extensive mentoring and grantsmanship expertise. Presentations may be attended in person or via a live web feed and are recorded for anytime viewing. In addition to the monthly program, attendees are offered the opportunity to meet individually with a professional grants educator/advisor for advice and direct feedback on their draft applications. K-Club topics span a wide scope and include a variety of specific sessions falling under the broad headings of

1. Navigating the NIH and extramural research funding landscape
2. Strategies and approaches to writing NIH and other grant applications
3. General advice and guidance in preparing research grant applications
4. Research administration and logistics
5. Professional development including focused sessions on mentoring

* ***Research Resources 101 (monthly):*** Research Resources 101 is jointly sponsored by the Departments of Pediatrics and Medicine. It is a monthly series designed to introduce early career and established investigators to research resources available at Emory University and provides information about the access to and use of individual clinical and basic research resources. Topics presented range from clinical to basic science research related and include subjects like electronic resources, regulatory support, consultative services and core facilities. Presentations may be attended in person or via a live web feed.
* ***FEED Conference (annually):*** Co-sponsored by the Emory Departments of Pediatrics and Medicine, the Faculty Education, Enrichment, and Development Conference or “FEED Conference” is an annual full day event that includes general presentations as well as career-path specific sessions for clinical researchers and basic scientists. Regularly presented topics disseminate practical information such as use of tools to facilitate collaboration, finding research funding, the manuscript review process and the Emory promotion process.
* ***Clinical Research Bootcamp (annually):*** The Emory School of Medicine Office of Faculty Development organizes and hosts an annual “Clinical Research Boot Camp,” a day-long program providing participants with a comprehensive overview of the major components involved in clinical research, including the development of sound research protocols, maintaining compliance and high ethical standards, and the successful planning of a productive research career. Specific topics addressed include study design, statistical resources and basic statistical techniques, securing research funding, Institutional Review Board considerations, conflict of interest and the importance of networking.
* ***Junior Faculty Development Course (10 sessions over 5 months):*** Featuring a diverse faculty selected from throughout the School of Medicine, School of Public Health and Goizueta Business School, this course presents information necessary for success in an academic medical center using a variety of formats including didactic presentations, panel discussions, group and individual exercises, and case-based problem solving. Specific topics include organizational structure and finances, teaching, presentation skills, promotions and tenure, manuscript writing, negotiation and conflict resolution and ethics.
* ***Emory Medicine Professional Leadership Enrichment and Development Program (EM-ProLEAD):*** The focus of EM-ProLEAD is to enrich leadership skills, enhance business knowledge, and develop strong partnerships across Emory. Aspiring leaders must be nominated by their division chiefs to be considered. The Program features lessons from campus leaders, more advanced training in financial planning and strategy, and exercises to develop recognition of individual strengths and areas for growth. The program is 10 months in length and includes mandatory 4 hour monthly sessions.
* ***Laboratory Management Course:*** Once a year, the Emory Office of Postdoctoral Education offers a Laboratory Management training class to support the success of postdocs and junior faculty in establishing and managing their own independent basic science research labs. The course has five two-hour sessions with two major topics covered in each session in one-hour segments. Topics that are covered include setting up your own lab, budget management, hiring people, data management and managing the tenure-process. The course is offered once a year in the Spring semester. A certificate of “Lab Management Training” is awarded to all who attend all 5 sessions and complete a final course project.
* ***Principles and Practice of Molecular Biology in Medicine course:*** Offered annually, this course is designed to provide an overview and technical information on the most common molecular biology techniques that are available for biomedical research. Taught by experienced Emory School of Medicine faculty, this course educates participants to select the most appropriate techniques to best test their research questions and hypotheses and to appropriately design experiments and incorporate proper controls. Each lecture includes a description of the methodology being presented, the strengths and weaknesses of the approach being used, as well as examples of successful use of the techniques from the literature. Topics covered include: Monitoring Cell Growth and Apoptosis; Identification and Localization of Proteins in Cells; Protein Analysis; State of the Art Techniques in Proteomics; Signaling Networks in Cells; DNA/mRNA Analysis; Regulation of Gene Expression; Defining Function of a Gene or Protein in Cultured Cells; Defining Function of a Gene or Protein in Animal Models; Biomaterials Based Approaches; Design & Analysis of Experiments; Grant Writing Skills; and Fundamentals and Art of Scientific Presentation and Manuscript Writing.

