Facilities and Resources

The Brodeur Laboratory is housed in 2,200 square feet of space on the 3rd floor of the Colket Translational Research Building (CTRB) (http://www.research.chop.edu/programs/cccr/index.php/about/research-programs-laboratories/garrett-m-brodeur-laboratory.html). The laboratory is fully equipped with all the equipment necessary for the conduct of cellular, biochemical and molecular studies related to neuroblastoma research. Besides Drs. Brodeur, the lab consists of 6 fellows, post-docs, research associates, technicians and students.

The Chorny/Alferiev Laboratories occupy 4,400 sq. ft. of nanomedicine research, cell and molecular biology, and biochemistry laboratory space in the ARC Building of CHOP. Nanoparticle formulation and characterization equipment: Probe sonicator (50 Sonic Dismembrator or Probe Sonicator, FB50, Fisher Scientific); Probe sonicator XL (Sonicator Untrasonic Liquid Processor XL, XL2020, Misonix Incorporated); Rotary evaporator with vacuum controller (Rotavapor R-200, BUCHI Analytical Inc.); Benchtop freeze dryer (VirTis Benchtop K, 4KBT2L, SP Scientifitc): Analysis and characterization: Brookhaven 90Plus particle and zeta sizer (interfaced with BIC Particle Sizing Software and BIC Zeta Potential Analyzer software), Microplate absorbance and fluorescence readers with SoftMax Pro 5.4 and 6.4 software, Nicolet Micro FTIR, Perkin Elmer DSC, HPLC with WISP autosampler, P.E., atomic absorption spectrophotometer and P.E. fluorometer.

CHOP Laboratory Research Core Facilities and Equipment (Selected from 18 Cores available)

Biostatistics and Data Management. BDMC includes the Biostatistics, Data Management and Information Systems sub-cores. The Biostatistics sub-core provides study design expertise, development of randomization schemes, sample size calculations including power analysis, and statistical analysis and interpretation of study results. Biostatisticians collaborate with investigators on grant preparation, protocol development, and conduct and analysis of basic science, pre-clinical and clinical trials. The Data Management sub-core provides case report form development, data entry and review, and discrepancy checking and resolution.

Bioanalytical Core. This laboratory is equipped with all standard equipment for pharmacokinetic studies including two ABI/Sciex 4000 liquid chromatography/mass spectroscopy/mass spectroscopy (LC/MS/MS) systems. Samples are tracked using ThermoFisher Watson LIMS. The Clinical Pharmacology & Therapeutics Division has the following equipment resources at its disposal in support of analytical method development and sample processing (located in CTRB 4208): two Shimadzu high performance liquid chromatography (HPLC) AD20 systems, a photo diode array detector, an ultraviolet dual wavelength detector, a fluorescent detector and two triple quadrupole LC/MS-MS systems. The adjacent area contains refrigerated centrifuge, vacuum centrifuge with a cold trap, spectrophotometer, and microplate reader interfaced to a computer. Molecular biology equipment includes an MJ Research Dyad thermocycler, 2 PCR workstations with UV lighting, a dedicated sterile human nucleic acid isolation facility, a Biorad GelDoc gel documentation system.

Laboratory Animal Facility (LAF). The CHOP-RI has two laboratory animal facilities, one located in the ARC and the other in the CTRB. The two LAFs provide care, housing, husbandry and veterinary care for CHOP’s animal colonies. Accredited by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC), the facilities’ responsibilities in ensuring humane care and use of animals include training, compliance oversight, administration and operations, clinical veterinary services and animal husbandry. The LAF works closely with the Institutional Animal Care and Use Committee (IACUC) to ensure that CHOP’s animal care and use program supports research while adhering to the regulations that govern the use of animals and the principles that underlie the ethical use of animals in research.

Small Animal Imaging Facility (SAIF). The SAIF core comprises small animal magnetic resonance imaging, optical imaging, ultrasound, single photoemission computer tomography, PET-CT and SPECT-CT. Optical Imaging: The Perkin Elmer IVIS Spectrum is an optical imaging system that supports both bioluminescence and fluorescence. It has high throughput (5 mice with 23 cm field of view), high resolution (up to 20 microns with 3.9 cm field of view) and ease of operation. MRI: The MRI system is a Clinscan™(Bruker hardware, Siemens software) selected to provide state of the art rodent MR imaging capabilities. A 7T horizontal magnet with 12.9 cm gradient coils (maximum strength 600 mT/m) was chosen to provide high anatomic resolution and versatile performance. Ultrasound: The Visualsonics VEVO 2100 is a high-frequency, high-resolution digital system with linear array technology and Color Doppler Mode. The wide range of applications in animal models includes high-resolution anatomic imaging, Doppler Blood flow measurements, 3D-mode Imaging and volume analysis. Computing/Visualization: The image acquisition facilities are networked to a “preclinical reading room” powered by Vital Images Vitrea Enterprise servers and providing multiple high-resolution visualization and quantification stations for image review and analysis.
The Children’s Hospital of Philadelphia (CHOP)