**Grant and Manuscript Writing Resources**

Numerous institutionally initiated and supported faculty development opportunities are available throughout Emory University

* ***The Pediatrics Grant Editing/Manuscript Support Core (GEMS***) provides expertise to assist with final editing and of extramural grant applications and/or manuscripts reporting data generated from our pediatric research programs. Emory faculty member, Becky Kinkead, PhD, and grant consultant Janet Gross, PhD, work one-on-one with fellows and junior faculty towards building a research track record and securing extramural funding. <http://www.pedsresearch.org/research/cores/gems-core/overview/>
* Grant strategy and writing programs are offered through a School of Medicine Office of Postdoctoral Education organized ***“K Tutorial,”*** a 6 hour course designed to provide in-depth information and targeted grant writing assistance to faculty preparing NIH K applications.
* Department specific grant writing help is also offered through programs such as the Dept of Pediatrics sponsored ***“Grant Editing and Manuscript Support Core,”*** which is a fully subsidized service providing comprehensive grant and manuscript editing support.
* The Emory University Center for Faculty Development and Excellence organizes a faculty writing group called ***“The Writing Room”*** that is tailored to a small group of participants and designed to meet their specific needs and preferences. The Center for Faculty Development and Excellence serves as scheduler and convener of this group and facilitates the planning and communication of the current cohort of participants.
* The Emory School of Medicine Office of Faculty Development offers ***a “Peer-Mentoring Manuscript Development Initiative,”*** connecting junior faculty ready to publish with experienced faculty who can provide the needed guidance and mentoring.
* The Laney Graduate School at Emory University organizes the ***“Grant Writing Program”*** that addresses every stage of grant proposal writing inducing developing fundable project ideas, presenting projects in persuasive ways and tailoring proposals to specific funders. The program is designed so that you can participate in a series of forums and workshops that build on one another and help you to develop your proposal and dissertation project. Workshops and informational sessions are offered throughout the year.
* The Woodruff Health Sciences Library subscribes to ***Nature Masterclasses***, an online scientific writing course. The masterclass consists of 15 course modules, varying in length from 30 to 75 minutes each, covering the entire scientific publishing process, from planning a paper to getting it published. The modules are taught by editors from the *Nature* journals and cover topics ranging from "Elements of Writing Style" to "Selecting a Journal for Publication" to "Measuring Impact."

**Mentoring**

Mentoring is a strong cultural component at all levels of Emory. The “Mentor Emory” program is organized annually and not only pairs mentees with seasoned mentors based on the mentee identified needs, but also facilitates the development of these relationships through moderated sessions and suggested communication strategies. The Department of Pediatrics also offers a variety of mentor-specific resources including the “Mentoring Check-up” series designed to seek feedback from junior investigators and learn what areas they are still in need of assistance seeking mentor resources to match. “Speed Mentoring” is a session held during the annual Emory Departments of Pediatrics and Medicine sponsored Faculty Education, Enrichment, and Development Conference that pairs junior faculty members with senior faculty members. This venue provides a series of short face-to-face meetings to facilitate networking and to promote mentor related discussions between individuals who may not otherwise have a chance to meet.

**Pilot/Seed Grants**

The Emory University Department of Pediatrics and Children’s Healthcare of Atlanta are committed to providing grant support for investigators as they pursue additional grant funding. Annual seed grant programs available for research initiatives include a) The Pediatric Center Research Seed Grant program supporting basic, clinical and translational pediatric research projects with an emphasis on supporting junior faculty; b) the Friends Research grant geared towards non-faculty clinicians with project ideas that are likely to have a direct clinical practice impact; c) Dudley Moore awards for nursing and allied health research and d) the Pediatric Research Center Pilots. Emory University also offers a variety of seed funding opportunities open to all Emory faculty.

Children’s Healthcare of Atlanta also partners with Georgia Tech to offer a variety of child health focused seed funding opportunities. This includes a “Quick Wins” funding program that pairs clinicians with Georgia Tech engineers and computer scientists towards delivering rapid solutions to address unmet clinical needs. Projects must propose delivery of a workable solution into the hands of a clinician within 18 months from the receipt of funds and project start. Georgia Tech also offers other child health focused funding opportunities such as “Child Impact Grants” and “Imlay Innovation Fund Grants” both calling for innovative research project ideas in areas aligned with Children’s defined clinical priorities.

The Georgia CTSA offers targeted seed grant programs to promote clinical and translational science including support for research involving community-based research initiatives and development and support of research technologies aimed at benefitting the clinical community. Through collaboration with the Emory University Research Committee, the GEORGIA CTSA supports several health-science specific $30K awards for short-term research goals that can be accomplished in one year or less. The program prioritizes funding of research and creative projects to explore new areas of research that are likely to attract outside support.

**Formal Seminars and Conferences Facilitating Networking & Intellectual Interactions**

There are numerous opportunities for intellectual interactions with other investigators. Some examples are listed here:

***Department of Pediatrics***

* Pediatric Research Grand Rounds (monthly) connecting a clinical case from the hospital to a research presentation related to ongoing investigations and Emory and/or Children’s.
* Pediatric Research Seminar (weekly) representing topics relevant to all Research Centers including a monthly seminar dedicated to topics of interest to the pediatric research centers.
* The annual Regional Pediatric Research Conference routinely attended over 300 scientists from the Southeast focused on child health related research

***Rollins School of Public Health – If relevant***

* Extensive spectrum of courses including epidemiology, biostatistics, and data management in research are available to Emory faculty and through the MSCR program
* Regularly scheduled seminars in epidemiology, biostatistics, and clinical trials methodologies
* MSCR Journal Club: Critical assessment of research design and methodologies; discussion of patient-oriented research related topics (e.g. use of placebo; informed consent)
* MSCR Clinical Research Colloquium: Series of seminars given by leaders in clinical investigation detailing their clinical investigation careers and how they have organized multidisciplinary approaches to address complex issues in biomedical research

***Emory University Postdoctoral and Graduate Level Education***

**The Emory Office of Postdoctoral Education**

***The Emory University Office of Postdoctoral Education (OPE)*** has been the home for the formation and enforcement of Postdoc policies since 1999. Although established to oversee and serve the needs of the nearly 700 PhD postdoctoral fellows working across the entire Emory University Campus, OPE programs and resources are available to everyone at Emory. <https://med.emory.edu/postdoc/>

OPE Coursework:Working with faculty, OPE directs courses specifically designed for Postdocs, Junior Faculty and medical research fellows in the following areas: Responsible Conduct of Research; Laboratory Management; and Rigor and Reproducibility.