Founded in 1855, The Children’s Hospital of Philadelphia is the nation’s oldest hospital dedicated solely to the care of children. CHOP has a long-standing and continuing commitment to developing the leaders in medicine and science, expanding the frontiers of pediatric care through novel research programs and translational research, and applying those advances to clinical care. CHOP is an independent hospital, autonomous medically, administratively and financially. Despite changes in the health care environment affecting practice and reimbursement, CHOP has been in a position to maintain a steady pace of growth and development in its clinical, teaching and research activities. In FY2017 CHOP received more than $248M in extramural sponsored program funding, 62.65% of which were federal grants. CHOP’s main campus is directly adjacent to the School of Medicine and the Hospital of the University of Pennsylvania. CHOP has six academic Departments: Pediatrics, Surgery, Anesthesiology/Critical Care, Radiology, Pathology, and Psychiatry. Unlike the other CHOP departments, the Department of Pediatrics is also the academic department of the University of Pennsylvania, Perelman School of Medicine. CHOP is the major provider of primary health care services for children of West and South Philadelphia, and a major tertiary referral center for the greater Delaware Valley area. The CHOP main campus includes inpatient, outpatient, research, and rehabilitation facilities in an interconnected complex of buildings. Annually, CHOP receives approximately 29,000 inpatient admissions, nearly 90,000 emergency room visits, and nearly 1.4 million outpatient visits. CHOP’S Delaware Valley Network, with 47 locations, includes 31 primary care facilities, 13 Specialty Care Centers, and partnerships with 11 community hospitals. Patient care activities have continued to grow. CHOP’S main campus features the 527 bed Main Hospital, the Richard D. Wood Ambulatory Care Center, and the rehabilitation facility Children’s Seashore House.

Directly or in partnership with others, CHOP seeks to provide accessible, comprehensive, innovative, and high-quality medical and surgical care to children in Pennsylvania, New Jersey, and Delaware as well as other states and countries. A tertiary and quaternary care center with state-of-the-art inpatient and outpatient facilities, CHOP provides care for the sickest children from around the world. Many of its clinical programs, including those in Oncology, Hematology, Cardiovascular Disease, Endocrinology, Neurology, Neonatology, Immunology, Infectious Diseases, and Genetics are considered pre-eminent centers of care. As a result of these and other highly regarded programs, CHOP has been consistently ranked as one of the top Children’s Hospitals in the nation for the past 5 years in the annual physician survey by US News & World Report. CHOP has also been rated #1 for 4 of 4 biannual fact-based surveys of Children’s Hospitals around the country by PARENT Magazine. In addition, PARENT Magazine has rated several subspecialty areas over the past 6 years, and CHOP has had the majority of #1 ratings in these areas. By both fact-based and reputation-based surveys conducted in the past 5 years, CHOP and its individual subspecialty programs have consistently been rated the best in the nation. A busy teaching hospital with more than 250 trainees at all levels at any given time, the hospital focuses its educational mission on health professionals at all levels, with an emphasis on training future leaders who are devoted to the care of children. Although a separate entity, CHOP is an essential and integral element in the educational and training programs of the University of Pennsylvania School of Medicine.

The Children’s Hospital of Philadelphia Research Institute

Established in 1972, the Research Institute at CHOP fulfills the healthcare system’s long-standing dedication to pediatric research and is a reinforcement of its “bench to bedside” philosophy. Approximately one-third of the total space in the Hospital is devoted to research, and the Research Institute administers and organizes all such activities. The Institute is home to one of the largest government- and foundation-supported pediatric research programs in the country, receiving roughly $119 million in NIH awards yearly, and boasting an annual budget of approximately $383 million. Supported by a staff of over 2000, more than 500 investigators carry out clinical and laboratory research studies in every pediatric subspecialty and scientific inquiry, including AIDS, autism, cancer, cardiology, and genetics, as well as public policy, and safety. There is currently more than 750,000 square feet of research space across three facilities. CHOP Research is housed within nine research Centers of Emphasis, specifically established to focus on areas of research having the greatest impact on translating basic research findings into medical innovations. See www.research.chop.edu/research/centers-emphasis. In addition, CHOP Research has developed 10 interdisciplinary Research Affinity Groups. This group structure reflects the increasingly interdisciplinary and multidisciplinary nature of many key research questions. The groups link multi-talented investigators with common research interests who are widely dispersed through the Institute, thereby encouraging, and supporting collaboration across disciplines. See www.research.chop.edu/research/research-affinity-groups.
And, with a primary goal of easing the burden on researchers and enabling them to focus more efficiently on their research, CHOP has established multiple institutional, departmental, and administrative core facilities which provide instrumentation and technical skill. Each year, the Hospital invests millions of dollars in sophisticated research instrumentation for the core facilities, which are lead by scientific or faculty directors and one or more technical directors. Laboratory research is conducted in newly constructed facilities which include 93 lab modules and numerous core facilities providing state-of-the-art shared research resources to Hospital investigators. See www.research.chop.edu/research/chop-research-core-facilities.

Key resources in the CHOP Research Institute relevant to this proposal include:

- **Office of Research Regulatory Affairs** is responsible for creating and maintaining procedures to ensure the Protection of Human Subjects. The Institutional Review Boards (IRBs) conduct initial and continuing review, as well as inform investigators of their obligations and of the procedures by which they submit studies to the IRB for review.

- **Research Administration Office** is responsible for the final review of all grant applications, ensuring adequate facilities are available to support the application, applicable certifications are provided, and that all applications are signed by an approved institutional representative. This office is also responsible for negotiating on behalf of the institution with all external sponsors, consultants, and subcontractors.

- **Research Business Office** provides post-award management of grants to investigators. The office consists of an experienced Manager who is responsible for the supervision of four Senior Business Managers, seven Business Managers, three Assistant Business Managers, and three Administrative Assistants. Services provided include the official authorization of all expenditures, monitoring of all expenses, and providing internal expenditure reports to investigators of specified grants from the Hospital’s general accounting ledger system, Lawson. The staff is also responsible for working with Research Accounting to ensure that all grants are accurately closed and financial reports are submitted to sponsors in a timely manner.

- **Research Accounting Office** is responsible for fiscal management of all sponsored projects funds. It maintains a staff of qualified accountants and assistants to perform all accounts receivable and payable functions within the institute. They generate invoices to external sponsors based on actual expenditures documented in the Lawson accounting system operated by the Hospital. The staff also is responsible for working with the assigned Research Business Manager to ensure that all grants are accurately closed and financial reports are submitted to sponsors in a timely manner.

- **Recruitment Enhancement Core (REC)** is a program of the Clinical Research Support Office within CHOP’s Research Institute. REC services include: (1) consulting with study teams to identify strategies for recruitment and retention of research participants; (2) enabling networking opportunities across CHOP and UPenn so that investigators can share recruitment resources; (3) searching CHOP’s EHR to identify potential participants (e.g., searching by diagnostic labels and billing codes); (4) facilitating both paper and electronic contact of those individuals to invite their participation. The REC is also in the process of creating a research volunteer registry that would enroll families and their children from all possible clinical services in the health care system. This registry will be part of the "Clinical Research" finder page on the main hospital’s website, as well as CHOP's Research Institutes public facing page. It draws from electronic fields in the eIRB to describe and list in a searchable manner all active CHOP studies. The registry component will include the ability for the public to specify an interest around a particular disease or disorder, and to sign up to be contacted for future research studies. In addition to recruitment of specific study populations of interest, the full range of medical disorders and diseases represented in the registry will provide unparalleled ability for researchers to create custom made controls groups tailored to their particular disease or disorder. The REC is also devoting considerable energy and resources by working with our general outpatient pediatric population to identify a segment of completely healthy and typically developing controls (e.g., by targeting well child visits). The registry will be promoted to the public in various ways including community events, traditional and social media outlets, and a planned speakers group that will engage local schools and parent/teacher groups around the various types of research conducted at CHOP. The REC will also promote studies internally to the 13,000 employees of CHOP as well as potentially reaching out to University of Pennsylvania employees, which would be an additional 43,000 individuals.
Buerger Center for Advanced Pediatric Care

The Division of Oncology has recently moved to the new Buerger Center for Advanced Pediatric Care. This is a world-class outpatient pediatric medical facility located on the South Campus. This 12-story, 700,000-square-foot ambulatory facility will serve as a hub for comprehensive medical services. Clinical neighborhoods of related specialties have been designed to accommodate patients seeing multiple specialists during a single visit. Additional amenities, including a 14,000-square-foot rooftop garden and educational play areas provide therapeutic opportunities and respite for patients, families, and staff. The significantly larger space includes an expanded Alex Scott Day Hospital, separate clinic space with designated check in and "wait, play, learn" areas, a pharmacy and phlebotomy services. Play areas have been designed inside the clinic and day hospital to provide space separately to children and teens.