OPE Career Development Programs and Services: OPE provides tools for IDP’s and develops and offers workshops and programs throughout the year for grant writing and other research relevant career development activities, including but not limited to:

* CV and cover letter writing
* Special Science Writing for Publication
* Special Grant Writing Workshops for F, K and private funding sources: <https://med.emory.edu/postdoc/CurrentPostdocs/Funding/index.html>

OPE Sponsored Courses/Workshops - Additional Details:

**The Responsible Conduct of Research Ethics course is offered twice each year and is specifically designed for PhD and MD trainees conducting basic, translational and clinical research. Using a case study and in-person approach, discussions on conflict of interest, authorship, research misconduct, data acquisition and management, collaborative and team science, human subjects, animal use, and mentor/mentee relationships provide a broad appreciation for the ethical issues of research. A separate two-hour workshop on Rigor and Reproducibility is offered twice each year.**

**F and K grant writing tutorial series are offered six times a year for trainees preparing federal and private grant applications. Focused on F32 and K award scholarships, each series is composed of three didactic sessions followed by individual revising sessions guided by a grants writer working with the Postdoctoral Fellows, Medical Research Fellows, or junior faculty. They have a proven track record with a success rate of funding upwards of 50% for applications submitted from postdoctoral fellows and junior faculty. Over 90% of Postdoctoral Fellows who receive K career development awards move to tenure-track faculty positions.**

**The F32 Bootcamp is a 12-week series designed to help the Postdoctoral Fellow and their sponsor develop a mature and well-reviewed application. Each session addresses the specifics of a particular grant section and strategies that strengthen or weaken that section. Webinars are also created for each section so that attendees can re-review the material as they write their own section. A grant editor reviews each section and provides appropriate feedback, guidance, and editing.**

**The Leadership and Management Certificate Program is comprised of nine workshops and is designed to**

**encourage the development of other professional skills. These sessions are taught by the Emory University Goizueta Business School faculty and cover essential topics in executive education. The skills covered are designed to help Postdoctoral Fellows become better leaders and managers whether they are planning on running an academic laboratory or are moving to a corporate or non-profit environment.**

**The Laney Graduate School and the Graduate Division of Biological and Biomedical Sciences**

The Laney Graduate School is home to over 40 PhD Programs spanning the natural sciences, social sciences, and humanities.  Most students working in biomedical fields relevant to this application are in programs based in the Graduate Division of Biological and Biomedical Sciences (GDBBS), a Division of the graduate school that includes eight interdisciplinary, interdepartmental graduate programs. Over 400 PhD students receive their training in the labs of over 350 faculty members, distributed across all of the major academic units on campus.  Faculty in the Department of Pediatrics are highly active in training these predoctoral students. In fact, more GDBBS PhD students receive their training in Pediatrics labs than any other department at Emory (13% of students in 2017 are in Pediatrics, out of 17 academic units).

Institutional support for graduate education at Emory is very strong. The GDBBS annual budget determines the number of new students that can be admitted each year. Successful applicants enrolling in GDBBS Programs receive 21 months of full support from the GDBBS and are supported by research grants, training grants, or other individual fellowships for the remainder of their training. Several of the Programs are affiliated with a pre-doctoral training grant, typically from the National Institutes of Health.

The School of Medicine’s MD/PhD Program provides the opportunity for exceptionally bright and dedicated students to acquire both clinical and basic research training in order to pursue challenging careers in academic medicine. The Program is designed to provide students with the in-depth, high-caliber research training and medical education required of future leaders in biomedical research. Students are enrolled in both the Laney Graduate School and the School of Medicine during the approximately seven years required to complete both degrees in the Program. Many MD/PhD students select a Program within the GDBBS for the PhD component of their degree. The MD/PhD Program is funded in part through the National Institutes of Health’s Medical Scientist Training program. Additional support derives from Emory University, the School of Medicine, and the Laney Graduate School.

Students in GDBBS Programs receive training in critical thinking, creative problem solving, effective communication, and technical skills relevant to their field, all in preparation for successful careers in academic or nonacademic venues. Some GDBBS students continue their training as postdoctoral fellows at top research institutions around the world, including at Emory. Other students go on to positions in industry, in scientific communication, in public policy, in commercialization, in education and outreach, in nonacademic lab science, and more.  Professional development and career planning activities help enable students to make informed decisions for their career path, and help to prepare them for the career of their choice. <http://biomed.emory.edu/>