Roberts Center for Pediatric Research

This newly constructed 21-story building, comprised of 466,000 square feet of research and office space, will house about 1,200 people by 2022, and is located on the now extended east side of the CHOP campus. The building was constructed in order to allow for better environmental conditions, flexibility to accommodate more administrative and research staff, and provide improved work spaces, conference and meeting options, and evaluation spaces. The first floor houses the lobby, Waterfront Gourmet Café and Deli and conference space. The second floor has additional conference space, and the fourth floor has the Subject/Evaluation suite. The remainder of the floors are workspaces and currently floors 5-11 and 13-15 are occupied. The new workspaces include a more open, bright and collaborative space, balanced with a variety of confidential spaces. Every work floor throughout the building is equipped with enclosed meeting spaces, semi enclosed meeting space, open meeting space, and huddle rooms to accommodate all types of workplace interactions. The remaining floors are available for future growth.

The Colket Translational Research Building (CTRB)

Located on the Hospital’s South Campus, CTRB has brought together a diverse group of researchers focused on pursuing cures through innovative approaches to treatment. The 11-story, 450,000-square-foot research building provides flexible state-of-the-art laboratory space that will not only advance the Hospital’s world-class research program, but will also enable the Hospital to recruit top-level investigators. Approximately 75 CCCR investigators, spanning the spectrum from basic to translational research, now occupy clinical and lab space within the new facility. The entire premise of the CCCR is to capture the synergy between disciplines, and the physical space has been designed to encourage that process. The labs, for instance, are strategically placed to bring together areas of emphasis that might not otherwise interact. Lab space for the oncology research program has expanded from 14,000 to 56,000 square feet. The facility is designed to expand vertically to 23 stories to provide for future growth, and it provides enormous opportunity for additional recruitment.

The Department of Pediatrics at CHOP/University of Pennsylvania School of Medicine

Pediatrics is the largest Department in the Hospital and is organized into Divisions representing the major subspecialties: Adolescent Medicine, Allergy/Immunology, Cardiology, Developmental and Behavioral Pediatrics, Emergency Medicine, Endocrinology, Gastroenterology/Hepatology/Nutrition, General Pediatrics, Hematology, Human Genetics, Infectious Diseases, Neonatology, Nephrology, Oncology, Pulmonary Medicine, Rehabilitation Medicine, and Rheumatology. The Department stands among the premier academic pediatric departments in the country, with its already wide and still growing clinical network and increasing number of faculty conducting basic and clinical research. CHOP’s Pediatric Department has been named best in the U.S. by U.S. News & World Report for 2017 for the fourth year in a row.
The Division of Oncology

The Division of Oncology includes 52 MD or MD/PhD and 7 PhD faculty members, 18 fellows in pediatric hematology/oncology fellowship training, residents, psychologists, nurse practitioners, registered nurses, home care nurses, social workers, dietitians, child life specialists, and is home to the Chairman of the Children's Oncology Group. Our Cancer Center offers comprehensive, family-centered care with expertise spanning every form of childhood cancer. Each year, the program treats more than 1,000 new patients and follows more than 13,000 patients previously treated for childhood cancer. Programs and services include inpatient and outpatient Oncology services, the Palliative Care Program, the Oncology Day Hospital, the Stem Cell Transplant Program, the Neuro-Oncology Program, the Psychosocial Oncology Program, the Cancer Survivorship Program, and extensive clinical and laboratory research programs. Our patients travel from across the region and across the world for consultation and treatment. Inpatient clinical activities of the Division take place at CHOP, which is located adjacent to the Hospital of the University of Pennsylvania (HUP) on the University of Pennsylvania campus. The Oncology Unit consists of 50 dedicated beds, including a 15-bed stem cell transplant unit. Outpatient activities of the Division occur at CHOP and at the CHOP campuses in King of Prussia, PA, Voorhees, NJ, and Princeton, NJ.

The Center for Childhood Cancer Research (CCCR)

In 2007, the CHOP Research Institute launched a bold initiative aimed at curing more patients with childhood cancer by using more precise, less toxic therapies. The CCCR is a Center of Emphasis at the Research Institute and represents a highly integrated basic, translational, and clinical research environment dedicated to eradicating the pain and suffering caused by cancer in children. This goal is realized by bringing together the diverse talents of investigators in the Hospital's renowned multidisciplinary program in pediatric cancer research, patient care and genomics. The Center's organization supports an environment where basic scientists interact with master clinicians around the central theme of improving cure rates through translational research initiatives. Recruitment of leading talent in areas facilitates this progress, spanning the laboratory and clinical research ends of the spectrum, enabling the Center's mission. Key to the Center's success is translating the latest scientific findings obtained from cutting-edge basic research into innovative clinical trials designed to dramatically improve the cure rates for pediatric cancers while simultaneously eliminating long-term side effects.